



Value for Money Assessment

Review of approaches and key concepts

March 2015



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Context of this Report and Acknowledgements

This report is part of EPEC's work on 'PPP Investment Planning, Programming, Project Selection and Preparation' and responds to EPEC members' requests with regard to mapping approaches to Value for Money (VfM) assessments.

This report has been developed by EPEC in close co-operation with Rebel, a consultancy company with expertise in PPPs and VfM assessment. EPEC is grateful for the assistance provided by members in the compilation of this report. Particular thanks are also due to Frederic Marty (CNRS Fellow Research Group on Law, Economics and Management, Nice Sophia Antipolis University), Joe Flanagan (Director of Investment Policy & Appraisal Group, NHS Wales and Welsh Government) and Joseph Lowe (Head of Economics Branch, HM Treasury), all of whose long experience and views on the topic proved invaluable.

As VfM assessment methodologies are in constant development, the findings presented here are inevitably subject to change.

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ANNEX - Rebel report on risk, discount rates and non-valued effects in VfM assessment

1. Introduction

1.1. Background to the report

In many countries Value for Money (VfM) assessment is used by public authorities as a decision-making tool in the context of public investment. These decisions are diverse and may involve, for example, the choice of which new project to initiate, the selection of the best technical solution for a particular project, the identification of the best delivery option or even the choice among PPP bids for a particular project. This report focuses in particular on the use of VfM assessment to guide and support decisions on whether to deliver a public infrastructure project through a Public-Private Partnership (PPP) or through other public procurement means.

In this context, the overall approaches and objectives of VfM assessment are broadly the same in various countries: comparing the costs and benefits of project delivery options in a structured manner in order to identify the best option. However, there is no unique approach to VfM assessment, as its precise objectives, and therefore related methodologies, reflect government policies and different administrative processes. These differences are not always easily identifiable. Also, there are ongoing debates on some of the methodological approaches relevant to carrying out VfM assessments.

In order to understand the main differences in the approach to VfM assessment, it is helpful to understand the reasons that lie behind these differences and the precise objectives of the particular VfM assessment. Understanding the purpose for which a tool is used helps to ensure that it is used in the right way.

1.2. Relevance of the report

VfM assessment is central to decision-making in PPPs in many countries. Comparing methodologies and approaches used for VfM assessment is therefore of interest for a number of reasons:

- different approaches to VfM assessment have now been developed in a range of countries and in some countries for over twenty years. These have also been periodically revised and enriched, providing a growing body of available methodologies;
- a significant number of VfM assessments using these approaches have now been undertaken on projects, providing valuable feedback based on experience; and
- public authorities continue to seek ways to introduce or improve their approaches to VfM assessment and are therefore interested in understanding existing approaches and lessons learnt from their application.

It is therefore useful to describe the main elements of existing approaches and their context in a selected number of countries as well as to explain some of the key concepts that lie behind VfM assessment.

1.3. Target audience

This report is mainly addressed to:

- PPP policy-makers, for example those in PPP Units; and
- public sector PPP practitioners, such as procuring authorities.

In countries with established PPP markets and a track record in VfM assessment, the information contained in this report may be useful when undertaking comparisons and reviewing their own VfM policies and guidance.

In countries with less experience in VfM assessment, this report may contribute to the development of VfM policies and guidance. In particular, it may assist in understanding the methodological options for key components of VfM assessment that are discussed in this report.

1.4. Content

The report is structured as follows:

- Section 2 highlights some of the main concepts around VfM assessment and provides an overview of the context in which VfM assessment takes place;
- Section 3 contains overviews of the VfM guidance available in France, Germany, the Netherlands and the UK¹ together with references to the main sources of guidance in each of these jurisdictions. While approaches are also well developed in a number of other EPEC member countries, EPEC considers that this selection broadly represents the range of approaches across most EPEC members;
- the Annex is a report prepared by Rebel, providing a detailed analysis and comparison of three central areas of VfM assessment, and is structured as follows:
 - risk analysis – including the tools used to identify, allocate and value risks (Chapter 1 of the Annex); and
 - selecting the discount rate – specifically the choice of a discount rate to calculate the Net Present Value (NPV) of the total costs incurred by a procuring authority for each procurement option at different stages of the project cycle (Chapter 2 of the Annex);

¹ Observations for the UK are based on national policy and, where relevant, where it applies to England.

- non-valued effects (i.e. those effects that could be included when comparing options under the VfM assessment but which are not given a monetary value) including guidance, practices and their importance in VfM assessment (Chapter 3 of the Annex).

The three key topics of risk, discount rate and non-valued effects feature strongly in most approaches to VfM assessment but are treated in different ways. These topics are therefore described, discussed and analysed both from a theoretical perspective ('what does the relevant PPP guidance prescribe?') and from a practical perspective ('what are the challenges and issues in practice?').

In addition to the countries covered in section 3 of the report, the analysis in the Annex also makes reference to VfM approaches from Australia², Belgium³, Canada⁴ and New Zealand.

² Observations for Australia are based on findings that are related to national policy and specifically the State of Victoria.

³ Observations for Belgium are based on findings that are specifically related to Flanders.

⁴ Observations for Canada are based in findings that are related to national policy and specifically the Province of Alberta.

2. Background to VfM assessment

The definition of key terms used in VfM assessment can vary among different policies and methodologies. To help overcome this difficulty, and to build a clear basis of understanding, this section starts by providing some common definitions to the key concepts used throughout the report.

2.1. Initial concepts and definitions

For the purposes of this report, **PPPs**⁵ refer to those arrangements between the public and private sector designed to deliver public infrastructure projects and their related services that have traditionally been financed and delivered by the public sector.⁶ PPPs are typically undertaken as long-term contracts in which the public sector makes a performance-based payment to the private sector for the provision of a service (e.g. for the availability of a road) and/or the private sector obtains a temporary right to generate revenues from the provision of the public service (e.g. a toll from road users). Such arrangements further specify that both the public and private sector each bear certain project risks (and/or share them) underpinned by the application of often significant levels of long-term private financing.⁷

The **conventional procurement option** for the purposes of this report involves the delivery of a project by a public (or publicly-owned) entity. This implies that the public entity is responsible for, and bears most of the risks associated with, the integration and optimisation (but not necessarily implementation) of the various project activities (such as design, contracting, financing, construction, maintenance or monitoring). The conventional procurement option may also be referred to in VfM assessment guidelines by different terms, for example 'the public sector comparator', 'the traditional procurement option', 'the classical option' or 'the non-PPP option'.

VfM seeks to capture the relationship between cost and value. The cost element usually represents the cost over the life time of the project⁸ to deliver the associated value, including the costs of managing the associated risks in doing so. Value comprises the quality and quantity of service or performance level over the same period.

⁵ This summary description of a PPP is not a uniform one for all jurisdictions under review in this report. It captures, however, most of the common features of PPPs, as defined in different guidance for VfM assessment. It reflects the most common, though not exclusive, focus of VfM assessment on a comparison of project procurement options. The term PPP is also often used more broadly to include, for example, various forms of joint venture between the public and private sectors.

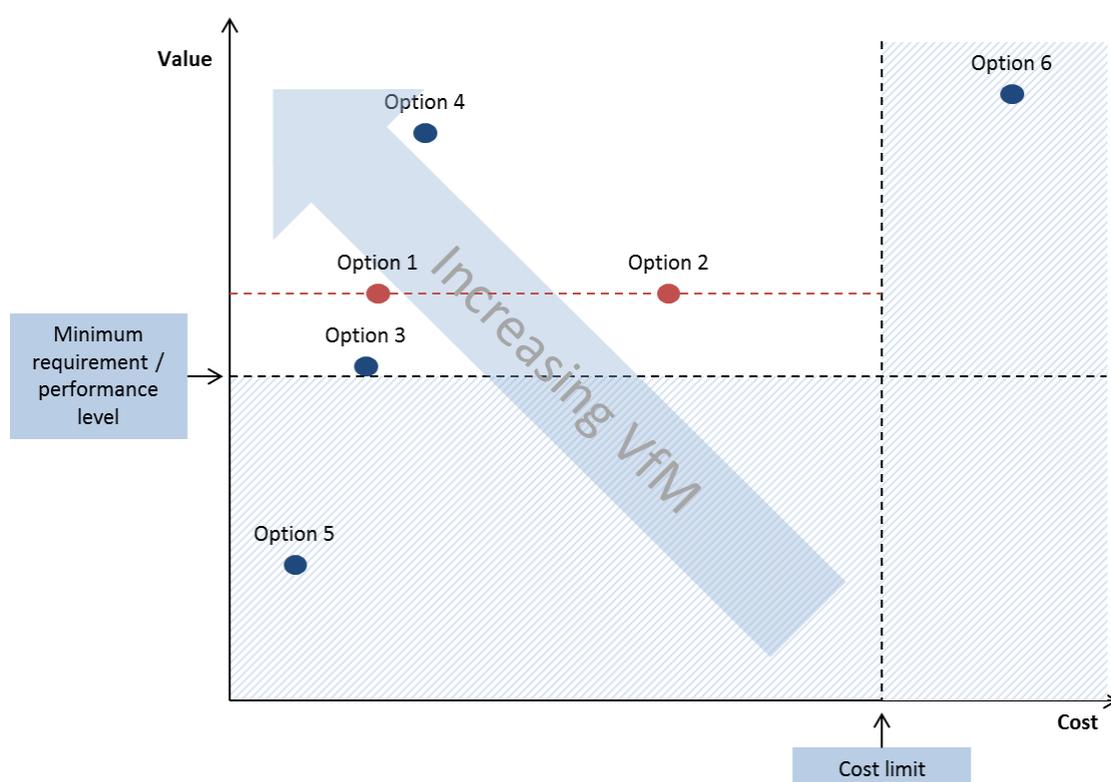
⁶ See also Paul Grout, 'Value for Money measurement in public-private partnerships', in: EIB Papers, Volume 10, no 2, 2005, available at: www.eib.org/attachments/efs/eibpapers/eibpapers_2005_v10_n02_en.pdf

⁷ See 'The Guide to Guidance, How to Prepare, Procure and Deliver PPP Projects', EPEC, July 2011, available at: www.eib.org/epec/resources/guide-to-guidance-en.pdf or the EPEC PPP Guide, available at: www.eib.org/epec/g2g/i-project-identification/12/124/index.htm

⁸ Often referred to as 'whole-life costs'.

The relationship between value and cost can be presented conceptually in the form of Figure 1, where different options represent different combinations of performance and cost. Options 1 and 2 could typically represent the assessment of different procurement options: in assessing these options, it is usual for them to be compared on the basis of the delivery of the same performance levels.⁹ In this case, for the same performance level, option 1 can be expected to represent better VfM (lower cost for a comparable level of performance) and therefore this is the procurement option to choose. This broadly and conceptually describes the quantitative part of a VfM assessment.

Figure 1 - a conceptual illustration of VfM



While the focus of this report is primarily on the procurement decision, the relation between value and cost can in theory apply to other areas for decision-making for a procuring authority (“Authority”). As noted in the Introduction, these could include: (i) a new project to initiate, (ii) the selection of the best technical solution for a particular project, or (iii) the choice among PPP bids for a particular project.

For example, if the various options in Figure 1, represented different bids, Option 3 is the least expensive of all the acceptable options but the lower performance level associated with this option suggests that the VfM of this option is expected to be worse than options 1 and 4. This illustrates an important feature of VfM, in that the cheapest option may not necessarily be the best option.

⁹ There may also be intrinsic benefits (such as earlier service delivery) for one of the options (but not the other) that may also need to be taken into account.

Option 4 illustrates another important feature of VfM in the sense that it captures the proportionality between value and cost. Thus option 4, with a different performance level and cost to option 1 may still represent a similar level of VfM to option 1 (it is more expensive but its performance levels are also higher) – in this case the Authority will need to take into consideration issues such as any benefits that might not be captured already and optimum/maximum required levels of performance when deciding between these two options.

VfM is a relative concept: knowing the VfM of a particular option in itself is not necessarily useful. The VfM concept takes its full meaning when used to compare options. Therefore, VfM is usually used in the context of comparing one option relative to another. An Authority will usually have identified a minimum requirement or performance level for a project. Therefore an option that falls below this level (option 5 in Figure 1) would not be considered as it does not meet minimum performance requirements (even though it is the least expensive of all the options).

Equally, an Authority will usually have a budgetary limit to the amount that it can afford to spend over the life of a project and the services it delivers. An option (option 6 in Figure) that requires a level of expenditure above this limit may not therefore be available for consideration, however attractive it might be in terms of performance. It is deemed not to be 'affordable'. This also illustrates the important difference between assessing the VfM of an option and assessing its affordability, both of which are important but different considerations in identifying and choosing options.

As this report focuses primarily on the procurement option decision, **VfM assessment** is defined here as the structured comparison between a conventional procurement and a PPP option that is carried out by an Authority in accordance with a defined methodology.

2.2. Context for VfM assessment

The role of the VfM assessment differs between countries. In some countries (for example France, the UK and Australia) VfM assessment forms an integral part of the project development process with VfM being assessed regularly as the PPP option is developed and designed. In other countries (for example Belgium (Flanders) and the Netherlands) the PPP option is usually developed independently of the VfM assessment process itself.

Similarly, the various methods and practices demonstrate significant differences in the requirement to use prescribed VfM assessment methodologies, how the VfM assessment contributes to decision-making and the timing/frequency and scope of the VfM assessment.

When describing, analysing and seeking to understand VfM assessment in different jurisdictions it is therefore important to identify the different country-specific contexts and processes that drive the assessment.

Use of VfM assessment in the PPP decision-making process

Choosing or rejecting the PPP option is often a decision that takes place within a wider political context and this differs across countries. A VfM assessment is typically not the only step in the decision-making process.

The *criteria applied* in the VfM assessment are usually a mix of quantitative and qualitative criteria. But this mix varies: in some countries it involves a financial or economic comparison assessed on a predominantly, though not exclusively, quantitative basis (as for example in France, Germany and the Netherlands). In other countries, the scope is a broader mix of quantitative and qualitative criteria (as in the UK, for example).

The *requirement to use* VfM assessment differs between countries. In some countries, a VfM assessment is mandatory by law in order for a PPP scheme to be undertaken (for example the *évaluation préalable* - Preliminary Assessment - in France). In others, a VfM assessment is carried out on a more voluntary basis (e.g. in the Netherlands where no formal obligation for VfM assessment exists).

The *contribution to the decision-making process* also differs. In some countries (for example in the UK), the VfM assessment effectively works as a gateway, meaning that a negative outcome of the VfM assessment is highly unlikely to lead to project delivery in a PPP structure. In other countries, for example in Belgium (Flanders), the VfM assessment plays a less decisive role, in the sense that other inputs (i.e. not captured in the structured VfM methodology itself) may influence the final decision on applying the PPP option or the conventional procurement option.

The *drivers behind the use* of VfM assessment may vary across countries. In broad (over-simplified) terms, VfM assessment will usually involve one or a combination of the following:¹⁰

- as an *'eye-opener'* or *'awareness-raiser'*: in some countries and sectors, particularly where PPPs are new and where there is political or social opposition, the VfM assessment may be used as a means by which PPPs may be justified on an objective basis and introduced as a competing approach to the conventional procurement option. This can help to ensure that a PPP option 'gets an equal chance' for consideration;
- as a *'gate-keeper'*: in other countries and sectors, the use of PPPs as a valuable tool to implement public projects may be less polemical. However, assuming VfM is a core policy objective, it is then important to demonstrate that the selected option is expected to deliver the best VfM, especially if other drivers (such as balance sheet treatment) may also push for the application of PPPs;
- as a *'negotiation tool'*: on top of supporting the decision to launch the project as a PPP, VfM assessment is sometimes used for interacting with the market.

¹⁰ Multiple drivers may apply in the same country.

In this role, the VfM assessment is used during the procurement stage as a hard-edged negotiation tool in the interaction with PPP bidders. Under this approach, the winning bid in a procurement process should 'beat' the conventional procurement option (which may be updated to reflect revised requirements or market conditions) as a result of the bidding process; and/or

- similar to a negotiation tool, as a *'bid sanity check'* where the winning bids are compared with the conventionally procured option that was developed during the earlier stage of deciding on the procurement route to take. Under this approach, the question at stake will be whether the bids received are in line with what was originally expected, and if not, why not.

When is VfM assessed?

VfM assessments are carried out at various stages during project preparation and implementation. Most countries carry out the analysis at least during the preparation or procurement stages.

The timing and frequency of VfM assessment in the project life cycle differs. In some countries (for example in France), the particular emphasis is put on VfM assessment during the project preparation stage. In other countries (particularly in the UK) VfM assessment is part of a continuous process throughout the project life cycle. In this case, the assessment is used to help make decisions at different stages during the preparation of the project and at various approval stages in the project cycle.

During the *preparation stage*, VfM assessment is based on the comparison between the assumed conventional procurement option and the assumed PPP option. The results of the VfM assessment typically feed the decision of which delivery route will be taken. The drivers of VfM assessment at this stage are the above-mentioned 'eye-opener' and 'gate-keeper' objectives. Typically, the VfM assessment at the preparation stage consists of two theoretical cases, since at this stage private sector bids are of course not available.

During the *procurement stage*, VfM assessment can be used to assess and compare different private sector bids and/or compare these with the assumed conventional procurement option. In this case, the driver of the VfM assessment is the above mentioned 'negotiation tool' objective.

In some countries, the VfM assessment at the procurement stage (for example the 'Stage 3 assessment' in the UK) has a strong focus on the quality of competition. The assumption is that the quality and extent of competition is itself a relevant indicator that VfM is being achieved. Thus, if the procurement process is conducted well and there is a strong competitive process, this process will drive the best deal and hence deliver VfM for the Authority.

Outside of the main project preparation and procurement stages:

- some countries have developed a qualitative *quick scan VfM assessment*, which may be carried out at an early stage prior to the detailed more comprehensive VfM assessment at the project preparation stage. This may

focus simply on assessing the potential availability of the PPP option. This is the case for France, Germany, the Netherlands and the UK; and

- during and/or after the implementation of the project, various types of *ex-post assessments* are sometimes used to assess the actual VfM of the project, in order to check whether the expected advantages from PPP procurement have materialised. In most cases, the *ex-post* assessment takes the form of an ‘*ex-durante*’ assessment, since the project will usually still be in its operating phase. These assessments are typically performance audits, often carried out by national audit offices. They will therefore look at the processes that were carried out to ensure that the best possible VfM was achieved. In some cases, the *ex-post* assessment can take the form of an evaluation of a package of PPP projects. The objective of these assessments is to provide feedback and lessons learnt for future PPP programmes and projects.¹¹

Focus and perspective of VfM assessment

The focus of VfM assessment varies across countries. In some cases, the benefit of greater *certainty of cost and delivery time* of the project^{12,13} may be considered important. Accordingly, the costs associated with the PPP option, when compared with the conventional procurement option, may be considered as similar to an ‘insurance premium’ paid to the private sector against the uncertainty of future cost and time of the delivery of the project. Consequently, the VfM assessment focuses on the question of whether the specific costs of a PPP option¹⁴ are at least compensated by the additional benefits, predominantly those of protection against future potential cost increases of a conventional procurement option.

In other countries, the focus may be more on assumed or demonstrated *efficiency gains* on constructing and/or operating the project by the private sector, which may include more efficient management of risks (e.g. arising from the integration of project design, construction and operation tasks). Thus, the emphasis is more on efficiency differences between the PPP and conventional procurement options. Therefore the core comparison is whether the additional transaction costs are compensated by life cycle cost optimisation and/or technical processes (e.g. due to innovation) that deliver higher performance.

In countries such as France, Germany and the UK, both of these factors are taken into consideration. In some countries such as Belgium (Flanders) and the Netherlands, the ‘insurance’ benefit is considered of somewhat less importance

¹¹ With regard to *ex-post* assessment of PPPs, EPEC is currently working on a paper reviewing various approaches and experiences.

¹² See B. Flyvbjerg, N. Bruzelius, W. Rothengatter, ‘Megaprojects and Risk: An Anatomy of Ambition’, Cambridge University Press, 2003.

¹³ See F. Marty, S. Trosa, A. Voisin, ‘Les partenariats public-privé’, Repère-La Découverte, 2006.

¹⁴ Such as transaction costs, additional financing costs, but also costs arising from specific risks induced by long-term contracting including moral hazard issues and unavoidable contract renegotiations in a context of a bilateral monopoly.

compared to the 'efficiency gain' effect. However, these differences are generally ones of degree and emphasis rather than being absolute.¹⁵

There are also differences regarding the perspective from which the VfM assessment is made:

- In France and Germany, the comparison is carried out mainly from an Authority's perspective and therefore focuses on the financial comparison between the delivery options¹⁶ and the impact on the specific Authority's budget (this may be termed a 'micro-economic' perspective); and
- In Belgium (Flanders), the Netherlands and the UK, the focus is on the socio-economic value of public spending from a 'macro' perspective. Thus, rather than the more specific perspective of the individual Authority, the approach is assumed as being the one from a wider tax-payer perspective.

These differences can have important implications when it comes to deciding which discount rate to use – one that reflects specific funding costs for the Authority or one that reflects the time preferences for spending public money (and whether the determination such time preference is based on economic or financial assumptions). This is explored further below and in Chapter 2 of the Annex.

For all countries, it is important to note that the VfM comparison of PPP and conventionally procured project options is generally carried out as a separate and subsequent exercise to that which involves assessing different public investment options themselves. Nevertheless, potential ways of partnering with the private sector may still form part of the earlier investment option analysis.

2.3. Risk analysis, choice of discount rates and non-valued effects

A number of key questions arise in assessing the VfM for different procurement options, including:

- Given that different options are likely to involve different risk profiles, how should these be analysed?
- What discount rate should be used to compare the different expenditure profiles of each option for the Authority?
- How should the non-monetary effects of options be assessed?

These three areas of analysis are introduced briefly in this section. However, given their importance and complexity, an extensive review of the topics related to these three questions is provided in the Annex.

¹⁵ Arguably, they are also linked in that the best VfM option is one that is expected to manage risks (of costs and time) most efficiently and effectively.

¹⁶ The financial flows used in France contain some socio-economic elements. This is particularly the case of benefits as a result of earlier delivery of the facility and service commencement of a particular option.

Risk

Each procurement option is likely to present a different risk profile and associated cost. The analysis of risk in VfM assessment therefore usually involves a process to identify and evaluate the risks associated with each option. Identifying risks can involve various approaches such as the use of checklists and standard documents often based on experience from previous projects. Equally, valuing risks can range from a high-level qualitative analysis of prioritised risks (usually conducted at the early stages of VfM assessment) through to detailed and complex quantitative approaches, for example using probability distributions. Risk can be reflected in the options either through adjustments to the cashflows of a particular option or through adjustment to the rate used to discount the cashflows. A combination of these approaches is sometimes used, depending on the risk, but it is important to avoid double counting. Risks may often be analysed in categories to avoid overestimation that can result from analysing individual risks that are correlated.

In some countries, evidence-based adjustments may be applied to the project cost assumptions at various stages of the VfM assessment to reflect the tendency in the public sector to underestimate future costs and capture the effect of unknown uncertainties. An example is the use of 'optimism bias' factors in the UK. This approach is complemented by more detailed project-based analysis of risks as the project moves through the development cycle.

