

Public-Private Partnership Financing in South Africa

Tim Prüssing

Supervised by Carlos Correia

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List of Acronyms

CPI	Consumer Price Inflation
DBOT	Design, build, operate and transfer
DBSA	Development Bank of Southern Africa
DFBOT	Design, finance, build, operate and transfer
DFO	Design, finance and operate
IRR	Internal Rate of Return
IUK	Infrastructure UK
MWh	Megawatt hour
NPV	Net Present Value
PFI	Private Finance Initiatives
PPP	Public Private Partnership
PWC	PricewaterhouseCoopers
R	Rand
REIPPPP	South African Renewable Energy Independent Power Producer Procurement Programme
RFP	Request for Proposal
RFQ	Request for Quotation
RPIX	Retail Price Index excluding mortgage interest payment
S&P	Standard & Poor's
SPV	Special Purpose Vehicle
UK	United Kingdom
YTM	Yield to maturity

1. Introduction

1.1. Background

If structured and procured properly, Public Private Partnerships (PPPs) allow governments to pursue infrastructure projects in an efficient and cost effective way, offering value for money to the public and in some cases even enabling the development of infrastructure assets where traditional procurement would otherwise not have been possible (CBI, 2011).

Definitions for PPPs vary by country, framework and author. For the purposes of this paper, we understand a PPP to refer to a partnership between the public and private sector, where a private sector party participates in or provides support for the provision of infrastructure-based services (Ng and Loosemore, 2007). Delivery of the project is done through special purpose vehicle set up and typically financed from equity and debt in a highly leveraged structure (Spackman, 2002). As part of the partnership, the private party bears responsibility for financing, designing, building, operating and/or maintaining an infrastructure project for a set period of time (Kwak, 2009).

While South Africa has a well-developed PPP framework, the PPP market is small with many South African PPPs being cancelled prior to procurement and few ever entering the procurement stage and reaching financial close. Of the successful projects, many have stayed in the feasibility stage for prolonged periods of time and today there is an unclear pipeline of future projects (DLA Cliffe Dekker Hofmeyr, 2012). To date, only 20 PPPs have been procured in total with 10 of the projects having been procured prior to 2003 and 6 having been procured in 2006 and 2007 (PPP Unit, 2013).

A study on critical success factors for Public Private Partnerships and Private Finance Initiatives (in short PFIs, as they are called in other regions) conducted a survey to rank the relative importance of critical success factors in the UK PPP/PFI environment. The study found that an available financial market was one of the top three factors required for the development of successful UK PPP/PFI projects (Li, 2005).

This study argues that the financing options available to PPPs in the South African financial market are limited and only few traditional financing solutions, such as commercial bank debt, are available to project developers. While traditional financing solutions may provide an attractive and easy to obtain financing solution, they are not necessarily optimal, cheap or able to provide the best value for money (National Audit Office, 2001). This suggests that the South African financial market, which is so critical to the success of PPP projects, may in fact be hindering the development and efficiency of the market.

The main research questions addressed in this study are:

- what is a PPP and what does its typical structure look like;
- what is the state of the South African PPP market including framework and number of projects procured;
- what financing options and models are available to PPPs worldwide; and
- what financing solutions have been employed on South African projects?

In answering these questions, we particularly focus on the financing options available to PPPs. As part of this overview we discuss private sector and public sector solutions. Private sector solutions discussed include equity, debt and mezzanine finance. We give particularly focus to debt financing which tends to make up the majority of

financing in a typical PPP. Public sector solutions include government contributions, guarantees as well as hybrid structures.

By way of a case study, we illustrate how the failure to consider (or the inability to use) alternative financing solutions can impact the costs of a project. The case study is based on the first two South African prison PPPs which have received heavy criticism over their costs and non-parity to state run facilities (Open Society Foundation for South Africa, 2003). By way of quantitative and qualitative analysis, we address the following research questions relating to the prison PPPs:

- what was the background to the procurement of the prisons and what were the key terms and details of the projects;
- what was the total cost of the prisons;
- what were the financing terms and were these fair;
- could alternative financing solutions or structures have been used to bring savings to the public sector; and
- what is the outlook for South African PPP prisons?

This study contributes to the South African PPP market by demonstrating the importance of a careful analysis of the project structure and consideration for alternative financing solutions. It further provides a considered evaluation of the market and the lack of alternative financing solutions available. This analysis leads to the policy recommendation that the development of a deep and available PPP financing market could benefit the market.

1.2. Objectives of the study

The objective of the study is to explore the financing solutions available to PPPs and infrastructure projects using a project finance structure on world markets, and put this

in the context of the South African PPP market. The purpose of this research is to thereby assess the state of the South African PPP financing market and to give an indication how such alternative financing options could benefit PPPs in South Africa by lowering project costs, increasing returns and decreasing the cost to the public sector.

1.3. Outline of the study

This study is set out over four chapters. Chapter 1 provides an introduction including background, problem statement, objectives and outline. Chapter 2 is a literature review, which explores various definitions of PPPs, the typical structure of such projects before considering PPPs in a South African context and exploring what funding options are available, both internationally and locally. The section further assesses the state of the South African PPP market by looking at the regulatory framework, the number of projects procured and financing solutions available in the market. Chapter 3 is a case study which explores two South African prison PPPs and provides a background to the projects before analysing total costs and financing costs in detail. The chapter also analyses whether alternative financing solutions or structures could have been employed to bring savings to the public sector. Chapter 4 presents the overall conclusion with policy recommendations and scope for future research.

2. Literature review

2.1. Introduction

In this chapter, we review the South African PPP framework and provide a high-level overview of the South African PPP and infrastructure project market with a particular focus on debt financing solutions.

We then review the various funding options available to PPPs and similar project finance deals. This review focuses on funding options available internationally and does not limit itself to the South African market. Funding options available include traditional forms of financing, new alternative methods of financing and public sector financing initiatives.

After establishing the various financing options available to PPP projects, we explore which PPP funding options have been utilised and are available in the South African market specifically. The section focuses on both financing solutions used in the past as well as recent trends observed in the market.

In this chapter, we answer the following research questions:

- what is a PPP