Identifying and evaluating risks is also used to help determine how risks are allocated between the public and private sector when developing the PPP option. The assumption is that better VfM results from allocating a risk to the party best able to manage it for the least cost. The VfM assessment in a number of countries can therefore play an important role in helping to guide the design, in terms of risk allocation, of the PPP option itself.

An important issue for risk analysis is the availability of the appropriate level and quality of data for the analysis. Risk analysis can be highly complex. It is therefore fundamental to ensure that the analysis is both internally consistent and is proportionate to the size and nature of the project involved.

Chapter 1 of the Annex describes the various approaches to risk analysis in the VfM assessment in greater detail.

Discount rates

Each procurement option will have different expenditure profiles over time: an option that involves payments for the Authority later in time than one where the payments are required sooner will have a different overall cost in today's value. In the various quantitative VfM assessment methodologies discounting plays an important role. It is used to put the cost profiles of different options on a comparable basis and may also be used to reflect risk.

The discount rate used differs between VfM assessment approaches. This is also subject to considerable academic debate. An important driver to the choice of a discount rate is whether the VfM assessment is fundamentally based on a socio-economic perspective (as for example in Australia, Belgium, the Netherlands and the

UK) or whether it is based on the narrower financial perspective of the Authority (as for example in France). In the case of the financial perspective, the discount rate reflects the cost of borrowing for the Authority for the period of finance required by the PPP option. If a socio-economic perspective is taken, then the rate may either be based on the private cost of capital for the project including a risk premium to reflect comparable project risks (to the extent that such risks are not otherwise reflected in adjustments to the cashflow figures for the project) using market assumptions or the discount rate may be based on economically-derived assumptions established from time to time by government (e.g. the social time preference rate established by HM Treasury in the UK). In most cases the same discount rate is applied to the cashflows of the conventional procurement and PPP options.

There is therefore a variety of different approaches used to determine the discount rate in the various VfM assessment methodologies. These depend mainly on assumptions about the perspective of the assessment, the way risks are reflected and the approach to whether or not market-based rates can be used as an accurate basis to reflect relevant risks and time preference. Chapter 2 of the Annex explains and compares these various approaches in greater detail.

Non-valued effects

Not all the benefits of a particular option can be captured in monetary terms. There is usually a need to include non-valued effects in the comparison between options. Non-valued effects may be both quantitative but not valued (in monetary terms) or they may be quality effects which are not expressed in terms of quantity (such as flexibility or the quality of competition). In some cases, non-financial benefits of a specific option, such as the economic benefits of earlier service delivery of a particular procurement option, may be taken into account in comparing options.¹⁷

The various approaches to assessing non-valued effects differ significantly in terms of their emphasis, timing and nature. Within a particular VfM assessment methodology, different qualitative assessment criteria are also used at different points in the project development cycle. Qualitative criteria often play the dominant role in the early phases of the VfM assessment, and in some cases, the later phases as well (such as the procurement phase, as in the UK). Apart from ensuring that the relevant non-valued effects are captured and that a more 'rounded' assessment is carried out, there may be limitations to the quantitative assessment, such as the availability and reliability of the underlying data required. In some countries (e.g. Scotland), the VfM assessment is now almost exclusively based on qualitative criteria.

Checklists of qualitative criteria are usually used in VfM assessment guidelines. In most cases, it is left to the Authority to decide how to weigh the assessment criteria and combine the result with the qualitative analysis to achieve an overall assessment of VfM.

¹⁷ See 'The Non-Financial Benefits of PPPs', EPEC, June 2011, available at: www.eib.org/epec/members/documents/epec-non-financial-benefits-of-ppps.pdf

Chapter 3 of the Annex describes the various approaches to qualitative assessment in more detail.

2.4. Limitations to VfM assessment and consequent developments

VfM assessment helps to enable decisions to be made in a consistent, methodological and transparent way. However, the implementation of approaches can present significant challenges.

As mentioned above, one of the most significant challenges can be the availability and reliability of the data required to perform the assessment, especially for the qualitative aspects. This is compounded by the fact that VfM assessment, if it is to inform decisions about future actions, necessarily involves having to make assumptions about future costs and benefits. Criticism has thus been levelled at VfM assessments that do not make enough use of relevant and up to date information and evidence.

VfM assessments have also been criticised as subject to manipulation to post-justify a decision that may already have been taken, especially when other factors such as balance sheet treatment are driving the choice of a particular option.

In response to these challenges, VfM guidance and practice has evolved in many countries to help match the tools used to the information available and to ensure that the analysis is both more proportionate and balanced. This has often led to the VfM assessment being based on a wider set of criteria (usually qualitative) than a more narrowly defined quantitative analysis. In some cases the quantitative analysis now plays a much smaller role than previously. At the same time, even if the assessment methodology is robust, it also needs to be part of a clear and effective decision-making process. Thus, VfM assessment guidelines have often been accompanied by the development of wider project quality control and approval processes in a number of countries.

In many countries, the importance of a strong competitive process has also been recognised to demonstrate and ensure VfM. Hence the assessment of competition in preparation for and during procurement is often a core part of the VfM assessment. This in turn has significant implications for how projects are prepared for the market and the capacity of the public sector to do this well. Demonstrating VfM is therefore not a separate theoretical exercise, but a closely integrated element of the PPP development process, the subsequent management of the contract and the *ex-post* assessment of the project.

2.5. Conclusion

It is sometimes commented that VfM assessment is 'more an art than a science'. This recognises the complexities and limitations of the process while at the same time

highlighting that sound judgement is often needed at the core of the process. Nevertheless, the need remains for tools to help ensure that decisions are taken in a disciplined, rational and consistent way and reflect the agreed policy. It is likely that approaches to VfM assessment will continue to evolve alongside the underpinning policies, methodologies and approaches to implementation.

3. Overview of VfM assessment guidance

This section provides a short description of available guidance on VfM assessment for selected European countries (France, Germany, the Netherlands and the UK) together with references of the main source material.

For each country, the aspects covered by VfM assessment guidance are presented in the following format:

- links to on-line resources and other printed documentation;
- scope of the exercise;
- timing in relation to the project cycle;
- main elements of the methodology, covering qualitative and quantitative components of the analysis; and
- information on institutional responsibilities in the process.

3.1. France

Sources

Methodological guide for PPPs

www.economie.gouv.fr/files/directions_services/ppp/GuideContratPartenariat.pdf

Template for the Preliminary Assessment

www.economie.gouv.fr/files/directions_services/ppp/plan_type_evaluation_preable.pdf

Excel-based template for financial information, required for the quantitative part of the Preliminary Assessment

www.economie.gouv.fr/files/directions_services/ppp/annexe_plan_type_evaluation_preable.xls

An example of a financial model for the quantitative part of the Preliminary Assessment

www.economie.gouv.fr/files/files/directions_services/ppp/SimulateurV4.zip

Reference guide for a financial model for the Preliminary Assessment

www.economie.gouv.fr/files/directions_services/ppp/guide_utilisation_modele_financier_evaluation_preable_v2.pdf

A risk matrix example

www.economie.gouv.fr/files/files/directions_services/ppp/ParametrageRisquesV3.xls

Scope

In France, VfM assessment forms the main part of the *évaluation préalable* (Preliminary Assessment). This assessment is mandatory by law: an Authority that contemplates procuring a project as a *contrat de partenariat*¹⁸ must carry out an *ex-ante* Preliminary Assessment that underpins the justification for the PPP approach, comparing the PPP with other procurement options available (e.g. traditional public procurement, user-pay concession).¹⁹ This comparison seeks to capture, from the Authority's perspective, both quantitative and qualitative aspects of cost and performance for the options being compared. It is also worth stressing that the Preliminary Assessment does not aim to assess whether or not public sector budgetary resources are available for a project. This is a separate exercise.

Factors other than (or combined with) the assessed VfM in the Preliminary Assessment can also be invoked to justify the choice of the PPP option:

- the complexity of the project (in terms of financial, technical, legal or organisational structure) which may make it impossible for the Authority itself to define the best solution to meet its needs; or
- reasons of urgency where the PPP option is expected to address an urgent infrastructure requirement better than other options.

Timing

Given its focus on assessing VfM, the Preliminary Assessment is only carried out once the socio-economic appraisal of the project has confirmed a need for the investment and the key project requirements have been defined. The Preliminary Assessment precedes the launching of the PPP procurement procedure. The Preliminary Assessment is then required to be kept up-to-date throughout the project preparation and procurement phases as it will be used to help prepare for and negotiate the PPP contract.²⁰

¹⁸ The Preliminary Assessment is not required for all types of PPP. Only *contrats de partenariat* (authority-pay PPPs) are subject to this methodology. For more details on the Preliminary Assessment see MAPPP's template for the preliminary assessment dated February 2011, available at:

www.economie.gouv.fr/files/directions_services/ppp/plan_type_evaluation_prealable.pdf

¹⁹ See MAPPP's methodological guide of March 2011, page 24 '*L'analyse comparative demandée à ce stade doit faire apparaître les divers schémas juridiques retenus (marché public, gestion en régie, délégation de service public, bail emphytéotique administratif, concession de travaux publics, concession d'aménagement, contrat de partenariat*'; available at:

www.economie.gouv.fr/files/directions_services/ppp/GuideContratPartenariat.pdf

²⁰ See MAPPP's methodological guide, page 27: '*Autant qu'une aide à la décision d'engager la procédure, elle doit être le moyen privilégié de bien préparer et d'encadrer le dialogue compétitif en identifiant les leviers de création de valeur liés au recours au contrat de partenariat pour la personne publique. A ce titre, elle doit constituer un guide de référence qu'il conviendra d'actualiser au fur et à mesure de son déroulement.*'

Methodology

The VfM assessment predominantly involves quantitative analysis. However, the exercise also includes some qualitative analysis particularly with respect to assessing service performance or sustainable development issues.²¹

Quantitative analysis

This part of the VfM assessment relies on a comparison of the whole-life costs of the different procurement options for a given project.²² The net costs of the various procurement options are assessed and compared from an Authority's point of view.

The guidance involves two broad steps in the analysis.²³

First, the cashflows for each option are estimated. The main cost and revenue items taken into account are:

- design and construction costs (including a contingency margin where appropriate);
- operating and maintenance costs;
- taxes (including VAT);
- financing costs;
- project management and monitoring costs for the Authority;
- revenues from the asset (if any); and
- public subsidies (if any).

For the PPP option, the guidelines indicate that estimated costs can be adjusted in two ways:

- by applying an efficiency ratio to reflect any expected cost savings (in comparison to the conventional procurement option) achieved by involving the private sector (e.g. ability to negotiate lower supply costs, synergies with other activities). The use and level of such a ratio must be justified on a case by case basis; and
- by taking into account the monetised benefits (if any) derived from the accelerated delivery of assets/services as a result of the PPP option.²⁴

²¹ See MAPPP's methodological guide, page 14: '*Bien entendu, comme antérieurement, il conviendra de compléter ce calcul économique plus fin, par des arguments à caractère qualitatif, qu'il s'agisse de développement durable ou de la nécessité de respecter des contraintes de délai (par exemple, gagner une ou deux rentrées scolaires pour un collège à construire)*' and page 23 '*Enfin, l'analyse comparative ne doit pas être circonscrite au seul domaine des coûts, aussi important soit-il pour la décision. Elle doit aussi porter au minimum sur la performance et le partage des risques et les motifs sur lesquels la personne publique pourra s'appuyer pour justifier un recours à un contrat de partenariat ne sont pas limités à la sphère économique et financière mais peuvent être aussi de caractère juridique, administratif, ou se rapporter au concept de développement durable.*

²² Detailed financial requirements for the Preliminary Assessment are explained in an Excel-based project example from MAPPP, available at: www.economie.gouv.fr/files/files/directions_services/ppp/SimulateurV4.zip

²³ Template for the Preliminary Assessment, MAPPP, February 2011.

²⁴ See box 2 of 'The Non-Financial Benefits of PPPs – An Overview of Concepts and Methodology', EPEC, June 2011, available at: www.eib.org/epec/resources/epec-non-financial-benefits-of-ppps-public.pdf

Second, an analysis of the project risks is carried out, with a view to adjusting the cashflows mentioned in the first step by taking into account the estimated costs of the risks for the Authority. The guidance underlines that this step is at the core of VfM assessment considering that (i) risks can often fail to be identified within the conventional procurement option which can make this option appear initially less risky and therefore less expensive and (ii) a smart allocation of risks between the public and private parties (i.e. to the party best able to assess and manage them) can create additional value.²⁵

According to the guidance, valuation of risks must be performed by estimating the probability and impact (e.g. potential cost overruns) of each of the main risks. Two risk valuation methods can be used depending on the size of the project:

- a simplified method for small projects (construction costs of up to EUR 50 million), which uses discrete probability distributions of risks and enables the calculation of the average financial impact of the key risks; and
- a more sophisticated method for larger projects, which relies on Monte Carlo simulations and continuous probability distributions of risks. The 'value-at-risk' (VaR) is then assessed. VaR is a methodology that seeks to identify the maximum potential financial impact of risks for a given probability level of confidence (often referred to as 'risk averseness') required by the particular Authority.²⁶ This is described in more detail in Chapter 1.3.2 of the Annex.

The robustness of the analysis is further tested through:

- a sensitivity analysis, measuring the impact for the Authority of changes in costs or revenues of the project; and
- a 'break-even' analysis, which identifies the difference between the lowest cost procurement option and the alternative more expensive options.

The discount rate used to calculate the present value of cashflows for the various procurement options corresponds to the Authority's own borrowing rate for loans with a maturity equal to the expected PPP project contract duration. This rate reflects the marginal cost of funding of the Authority itself.

Qualitative analysis

The qualitative part of the methodology consists of identifying and assessing non-valued factors which should also inform the procurement option decision (e.g. earlier availability of the service, improved service quality, higher environmental performance).

The quantitative and qualitative assessments are brought together in an overall report that compares the VfM of the various procurement options available and identifies the procurement option that is expected to offer the highest VfM for the Authority.

²⁵ See MAPP's template for the identification and evaluation of project risks available at: www.economie.gouv.fr/files/files/directions_services/ppp/ParametrageRisquesV3.xls

²⁶ See MAPP's methodological guide, March 2011, available at: www.economie.gouv.fr/files/directions_services/ppp/GuideContratPartenariat.pdf

Institutional responsibilities

Any Authority planning to implement a project as an authority-pay PPP (i.e. as a *contrat de partenariat*) is required to undertake a Preliminary Assessment in line with the prescribed methodology.

MAPPP reviews and validates the Preliminary Assessments. However, regional and local authorities that seek to implement PPP projects are not currently obliged to submit their Preliminary Assessments to MAPPP. In practice however, many of them do so on a voluntary basis.²⁷

²⁷ For details on PPP institutional arrangements in France, see 'France - PPP Units and Related Institutional Framework', EPEC, May 2012, available at: www.eib.org/epec/resources/epec_france_public_en.pdf

3.2. Germany

Sources

Manuals for viability studies of PPP projects

PPP Manual – Guidebook for Public-Private Partnerships/PPP-Handbuch – Leitfaden für Öffentlich-Private Partnerschaften, Bundesministerium für Verkehr, Bau und Stadtentwicklung (BMVBS), Deutscher Sparkassen- und Giroverband (DSGV), Berlin, September 2009

www.ppp.nrw.de/englische_version/ppp_manuals/viability_studies_of_ppp_project.pdf

Methodology for viability studies of PPP projects in federal roads

www.bmvi.de/SharedDocs/DE/Artikel/StB/oepp-wirtschaftlichkeitsuntersuchung-methodik.html?nn=36122

Manual for viability studies of PPP projects in public buildings

www.fib-bund.de/Inhalt/Leitfaden/Wirtschaftlichkeit/2014-08_LFWU_Hochbau_3-Auflage_BMUB_2014.pdf

Sources of data for viability studies of PPP projects in public buildings

www.fib-bund.de/Inhalt/Leitfaden/Wirtschaftlichkeit/2014-05_Datenquellen_WU_Hochbau_barrierefrei.pdf

Standard model for viability studies for PPP projects in public buildings

<http://www.partnerschaften-deutschland.de/grundlagenarbeit/standardisierung/wu-rechenmodell-20/>

Scope

In Germany, VfM²⁸ is determined through a quantitative assessment of the estimated whole-life costs of different procurement options for a given project. In addition, an assessment of certain qualitative elements is undertaken during the preliminary project identification phase.

Timing

VfM assessment is primarily undertaken at three phases of a project development, during.²⁹

²⁸ This section describes the general VfM assessment process based on national guidance. More detailed or specific guidance exist in Germany in sub-national jurisdictions or for certain sectors. For example, VfM assessment guidance specific to road PPPs has been prepared by the German Government's Transport Infrastructure Financing Company (VIFG) available at: www.vifg.de/de/service/downloads/index.php

²⁹ For details see, 'PPP Manual – Guidebook for Public-Private Partnerships / PPP-Handbuch – Leitfaden für Öffentlich-Private Partnerschaften, Bundesministerium für Verkehr, Bau und Stadtentwicklung (BMVBS), Deutscher Sparkassen- und Giroverband (DSGV)', Berlin, September 2009.

- the project identification phase³⁰ when a 'PPP suitability test' is carried out that is based on qualitative criteria (described below under 'Methodology'). At this point, a preliminary decision for or against development of the project as a PPP is taken by the Authority;
- the project preparation phase when a quantitative analysis is carried out that involves estimates of project costs for a theoretical conventional procurement option (referred to as the Public Sector Comparator ('PSC')) and a PPP alternative. At the end of this stage the decision is taken whether or not to tender the project as a PPP. However this does not necessarily mean that if PPP bids are received that a PPP will be concluded; and
- the procurement phase, when the VfM of each of the bids received is compared to the PSC. At this stage, a final decision is taken on whether the project will be procured conventionally or as a PPP and, if as a PPP, which bid represents the best VfM.

The guidance available strongly recommends gathering and using evidence on the VfM achieved for projects that have already been signed: Authorities are therefore expected to use data and lessons learnt from past projects as input in the development of future projects.

The guidance also underlines the dynamic nature of VfM assessment (as a continuous exercise during the project preparation and procurement phases). As the preparation and procurement of the project progresses and further detailed data becomes available the Authority is required to update its analysis.

Methodology

Qualitative analysis

The first step of the VfM assessment in Germany consists of a preliminary qualitative suitability test. Its objective is to examine whether a project is generally suitable for implementation as a PPP or not. The guidance does not provide for a generic list of criteria to be considered by the Authority and recommends a project-by-project approach, taking into account:

- general features of PPPs (e.g. effectiveness of the life-cycle approach, risk allocation, output specifications, performance-based payment mechanisms);
- sector-specific criteria (e.g. demographic changes for a school project);
- criteria specific to the chosen contract model (e.g. requirements posed by a concession model for a road project); and

³⁰ For details regarding the various contractual forms of PPPs in Germany, available at: www.ppp-projektdatenbank.de/fileadmin/user_upload/Downloads/OEPP-Vertragsmodelle.pdf

- criteria specific to the project (e.g. specific institutional or geographical circumstances).^{31 32}

However, in North-Rhine Westphalia, four questions addressing the main potential benefits of a PPP are provided as a starting point for the analysis and establishment of a list of criteria:

- Is the project size sufficient to ensure that any improvements in efficiency will compensate for the transaction costs?
- Are there legal and/or project-specific restrictions that rule out the use of a PPP?
- Is it possible to link the elements of the project life-cycle in such a way that synergies may be achieved (e.g. linking long-term operation costs to project design)?
- Are the project risks known and would it, in principle, be possible to transfer some of them to a PPP partner?³³

These potential non-financial benefits are assessed only qualitatively and are not valued. This provides the basis for a decision regarding whether or not to proceed with a more detailed quantitative assessment.

Quantitative analysis

A quantitative analysis is carried out for those projects for which the qualitative analysis has indicated that a PPP approach has potential benefits.

As a reference for a comparison, a PSC is developed. This is a theoretical cashflow model of a conventionally procured project, taking into account costs and revenues over the project life-cycle. The main cashflow items used in the PSC are:

- capital expenditure (planning and construction);
- financing costs;
- operating and maintenance costs (including all major life-cycle, as well as maintenance costs);
- transaction and administrative costs;
- risk costs for the various project phases (e.g. construction, operation);
- revenues from fees/tolls, if applicable; and

³¹ See ‚Leitfaden Wirtschaftlichkeitsuntersuchungen bei PPP-Projekten, Finanzministerkonferenz-Arbeitsgruppe und Bundes-Arbeitsgruppe‘, September 2006, available at: www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Bauwesen/ppp_projekte_wirtschaftlichkeitsuntersuchung_leitfaden.pdf

³² For example, for federal PPP projects in public buildings a generic list of criteria has been established. See ‚Leitfaden Wirtschaftlichkeitsuntersuchungen bei der Vorbereitung von Hochbaumaßnahmen des Bundes‘, August 2014, available at: www.fib-bund.de/Inhalt/Leitfaden/Wirtschaftlichkeit/2014-08_LFWU_Hochbau_3-Auflage_BMUB_2014.pdf

³³ Based on the manual for viability studies of PPP projects, PPP Task Force of North-Rhine Westphalia, April 2007, available at: www.ppp.nrw.de/englische_version/ppp_manuals/viability_studies_of_ppp_project.pdf

- costs/revenues from the disposal of the asset at the end of its life-cycle (this item is not calculated for projects in the transport sector due to non-availability of suitable and reliable data).³⁴

To the extent possible, the Authority is required to use empirical data from existing comparable projects in preparing the PSC.

The individual risks considered in the PSC are pooled into risk categories, according to the phases of the project cycle. The guidance provides examples for several main categories of risks to be considered:

- planning;
- construction;
- funding;
- operation, maintenance and repair; and
- residual value.

In this context, the main focus of the risk identification and valuation is on the risks that can potentially be transferred to the private partner under a PPP. The valuation of risks retained by the Authority may also be carried out, but this is not mandatory. This is described in more detail in Chapter 1.3.1 of the Annex.

Subsequently, a financial model of a PPP option is prepared by the Authority, covering all phases of the project-cycle.

The guidance provides for the cashflow calculations for the PPP procurement option to be presented either as numerical estimates of individual costs or as a percentage of the levels of individual or broader categories of costs (and revenues) used for the PSC.

As project preparation progresses, and as more information on the project becomes available, the guidance recommends that estimates of the PPP option cashflows are prepared in increasing detail (i.e. not as broad cost categories but as individual cost items where possible).

VfM is then assessed through a comparison of the discounted cashflows of the PSC and PPP options.

The guidance states that, as a rule, the cashflows for both the PSC and PPP financial models should be discounted using the same nominal discount rate. The recommended discount rate is the one representing the cost of financing for government (i.e. the market interest rate of government bonds for the period similar to the duration of financing for the PPP project). There is detailed guidance on how this rate is established in relation to the required period, which can be quite complex to determine. This is described in more detail in Chapter 2.3 of the Annex.

³⁴ See 'Leitfaden Wirtschaftlichkeitsuntersuchungen bei PPP-Projekten, Finanzministerkonferenz-Arbeitsgruppe und Bundes-Arbeitsgruppe', September 2006.

Whenever it is expected that there may be significantly different non-valued effects for the different procurement approaches, these are assessed and taken into account by the Authority in the final decision on the procurement method. The guidance mentions a series of possible aspects that should be considered (e.g. socio-economic effects, town-planning requirements, preservation area requirements, ecological impact). The criteria are then scored for the different options, weighted by (more than one person) for their assumed importance).

The decision about the procurement approach is then based on both quantitative results and the analysis of the non-valued benefits (if relevant) for the procurement approaches considered. The focus, however, is predominantly on the results of the quantitative analysis, while qualitative aspects with a direct bearing on the project are taken into consideration.

Before the award of the contract, VfM is re-assessed and confirmed by comparing:

- the bids amongst themselves; and
- the bids with the final PSC.

In this process, the PSC may require adjustment that results from any changes to the project that arose in negotiations with bidders during the procurement phase. The guidance mentions four possible changes:

- project parameters/basic assumptions;
- scope and/or term of the project;
- scope of work or quality requirements; and
- allocation and/or assessment of risks.

The result of the VfM assessment is used by the Authority to support its decision on the procurement option and, if as a PPP, among the various bids received.

Institutional responsibilities

VfM assessment is undertaken by the Authority in charge of procuring the project, which may be at the federal, Länder or local government level. For PPPs in certain sectors at the federal level (transport/highways and public buildings) the following federal entities are involved:

- the Federal Ministry of Transport and Digital Infrastructure (BMVI) as the ministry responsible for legal and operational supervision of PPPs in the area of federal highways, together with Germany's Transport Infrastructure Financing Company (VIFG) as the centre of expertise for PPPs in the transport sector; and
- the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) as the ministry responsible for PPPs in public buildings.

In Germany, Authorities can benefit from project advice throughout the PPP process, including for VfM assessment - for example, through *Partnerschaften Deutschland* (Partnerships Germany) or the PPP Units of the relevant ministry or Länder.

3.3. The Netherlands

Sources

Public-Private Comparator Manual

www.government.nl/documents-and-publications/directives/2013/03/01/public-private-comparator-manual-2013.html

Public Sector Comparator

www.government.nl/files/documents-and-publications/directives/2002/08/01/psc-manual/handleidng-psc-uk-version.pdf

Scope

VfM assessment in the Netherlands is undertaken at two stages: during the project identification phase and during the procurement phase. Both are based primarily on a quantitative comparison of whole-life costs of procurement options considered for a given project.

Timing

A first VfM assessment is undertaken during the project identification phase and before a decision is made on the procurement route for a given project. This assessment provides a preliminary comparison, expressed in qualitative and, subsequently, quantitative terms, of the expected differences between a PPP and a conventional procurement option. This step is called the 'Public-Private Comparator'.³⁵

A more detailed VfM assessment is carried out during the procurement phase, when PPP bids are compared against a more complete and detailed financial model for the conventional procurement option (based on financial and socio-economic considerations) referred to as the 'Public-Sector Comparator'.³⁶

Methodology

Qualitative analysis

Although VfM assessment in the Netherlands is largely driven by the comparison of quantitative factors, guidance recommends the identification and evaluation of a number of qualitative factors during the project identification phase. This part of the

³⁵ See 'Public-Private Comparator Manual', The Ministry of Finance, March 2013, available at: www.government.nl/documents-and-publications/directives/2013/03/01/public-private-comparator-manual-2013.html

³⁶ See 'Public Sector Comparator', PPP Knowledge Centre, August 2002, available at: www.government.nl/files/documents-and-publications/directives/2002/08/01/psc-manual/handleidng-psc-uk-version.pdf

VfM assessment precedes the preparatory work on the identification and initial estimates of the project cashflows.

The guidance provides, as examples, a number of subjects deemed to be the most relevant for the qualitative VfM assessment:³⁷

- flexibility in the provision of services under different options;
- analysis of services as to whether they are considered to be core or non-core activities for the procuring Authority (i.e. allocating non-core activities to the private sector may be advantageous for the public sector);
- budgetary flexibility in case a future reduction in government expenses is required considering the long term contractual commitments of a PPP (however the assessment must be carried out on the basis that there is currently sufficient budgetary resources for all the procurement options considered); and
- potential for, or limits to, innovation arising out of the provision of the services by the private sector.

The Public-Private Comparator guidance contains an appendix that discusses the most common arguments in favour of and against PPP procurement which can be used by Authorities to help inform their qualitative analysis.³⁸

Quantitative analysis

The scope of the quantitative VfM assessment differs slightly according to the project phase during which the analysis is carried out.

During the project identification phase, risk-adjusted cashflows are developed for both the PPP and conventional procurement options. The Authority is required to assess the costs and revenues (if relevant) of a PPP option relative to a theoretical conventional procurement option. In practice, this means that costs, revenues and the value of risks in the conventional procurement option are treated as a benchmark against which the estimated differences in costs, revenues and value of risks for a PPP option are measured. The VfM guidance suggests that costs are grouped into four broad categories: preparation, transaction, construction and operational/exploitation costs. The value of risks retained by the public sector is also broadly estimated at this stage.³⁹

During the procurement phase,⁴⁰ a more precise benchmark for the conventional procurement option is developed, taking account of any changes in project scope and/or specifications that may have arisen in the course of the procurement process, including as a result of any interaction with bidders. A comparison is made between the overall cost of the preferred PPP bid and the updated, more detailed,

³⁷ For details see 'Public Private Comparator Manual', The Ministry of Finance, March 2013.

³⁸ Idem, Appendix 7: 'Determining differences between the public and the private implementation scenarios'.

³⁹ Idem, Appendix 4: Risk analysis; Appendix 5: Model overviews of pure risks.

⁴⁰ For more information about the VfM assessment during the procurement phase in the Netherlands see Public Sector Comparator, PPP Knowledge Centre, August 2002.

conventional procurement benchmark. The costs are calculated from the start of the procurement process so that preparatory costs incurred before this stage are not included in the PSC.

In making adjustments to cashflows for the project risks, the guidance distinguishes between 'pure' risks (i.e. events that have a negative impact on the expected costs and revenues of the project (such as additional unforeseen requirements/costs) and 'spread' risks (reflecting technical or market uncertainties). This is described in more detail in Chapter 1.3.4 of the Annex.

Supplementary considerations also need to be taken into account: such as ensuring competitive neutrality as a result of differences in the tax treatment of options, the potential costs of re-tendering the project, costs or revenues from refinancing and the cost of PPP monitoring. Likewise, a sensitivity analysis needs to be conducted based on variations around the main cost and revenue assumptions.

The same discount rate is used to calculate the present value of cashflows in the two stages of the VfM assessment. This discount rate is composed of:

- an interest rate that represents the public sector cost of financing: applying the government borrowing rate relevant for the average duration of the financing for the PPP option; and
- a market-related risk premium to reflect systemic risks: the guidance provides two methods of calculation, a benchmark (i.e. based on similar previous projects) or the estimated weighted average cost of capital ('WACC') for the project (see Chapter 2.5 of the Annex for an explanation of the WACC.).

The same discount rate is applied to the cashflows of both procurement options.

Institutional responsibilities

Authorities carry out the VfM assessment for their projects. The guidance is addressed primarily to central government Authorities but can be applied equally by local entities.

3.4. The United Kingdom

Note: As at the date of this report, the UK Government is planning to update its guidance with the issue of 'The Green Book - Appraisal and Evaluation in Central Government' and as part of this exercise and following the introduction of the PF2 model, HM Treasury may also update its guidance on appraising PF2⁴¹ procurement options. Supplementary guidance to the Green Book is also published from time to time. It is therefore important to note that the description provided below is based on available guidance on VfM assessment at the date of this report and this may change and no longer represent the up-to-date position.

Sources

The Green Book – Appraisal and Evaluation in Central Government

www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

Supplementary Green Book Guidance: Intergenerational Wealth - Transfers and Social Discounting

www.gov.uk/government/uploads/system/uploads/attachment_data/file/193938/Green_Book_supplementary_guidance_intergenerational_wealth_transfers_and_social_discounting.pdf

Supplementary Green Book Guidance: Optimism Bias

www.gov.uk/government/uploads/system/uploads/attachment_data/file/191507/Optimism_bias.pdf

Public Sector Business Cases, Using the Five Case Model, Green Book Supplementary Guidance on Delivering Public Value from Spending Proposals

www.gov.uk/government/uploads/system/uploads/attachment_data/file/277345/green_book_guidance_on_public_sector_business_cases_using_the_five_case_model_2013_update.pdf

Value for Money Assessment Guidance

www.gov.uk/government/uploads/system/uploads/attachment_data/file/252858/vfm_assessmentguidance061006opt.pdf

*NB: The VfM assessment guidance was developed for Private Finance Initiative (PFI) type PPPs. These represent the majority, but not totality of PPPs in the UK to date.*⁴²

⁴¹ PF2 refers to the UK Government's recently updated approach to involving private finance in the delivery of public infrastructure and services through a long-term contractual arrangement and follows a review of and changes to the previous PFI (private finance initiative) policy.

⁴² The VfM guidance states that 'some of the core principles relating to achieving VfM in PFI projects are also applicable to other forms of public sector procurement, in particular those projects that involve substantial capital expenditure.'

Scope

VfM is defined as *'the optimum combination of whole-life costs and quality (or fitness for purpose) of the good or service to meet the user's requirements'*.⁴³ VfM guidance stresses the importance of basing the VfM assessment on available evidence, on carrying out the assessment well in advance of engagement with the market and of a well-planned and managed process in preparing and procuring projects to ensure VfM. Guidance also notes that VfM is a relative concept which requires comparison of the potential or actual outcomes of alternative (real and relevant) procurement options. It may also require a high degree of estimation, especially where experience and/or data on similar projects procured under different procurement routes are limited.

An important characteristic of VfM and its assessment in the UK is its relevance to decision-making, not only in the different phases of PPP preparation and procurement, but more widely to public investment assessment and decision-making, irrespective of the delivery or procurement method.⁴⁴

The broader public investment development framework

In order to understand the role and context of VfM assessment, it is helpful to understand the broader process that applies to public investment preparation and decision making. The case for public investment is usually developed through a series of 'Business Cases' for the various stages of the project (see Box 1 below). These different stages are linked to key decisions and therefore quality control approval/assurance points or 'gateways'.

⁴³ 'Value for Money Assessment Guidance', November 2006.

⁴⁴ See 'The Green Book – Appraisal and Evaluation in Central Government', HM Treasury, July 2011, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

Box 1: 'Business Case Development' in the UK

There are three stages in the evolution of a project Business Case. These correspond to key stages in the spending approvals process. These are referred to as the Strategic Outline Case, the Outline Business Case and the Full (or Final) Business Case. For major policies and programmes that comprise multiple projects for their delivery, an initial Strategic Outline Programme (SOP) stage may often be the starting point in the life of a project. A number of stages then follow as the case is developed for a particular project.

Stage 1: The Strategic Outline Case (SOC) confirms the strategic context for the investment and goes on to make a robust case for change. It provides stakeholders with an early indication of the proposed way forward (not yet, at this stage, the preferred project option), having identified and undertaken an analysis of a wide range of available options, as well as their indicative costs.

Stage 2: The Outline Business Case (OBC) revisits the SOC in greater detail and identifies a preferred option which optimises VfM. It also sets out the likely contractual arrangement, demonstrates its affordability, assesses the expected quality of competition and market appetite and details the supporting procurement strategy, together with management arrangements for the successful development of the project. The project moves into its procurement phase following approval of the OBC. An important feature of the OBC is that it seeks to ensure that the different components of the project (i.e. its rationale, scope, expected cost, risk allocation, market appetite, VfM and required management resources) are all balanced before any procurement process is launched. Thus, for example, the OBC seeks to ensure that the expected allocation of risk to the private sector is realistic and bankable and in line with findings from the analysis of expected market appetite and that the expected costs and financing assumptions reflect this. This helps to reduce the risks of more costly, or even unaffordable, changes later on. The OBC is therefore often iterative in its development as these different components are adjusted to fit one another and re-assessed where necessary.

Stage 3: The Full Business Case (FBC) revisits the OBC and records the findings of the procurement process. It also presents a recommendation for an affordable solution which continues to optimise VfM, including detailed arrangements for the successful delivery of the service from the recommended provider. The FBC is therefore developed during the procurement phase of the project, following detailed negotiations with potential service providers but prior to formally signing contracts.

Following FBC approval, the Business Case continues to play a major role throughout the life of the project. This includes internal and external audit, operational management including the risk management register and post project evaluation, required in accordance with policy guidance.

The other related and important tool used to guide public investment preparation and the decision-making process is the 'Five Case Model' (see Box 2 below). This

provides a conceptual 'thinking' framework to be used by Authorities in preparing each stage of the Business Case.

Box 2: Five Case Model in the UK⁴⁵

The Five Case Model is an adaptable 'thinking' framework that guides Authorities in developing their Business Cases and decision-making processes using five key themes that are relevant throughout the process. The more detailed issues for each theme and the ways to deal with them may vary depending on which point the Authority is at in the project cycle. The five key themes of enquiry are the:

- Strategic Case: the rationale for why intervention/project is required, as well as a clear definition of outcomes and the potential scope for what is to be achieved;
- Economic Case: to demonstrate that the use of public funds involved in the project optimises public value, usually involving the identification and assessment of the costs and benefits (in line with Green Book guidance) of a range of real and relevant options;
- Commercial Case: to demonstrate the viability of a competitive procurement and the contractual (including any risk allocation) arrangements involved;
- Financial Case: to demonstrate that the preferred option will result in a fundable and affordable project; and
- Management Case: to demonstrate that the preferred option is capable of being delivered successfully, in accordance with recognised best practice.

The approach is designed to be flexible. Thus, the stages of the Business Case development may be extended to more stages for complex and large projects and be more concise for smaller, more standard projects.

The determination of VfM is an integral and continuous part of the underlying Five Case Model approach. Assessing any potential of the PPP option, if identified in the broader Business Case Development process, will then follow more specific VfM assessment guidance.

Timing

The VfM guidance identifies three key phases in PPP project delivery where VfM is expected to be assessed in line with the Business Case development stages.⁴⁶

⁴⁵ Based on Public Sector Business Cases, Using the Five Case Model – Green Book Supplementary Guidance on Delivering Public Value from Spending Proposals, HM Treasury, 2013, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/277345/green_book_guidance_on_public_sector_business_cases_using_the_five_case_model_2013_update.pdf

⁴⁶ This section is based on 'Value for Money Assessment Guidance', HM Treasury, November 2006

- (1) Programme Stage – the main objective at this stage is to provide an initial assessment as to which projects (if any) within the particular investment programme are likely to deliver VfM if developed further as PPPs or whether alternative approaches need to be considered. At this initial stage, the results and conclusions from the VfM assessment are characterised by a high level of uncertainty.

This assessment takes place in two parts:

- i. a qualitative assessment that includes the elements of the analysis that are not directly linked to costs and financial variables. This part involves an assessment of the viability, desirability and achievability of the PPP procurement for an investment programme (for details, see section on ‘Methodology’ below); and
 - ii. a quantitative assessment that involves calculations of high-level estimates for procurement options considered for the programme. The guidance underlines that, even at this early stage, it is important to take into account evidence from available *ex-post* evaluations of existing PPPs. It is also important to consider the degree of heterogeneity of projects in the investment programme, identifying non-typical projects and their particular risks.
- (2) Project (SOC/OBC) Stage – during the project preparation stage, the aim is to verify for a given project the initial assumptions and conclusions about possible VfM that were previously estimated at the programme level. In this phase, the suitability of a PPP procurement method for the project needs to be assessed in more detail with the objective of informing the decision about the procurement approach to be taken.

Similar to the previous stage, but in greater project-level detail, the VfM assessment is carried out in two parts:

- i. a qualitative assessment, that verifies for a given project, the validity of initial conclusions in the same three areas as in the previous programme-level VfM assessment. A greater level of detail and precision is required that takes into account specific features of the project; and
 - ii. a quantitative analysis that involves an estimation of project specific data, taking into account experience from previous PPP procurements where available (for details see section ‘Methodology’ below).
- (3) Procurement (FBC) Stage – this stage involves an iterative VfM assessment from the tender launch until financial close. This should capture changes to the project scope that result from the evolution of bids during the procurement process.

A key factor to ensuring VfM at this stage will be the extent and quality of competition. In this context, current UK guidance underlines that VfM can be eventually achieved, or even enhanced, through the procurement process when the interest from the private sector for a given project is high and strong competition among bidders can be expected. Before launching the procurement

process, the Authority therefore has an important task to carry out a comprehensive market sounding exercise to understand the potential for competition among potential bidders.

The bidding process needs to result in a risk allocation between the private partner and the Authority that will optimise VfM for the public sector. Standardised contractual clauses and sector-specific contracts have been developed and it is government policy to use these to frame the allocation of risk.⁴⁷

Unlike some other countries, a quantitative assessment comparing actual bids with a public sector comparator (described below under Methodology) is not carried out. However, if actual bid prices differ significantly from the expected costs estimated at the OBC stage, questions should be asked as to whether there are legitimate external reasons for the difference that could not be foreseen and, if not, why this escalation was not captured by the optimism bias (described below under Methodology) estimates. However, this is not necessarily a reason to halt or revisit the procurement decision.

Methodology

In the UK, VfM assessment is based on both qualitative and quantitative elements. The qualitative considerations should frame the approach to the quantitative VfM assessment, with the intention being that the quantitative assessment is used as a support tool for making an overall assessment. The outputs from the quantitative or qualitative assessment should not therefore be considered in isolation as a standalone case for, or against, the PPP option. The Business Case brings together the qualitative and quantitative assessments into an overall VfM assessment. This must note an appropriate and thorough explanation of the leading factors in both the quantitative and qualitative analyses in coming to a decision, especially where the two assessments do not appear supportive of one another.

Qualitative analysis

This focuses on three main aspects:

- i. Viability, which involves assessing whether there are any efficiency, accountability or equity (in the sense of distributional) issues which would indicate that services are better delivered through a conventional procurement or PPP route. It considers whether expected changes and levels of operational flexibility are compatible with a long-term PPP contractual structure. It also considers the extent to which the service requirements can be clearly defined and measured;
- ii. Desirability, which assesses whether the benefits of the PPP option (such as risk management, innovation, integration of design, build and operation)

⁴⁷ For details, see 'Standardisation of PF2 Contracts, Draft', HM Treasury, December 2012, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/221556/infrastructure_standardisation_of_contracts_051212.pdf

outweigh the expected higher cost of capital and other costs associated with the PPP option; and

- iii. Achievability, which takes into account the level of expected private sector interest in the PPP option (e.g. the skills and capacity of the private sector, its appetite for risk, any lender constraints) as well as the capability of the Authority to manage the PPP procurement process and subsequent contract.

These three areas of consideration serve as a preliminary PPP suitability test (both at a programme and a project level). It is up to the Authority to bring these different aspects together to form an overall view on the qualitative assessment (e.g. there are no prescribed weights attached to the different qualitative assessment aspects). Equally, these do not systematically cover issues of non-financial benefits that may be associated with using PPPs. This is described in more detail in Chapter 3.2.3 of the Annex.

Quantitative analysis

This involves the comparison of risk-adjusted cashflows of: (i) a PPP option, and (ii) a conventionally procured option to deliver the same quantity and quality of services (output) over an equivalent period of time (called Public Sector Comparator or PSC). The PSC is therefore defined as 'a hypothetical risk-adjusted costing, by the public sector as a supplier, to an output specification produced as part of a PFI procurement exercise'. It is 'based on the recent actual public sector method of providing that defined output (...) and takes full account of the risks which would be encountered by that style of procurement'.⁴⁸

Guidance requires adjustment to project estimates and assumptions through a correction for so-called 'optimism bias'.⁴⁹ This seeks to address the observed systematic tendency by the public sector to be over-optimistic about project costs and timelines. Optimism bias is described further in Chapter 1.3.3 of the Annex. Where known, the estimates of the whole-life cashflows are also adjusted by the expected value of the risks for each option.

Through discounting, the NPV of each option is calculated and the relative VfM of the various procurement options can be estimated in quantitative terms. The discount rate used in the VfM assessment is based on the concept of a socio-economic time preference and is applied to both the PPP and PSC cashflows.⁵⁰ This is described in more detail in Chapter 2.4 of the Annex.

Where the difference in the results for the conventional option (PSC) and PPP option are marginal, and/or where there is a high level of uncertainty around inputs, and/or outputs are highly sensitive to the input variables, the figures should not be

⁴⁸ See 'The Green Book – Appraisal and Evaluation in Central Government', HM Treasury, July 2011.

⁴⁹ See 'Supplementary Green Book guidance: Optimism bias', HM Treasury, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/191507/Optimism_bias.pdf

⁵⁰ For more details see: 'Supplementary Green Book guidance: Intergenerational wealth: transfers and social Discounting', HM Treasury, July 2008, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/193938/Green_Book_supplementary_guidance_intergenerational_wealth_transfers_and_social_discounting.pdf

interpreted as sufficient evidence for or against use of a PPP procurement route. In such cases, the guidance indicates that more weight should be given to the qualitative than the quantitative assessment.

Institutional responsibilities

HM Treasury's VfM assessment guidance is used by central and local government Authorities in England. Regional governments are responsible for developing their own, or adopting, VfM guidance and applying the related assessment and approval processes. Scotland for example (see Box 3) has developed its own approach to VfM assessment, although this adopts a number of aspects of HM Treasury guidance.

VfM analysis at the programme level is usually undertaken by the Authority's sponsoring ministry and, where available, this would be carried out by the ministry's private finance unit. During the project preparation and project procurement stages, the Authority (line ministry or local authority team) will be responsible for assessing (and achieving) VfM for the project. Depending on the nature and size of the project, various approval and assurance processes and gateways are used to approve the project moving through the various Business Case stages and therefore the assessment of VfM at various points in the development of the project.⁵¹

Box 3: VfM assessment in Scotland

In Scotland, PPP projects are carried out in the framework of the Non-Profit Distributing Model (NPD) as an alternative to the UK Private Finance Initiative (PFI), now PF2.⁵²

VfM assessment for PPP/NPD projects has evolved into a qualitative analysis at the programming level, when projects are prioritised according to the potential VfM they are expected to deliver. VfM assessment of NPD programmes in Scotland is undertaken in the context of the standard UK Five Case Model and follows, in principle, the UK HM Treasury's guidance on the qualitative criteria of viability, desirability and achievability. In addition, the following criteria are considered:

- high capital intensity;
- share of operating costs in the total whole-life costs of the project;
- residual value issues; and
- prior experience with PPP procurement.

VfM assessment based on quantitative analysis is not carried out due to uncertainties about the financial assumptions of different procurement options for the project.

Source: Interview with Scottish Futures Trust (SFT)

⁵¹ See for example HM Treasury's 'Major Project approval and assurance guidance', available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/179763/major_projects_approvals_assurance_guidance.PDF.pdf

⁵² See www.scottishfuturestrust.org.uk/our-work/funding-and-finance/non-profit-distributing

3.5. Comparative summary of VfM assessment approaches

The following table provides a comparative summary of the VfM assessment approaches described in the previous sections:

	France	Germany	Netherlands	United Kingdom ⁵³
Scope of assessment				
	Predominantly quantitative with some qualitative criteria.	Predominantly quantitative with some qualitative criteria.	Predominantly quantitative with some qualitative criteria.	Qualitative considerations frame approach to quantitative VfM assessment. Quantitative assessment to support overall assessment.
Timing				
Identification phase		x	x	x
Preparation phase	x	x		x
Procurement phase	x	x	x	x (qualitative)

⁵³ Following the introduction of the PF2 model, HM Treasury plans to update its guidance on appraising PF2 procurement options.

	France	Germany	Netherlands	United Kingdom ⁵³
Approach				
Perspective	Authority financing perspective.	Authority financing perspective.	Socio-economic perspective.	Socio-economic perspective.
Quantitative				
	Cashflows of options differentiated by efficiency factors and risks. May also include economic benefits of earlier service delivery.	Cashflows of options largely differentiated by efficiency factors and risks.	Cashflows of options largely differentiated by efficiency factors.	Cashflows of options differentiated by risks and efficiency factors.
<i>Risk analysis</i>	Value of risks reflected in the cashflow items. Use of probability distributions of risk and 'Value at Risk' approach.	Assessment of probability and impact of risks using qualitative factors followed by more detailed quantitative assessment of priority risks. Focus on the risks that can potentially be transferred to the private partner.	Adjustment to the cashflows for 'pure' risks (such as additional unforeseen requirements/costs) and technical risks but not market risks which are reflected in discount rate.	Adjustment to the cashflows of procurement options to reflect risk. Use of 'optimism bias' factors to capture unknown uncertainties on costs and revenues based on empirical evidence.
<i>Discount rate</i>	Based on cost of financing for Authority with a maturity equal to the expected PPP project contract duration. Same rate applied to all procurement options.	Based on cost of financing for government with an average maturity of the expected PPP project financing, and for sizeable projects (e.g. motorways) rates from the government borrowing yield curve for each year of discounting. Same rate applied to all procurement options.	Based on (private sector) weighted average cost of capital. Same rate applied to all procurement options.	Based on socio-economic time preference rate established by HM Treasury applicable to all public investment decisions. Same rate applied to all procurement options.

	France	Germany	Netherlands	United Kingdom ⁵³
Qualitative /Non-valued effects	Preliminary Assessment (<i>évaluation préalable</i>) to include qualitative comparison covering, in particular, service quality and environmental performance to supplement quantitative assessment.	Preliminary test of project suitability as PPP prior to detailed quantitative assessment. Subsequently, all relevant non-valued effects assessed (e.g. socio-economic effects). Supplements quantitative assessment.	Evaluation of a number of qualitative factors during the initial project identification phase. Guidance on key areas for assessment that includes focus on flexibility of service provision, priority of service to government, budgetary flexibility & innovation.	Qualitative assessment considers viability, desirability, achievability factors throughout process. At procurement stage, strong focus on quality of market competition.
Institutional responsibilities				
	Carried out by any Authority planning to implement a project as a <i>contrat de partenariat</i> (i.e. authority-pay PPP), in accordance with the national guidance issued by the Central PPP Unit (MAPPP). MAPPP required to review and validate the Preliminary Assessment for central government procuring authorities (and local authorities if requested by them).	Carried out by the Authority in charge of procuring the project, which may be at federal, Länder or local government level. For PPPs in certain sectors at the federal level (transport/highways and public buildings), dedicated federal entities are involved.	Authorities have a responsibility to carry out VfM assessments for their projects.	Authorities responsible for carrying out VfM assessments for their projects in line with central or regional VfM guidance. Regional governments responsible for developing their own VfM guidance and applying the related assessment and approval processes.

Annex



Rebel report on risk, discount rates and non-valued effects in VfM assessment

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Risk identification, valuation and allocation in VfM assessments

Introduction

This chapter describes how risks are treated in VfM assessments¹ and the relationship between risk treatment and project cost/revenue estimates.

It is important first to recognise that there are two broad but somewhat different definitions of risk used in the different VfM assessment approaches:

- In one approach, which focuses on risk in the context of financing/investment, risk is often defined by financial/investment experts in terms of the level of uncertainty² of future events, leading to uncertainty of future cashflows. As Brealey and Myers note: 'Risk in investment means that future returns are unpredictable'.³ In this respect, a riskier project means a project demonstrating a larger bandwidth around expected revenues and/or costs (or a flatter curve on the probability distribution of these revenues and/or costs). Often, financial/investment experts value these types of risk by taking the price that needs to be paid to reduce the bandwidth around the expected value of a particular revenue and/or cost, i.e. increase the level of certainty of revenues and/or costs. So, in short, a financial/investment expert defines risk in terms of events that determine the range of possible values.
- In the other approach, often used by engineering experts, risk is typically defined in terms of events whose consequences may negatively impact the value of future expected cashflows. According to this approach, a riskier project would result in reduced expected revenues and/or increased expected costs. Typically, engineering experts value these types of risk by multiplying the probability of occurrence and the expected impact on cashflows, i.e. the increase over and above an initially expected cost or decrease of an initially expected revenue. So, in short, an engineering expert defines risk in terms of events that may change for the worse the expected values.

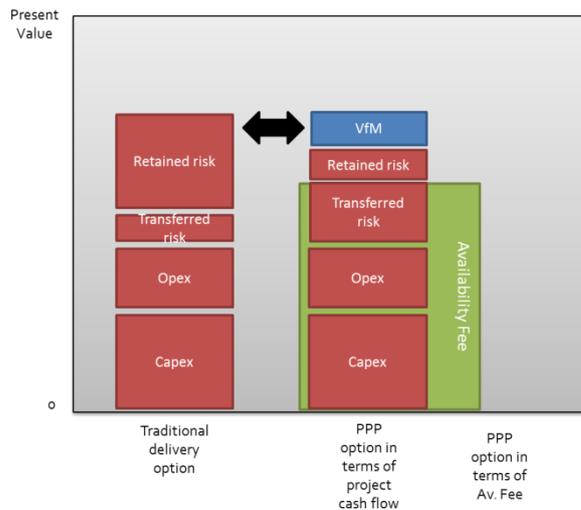
Risk analysis (defined here as a term to encompass all the relevant risk related activities) is a key component in VfM assessments since the nature and intensity of risk transfer to the private sector is one of the main differentiating factors between the procurement options that are being compared. Figure 1 gives an example of a typical comparison between a conventional procurement option and a PPP option for an availability payment based PPP contract. In this example it can be noted that risk is one of the main factors included in the comparison.

¹ It should be noted that risk analysis of projects is also usually carried out in the broader context of project appraisal and project management, and not exclusively for VfM assessment purposes.

² In order to avoid misunderstanding: uncertainty in this context refers to a spread around an expected cost or revenue amount rather than to 'true uncertainty' as defined by Knight (1921).

³ Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance (1988).

Figure 1: Relevance of risk analysis as part of the VfM assessment⁴



Capex = Capital Expenditure

Opex = Operational expenditure

Transferred and retained risk from the perspective of the public sector

Some countries carry out the design of the PPP option prior to the VfM assessment. For other countries, (part of) the design of the PPP option and the VfM assessment process go hand in hand. This leads to a different focus of the risk analysis process in the various VfM assessment guidelines.

In countries like France and the UK, risk analysis in the VfM assessment guidelines is a core component of project risk management and is here referred to as the 'broadly applied risk analysis approach'. In Belgium and the Netherlands, risk analysis is more narrowly focused on the *determination of the value* of the retained and transferred risk of the conventional procurement option and the *predefined* PPP option (see Figure 1).

The chapter examines the following steps of the broadly applied risk analysis approach:

- the identification and registering of risks, which focuses on identifying the risks related to the project being considered (paragraph 1.2);
- the valuation of risks, which focuses on finding a value for the project risks (paragraph 1.3); and
- the allocation of risks,⁵ which aims at finding the optimal types (and parts) of risks to be transferred to the private sector under the PPP delivery option(s) that is/are being considered (paragraph 1.4).⁶

Risk identification and registration

The first step in the risks assessment/management process is the identification of all relevant risks related to the project (paragraph 1.2.1). The second step is the registration and classification of the identified risks (paragraph 1.2.2).

A detailed description of risk identification and registration can be found in the guidelines for VfM assessments.⁷ This report contains a short general summary of the risk identification and registration process.

⁴ Stylized comparison, not taking into account any differences that may arise from OPEX, CAPEX or other differences.

⁵ Risk allocation is only carried out in the broadly applied risk analysis.

⁶ The allocation and the valuation of risks is often in practice an iterative process. Particularly in France, the allocation would be carried out prior to the risk valuation.

Observation 1: The objective of risk analysis varies according to the country in particular because the PPP option is developed in different ways

Risk identification

The guidance on VfM assessment generally recommends as a starting point to generate as complete a picture as possible of all relevant risks that relate to the project being considered. In doing so, it is important to avoid blind spots. The different guidelines provide a number of supportive tools (which may often be combined) to help generate complete a picture of the project risks, including:

- Conducting risk workshops with the participation of the key project stakeholders;
- Using checklists of typical project risks; and
- Using documentation on risk analysis conducted on similar prior projects.

Observation 2: The general approach to risk identification is roughly similar for all examined countries

Risk workshop

A risk identification workshop typically aims to stimulate the generation of different perspectives on project risks. This is achieved by including stakeholders, such as end-users, representing different aspects of the project (financial, judicial, technical, management) and by structuring the brainstorm according to project life chronological phases. To avoid group think⁸ the process of the workshop can be structured by first asking participants to think of a number of risks before going into a plenary phase where ideas are combined. Advisers may be used to assist in this process.

Textbox 1: Risk identification at Bendigo Hospital (Australia)⁹

The Bendigo Hospital DBFO contract was tendered by Victoria State Department of Health ('VdH') and Bendigo Health (the Victoria State regional health service). Financial close was reached in May 2013. The project includes the design and construction of the hospital, parking and commercial facilities and the 25-year operation of services such as building maintenance, cleaning, help desk, security, patient food provision, parking, portering and waste management. The estimated capital value of the project is AUD 630 million (EUR 432 million).

VdH has been in the lead for the project in general, including the VfM assessment. To help VdH conduct the VfM assessment, a firm of consultants was hired. The consultant conducted a risk workshop which included people from VdH, Partnerships Victoria/Victoria State Treasury and Bendigo Health. These experts brainstormed the relevant risks for the project using a risk workshop.

The list below is an extract from the project summary and offers some examples of project specific risks that were identified as a result of the workshop:

Risk Category	Description
Planning and planning approvals	<i>Risk that planning permits for the use of the site are required, which may lead to delays</i>
Site Contamination Risk	<i>Risk of unforeseen costs relating to the management and removal of existing contamination from the project site.</i>
Artefacts and Heritage Claims	<i>Risk that the site has archaeological and cultural heritage value (above or below ground).</i>
Design, Construction and Commissioning Risk	<i>Risk that construction activities cannot be completed on time and/or to budget.</i>

⁷ For example the Orange Book in the UK, MAPPP publication on risks in France, and Queensland Government publication on risk management.

⁸ A psychological concept which leads members of a group to think alike – a collective tunnel vision.

⁹ Source: Partnerships Victoria (2013). Bendigo Hospital Project Summary, and case interview with Partnerships Victoria.

Defects Risk	<i>Risk that defects are identified following completion of construction.</i>
Modification	<i>Risk of the State electing to make a significant variation to the new facility or the services to be provided by the private party.</i>
Operational Risk Lifecycle Costs	<i>Risks associated with the replacement and refurbishment of the new facility over the operating phase of the Project.</i>
Utility Price and Volume Risk	<i>Risk of change in the price of the utility inputs required by the facilities and energy demand.</i>
Changes in Law or Policy (General)	<i>Risk that a change in legislation / regulations, State policy or quality standard, which applies generally, will have an impact on the design or construction or provision of the services.</i>
Changes in Law or Policy (Project Specific)	<i>Risk that a change in legislation / regulations, State policy or quality standards, which expressly and exclusively applies to the Project, will have an impact on the design or construction of the new facility or provision of the services.</i>
Force Majeure	<i>Risk that specified unforeseen events will have an impact on the design or construction of the new facility or on the provision of the services.</i>
Funding Risk	<i>Risk of providing funds to meet design and construction costs.</i>
Residual Conditions	<i>Risk that on expiry of the contract term the condition of the new facility is less than that required by the project agreement.</i>

Risk checklists

Checklists of risks typically associated with projects are often used to check the outcome of a risk identification workshop for possible blind spots, or are used in their own right for identifying risks. Some VfM assessment guidelines include checklists, for instance the Australian PSC Guidance,¹⁰ which offers a list of general risk types, the PSC Guidance of the Netherlands¹¹ or the UK Ministry of Defence which offers a more extensive list.¹² Textbox 2 contains an overview of typical perspectives found in the risk checklists highlighting the broad risk categories and the phases in the project's development where different risks may arise.

¹⁰ National PPP Guidelines Volume 4, PSC Guidance, December 2008. Page 29, table 6.1 Risk identification.

http://www.infrastructureaustralia.gov.au/public_private/files/National_PPP_Guidelines-Vol_4_PSC_Guidance_Dec_08.pdf

¹¹ PSC Manual Appendix C: Risk checklist. http://www.mfcr.cz/assets/cs/media/Twinning_c-0002_2002-07_Public-Sector-Comparator-guidance-Ministry-of-Finance-the-Netherlands.pdf.

¹² MOD Private Finance Unit Guidance Note. Allocation and Management of Risk in PFI projects. Version 4, 2010. Page 11, Annex A.

Textbox 2: Example of risk identification category and timing checklists^{13 14}

Checklist #1: Project activities	Checklist #2: Project phases	Checklist #3: Future events
<ul style="list-style-type: none"> ✓ Strategic ✓ Financial and economic ✓ Legal ✓ Permitting ✓ Social and societal ✓ Technical and technological ✓ Organisational ✓ Spatial and geographical ✓ Demographical ✓ Environmental and ecological ✓ Political 	<ul style="list-style-type: none"> ✓ Commissioning ✓ Design ✓ Engineering ✓ Construction ✓ Operation ✓ Maintenance ✓ Major maintenance ✓ Hand-back 	<ul style="list-style-type: none"> ✓ Compensation event ✓ Delay event ✓ Force majeure

Standard documentation

Observation 3: The general tendency is to reduce project preparation costs by using standard PPP contracts as a starting point for risk analysis.

Some countries have developed standard PPP contract frameworks which, even if it is not their primary purpose, can be used as checklists for risk identification purposes.¹⁵ An example is the UK HM Treasury PF2 Standardised Contract and sector specific standardised contracts that are based on this.¹⁶ The Netherlands has developed sector specific standardised contracts for highways and public buildings. Germany has similarly developed standard contract frameworks, where for highways, different models are available which vary in terms of risk allocation. Australia uses a 'standard commercial principles' document which provides a basis for all social infrastructure PPPs ('social' in this setting means 'non-user pay generating').¹⁷

In most countries, identifying risks is a continuous process which goes far beyond the VfM assessment of project delivery options. There may therefore be a number of other stages in the evolution of the project (e.g. the UK's Business Case approach) where project risks are examined closely, with identification becoming more detailed as the preparation of the project advances.

Registering risks

The risks that are identified during the risk identification step are brought together in a risk register or risk matrix. This is usually a spreadsheet table in which all risks that have been identified are listed. By adding the characteristics of each risk (for example the project phase in which it occurs or its type), the risks can be further classified and placed in various categories.

The exact purpose and content of the risk register differs between countries.

¹³ U.S. Department of Transportation, FHWA (2013), Guidebook for Risk Assessment in Public-Private Partnerships.

¹⁴ Checklist #3 is terminology used in PPP contracts. In this checklist, it is intended to draw the attention to possible future events that may impact on cashflows.

¹⁵ The use of standard contracts reduces time spent on risk identification and allocation and thus reduces project preparation costs.

¹⁶ It should be noted that the standard documentation is being revised as part of the introduction of PF2.

¹⁷ Infrastructure Australia (2008). National PPP Guidelines. Volume 3: Commercial principles for Social Infrastructure.

http://www.infrastructureaustralia.gov.au/public_private/files/National_PPP_Guidelines_Vol_3_Commercial_Principles_Social_Infrastructure_Dec_08.pdf.

- In Belgium and the Netherlands, the risk register is focused on the VfM assessment during the procurement stage. The risk analysis during the feasibility stage is not necessarily captured in a risk register, since the risk analysis at that stage is limited to a broad estimation of overall possible savings. The risk register in the procurement stage is strictly aimed at risk valuation for those risks that are transferred to the private sector in the PPP option while retained by the public sector in the conventional procurement option. Therefore, the risk register contains only valuation elements for those risks: the phase, the probability of the risk occurring, the impact of the risk, and the value of the risk.
- In the UK, the risk register contributes to the VfM assessment at various stages during the project life cycle. Therefore, the risk register is developed over time and in more detail in line with the different project stages as the project evolves and the risks are understood in increasing detail. For example, the risk register at the outline business case stage will contain a greater level of detail than at the strategic case stage.¹⁸ The logic of this approach is partly to ensure that time and effort spent on risk analysis is appropriate to the stage of the project. There is little point carrying out a detailed risk analysis at the very early concept stages of a project and when detailed aspects of the project may still need to be defined. A more detailed analysis, and therefore increased time and resources, is required for the risk analysis as the likelihood increases of the project being realised.
- In France, the risk register contributes primarily to the VfM assessment during the preparation stage (the *évaluation préalable*) and secondarily to the identification of risks which must be allocated between the public and private sector when developing the PPP contract. The establishment of a project specific risk matrix is influenced by a pre-structured risk matrix that is included in the French guidance. The pre-structured risk matrix includes, for a limited number of sectors, an indicative allocation of risks between the procuring authority and the private partner and some indicative figures and distribution scales for specific risk items.

Table 1: Example of a risk matrix¹⁹

Risk	Risk allocation				Comments
	Conventional option		PPP option		
	Public entity	Private partner	Public entity	Private partner	
Preparatory phase					
Risk 1					
Risk 2					
...					
Development and construction phase					
Risk 1					
Risk 2					
...					
Operational phase					
Risk 1					

¹⁸ HM Treasury (2004), The Orange Book. Management of Risk – Principles and Concepts .

¹⁹ Modified from MAPPP, Mission d'appui aux partenariats public-privé.

Risk 2					
...					
Special risks					
Risk 1					
Risk 2					
...					

Risk valuation

The primary objective of risk valuation is to provide inputs, in terms of values, for the comparison between the PPP option and the conventional procurement option. In all countries the risk valuation exercise also contributes to preparing for any dialogue or negotiations with the private sector that may take place during the procurement stage. Valuing risks and risk allocation (see section 1.4) however is an iterative process.

Four main methodological approaches to risk valuation can be identified, namely:

- determination of the expected value of individual risks, for example as followed in Germany (paragraph 1.3.1);
- valuation of individual risks on the basis of risk distributions, particularly followed in France (paragraph 1.3.2);
- over and above the valuation of individual risks, the use of an 'optimism bias factor' for unknown risks in addition to otherwise quantified risks, particularly adopted in the UK (paragraph 1.3.3); and
- valuation of categories of risks, particularly adopted in Belgium and the Netherlands (paragraph 1.3.4).

It should be underlined that in practice the difference between the methodologies tends to be smaller than may appear from the above list that deliberately seeks to distinguish more sharply the different methodologies.

Determination of expected value of individual risks

A detailed description of this approach is provided in the German guidelines.²⁰ The approach may be characterised as predominantly following the risk definition adopted by engineering experts (see section 1.1). It should further be pointed out that the risk valuation is predominantly carried out as part of determining the cashflows of the conventional procurement option. Consequently, no separate (prior) risk valuation for the potential PPP option is carried out.

Each risk is provided with a qualitative indication of the probability of its occurrence (high, medium, low) and the expected impact on cashflows for the procuring authority if the risk occurs (high, medium, low). All risks that are either indicated as having a high probability of occurrence or a high impact will then be valued, as demonstrated in Table 2.

Observation 4: Risk valuation in Germany focuses on valuation by multiplying probability of occurrence and expected impact

²⁰ Land Nordrhein-Westfalen, Leitfaden 'Wirtschaftlichkeitsuntersuchungen bei PPP-Projekten', September 2006.

Table 2: Prioritization matrix used in German risk valuation

Probability/Impact	Low impact	Medium impact	High impact
Low probability			Value with high priority
Medium probability			Value with high priority
High probability	Value with high priority	Value with high priority	Value with high priority

For each of the prioritised risks, the probability of occurrence and the impact is then estimated at a more detailed level. This estimation is carried out by using, for example, a matrix as shown in Table 3.

Table 3: Valuation matrix used in German risk valuation²¹

Cost overrun/underrun	Impact (assuming base estimate EUR 10 million)	Likelihood	Risk value
-10%	-1 million	5 %	-0.05 million
0%	0	20 %	0
10%	1 million	40 %	0,4 million
20%	2 million	25 %	0,5 million
30%	3 million	10 %	0,3 million
Total			1,15 million

A number of sources are used for completing the matrix in Table 2, including:

- market information on risks, for instance insurance premia;
- empirical data, specifically benchmark information from other projects;
- theoretical valuation, for example the determination of revenue risk based on the estimated demand from traffic models and the estimated price elasticity of users; and
- expert opinions.

One of the main reasons for following the above described approach is to avoid overestimating the value of risks, which could occur if one were to value each risk (i.e. not only the prioritized risks) individually. The advantage of the above approach also seems to be taking a practical approach to focus only on the main risks proportionate to the availability of data.

Valuation of individual risks on the basis of a risk distributions

The Australian and French guidelines advise that probability analysis should be used for risk valuation. This approach puts the emphasis on the perspective on risks that is followed by financial/investment experts (see section 1.1). The objective of this approach is to determine the 'Value at Risk' (also sometimes referred to as the 'certainty equivalent') for the cost/revenue components for the different procurement options. The Value at Risk approach is depicted in Figure 2 for an individual cost related risk.

Observation 5: Risk valuation in France focuses on (clusters of) individual risks taking into account the risk averseness of the procuring authority

²¹ Modified from Finanzministerkonferenz (September 2006), *Leitfaden, 'Wirtschaftlichkeitsuntersuchungen bei PPP-Projekten.'*

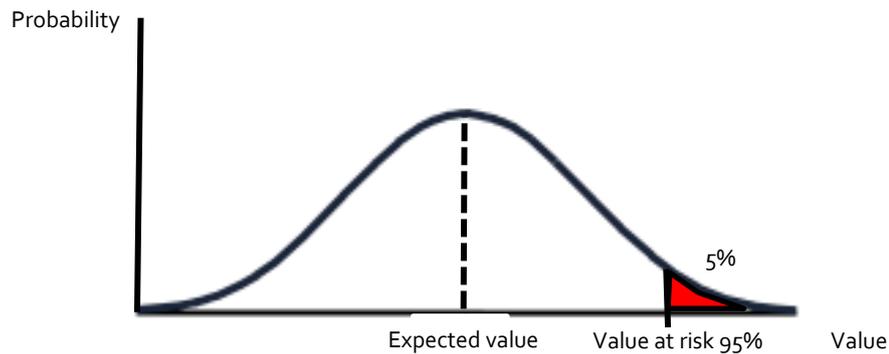
Figure 2: Value at Risk at 95 percent certainty²²

Figure 2 depicts an example of the relationship between the probability and a particular cost value: the vertical axis indicates the probability (or likelihood) and the horizontal axis the cost. In this approach to risk, the level of risk is reflected in the shape of the curve: a flatter curve is a riskier cost item, i.e. a wider range of possible costs. In this example, the expected value of the particular cost would be found in the middle of the curve. At this point on the curve, the probability (or likelihood) of higher than the expected cost equals the probability of lower than the expected cost. However, say a given minimum level of certainty is required for the cost - in the example in Figure 2 this is 95 % - the corresponding cost for this level of certainty may then be determined – this is what is called Value at Risk ('VaR'). In other words Figure 2 is indicating that there is a 95 % chance that the cost will not exceed the VaR figure. Put differently, there is a 5 % chance that the cost will exceed the VaR. A required probability level higher than 50 % is often referred to as 'risk averseness'. Thus, a key variable in the analysis is the relevant procuring authority's level of risk averseness that it has chosen to work with.

This analysis is usually supported by a methodology called Monte Carlo analysis. Computer based software packages for this analysis are provided by, among others, @Risk and Crystal Ball.

A key issue in this approach therefore is to determine the probability distribution function for each cost/revenue (i.e. the form of the relationship between probability and cost/revenue) to use for each type of risk and the parameters to use (minimum and maximum values, average, etc.). This approach is therefore particularly sensitive to the availability and quality of data in order to determine the appropriate distribution curve and the detailed shape of the curve for each cost/revenue as shown in Table 4.

Table 4: Example of risk matrix for transportation projects²³

	Chance of occurrence (%)	Impact cost distribution type	Impact cost public (min %; expected %; max %)	Impact cost private (min %; expected %; max %)	Impact delay distribution type	Impact delay public (min months; expected months; max months)	Impact delay private (min months; expected months; max months)
Construction							
Study	2	Log normal	1; 6; 32	0; 4; 15	Log normal	1; 5; 25	1; 4; 17
Scope changes	98	Exponential	Exp 9	Exp 2	Exponential	Exp 6	Exp 1
Construction progress	2	Log normal	0; 2; 7	0; 1; 3	Exponential	Exp 2	Exp 1
Failure	2	Triangular	11; 16; 19	6; 11; 15	Normal	3; 6; 9	2; 6; 10
Operations							
Interface	98	Exponential	Exp 5	Exp 1	Exponential	Exp 2	Exp 1

²² Modified from MAPPP, Les contrats de partenariat - guide methodologique, page 51.

²³ Modified from MAPPP, Mission d'appui aux partenariats public-privé Parametrage, Parametrage Risques V3, page 23.

Developments	2	Log normal	2; 3; 6	0; 1; 2	Log normal	0; 2; 8	0; 1; 3
Performance	98	Exponential	Exp 6	Exp 4	Exponential	Exp 2	Exp 1
Traffic demand	50	Exponential	Exp 3	Exp 1	N/A	N/A	N/A
Major maintenance							
Interface	2	Triangular	4; 9; 14	3; 8; 12	Exponential	Exp 2	Exp 1
Performance	10	Exponential	Exp 30	Exp 25	Exponential	Exp 2	Exp 1
Traffic demand	50	Exponential	Exp 5	Exp 3	N/A	N/A	N/A

In France, in practice, individual risks that are identified and registered are often grouped into more macro level clusters. This is done as it is often almost impossible to identify the individual impact of each of the numerous individual risks and in order to limit overweighting the overall risk due to correlation among individual risks (for example the risk of a construction cost increase may be driven by a number of individual factors such as weather, transport costs, import delays etc.).

It is important to be aware that the level of risk averseness of a public procuring authority can influence the comparison between the PPP option and the conventional procurement option. To help understand this further, the influence of risk averseness on the comparison is demonstrated in Figure 3.

Figure 3: Change of preference between 50 percent certainty value and 95 percent certainty value ²⁴

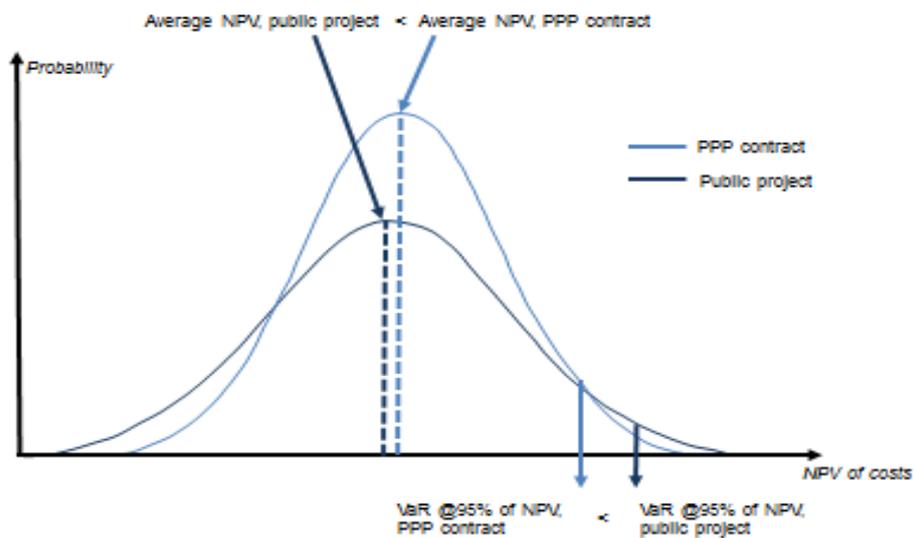


Figure 3 depicts the relationship between probability and a particular cost value. The first graph (light blue) represents the relationship for the private sector and the second graph (dark blue) the relationship for the public sector or conventional procurement option. For each of the public and private options, the vertical dotted lines mark the points where the likelihood is the same of costs being greater than or less than the cost value indicated. This is the 'expected' cost for each option. As can be seen from the graphs, in this particular case, the expected cost is higher in the hands of the private sector than in the hands of the public sector: the light blue dotted vertical line lies to the right of the dark blue dotted vertical line. Say this concerned construction cost risk for a particular type of building. The shape of the probability distributions for the construction costs for the two options is indicating that for a 50% probability (i.e. in half the cases) the data shows that if the building were to be procured conventionally, the 'expected' cost would be less

²⁴ Modified from MAPP, Les contrats de partenariat - guide methodologique, page 51.

than if it were to be procured as a PPP. However, the data also shows that at a 95% probability level (i.e. 95% of the area under each graph or, in other words, if 95 % of cases are considered), the cost level for the PPP option is *lower* than the conventional option. The private sector for example may have better cost management controls, so the overall range of expected costs is narrower than for the public sector. Thus, if a 95 % level of certainty is required, then the expected level of construction cost for the PPP option is *less* than for the conventional procurement option and thus a different conclusion is reached.

The Australian and French VfM guidelines also advocate the detailed assessment of (clusters of) individual risks where relevant, as a preparation for any negotiation on the allocation of individual risks between the public and private sector. Such assessment, including the VaR assessment, therefore allows the public sector to develop a detailed perspective on particular risks. This helps to reduce differences between the public and private sector in the level of information available to them, often referred to as the problem of 'information asymmetry' (with the public sector often lacking information in comparison with PPP bidders).

It should be underlined that the French approach is tailored towards the risk averseness level of the procuring authority. The perspective of the procuring authority is particularly relevant since the French approach focuses on the financial impact for the procuring authority (i.e. the micro-economic perspective), whereas the approach in the other studied countries is on the socio-economic impact to society (i.e. macro-economic perspective), in which risk averseness of the particular procuring authority is not considered relevant.

In practice, the relatively elaborate approach that is described above is often carried out by, or with the help of, external experts.

Textbox 3: Risk valuation for the project 'Training and innovation grand campus Lille'²⁵

In the context of a large improvement programme for the Grand Campus Lille, a PPP contract was developed specifically aimed at creating three separate buildings: a library, a physical training centre and campus building. The combined value of the three buildings amounts to approximately EUR 80 million.

The expected value of the conventional procurement option amounted to EUR 79 million, whereas the expected value of the PPP option amounted to EUR 85 million, which made the conventional procurement option 7 percent more attractive than the PPP option.

Subsequently, a risk evaluation, incorporating a level of risk averseness (i.e. a 95 percent certainty level), was carried out. This led to a greater increase in the expected risk level of cost overruns for the conventional option summarised as follows:

	Conventional procurement option	PPP option
Cost overrun – construction	24.5 %	4.7 %
Cost overrun – operations	35.6 %	4.0 %
Cost overrun major maintenance	36.8 %	0.3 %

Adding these risk percentages to the expected values, led to a net present value (including risk) of EUR 95 million for the conventional procurement option and EUR 90 million for the PPP option.

'Optimism bias'

In the UK, risks are captured by a combination of risk quantification (for identified individual risks) and application of a factor aiming to correct a tendency towards optimism on levels of cost and revenue, so-called 'optimism bias' or 'OB' (see Textbox 4).

²⁵ Source: MAPPP, Avis n° 2011-38 sur la réalisation du projet formation et innovation, novembre 2011, not taking into account delay effects.

Textbox 4: Optimism bias

The concept of optimism bias is described in a supplement to the UK Green Book.²⁶ In short, studies by Flyvbjerg have shown that for public infrastructure projects there is a tendency to underestimate costs and overestimate revenues.²⁷ Mott MacDonald performed a specific study for UK projects in order to find UK specific data.²⁸ They determined that, based on empirical data for a large number of projects for different forms of infrastructure, there were different factors by which the costs and revenues had been under-/over-estimated. This data was then used as input for the HM Treasury standard Excel tool for VfM calculations²⁹. Project teams however are still expected to carry out a full risk analysis.

The application of optimism bias factors can lead to a difference between the cost estimations for the different project delivery options depending on the point in time in the project development cycle that they are applied: at the point of signing the PPP agreement, the optimism bias factors are only applied to the conventional procurement option reflecting the expected higher relative underestimation of costs at this point compared to the private sector option. The argument is that the private party within a PPP contractual structure will have included the value of particular risks as part of their PPP bid.

Optimism bias factors are applied as part of, and through the different stages of, the project. This includes the earlier stage economic analysis as part of the overall approach to developing projects in line with the UK's Five Case Model. Optimism bias factors are first applied to the costs and revenue assumptions at the initial strategic outline case ('SOC') stage to all options which may, though not necessarily, include at this early point a PPP procurement option and the conventional procurement option. In effect, optimism bias factors are a proxy to adjust project values such as costs in the absence of information for more detailed risk analysis at that particular stage.

Observation 6: Risk valuation in the UK takes into account unknown uncertainties by applying a Optimism Bias factor

During the subsequent more detailed outline business case ('OBC') stage, project costs/revenues are adjusted based on their values as a result of more detailed risk analysis (roughly comparable to the German method described in section 1.3.1). Accordingly, a residual but lower optimism bias factor is expected to be applied for both the PPP procurement option and the conventional procurement option. In other words, as more detail on expected costs and revenues is determined, the optimism bias factors applied will be lower for both the PPP procurement option and the conventional procurement option in the OBC stage when compared to the SOC stage as the development of the project is further advanced.

The use of optimism bias factors is a structured approach to ensure that more realistic assumptions on project costs and revenues are applied from the early stages of project development (and therefore decision making) using an approach that is both evidence based and relatively simple to apply. A similar approach (for example applied in the Netherlands, see section 1.3.4) includes using a factor for the 'unknown unknowns' in the prescribed cost estimate methodology.

²⁶ UK Treasury. (2007). Supplementary Green Book Guidance: Optimism Bias

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191507/Optimism_bias.pdf.

²⁷ Flyvbjerg, B. (2002) Megaprojects and Risk. An anatomy of ambition.

²⁸ Mott MacDonald (2002). Review of Large Public Procurement in the UK.

http://www.parliament.vic.gov.au/images/stories/committees/paec/2010-11_Budget_Estimates/Extra_bits/Mott_McDonald_Flyvberg_Blake_Dawson_Waldron_studies.pdf.

²⁹ It should be noted that the standard model is no longer being provided and is being revised as part of the introduction of PF2.

Textbox 5: South Tyne and Wear Waste Management Partnership, UK^{30 31 32}

The South Tyne and Wear Waste Management Partnership (STWWMP) is a partnership between three UK local authorities to deliver a project that includes the design, construction, financing and 25-year operation of a waste to energy facility. The estimated value of the contract is GBP 727 million (EUR 916 million).

In accordance with the UK project assessment methods, a strategic and subsequently outline business case were drafted using the principles of the Five Case Model. Part of the analysis during the OBC phase involved estimating the optimism bias (OB) at that stage. A consultant was hired to support in the estimation process.

To arrive at the relevant OB factors to apply, the following steps were followed:

1. Decide which project component type to use

The Mott McDonald study offers different OB ranges for different types of project components. The STWWMP project consists of a mix of project components, of which 77 % comprised equipment, 10 % standard buildings, 10% standard civil engineering and 3 % non-standard civil engineering costs.

2. Start with the upper bound (i.e. the upper OB factor for the project type)

3. Consider whether the OB factor can be reduced

The OB factor can be reduced when contributory factors are mitigated. For the STWWMP project, these factors were considered and this resulted in lowering the OB factors compared to the upper bound. The upper and lower bound assumptions and the specific project assumptions are displayed in the table below.

Project component	OB upper bound (%)	OB lower bound (%)	OB used by STWWMP (%)
Standard Buildings	24	2	9.28
Non-Standard Buildings	51	4	N/A
Standard Civil Engineering	44	3	30.04
Non-Standard Civil Engineering	66	6	30.03
Equipment/Development	200	10	66.9
Outsourcing	41	0	N/A

4. Apply the optimism bias factor

By using the percentages per project component and applying the weight of the project component in relation to the overall project capital development cost, an OB factor was found for the different project components for the purposes the VfM calculation. This led to an OB factor of 56.5 % in total.

The next step was to split this percentage for the pre and post-FBC. The part of the risk that is pre-FBC is assumed to be mitigated at the post-FBC stage. For instance, the total OB on initial capex is assumed to be 56.5 % and then split 25 % / 75 % to pre and post-FBC. Consequently, the resulting pre-FBC OB factor is 14.1 % and post-FBC OB factor is 42.4 %. For the STWWMP project, the consultant estimated project specific assumptions based on experience in other projects. The specific project mentioned as a reference is the West Sussex PFI. The consultant indicated that there was limited data to derive assumptions. The full argumentation for these assumptions is available in the published outline business case.

The standard UK HM Treasury VfM model at the time set out standard OB factors for different cost/revenue categories. These, and the project specific assumptions for STWWMP, are set out in the table below:

³⁰ Source: Outline business case STWWMP, Appendix 8.1 (2007) and interviews with HMT – not project specific.

³¹ This example is based on the outline business case documentation from 2007. In reality, the project assessment is a process which takes place over several years. The estimation of the optimism bias will decrease during the evolution of the project.

The purpose of this example is to demonstrate the working of the optimism bias at a specific point during the UK project cycle.

³² UK Optimism Bias supplement to the Green Book.

	OB pre-FBC Standard model assumption	OB post-FBC Standard model assumption	OB pre-FBC STWWMP specific	OB post-FBC STWWMP specific
Initial CapEx	14 %	17 %	14.1 %	42.4 %
Lifecycle costs	11 %	13 %	14.1 %	42.5 %
OpEx	11 %	13 %	5 %	20 %
Third Party Income	10 %	10 %	11.8 %	47.2 %

The standard UK HM Treasury numbers are based on the study by Mott McDonald (2002). Note that in the calculations, for the VfM assessment at the procurement stage, both pre- and post-FBC optimism bias were used while for the PFI option only the pre-FBC optimism bias was used. The third party income optimism bias was very high because in this project it was uncertain whether there would be a buyer for the heat generated, which would lead to a value of zero for these revenues.

5. Review the optimism bias adjustments
The resulting OB factors were independently reviewed, as part of the Gateway Review process.

Valuation of risk categories

The risk valuation approach followed in The Netherlands is to value risk according to risk categories. The valuation technique is based on three categories of risk, which are mutually exclusive and collectively exhaustive, namely:

- 'Pure' risks: these include potential incidents occurring during one of the project phases which have a negative effect on the expected value of the project (for example the risk of a cost arising for the project in order to deal with possible soil contamination).
- Technical spread risks: variations in estimated quantities or prices due to technical uncertainties (for example uncertainty about the quantity of concrete required during construction).
- Market-related spread risks: variations in estimated prices due to market circumstances (for example uncertainty about the costs of insurance premia).

Observation 7: risk valuation in for example the Netherlands is based on valuation of categories of risks

Pure risks and technical spread risks are typically valued in a similar way to the valuation of individual risks as described either in paragraph 1.3.1 or 1.3.2 in France and Germany. Benchmark data is available for typical projects (e.g. highways, public buildings). The estimates of these risk categories typically decline as the project gets closer to procurement and the costs become more defined and more certain. This is because new information becomes available which can turn part of the risks from an uncertain into a certain cost (which may be compared to the diminishing value of Optimism Bias, as applied in the UK). An example would be the costs of dealing with ground conditions, which can be tested in advance.

Market-related spread risk however is valued differently by including a risk premium in the discount rate (see chapter 2). More information on how to value this risk category can be found in the PSC Manual of the Netherlands.³³

³³ PSC Manual, Appendix 2: Risk valuation.

Textbox 6: Dutch example on risk categories³⁴

The city hall in the municipality of Westland is currently in the process of being tendered. The project includes the design, construction, financing and operation of an office facility. The estimated value of the contract is EUR 40 million.

The value of risks was determined through the following steps:

1. Qualitative assessment of risks

Through a risk workshop, individual risks were identified for each project phase. For each risk the allocation to public or private sector was identified.

2. Quantitative assessment of risks

Pure risks

The pure risks of the project were estimated both by a top-down and a bottom-up method. Top down, a percentage was applied on the construction costs of 13 % (EUR 4 million). This percentage was based on benchmark projects and was part of the cost estimation method. Bottom-up, the individual risks were assessed during an expert workshop by using estimations of chance of occurrence and impact. This valuation led to a total risk value for construction of EUR 4.1 million. Consequently, the top down and bottom up valuation showed similar outcomes and therefore validated the result. The bottom up valuation was also used for the other project phases (preparation and operation).

Technical spread risks

The technical spread risks of the project were estimated based on a confidence interval of 84 % and a standard deviation of 5 %. This led to a small adjustment of the cost estimation of EUR 0.1 million.

Market-related spread risks

The market related spread risks were valued through a risk premium in the discount rate (see Chapter 2). The current market nominal interest rate on Dutch government bonds was 2.73 % at the time. Since the public private comparator was calculated excluding inflation, the rate was corrected for 1.8 % inflation. Then several assumptions on the financing structure were used to estimate the weighted average cost of capital (risk premium on debt of 2 %, gearing of 90 % and return on equity of 11 %). All these assumptions were based on benchmark projects.

Risk allocation

The objective of risk allocation is to allocate individual project risks to the contract party best able to manage and carry the risk, i.e. to the party able to manage it for the least cost and so to limit the effect of the considered risk on the cost of the project. However, the extent to which risk allocation is part of the VfM assessment differs between the countries studied.

In Australia, France, New Zealand and the UK, risk allocation is included in the VfM assessment methodology. The VfM assessment in these countries is very much a part of the process in designing the PPP option.

In Belgium, Canada, Germany and the Netherlands, explicit allocation of risks also takes place but is not considered part of the VfM assessment methodology. Allocation of risk can be informed by other methodologies (considered outside the specific VfM assessment methodologies) and certain public sector preferences or experiences from previous projects. These other inputs may implicitly involve VfM considerations (for example market sounding in all cases will reveal the private sector's appetite and therefore costs, to manage a certain risk) so the actual distinction in approach with Australia, France, New Zealand and the UK may not in effect be that great.

Observation 8: In the UK, France, Australia and New Zealand, risk allocation is part of the VfM assessment methodology. In Belgium, Canada, Germany and the Netherlands risk allocation is carried out outside the VfM assessment

³⁴ Deloitte (2011). Publiek Private Comparator Gemeente Westland.

Nevertheless, the focus of the VfM assessment in Belgium, Canada, Germany and the Netherlands will be to assess a given PPP proposition rather than driving the development of a PPP proposition. Accordingly, the scope of the VfM risk analysis itself is relatively limited, focusing only on those risks that it is already proposed to be transferred to or to be shared with the private sector, rather than the VfM assessment working up from an identification and evaluation of all the project risks and then driving the allocation. However, one should not overemphasise this distinction of approach as the objectives are usually similar.

It is important to note that none of the countries make use of regulations to prescribe how specific risks should be allocated. In the countries studied, responsibility for appropriate risk identification, evaluation and allocation remains with the authority procuring the project.

The French guidance, for example, does not define a rule on how to allocate risks between the public and private sector. The guidance states that the public authority should examine the risk matrix and then decide on how to allocate risks between the private and the public sector. In practice, the risk matrix which presents in one place the risk identification, allocation and valuation is often prepared initially by the project management team within the procuring authority (including its advisers), and then reviewed and further optimized in cooperation with MAPPP (the French PPP unit).³⁵

The UK Green Book offers a list of risk types that can be considered for risk transfer to the private sector.³⁶ The Green Book underlines that risk transfer should go hand in hand with the ability for the private partner (freedom) to control and be responsible for the risk, otherwise the private sector will simply increase prices.

Observation 9: The approaches in the countries that include risk allocation in their guidance are very similar and mainly differ in the level of detail that is offered in the guidance

Before transferring any risk, the UK Green Book goes on to emphasise that the public authority should be knowledgeable about the risk, namely the expected impact on the cost for the private partner, any limitations to the risk transfer and the impact of the risk transfer on the private partner's incentives. In short, a risk can only be transferred when the consequences are sufficiently understood. Each transfer of risk should be considered from a VfM perspective, namely does the transfer of the risk to the private sector offer better VfM for the public sector rather than retaining it?

Standardised contracts, such as the UK's Standardised PF2 contract, are also an important source of guidance on risk allocation. On the basis that such standard contracts are implemented over time, this has the additional advantage of reflecting what the private sector is willing to accept in terms of risk transfer.

The Australian guidance on risk allocation offers extensive guidance on several major risks.³⁷ The guidance offers a general 5-step approach to risk allocation. For fine-tuning of risks, a business case is used to determine the balance between the cost of transfer and the cost of self-management. This recognises that risk allocation in general follows some basic principles and specific risk allocation requires case-by-case consideration. The description of major risks also offers guidance on typical considerations for PPPs. Risk allocation is to be considered in parallel with the possible mitigation options for each risk from both the public and the private perspective i.e. what measures could be considered to reduce the risk itself as opposed to its allocation? To assist the project teams, the relevant PPP Unit may provide support – for example Partnerships Victoria in the case of projects in Victoria State. Partnerships Victoria also plays the role of ensuring that 'standard commercial principles' are applied for applicable State level projects.

³⁵ For projects from central government, VfM assessments must be reviewed and approved by the MAPPP prior to the launch of the procurement. Sub-sovereign entities can submit their VfM assessments to MAPPP on a voluntary basis.

³⁶ HM Treasury (2011). UK Green Book. Appraisal and Evaluation in Central Government. Page 84 'transferring risk' https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf.

³⁷ Queensland Government (2008). PPP Guidance Support Material. Risk management.

Textbox 7: Risk allocation at Bendigo Hospital (Australia)³⁸

The risk allocation for Bendigo Hospital builds on several elements:

- The list of risks that was collected during the risk workshop (see also Textbox 1)
- The guideline 'standard commercial principles', which is part of the PPP guidelines of Infrastructure Australia
- Partnerships Victoria Risk Allocation and Contractual Issues Guide (2001)
- The adage: 'the State seeks to achieve best Value for Money by allocating risks to the party best able to manage them'.³⁹

Partnership Victoria is involved in the project implementation mainly to ensure that these principles are upheld.

As with all projects, the risks for the project can be allocated in three ways:

1. To the State
2. To the private party
3. Shared (though not necessarily equally)

The standard commercial principles guideline offers definitions of terms and covers the most common risks and a standard solution for dealing with those risks in a PPP contract. For instance, contamination risk is in principle allocated to the private party, unless it is caused by the state itself. The terms 'guideline' and 'standard' are to be understood therefore as a starting point for each project. Project specific issues may lead to deviations from the standard. Such a deviation will then need to fit within the adage to allocate risk to the party best able to manage it. For Bendigo Hospital, the risk allocation is consistent with the standard commercial principles framework.

The table below sets out the high-level risk allocation on the project by way of example. The more detailed risk allocation is specified in the contract documents.

Risk Category	State	Private party	Shared
Obtaining appropriate planning approvals	X		
Contamination			X
Artefacts, heritage claim			X
Construction		X	
Defects		X	
Modification	X		
Lifecycle costs		X	
Utility price and Volume	X		
Changes in law and policy (General)			X
Changes in law and policy (Project Specific)	X		
Force majeure			X
Financing		X	
Residual asset condition		X	

Summary of observations

In summary, the following observations have been made:

- The objective of risk analysis and its ambition vary somewhat according to the country: in the UK, France, Australia and New Zealand, VfM plays a central role in the guiding decisions on risk allocation. In the other countries risk allocation is less directly guided by the VfM assessment guidelines, but the overall effects are not too dissimilar.
- The general approach to risk identification is roughly similar for all examined countries.

³⁸ Source: Partnerships Victoria (2013). Bendigo Hospital Project Summary, and case interview with Partnerships Victoria.

³⁹ Bendigo Hospital Project Summary (2013), p. 19.

- Four different approaches to risk valuation have been identified (although in practice the impact of these different approaches can be quite similar) :
 - Risk valuation in Germany is carried out by valuing prioritized individual risks on the basis of probability of occurrence multiplied by financial impact. The German approach focuses on the risks that are typically identified by engineering experts.
 - Australia, France and New Zealand focus on finding the required adjustment to cost (and revenue) estimations in order to arrive at a modified cost (and/or revenue) estimation. A detailed assessment of individual risks is usually carried out. In France, this takes into account the level of risk averseness of the procuring authority. By treating risk as the bandwidth around expected revenues and/or costs, this approach is more in line with that typically followed by financial/investment experts.
 - The UK uses a combination of individually valued risks and a factor called 'optimism bias' to cover unknown uncertainties in cost and revenue estimates. The value (and certainty) of the individually valued risks typically increases during project evolution with the optimism bias correction correspondingly decreasing during evolution of the project preparation process. Optimism bias factors are based on empirical evidence.
 - In Belgium and the Netherlands risk valuation focuses on finding values for individual risks that may be considered for transfer to a PPP partner. The risks are valued on the basis of three categories: 'pure risks', 'technical spread risks' and 'market spread risks', with the two former categories being valued as done in either Australia or Germany, and the latter being valued through the discount rate.
- The most important methodological difference is the question of whether specific types of risks should be reflected in the discount rate or in the correction of the project cashflows. This is further elaborated in Chapter 2.
- The approaches in the countries that provide guidance on risk allocation as part of the VfM guidelines are very similar and mainly differ in the level of detail that is offered in the guidance.

In addition to the above observations, some more generic conclusions can be drawn from the analysis:

- It is important to take into account a sense of proportionality in the approach to risk analysis. Analysis should be applied in an extensive way for large and complex projects but an equally extensive approach is not likely to be justified for smaller, less complex projects.
- It is equally important to take into account the availability of data in the design of the risk analysis methodology. If good quality data is not available, a risk analysis methodology, however sophisticated, will only be as reliable as the quality of the data available.
- Sounding out the market on different areas of risk in a well organised and prepared way is a tested and valuable activity during the project preparation stage to ensure that the procuring authority's assumptions about risks, their valuation and potential allocation are realistic and will eventually generate VfM.
- Risk analysis will usually play a broader role than that in the context of VfM assessment. It can, for example, play an equally important role in the socio-economic analysis of a project as well as in any subsequent contract negotiations.
- It is important that a balance is struck between using, on the one hand, standard templates and approaches to simplify risk analysis, reduce costs and improve consistency and, on the other hand, ensuring that the project organisation thinks sufficiently carefully about the specific project risks and their allocation. It is probably for this reason that that none of the countries studied use laws or regulations to inform how specific risks should be allocated as this could otherwise

absolve procuring authorities from the responsibility to consider risks carefully when preparing their projects.

Setting the discount rate in a VfM assessment

Introduction

In this chapter, the focus is on the determination and use of a discount rate when conducting a VfM assessment. In all the countries reviewed, the expected cashflows of various delivery options are compared by expressing these future cashflows in terms of a (net) present value and therefore the discount rate plays an important role in the VfM assessment.

The discount rate is defined as the rate by which future cashflows need to be reduced (or 'discounted') in order to express those future cashflows in today's current value. Discounting is predominantly based on the principle that, generally, people prefer to receive goods and services now rather than later (this is often referred to as 'time preference').

The sum of a discounted (future) cash flow is called the present value of that cashflow, meaning that it is the total of that future cash flow stated in today's current value. By adding the present value of cash inflows of a project (for example user charges) to the present value of cash outflows of the project (for example capital expenditure and operating costs), the net present value (NPV) of the project is determined. Alternatively, the amount of expenses and revenues can be summed for each future period before discounting the net amount for each future period into a current value. Discounting therefore enables the cashflows for delivery options, which may have different future cashflow profiles over time, to be compared.

In this report a 'nominal discount rate' is defined as a discount rate in which expected price inflation is included in the cashflow amounts. The nominal discount rate is therefore relevant for discounting cashflows in which expected inflation related price increases have, when applicable, been included in the future cashflows (meaning that those cashflows in future years have been increased by the expected inflation rate).

A 'real discount rate' is defined as a discount rate in which no price inflation is included. The real discount rate is relevant for discounting future cashflows in which expected price increases have not been included (meaning that the cashflows in future years have not been increased for expected inflation). Typically, the nominal discount rate is higher than the real discount rate (i.e. if not in a deflation period, prices increase rather than decrease over time).

The discount rate is highly relevant in all the VfM assessment methodologies reviewed, where it is used to derive net present values of the expected future cashflows to the relevant public sector entity in both the PPP option and the conventional procurement option. Appendix 2 contains a worked example in which the calculations that involve the use of a discount rate are elaborated for a number of the different countries reviewed.

The discount rate to be used in VfM assessments however is the subject of considerable academic debate.^{40 41 42} Central to the debate is the question of whether and to what extent corporate finance valuation theory⁴³ is applicable to the public sector, specifically in the context of socio-economic assessments. Key in this debate is whether market information on the cost of capital that also reflects project risks may be considered superior to any other basis for assumptions to derive the discount rate (see for example section 2.4 for a description of the assumptions applied in the UK).⁴⁴ A subsequent academic debate, if corporate finance valuation is accepted as applicable to the public sector, is whether a corporate finance valuation approach should be followed in setting the discount rate to reflect certain

⁴⁰ Grimsey, Darrin and Lewin, Marvyn K. (2004), 'Discount debates: Rates, risk, uncertainty and value for money in PPPs', Public Infrastructure Bulletin: Vol. 1: Iss. 3, article 2. Available at: <http://epublications.bond.edu.au/pib/vol1/iss3/2>.

⁴¹ Gray, Hall, Pollard (2010), 'The public private partnership paradox'.

⁴² Lucas, Deborah (2012), Valuation of Government Policies and Projects, Annual Review of Financial Economics (MIT) 2012 4:39-58. Available at: www.annualreviews.org/10.1146/annurev-financial-110311-101829.

⁴³ See for example Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance (1988).

⁴⁴ Although the academic debate exists for decades, the development of VfM assessment methodologies, and currently the interest rates becoming historically low, increases the attention given to this debate.

project risks and/or whether these project risks should be reflected in the adjustment of the project cashflows.

The argument in favour of applying the corporate finance valuation approach is based on the assumption that the actual (or historic) cost of financing for government is not the correct basis for discounting, because this does not represent the true cost of capital for either the public sector or for the specific project. The academic basis for this argument is the 2nd paradigm of Miller-Modigliani, which proposes that the cost of capital of a project is identical irrespective of the sources of capital.⁴⁵ Based on this line of reasoning, it is argued that the private, i.e. risk adjusted, cost of financing for the project is a more appropriate indication of the economic cost of capital of the project, even for the public sector.

A counter argument however points to the assumptions that have to be made under the 2nd paradigm of Miller-Modigliani⁴⁶ and claims that these assumptions do not sufficiently hold to make use of market information as input for determination of the cost of capital for a project and thus the discount rate to be applied.

Examples of a different basis to the corporate finance approach for setting the discount rate include Germany and UK (see sections 2.3 and 2.4).

Overview of prescribed discount rates

Observation 10: Nominal discount rates and the basis for setting the nominal discount rate differ substantially in the various countries

The discount rates to be used are specified in the various guidance documents on VfM assessment across the countries reviewed.

However, reflecting the above described debate on the basic methodology to be applied to set the discount rate, the currently applied discount rates for VfM assessments in the countries covered by the study differ considerably, both in terms of nature and level. From a purely quantitative point of view, the discount rate ranges from, at current market levels, 3 % in Canada, France and Germany, to over 6 % in Australia, Belgium and the Netherlands. An overview of the discount rates currently applied is provided in Table 5 below.

Table 5: Discount rates used in VfM assessments

Country	Real discount rate	Nominal discount rate	Project specific market risk premium	Nominal discount rate used for VfM
UK	3.5 %	6.09 %	-	6.09 %
France	-	Market based authority borrowing rate (currently 3 %)	-	Market based borrowing rate (currently 3 %)
Germany	-	Market based government borrowing rate (currently 3 %)	-	Market based borrowing rate (currently 3 %)
Netherlands	-	Market based government borrowing rate (currently 3 %)	Market based (typically 3 %)	Market based including risk premium (currently 6 %)
Belgium	-	Market based government borrowing rate (currently 3 %)	Market based (typically 3 %)	Market based including risk premium (currently 6 %)

⁴⁵ Modigliani, F.; Miller, M. (1958). 'The Cost of Capital, Corporation Finance and the Theory of Investment'.

⁴⁶ These assumptions are: No taxes, no transaction costs, no bankruptcy costs, symmetry of market information.

Canada	-	Market based government borrowing (currently 3%)	-	Market based rate (currently 3%)
Australia (VIC)	-	4.95%	1.8-4.8% (depends on risk profile)	6.75% - 9.75%

It should be noted that – everything else being equal – a higher discount rate renders the PPP option more attractive vis-à-vis the conventional procurement option and vice versa because the PPP option will generally lead to a cash outflow for the procuring authority that is spread further out in time whereas the conventional procurement option will generally lead to a higher upfront cash outflow for the procuring authority. Appendix 2 contains a commented example demonstrating the impact of different discount rates in combination with different approaches to risk valuation, as described in chapter 1. Appendix 2 illustrates the impact of a change in interest rates on the various methodologies reviewed.

Three different approaches to determining the discount rate used in VfM assessments can be distinguished in the countries covered by the study, namely:

- **No project specific risk premium, actual public sector cost of financing:** In Canada, France and Germany the cost of financing of the procuring authority or the central government is used as the discount rate (paragraph 2.3);
- **No project specific risk premium, fixed rate.** In the UK, a fixed rate (based on the social time preference rate) is used as the discount rate (paragraph 2.4); and
- **Addition of a project specific risk premium.** In Australia, Belgium, the Netherlands and New Zealand a project specific risk premium is added to the cost of financing of the government applicable at the time of the procurement stage (paragraph 2.5).

Observation 11: The methodological basis for determining the discount rate differs between countries

No project specific risk premium, actual public sector financing cost

In some countries, such as Canada, France and Germany, the general (non-project-specific) cost of financing of the procuring authority or the central government is used as the discount rate to be applied in VfM assessments. The costs of financing are market rates and therefore expressed in nominal terms.

Particularly in France, the cost of financing of the procuring authority is used. This is because the VfM assessment in France focuses on the financial assessment from a micro-economic perspective (i.e. from the procuring authority financing level). The cost of financing of the procuring authority may therefore be expected to contain an authority specific (however non-project specific) risk premium.

There are three approaches that are used to determine the market-based rate at a certain point in time:

1. France uses the standard borrowing rate of the procuring authority for a loan whose maturity would equal the PPP project's life;
2. Various countries (e.g. Canada) use the approximate average loan life method;
3. Germany applies a more detailed method to link the PPP project loan maturity to equivalent maturities in the market.

Observation 12: Market following rates are set in different ways

The approximate average loan life method is carried out on the following basis:

- Determine the average loan life (how long does it take on average to pay back the loan on the project?). For a 25 year project, this will typically be somewhere between 10 and 15 years.⁴⁷
- Look up the current rates in the market for a government loan for this average loan life. If there are no quotes corresponding to the loan life (for instance there is no traded quote for 11.5 years), take the nearest two available quotes and interpolate.

The more detailed method used in Germany determines a weighted average rate on the basis of the specific durations of the financing profile of the PPP partner. This approach makes extensive use of formulae and calculations (a description of the approach can be found in the German VfM guidelines.)⁴⁸ The difference between the approximate average loan life method and the more detailed method is really one of the degree of precision of the discount rate. Any difference between the two methods will depend on the profile of the yield curve (which plots interest rates for different durations). If the curve is relatively flat, the difference will most likely be negligible. The difference may run to a maximum of some 25 basis points (bps, or 1/100ths of a percent) in case of a highly irregular yield curve.⁴⁹

In Canada, France and Germany no additional project specific risk premium is added to the rate. The approach in these countries is focused on the question of whether the additional cost (including the higher cost of financing) of the PPP option is compensated for by the benefits of having a lower risk for the public authority with respect to project delivery risks, principally cost and time overruns.⁵⁰ Particularly in Canada and France, any project specific risk premium that may otherwise be included in the discount rate, is reflected through the risk analysis (as described in chapter 1) by correction to the project cashflows.

In Germany, the valuation of typical financial/investment types of risk (such as elaborated in section 2.4) is not included in the discount rate, nor explicitly in the cashflows. The German approach may therefore be considered relatively prudent towards the application of PPPs.

No project specific risk premium, fixed rate

In the UK a standard discount rate for all public project appraisals, such as cost-benefit analysis, is used and this rate is also used for VfM assessment.⁵¹ This discount rate is expressed in real (i.e. not nominal) terms, and is adjusted to a nominal rate by adding a prescribed inflation assumption. Unlike the actual cost of financing approach described above, this fixed rate equals the social time preference rate ('STPR'). The STPR is an approach that is applied for socio-economic analysis and often advocated by the academics that claim that the available market information is not sufficiently accurate (see section 2.1). The STPR is the sum of two components, namely: (1) the rate at which individuals discount future consumption over present consumption (consisting of catastrophe risk and pure time preference) and (2) the product of annual growth in per capita consumption and the elasticity of marginal utility of consumption. The STPR is currently set at 3.5% in real terms. This rate is calculated and set by HM Treasury from time to time. A project specific risk premium is not added to the STPR. It may be argued that a (non-project specific) risk premium is captured by the STPR, covering the type of investment/financing risks that in other countries are captured in the project specific risk premium (see section 2.5).

As in other countries where a standardised discount rate is used, particularly for cost-benefit analysis purposes, the rate is a topic for discussion and is therefore periodically updated. These periods are usually five to ten years. For instance, the last update of the UK rate was in 2006.

Another argument for the use of a standardised discount rate is the consistency that use of a single rate can provide across all assessments (for example in the Five Case Model approach) and over time which can help to enable different options to be compared on a similar basis. It is preferred in the UK not to introduce a specific discount rate for the assessment and choice of the delivery method of a project.

⁴⁷ To calculate the average life, multiply the date of each principal payment (expressed as a fraction of years or months) by the percentage of total principal that has been paid by that date, summing the results and dividing by the total loan size.

⁴⁸ Finanzminsterkonferenz, Leitfaden 'Wirtschaftlichkeitsuntersuchungen bei PPP-Projekten', September 2006.

⁴⁹ Author estimations based on swap price runs.

⁵⁰ MAPPP (2011), Guide méthodologique, page 31 «L'évaluation économique en financière doit montrer que le recours au contrat de partenariat permet d'offrir à la personne publique une solution alternative moins coûteuse et/ou plus avantageuse».

⁵¹ HM Treasury (2011). UK Green Book. Appraisal and Evaluation in Central Government. Page 97. Annex 6: Discount rate.

Addition of a project specific risk premium

In Australia, Belgium, the Netherlands and New Zealand the discount rate used for VfM assessments includes a project specific risk premium. In Belgium, the Netherlands and New Zealand this is applied to both the conventional procurement option and the PPP option. Australia applies the public sector discount rate for discounting the conventional procurement option cashflows and a discount rate including a project specific risk premium for discounting the PPP option cashflows.

These countries follow the argument which claims that corporate finance valuation theory should be applied in socio-economic assessments of public sector investment (see context in section 2.1) and therefore the discount rate is based on the private cost of capital for the project. Since the VfM assessment in these countries is deemed to take place within a socio-economic perspective, so the VfM assessment should use this approach.

The private cost of capital is typically materially higher than the public cost of financing. By way of illustration, for a non-revenue generating project, the difference may be broken down as specified in Textbox 8.

Textbox 8: Breakdown of cost differences between public and private financing⁵²

Cost of ten year fixed interest government bond (= public cost of financing):	3 %
Weighted Cost of Capital (WACC) of PPP option, consists of:	
Base rate commercial loan:	325 bps
Swap premium for fixed interest:	25 bps
Liquidity spread:	150 bps
Project specific risk premium:	100 bps
Total for commercial loan:	6 %
Required return on equity:	12 – 15 %
Combined (85% loan – 15% equity) therefore approximately:	7 %
	$(6 \% * 0,85 + 15 \% * 0,15)$

In the relevant countries mentioned, the combined cost of capital (roughly 7 % in Textbox 8) forms the basis for the discount rate. The difference between the private cost of capital (7 %) and the public cost of financing (3 % in Textbox 8) is often referred to as *the 'project specific' (or 'market') risk premium*.

The argument supporting this approach claims that the project specific risk premium comprises specific risks that may be overlooked or underestimated in a dedicated risk valuation exercise (as described in chapter 1). The risks that may be considered to be included in the project specific risk premium are summarized in Textbox 9.

Textbox 9: Typical risks that are included in the project specific risk premium

In the Australian Guidelines the following risks are mentioned as part of the project specific risk premium:
<ul style="list-style-type: none"> • Bankruptcy risk of subcontractors/sponsors • Inflation risk • Demand risk • Price volatility

⁵² All rates mentioned in this paragraph are subject to continuous market fluctuations. The numbers are indicative but roughly representative for a typical PPP project financing in the studied countries. The interest on government bonds can be found on public websites such as Financial Times or Bloomberg. The costs for the PPP option are project specific. The swap premium is the premium for trading a stream of variable interest to fixed interest. The liquidity spread is the consequence of imperfect markets where financial institutions are reluctant to make lending commitments over a long term. Bps is short for basis points and a basis point is a 100th of one percent.

- Residual value risk
- Level of competition in markets of subcontractors

Other risks that may be considered relevant here (but are not included in guidelines) could be:

- Interface risk between main contractor and subcontractors
- Interface risk between subcontractors
- Liquidity

For a more elaborate description, see the Australian PPP Guidelines Volume 5: Discount Rate Methodology, Appendix B: Factors giving rise to systematic risk.

Further adjustments may be applied to the project specific risk premium set out above and the project options to which it is applied. These adjustments fall into three categories:

Observation 13: project specific risk premia are set in different ways

In the first category - Belgium and the Netherlands - a full project specific premium is included in the discount rate. This same discount rate (including the project specific risk premium) is then used for calculation of the NPV of both the conventional procurement option and the PPP option. This approach is based on the assumption that essentially all costs included in the private cost of capital represent costs to the economy that eventually ought to be borne by the government as well. In practice, project organisations may choose to reduce the project specific risk premium (applicable to both options) on the basis of specific argumentation supporting the difference between private cost of capital and costs to the economy (e.g. during the recent financial market crisis it was sometimes argued that the liquidity spread⁵³ applied by commercial banks should not be included in the discount rate).

In the second category – New Zealand - only part of the additional cost of capital is included in the risk premium, which is then included in the VfM assessment discount rate. Adjustment is made to the project specific risk premium to exclude, for example, capital market conditions leading to a liquidity spread. The discount rate, including the project specific risk premium, is applied to discount cashflows in both the PPP option and the conventional procurement option.

In the third category – Australia – a discount rate based on the public sector cost of financing is applied to the conventional procurement option. A different higher rate, based on the cost of private capital, is applied to discount the PPP option cashflows. The impact of this approach is that – all things being equal – the PPP option compares more favourably with the conventional procurement option than in the case of using the same discount rate for both options.

In determining the discount rate for the PPP option, only part of the additional cost of private capital may be included in the risk premium and therefore in the VfM assessment discount rate, depending the level of market risk that is transferred to the private partner. The Australian Guidelines therefore take the full project specific risk premium as a starting point and then consider the risk allocation in order to find an adjusted project specific risk premium.⁵⁴

In calculating the risk premium for the PPP option, Australia uses an advanced approach to calculate the risk premium for different sectors on the basis of the CAPM methodology. This approach bases the risk premium on the prices of stocks which have a similar risk profile to the project. The guidance does not necessarily require a particular VfM assessment to conduct its own project risk premium analysis and offers a table of discount rates (including a project specific risk premium) for different sectors, with the discount rates stated in terms of different ranges to use. The guidance then offers arguments on whether

⁵³ It is debatable to what extent the financial markets currently function well enough to arrive at representative pricing. An example of a current distortion in this market is the recent hike in premium for illiquidity. This would not occur in a perfect market (which are by definition liquid).

⁵⁴ Grout (2005), Value for Money measurement in public-private partnerships, EIB papers, Volume 10, no 2, pp 32-56.

to choose the lower, middle or upper end of the range. For a more elaborate description, see the Australian PPP Guidelines.⁵⁵

Observation 14: it is important to avoid double counting of risk when adjusting cashflows or the discount rate

When using a risk adjusted discount rate, it is important to be clear about how risks are treated (through adjustments to cashflows and/or adjustments to the discount rate) to ensure that there is no double-counting (or omission) of the related risks. Double-counting could lead to an overestimation of the attractiveness of the PPP case. Omission of these risks would similarly lead to an underestimation of the attractiveness of the PPP case. Australian guidelines highlight that risk is reflected in the cashflows (as in other countries) to reflect expected values and that the further adjustment for risk in the discount rate is to reflect the risk of *variance* in values.

Summary of observations

The following observations can be made:

- In all the countries reviewed, VfM assessment currently involves the principle of discounting future cashflows for the different project delivery options. The choice of the discount rate is therefore an important element in the VfM assessment methodology.
- In Australia, Belgium, the Netherlands and New Zealand the discount rate used for VfM assessments focuses on a socio-economic comparison. These countries choose to base the socio-economic discount rate on corporate finance valuation theory. Specifically in Australia, the PPP option cashflows are discounted using a discount rate that includes a project specific risk premium and the conventional procurement option cashflows are discounted using the public sector cost of borrowing. In the other three countries, the cashflows of both options are discounted using a discount rate that includes a project specific risk premium.
- In the UK, the discount rate equally focuses on a socio-economic comparison of different options. Unlike the countries mentioned above, in the UK the discount rate is based on an estimate of social time preference and not on corporate finance valuation theory. This rate is set by HM Treasury and is used consistently throughout the UK, including in the Five Case Model and in the socio-economic assessment of projects.
- In Canada the VfM assessment equally focuses on a socio-economic comparison. The borrowing rate of the central government however is applied. This rate is selected since it is considered to be an accurate reflection of the public sector cost of capital.
- In France, the borrowing rate of the procuring authority is applied. This rate is selected, since the VfM assessment focuses on the financial, micro-economic perspective of the procuring authority.
- When using a project specific risk premium as part of the discount rate (as is the case in Australia, Belgium, the Netherlands and New Zealand), it is important to avoid double counting of risks. If risks are addressed by an adjustment to the discount rate, then those same risks should not be included in corrections to the project cash flow figures (as opposed to different risks being corrected in the cash flow figures).
- Nominal discount rates range from roughly 3 % for example in France and Germany to over 6 % for example in Australia and The Netherlands. All other things being equal, a higher discount rate is more likely to demonstrate VfM for the PPP option.

In addition to the observations mentioned above, some overarching conclusions may be drawn:

⁵⁵ Australian PPP Guidelines. Volume 5: Discount Rate Methodology, Appendix B: Factors giving rise to systematic risk http://www.infrastructureaustralia.gov.au/public_private/files/Volume_5_Discount_Rate_Methodology_Guidance_August_21_03.pdf.

- Clarity is required about exactly what decision is being made when considering what discount rate to use. It is important to distinguish clearly between a financial micro-economic perspective (e.g. in France the perspective of the procuring authority) and the socio-economic perspective (as in the other countries) for the VfM assessment. A financial micro-economic perspective may make sense when the objective of considering PPP is predominantly the improvement of budgetary discipline of procuring authorities. A socio-economic perspective may make sense if the focus on considering PPP is improved cost effectiveness for taxpayers overall.
- In the case of a socio-economic perspective, it is clear that not all countries perceive the academic debate on the discount rate in the same way. Some countries (like Canada and Germany) do not explicitly include the related project specific risk premia in the discount rate. The UK bases the discount rate on the social time preference rate, which may be considered a theoretical alternative for corporate finance valuation method. Australia, Belgium, the Netherlands and New Zealand follow corporate finance valuation theory and include a project specific risk premium in the discount rate. The mathematical differences are demonstrated in Appendix 2.

Including non-valued effects in a VfM assessment

Introduction

The topics in Chapter 1 and Chapter 2 are largely associated with issues relevant to VfM assessments that are expressed in terms of monetary values, or 'valued effects'. In this Chapter the different approaches to including 'non-valued effects' in a VfM assessment are examined.

Non-valued effects are those criteria or effects that could be included in comparing options under a VfM assessment but which are not given a Euro (or other currency) value. For example, it might be important to consider whether the procuring authority has the capacity to manage a PPP option or whether there is likely to be any interest in the market for the PPP option and hence the quality of competition in delivering VfM.⁵⁶

Non-valued effects however can still mean quantification. For example specifying the number of workers to be transferred to a private party can be quantified without being valued. In this report, non-valued effects also include all factors that are not valued, even if these could have been valued. Consequently, this chapter focuses on qualitative analysis as well as quantified but non-valued analysis.

Not all countries include non-valued effects specifically as part of the VfM assessment. This does not mean that these effects are completely excluded from decision-making. They may still feature in separate analysis of the project, or through lobby activities or other influencing mechanisms on decision-making. This chapter however focuses on approaches that are explicitly part of the VfM assessment.

Overview of approaches to non-valued effects

A wide range of approaches to include non-valued effects in VfM assessments is seen in the countries studied. Furthermore, in some countries, different approaches are followed at different project stages.

These approaches can be divided into six main categories:

- A qualitative approach only, for example at the early project preparation stage in Australia (paragraph 3.2.1);
- A basic qualitative approach as a supplement to the valuation approach, such as is followed in Germany and the Netherlands (paragraph 3.2.2);
- An extensive qualitative approach that, together with the valuation approach, comprises the VfM assessment, as for example in the UK, at the project preparation stage (paragraph 3.2.3);
- An extensive quantified approach as a supplement to valuation, for example in Belgium (paragraph 3.2.4);
- A qualitative approach instead of valuation, followed in the UK at the procurement stage (paragraph 3.2.5); and
- More process focused approaches largely seen during *ex-post* VfM assessments, i.e. during the implementation and operation of the project (paragraph 3.2.6).

Observation 15: Six main approaches to non-valued effects are followed

⁵⁶ It should be noted that some of the qualitative tests may be perceived as inconsistent with a pure VfM assessment, although in many cases they are an important component of VfM guidance. For example, in the absence of a market for the PPP option, making a comparison between the PPP option and the conventional procurement option becomes at best theoretical. The possible inconsistency between these elements in the VfM assessment are not further highlighted in the remainder of this section.

Qualitative approach only at the project preparation stage

In Australia the VfM assessment conducted *at the early project preparation stage* is carried out on the basis of a qualitative approach. In Australia this is called the 'procurement options analysis'.⁵⁷ The criteria that are taken into account are:

- Project objectives: to what extent is the procurement option likely to optimise the project outcomes?
- Risks: which model is likely to achieve an optimal balance of risks?
- Project characteristics (scale, scope, whole-life service possibilities): are there unique circumstances that would prohibit the choice of a certain model? Is the scale sufficient for the PPP option? Are there merits expected from bundling capital and maintenance responsibilities?
- Agency capability: are the resources and the skills of the procuring authority sufficient to deal with the PPP procurement option?
- Market capability: is there sufficient availability of suitable bidders?

To a large extent, these criteria match the criteria that are used in a valuation assessment, however, they are only scored qualitatively (namely 'yes' or 'no'). Since there is no quantitative analysis at this stage, the qualitative factors alone are used to inform the analysis and are not weighed against monetary outcomes at this stage.

If the qualitative procurement options analysis has a sufficiently positive result, a more elaborate quantitative assessment is carried out in the next stage.

Basic qualitative approach as a supplement to a valuation assessment

In Germany the VfM guidelines require that all relevant non-valued effects are taken into account. The analysis is not conducted using a standard list of criteria. Rather the analysis is focused on non-valued effects only insofar as they are distinctive for the alternative procurement options. In practice, the non-valued effects are only relevant when the quantitative analysis is too close to call.

The French 'évaluation préalable' also includes a qualitative approach in addition to the quantitative approach. It is carried out at two stages:

- In the legal assessment part of the study.⁵⁸ In order to be authorised by law to apply the PPP option, the procuring authority has to demonstrate that the PPP option is the most efficient delivery option.
- In the comparative analysis of the PPP option versus the conventional procurement option. At this stage, the procuring authority has to compare the qualitative impact of each procurement solution in terms of performance and sustainable development. This seeks to capture benefits and disadvantages associated with the PPP option that are not associated with the conventional procurement option that may also need to be taken into account (e.g. the qualitative benefits of the service being delivered earlier due to the use of PPP).

Extensive qualitative approach combined with the valuation assessment

The UK has the most extensive and explicit structure for the analysis of non-valued effects. It consists of three parts, namely:

- Viability – this addresses the question of whether the programme or project is suitable for long term contracting. Issues included here are employment and skills transfer, interfaces with other projects, regulatory and legal issues.

⁵⁷ Infrastructure Australia (2008). National PPP Guidelines. Volume 1: Procurement options analysis.

⁵⁸ http://www.economie.gouv.fr/files/directions_services/ppp/plan_type_evaluation_preable.pdf.

- Desirability – this overlaps with the financial analysis as it addresses the question of whether the expected benefits outweigh the additional cost factors (e.g. likelihood of a payment mechanism and contract terms to incentivise good risk management, expected term of the requirement, scope for innovation).
- Achievability – this includes the market interest as well as timing issues and the capacity and capability of the procuring authority to manage the different delivery options.

For a project to be considered for PPP procurement in the UK, the assessment of non-valued effects should also be positive. Requiring both assessments to generate positive outcomes is the result of an earlier reconsideration of the VfM assessment approach which now places less reliance on the analysis of valued effects (as was the case in the earlier years of the UK PPP programme) and more reliance on 'logical thinking'. The underlying concern was that initial, more valuation focused analysis, could be subject to bias as well as recognising that any such valued analysis is, after all, based on assumptions which may vary in reliability and not capture all relevant aspects for decision making. This was also a concern in cases where strong budgetary incentives might exist for authorities to choose the PPP procurement option. The UK National Audit Office has offered an extensive discussion on this topic.⁵⁹ In practice, the non-valued effects are addressed at the various stages of the project's development with the emphasis tailored to the relevant stage of the project. For example at the procurement stage the emphasis will be more on the quality of competition and the authority's ability to manage an efficient and competitive procurement process.

Textbox 10: Non-valued elements for the South Tyne and Wear Waste Management Partnership, UK at the OBC stage^{60 61}

The qualitative analysis follows the template set out in the Treasury guidelines and therefore looks at viability, desirability and achievability. The summary of the results is provided below.		
	Summary question	STWWMP's considered response
Viability	Is the accounting officer satisfied that an operable contract with built in flexibility can be constructed, and that strategic and regulatory issues can be overcome?	The procuring authority is satisfied that its chosen funding and contract structure will: <ul style="list-style-type: none"> • Meet the targets set out in the JMWMS (the municipal strategy) with respect to residual waste treatment; • Create annual cost savings through joint working efficiencies; • Deliver the project in accordance with the prescribed Output Specification; and satisfy regulatory requirements.
Desirability	Overall, is the accounting officer satisfied that PPP would bring sufficient benefits that would outweigh the expected higher cost of capital?	The procuring authority is satisfied that the benefits of PPP outweigh the expected higher cost of capital by: <ul style="list-style-type: none"> • Delivering whole life cycle benefits by combining asset design, construction, delivery and operation of facilities providing a central point of accountability; • The combination of asset delivery and provision of finance by the private sector provides greater incentive to perform and deliver the contract specification; and • The contractor takes long-term cost and performance risk, and hence, the private

⁵⁹ NAO (2011). Lessons from PFI and other projects.

⁶⁰ Source: Outline business case STWWMP, page 106 and appendix 8.1(2007) and interviews with HMT – not project specific.

⁶¹ This example is based on the outline business case documentation from 2007. In reality, the project assessment is a process which takes place over several years. The final data might differ from the data presented here. The purpose of this example is to demonstrate the working of the optimism bias.

Achievability	Overall is the accounting officer satisfied that a PPP procurement programme is achievable, given client side capability and the attractiveness of the proposals to the market?	<p>sector manages cost risk to the taxpayer.</p> <p>In consideration of the points above, the STWWMP is satisfied the procurement programme is achievable, given that:</p> <ul style="list-style-type: none"> • The right level of internal and external resource and expertise has been committed to the project including a specialist advisor from the 4ps (today Local Partnerships - a public organisation jointly owned by HM Treasury and the Local Government Association (LGA) to provide technical support to the public sector) and a dedicated Procurement Director; • The project has a dedicated project management team with the requisite skills to lead and deliver this project; • Soft market testing has provided positive feedback from industry with regards to the STWWMP's proposed procurement strategy; and • The project seeks a product and a risk-sharing framework with which the private sector is familiar.
<p>These conclusions are built on the more elaborate list of questions. For instance, within the issue of viability, the question is asked whether a long-term contract can be constructed for this project. The answer builds on three sets of evidence. (1) While waste-PPP is still developing, 13 PPP contracts have been signed. (2) output based contracts have been used in this sector since 1990 and (3) specific feedback from the private sector was collected through a soft market testing event. The topic of viability also deals with questions of staff and knowledge transfer and changing legislation. On the topic of legislation, changing environmental legislation is predicted and covered by the change mechanism in the PPP contract. The full list of answers can be found in appendix 8.1 of the publicly available Outline Business Case for this project.</p>		

Canada similarly uses a combination of qualitative and quantitative approaches. The function of the qualitative analysis is to select viable and marketable PPP options. The order is first to conduct a qualitative analysis, and thereafter a quantitative VfM assessment. The viability of the PPP option is assessed qualitatively by looking at the criteria set out in Table 6, while the marketability is qualitatively assessed according to the criteria in Table 7.

Table 6: Criteria for assessing PPP viability (Source: PPP Canada P3 Business Case Development Guide)

Screening criterion	Relevant consideration(s)
Project size	Is the project's size sufficient to support the P3 costs?
Contract bundling	Is there potential to bundle a number of contracts into a single long term contract?
Nature of the project	Is the project a new build or a refurbishment?
Project integration	Is the project separated or integrated with existing assets or networks?
Consistency	Will the performance requirements and use of the project be relatively stable over time?
Performance Measurement	Can service performance be easily described and measured?
Asset life	Does the asset have an expected useful life greater than 20 years?
Maintenance requirements	Does the project have significant maintenance requirements?
Refurbishment requirements	Is the refurbishment cycle for the project relatively predictable and stable?
Limiting Factors	Are there stakeholders and/or other factors that influence transferability of the project's maintenance and operations
Innovation	Is there scope for innovation in design construction or operations?
Revenue	Is there scope for the private partner to generate additional ancillary revenues?

Table 7: Criteria for assessing PPP marketability (Source: PPP Canada P3 Business Case Development Guide)

1	Obtain an understanding of the marketability of the project Through discussions related to private sector interest in the various service components and delivery elements.
2	Highlight potential market constraints Such as, for example, constraints surrounding specialized design capabilities, financing and facilities management elements
3	Identify specific concerns with respect to risk allocation To determine key concerns from market participants with respect to the project and with respect to private sector appetite for assuming particular risks associated with the project.
4	Begin to prepare the market for the project By extending the period over which the market can decide whether or not it is interested in the project. This will also help to ensure competitive tension during the transaction process.
5	Estimate or confirm assumptions to be used in the quantitative assessment These may include financing assumptions and changes to the risk matrix

Extensive quantified approach as a supplement to valuation

In Belgium an extensive approach to non-valued effects is used, which comprises the quantification of all effects.⁶² The analysis consists of three components, namely: social value, operational value and financial value. For each of these components the question is asked whether the choice for a PPP procurement option will lead to a different outcome for that component. Social value is related to the project goals, for instance improved traffic safety or the reduction of travel times. Operational value is related to institutional elements at the level of the public organisation, to public decision making and to effects on the local economy. Social value and operational value are both assessed by means of a balanced scorecard. This means that each effect is scored but not valued in monetary terms.

The three individual outcomes (including the financial outcome) are then translated into an index. The guideline provides a formula to weigh each outcome and sum this up to a single value: 0.5 times the financial index plus 0.4 times the social index plus 0.1 times the operational index. In practice, this formula is not so important and the individual outcomes for each of the three elements are usually presented separately.

Qualitative assessment instead of valuation assessment

Most countries choose to perform a full valuation assessment at the procurement stage. The UK is an exception, which conducts a full qualitative approach.⁶³ The UK considers that at this stage the public sector comparator is less relevant as it is a theoretical construct created before bids are actually received from the market. Using it at the procurement stage is less useful given that it is now being compared with actual private sector options based on real bids. The aim of both assessments however is the same, namely to assess whether the procurement involves sufficient competition to achieve competitive prices.

⁶² Vlaams Kenniscentrum voor PPS (2003). Handleiding PPS Balanced Scorecard Fase 3.

http://www2.vlaanderen.be/pps/proces/instrumentarium_docs/Handleidingf3.pdf.

⁶³ HM Treasury (2006). VfM assessment guide. Chapter 5: Stage 3: Procurement level assessment.

However, there is a risk that comparison with a theoretically derived option may make the PPP option look cheaper, but without knowing the quality of the competition, it may still not represent the best VfM – this could arrive if, say, the conventional procurement option was overpriced (due to incomplete analysis) and/or only one bid from the market was received (due to a poorly run competitive process). The key issues that are considered in this approach are described in the UK guidance and include:

- the approach and structure of the procurement,
- specific sector related issues,
- broader market issues, and
- wider issues relating to the timing of the procurement.

It is important to note that the analysis of the quality of competition does not only take place at a defined point in the procurement process (although it has to be reported on at the decision point prior to signing the PPP agreement). Instead it is a continuous consideration for the project team. If at any point during the procurement process the project team considers the level of competition to be insufficient, then there should be careful consideration of the options to proceed and the impact on the project. The choices available would include cancelling the procurement and retendering by conventional project delivery, or continuing and accepting limited competition (for example in the case of a single bidder). Both approaches will have different consequences on time and costs, which should also be weighed in the assessment. If the choice is made to continue with only one bidder, appropriate measures should then be taken to limit the monopolistic pricing effects, for instance by introducing market testing in the supply chain.

Various process focused approaches during the *ex-post* stage

The *ex-post* analysis of VfM is not always conducted through a predetermined structure. Typically, the analysis involves a qualitative assessment. Areas of focus for *ex-post* assessment are the processes that were followed in conducting the preparation of the procurement of the project and related assessment activities and risk allocation. The National Audit Office ('NAO') in the UK regularly produces reports which look at various elements in different sectors and themes.⁶⁴ The NAO has also published a framework that sets out how it goes about *ex-post* VfM evaluation. The OECD also offers an overview of the content of *ex-post* VfM assessments.⁶⁵

Observation 16: Analysis at the ex-post stage often involves the assessment of non-valued effects

In Germany, the evaluation of the first four road PPP projects included feedback from the private consortia. This led to adjustments in the risk allocation for highway projects, leading to three contract types which differ in the amount of revenue risk transferred to the private party.

In France *ex-post* evaluations are performed by the Cour des Comptes (for State level PPPs) and the chambres régionales des comptes (for local government). The *ex-post* evaluations are comprehensive and elaborated assessments of the VfM for PPP deals (e.g. for defence, hospitals and prisons projects).

In the Netherlands and in other countries (especially as a consequence of the credit crisis), the evaluation of initial PPP projects has led to optimising of the proportion of the project that is privately financed. Since projects with large amounts of capex proved more difficult to finance privately when the markets tightened, the authorities looked for an optimum level of private and public finance. This can involve certain milestone payments made by the public sector after the construction phase of the project, while maintaining a sufficient level of subsequent performance related payments so that the private party has an incentive to perform at all times over the contract period.

Summary of observations

The following summary observations have been made:

- Six main approaches (at various stages of the project cycle) to non-valued effects can be distinguished:

⁶⁴ See: www.nao.org.uk.

⁶⁵ Burger P. and Hawkesworth, I., (2011), How to attain value for money: Comparing PPP and traditional public infrastructure procurement. OECD Journal on Budgeting, Volume 11/1.

- In the large majority of countries, the qualitative assessment is considered a vital element in the comparison between delivery options. This underscores the importance of ensuring that 'logical' thinking has taken place throughout the VfM assessment process and the practical limitations (and possible risks of manipulation) of information and assumptions if only a quantitative approach is used.
- Generally, the non-valued elements taken into account in the assessment differ between the project stages.
- It could be argued that assessing issues related to the achievability and viability of the PPP option is a precursor to determining if there are real options that can then be compared for VfM. Therefore assessing achievability and viability is separate from the VfM analysis itself. As can be seen, however, these generally all form a part of overall VfM assessment methodologies.

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Appendix 2: Comparative case study with comments

Introduction

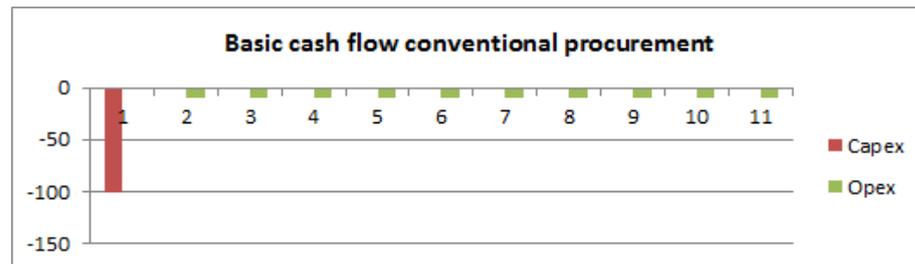
In this appendix, a numerical worked example of the VfM assessment for different countries at the preparation stage is presented for illustration and comparison.⁶⁶

The hypothetical example is a (highly simplified) project consisting of the construction, maintenance and financing of a non-tolled greenfield motorway.

The key characteristics of the project, irrespective of the procurement option implemented, are as follows:

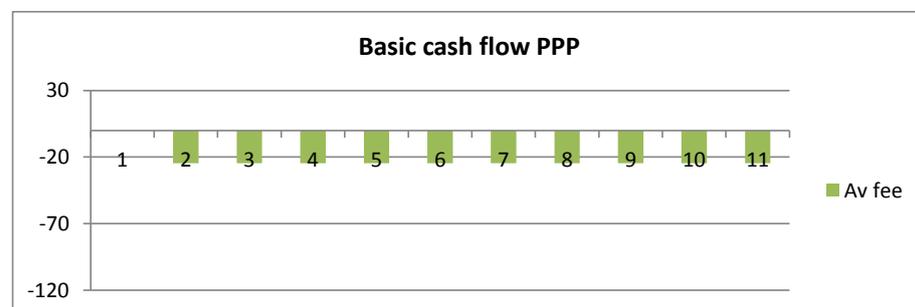
- Capital expenditure: 100
- Operational expenditure: 10 per annum
- Timing: 1 year building, 10 years' operation
- The borrowing rate for the procuring authority is 3 %

In the case of the conventional procurement option, the cash flow series of the project, prior to any risk adjustment, would be as follows:



In the PPP option, the procuring authority will pay an annual availability fee to the private partner during the operational phase. It is assumed that the cost of capital for the private partner equals 7.5 %.⁶⁷ The private partner will set (bid) an annual availability fee which covers both capital and operational expenditures plus the cost of capital. By goal seeking the availability fee at an Internal Rate of Return ('IRR') of 7.5 % (the assumed cost of capital for the private partner), the annual availability fee is calculated to equal 24.6.

The cash flow series to the procuring authority in case of PPP procurement, prior to any risk adjustment to the cash flow amounts, is therefore as follows:



⁶⁶ For the Netherlands, the described methodology is typically applied at the procurement stage. This does not influence the comparison of the selected methodologies.

⁶⁷ The (weighted) cost of capital is often used as a simplification for the more detailed capital costs (interest, dividends and other costs of financing). In many countries (including France), the detailed capital costs are modelled. In the example the weighted cost of capital is used.

For the purpose of simplicity and comparability it is assumed that the rate of inflation equals zero, and therefore cash flow amounts are expressed in nominal terms. This means that any discount rate that is applied will also be a nominal rate.

Basic methodology per country

The UK approach

The UK approach to the quantitative assessment of VfM at the procurement decision stage follows roughly the following three steps.⁶⁸

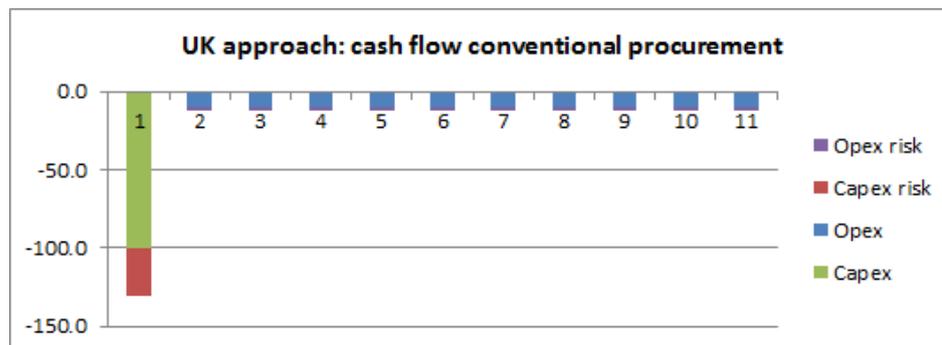
Step 1: Reflecting risk through adjustment to the project’s cash flow

The cashflows are adjusted on the basis of expected optimism bias and risk adjusted expected values. This would increase the cash outflow in the conventional procurement option and increase the expected availability fee required by the private partner.

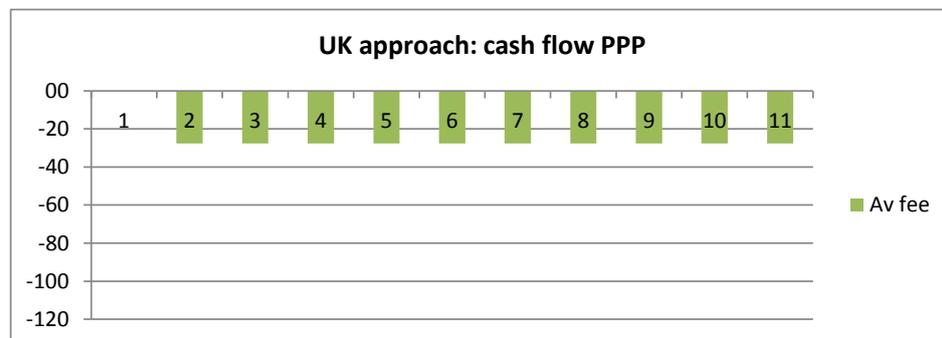
In the example, the correction of the original cashflows would work out as follows. It is assumed that the value of optimism bias is as follows:

- Capex optimism bias for the conventional procurement option: 31
- Capex optimism bias for the PPP option: 14
- Opex optimism bias for the conventional procurement option: 2.4 annually
- Opex optimism bias for the PPP option: 1.1 annually.

The application of optimism bias and risk adjusted expected values would work out as follows for the cash flow of the conventional procurement option:



For the PPP option, the cash flow including optimism bias and risk adjusted expected values, results in an annual availability fee of 27.7.



Step 2: Calculating the present value ('PV') by applying the discount rate

⁶⁸ For a full explanation of the VfM methodology please refer to HM Treasury (2006), Value for Money assessment guide.

With the discount rate set at 3.5% in real terms, and assuming an inflation rate of 2.5 % this gives a nominal rate of 6.09% (See Annex Chapter2, Section 2.4). Applying this discount rate to the adjusted cashflows, this results in a PV of 209 for the conventional procurement option and a PV of 191 for the PPP option.

Step 3: Comparing the conventional procurement option and the PPP option

The application of risk valuation and the discount rate results in a difference between the conventional procurement and PPP options. The additional VfM of the PPP option would amount to 18 (the difference between 209 and 191).

This difference is driven by two factors:

1. The impact of optimism bias and risk adjusted cashflows which, for this example, results in a more attractive (cheaper) PPP option;
2. Difference between the cost of private capital (7.5%) and the public discount rate (6.09%) which, for this example, works in the opposite direction and would result in the conventional procurement option representing better value for money, other things being equal.

The French approach

The French approach to the quantitative assessment of VfM at the procurement decision stage follows four steps.⁶⁹

Step 1: Identifying all relevant cost

In step 1, all relevant costs (and revenues) are identified (as in the UK). Typically, cost and revenue estimations for the PPP option and the conventional procurement option are not identical, based on the notion that the PPP partner is likely to generate life cycle cost optimisations.

In the example, it is assumed that an efficiency factor of 10 percent is applied to capital and operational expenditures.

Step 2: Calculating the cashflows

In step 2 the cashflows are calculated on the basis of the defined cost (and revenue) structure.

Step 3: Valuing risk by adjustment of the cashflows

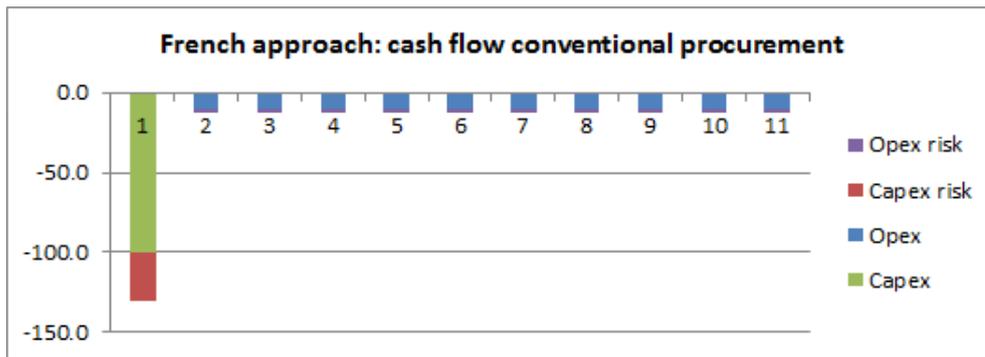
Both the volatility of cashflows and events with a negative impact (such as higher expected costs/delays) are captured by a correction to the cashflows. In the French approach, the volatility analysis focuses on any uncertainty with regard to the cost calculations or design specifications. Specific adjustments for market related risks (such as interest rate or index risk, sometimes referred to as systematic or systemic risk) are considered part of this approach. By using the Monte Carlo Simulation technique, the original 'non-risk adjusted' cashflows are modified by risk-corrected values. There are separate inputs and calculations for the Monte Carlo runs for the conventional procurement option and for the PPP option.

In the example, the correction of the original cashflows would work out as follows. It is assumed that the value of risk for the conventional procurement option amounts to:

- Capex risk conventional procurement: 31
- Opex risk conventional procurement: 2.5 annually

For the conventional procurement option, this results in the following cashflows.

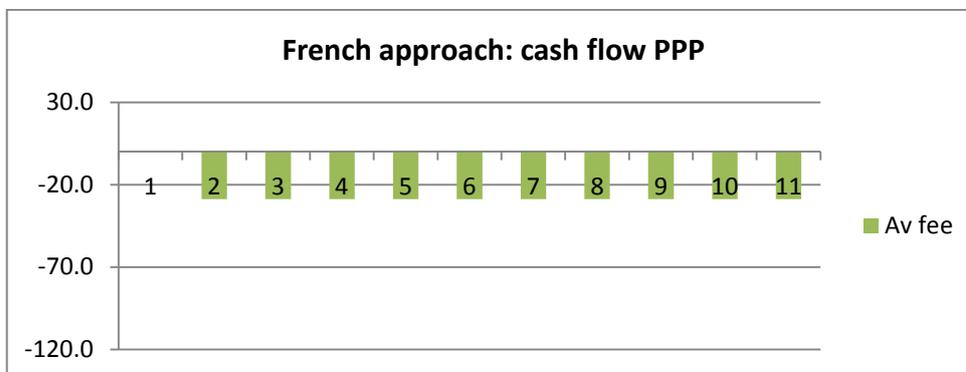
⁶⁹ MAPPP (2011), Les contract de partenariat: Guide méthodologique.



For the PPP option, it is assumed that the value of the risk is:

- Capex risk PPP: 14
- Opex risk PPP: 1 annually

This results in an annual availability fee of 25.2.



Step 4: Calculating PV by applying the discount rate

In the French VfM assessment, the cashflows for both options are discounted using a (floating) discount rate equal to the borrowing rate of the public sector entity that will procure the project at the time of the analysis.

In the example project, it is assumed that this (nominal) rate equals 3%. For the conventional procurement option, this results in a PV of 231. For the PPP option, this results in a PV of 208.

The application of the assumed efficiency factor, the risk valuation and the discount rate results in a difference in the present values of the cost of the conventional procurement and PPP options. In this example, the additional VfM of the PPP would amount to 23 (a PV of 208 instead of 231).

This difference results from three sources:

1. Different assumptions for the capital and operational expenditures due to the assumed efficiency of the PPP partner;
2. Different assumptions in the risk valuation through cashflows for the conventional procurement option and PPP options, which, for this example, results in a more attractive (cheaper) PPP option;
3. Difference between the cost of private finance (7.5 %) and the public discount rate (3 %) which for this example would result in a more attractive (cheaper) conventional procurement option, other things being equal.

The approach in the Netherlands

The approach in the Netherlands to the quantitative assessment of VfM at the preparation stage follows four steps.

Step 1: Valuing risk by adjustment of cashflows

It should be noted that the Netherlands methodology assumes that risk adjustments for the conventional procurement option and the PPP option are identical, except for those risks for which specifically identified differences can be identified. In practice, this often means that the risk adjustment for both alternatives is identical, and any differences are assumed to be included through the applied efficiency differences.

In the example project, it is assumed that the adjustment for risk through cashflows for both options is as follows:

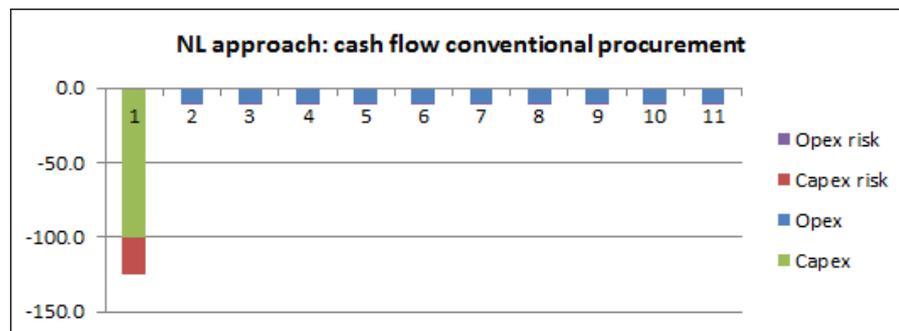
- Capex risk: 25 % adjustment to initial cost estimate
- Opex risk: 15 % adjustment to initial cost estimate

Step 2: including assumptions on the cost (and revenue) differences

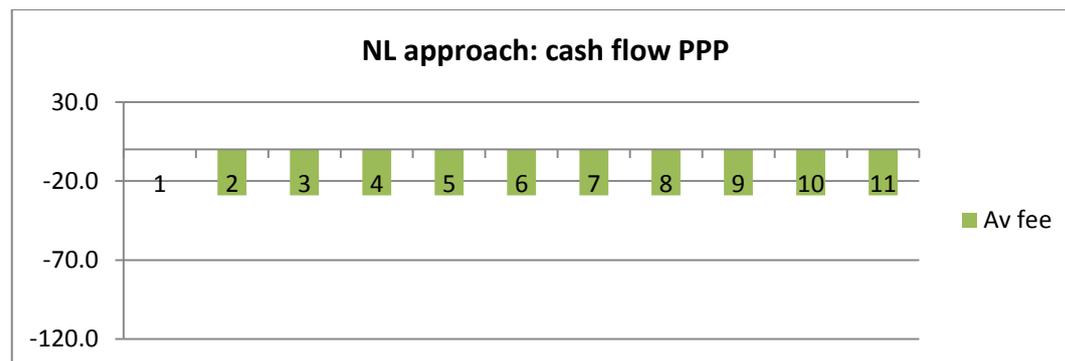
Comparable to the French methodology, in the Netherlands cost and revenue estimations for the PPP option and the conventional procurement option are not identical.

In the example, it is therefore assumed that an efficiency factor of 10 percent is applied to capital and operational expenditures.

For the conventional procurement option, the cash flow is as follows.



The PPP uses the same cost calculations as the conventional procurement option, corrected for the assumed efficiency difference. This results in an availability fee of 26.7.



Step 3: Calculating PV by applying the discount rate

In the VFM assessment in the Netherlands, a discount rate including a risk premium for project specific volatility is used. This rate is estimated by using benchmarks derived from the market (i.e. based on what the private capital markets would price this volatility at). For the example project, it is assumed that the rate equals 7.5 % i.e. the discount rate applied is the assumed private sector cost of capital. This results in a PV for the conventional procurement option of 190, and a PV for the PPP option of 171.

Step 4: Comparing the conventional procurement option and the PPP option

The application of the assumed efficiency gain results in a difference between the conventional procurement option and the PPP option of 19 (a PV of 171 instead of 190). This is because the risk valuation through cashflows is applied equally to the conventional procurement option and the PPP option, and the public discount rate equals the private cost of finance.

In other words, in the Netherlands, the comparison between the conventional procurement option and the PPP option focuses mainly on differences in operational cashflows, i.e. differences in capital expenditure, maintenance costs, transaction costs and timing of the cashflows. In the procurement phase, small differences may occur between the market based discount rate and the actual private cost of capital.

The approach in Germany

The approach in Germany to the quantitative assessment of VfM at the procurement decision stage follows four steps.

Step 1: Valuing risk by adjustment of cashflows

The approach in Germany does not differentiate in the risk calculation between the conventional procurement option and the PPP option (except in case of specifically identified differences). In the example project, it is assumed that the adjustment for risk through the cashflows is as follows:

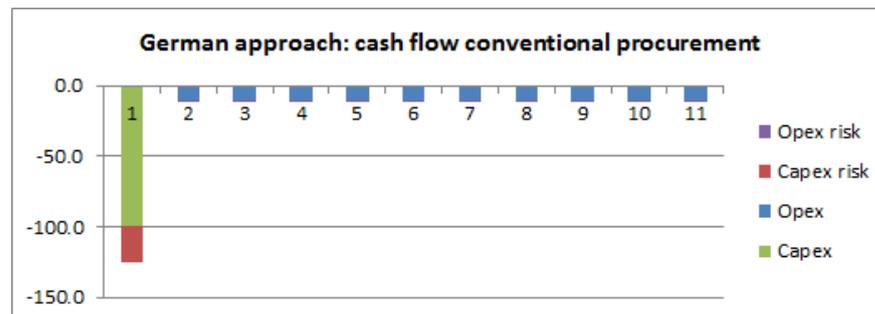
- Capex risk: 25
- Opex risk: 1.5

Step 2: including assumptions on the cost (and revenue) differences

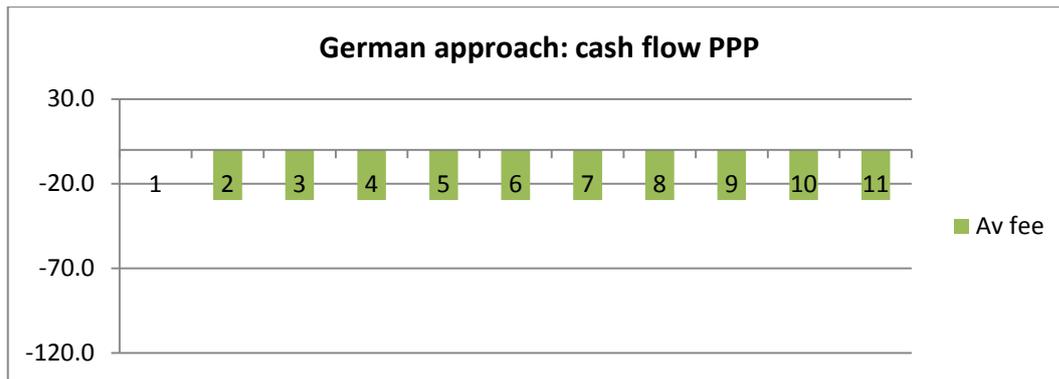
Comparable to the French and Netherlands methodology, in Germany cost and revenue estimations for the PPP option and the conventional procurement option are not identical.

In the example, it is assumed that an efficiency factor of 10 % is applied to capital and operational expenditures.

For the conventional procurement option, the cash flow is therefore as follows.



The PPP uses the same cost calculations as the conventional procurement option, corrected for the assumed efficiency difference. This results in an availability fee of 27.3.



Step 3: Calculating PV by applying discount rate

In the German VfM assessment, the cashflows for both options are discounted using a (floating) discount rate equal to the borrowing rate of the public sector entity that will procure the project at the time of the analysis.

In the example project, it is assumed that this (nominal) rate equals 3 %. For the conventional procurement option, this results in a PV of 217. For the PPP option, this results in a PV of 226.

Step 4: Comparing the conventional procurement option and the PPP option

The application of efficiency gain results in a difference in the present values of the cost of the conventional procurement option and PPP option. In this example, the PPP does not offer additional VfM but results in an additional cost of 9 (a PV of 226 instead of 217).

This result is the sum of efficiency gains and the consequence of the difference between the cost of private finance (7.5 %) and the public discount rate (3 %).

Effects of market changes on the results

What happens when the market interest rate goes up?

Suppose that the market interest rate goes up by 3 %. This affects the assumption of the private cost of capital, which increases from 7.5 % to 10.5 %. The consequence is that the availability fee for the PPP option increases i.e. making the private sector option more expensive than previously.

UK: private cost of capital goes up, public discount rate remains equal

In the UK methodology, the private cost of capital changes to 10.5 % but the public discount rate is standardised and therefore remains unchanged at 6.09 %.

This leads to the following changes in the outputs of the analysis:

UK	PV conventional	PV PPP
Basic scenario	-209	-191
Market interest rate up 3 %	-209	-208

The consequence of the higher private cost of capital is that the availability fee in the PPP option increases. Since the same public discount rate is used, the present value of the conventional procurement option remains unchanged while the present value of the PPP option increases making it almost equal to the conventional procurement option.

France: private cost of capital and public discount rate both increase

In the French methodology, the private cost of capital changes to 10.5 % and the public discount rate increases from 3 % to 6 %.

This leads to the following changes in the outputs of the analysis:

France	PV conventional	PV PPP
Basic scenario	-231	-208
Market interest rate up 3 %	-210	-189

The consequence of the higher private cost of capital is that the availability fee in the PPP option increases. The higher public discount rate however results in a lower present value of both the conventional procurement option and the PPP option (i.e. the discount rate increase offsets the effect of the higher availability fee).

Netherlands: private cost of capital and public discount rate both go up

In the methodology of the Netherlands, the private cost of capital increases to 10.5 % and the discount rate (which is based on the private sector cost of capital) also increases from 7.5 % to 10.5 %.

This leads to the following changes in the outputs of the analysis:

Netherlands	PV conventional	PV PPP
Basic scenario	-190	-171
Market interest rate up 3 %	-176	-158

The consequence of the higher private cost of capital is that the availability fee in the PPP option increases. The higher public discount rate however results in a lower present value for both the conventional procurement option and the PPP option (the discount rate offsets the effect of the higher availability fee). The difference between both options remains equal to the assumed efficiency gains by the PPP option.

Germany: private cost of capital and public discount rate both increase

In the German methodology, the private cost of capital changes to 10.5 % and the public discount rate increases from 3 % to 6 %.

This leads to the following changes in the outputs of the analysis:

Germany	PV conventional	PV PPP
Basic scenario	-217	-226
Market interest rate up 3 %	-198	-206

The consequence of the higher private cost of capital is that the availability fee in the PPP option increases. The higher public discount rate however results in a lower present value for both the conventional procurement option and the PPP option (i.e. the discount rate increase offsets the effect of the higher availability fee).

What is the impact of differences in project risks?

Suppose that the cost of capital for the project risk is 3 % higher than that used in the example above. This affects the assumption of the private cost of capital, which increases from 7.5 % to 10.5 %. The consequence is that the availability fee for the PPP procurement option increases to 26.6 per annum (because the underlying cost of financing the project in the PPP option is higher than that used in the example so far).

UK: private cost of capital goes up, public discount rate remains equal

In the UK methodology, the private cost of capital changes to 10.5 % but the public discount rate is standardised and therefore remains unchanged at 6.09 %.

This leads to the following changes in the outputs of the analysis:

UK	PV conventional	PV PPP
Basic scenario	-209	-191
Sector risk up 3 %	-209	-208

Since the same public discount rate is used, the present value of the conventional procurement option remains unchanged while the present value of the PPP option increases. Effectively, this leads to the same changes as the previous scenario. In other words whatever drives the higher cost of private capital, be it changes in the underlying risk free market interest rate or a higher sector specific risk premium, the relative cost of the PPP option will increase compared with the conventional procurement option.

France: private cost of capital increases

In the French methodology, the private cost of capital changes to 10.5 % but the public discount rate remains unchanged at 3 %. The sector risk is accounted for in the value of risk that is added to the cashflows. The new values of risk are assumed to be:

	Basic scenario	Increased Sector risk scenario
Capex risk conventional	31	41
Opex risk conventional (annually)	2.5	3.5
Capex risk PPP	14	20
Opex risk PPP (annually)	1	1.5

This leads to the following changes in the outputs of the analysis:

France	PV conventional	PV PPP
Basic scenario	-231	-208
Sector risk up 3 %	-249	-238

The consequence of the higher private cost of capital and the higher value of risk in the cashflows is that the present value of the availability fees in the PPP option increases. The present value of the conventional procurement option however also increases due to the higher risk values that are also applied to the cashflows of the conventional procurement option.

Netherlands: private cost of capital and public discount rate both go up

In the methodology for the Netherlands, the private cost of capital changes to 10.5 % and the public discount rate goes up from 7.5 % to 10.5 %.

This leads to the following changes in the outputs of the analysis:

Netherlands	PV conventional	PV PPP
Basic scenario	-190	-171
Sector risk up 3 %	-176	-158

The higher public discount rate results in a lower present value for both the conventional procurement and the PPP options (the discount rate increase offsets the effect of the higher availability fee). These are the same changes as for the higher interest rate scenario. In other words, it makes no difference. The result of the comparison is still determined by the assumption on efficiency gains.

Germany: private cost of capital increases

In the German methodology, the private cost of capital changes to 10.5 % but the public discount rate remains unchanged at 3 %.

This leads to the following changes in the outputs of the analysis:

Germany	PV conventional	PV PPP
Basic scenario	-217	-226
Sector risk up 3 %	-217	-245

The consequence of the higher private cost of capital is that the present value of the availability fee in the PPP option increases. The negative impact of choosing the PPP option increases.

Summary of findings

The above examples lead to the following observations:

- France and Germany (and to some extent the UK) include a higher cost of private finance in their valuation, while the Netherlands assumes equal costs of financing. This observation needs to be placed in the context of the VfM assessment. The application of this basic methodology for risk valuation and discount rate leads to a difference between the conventional procurement option and the PPP option in France, Germany and the UK. In the Netherlands, all differences between the conventional procurement option and the PPP option stem from differences other than the use of the discount rate.
- The UK uses a standardised discount rate which does not vary with changing market interest rates or sector risk. The result is that if market interest rates or sector risks increase, the PPP option will be valued as more expensive.
- In France and Germany, the discount rate varies with market interest rate which means that both the conventional procurement option and the PPP option are affected when market interest rates go up. For the Netherlands, both interest rate modifications and change of sectorial risk profile lead to an adjustment in the discount rate but there is no difference in the outcome.



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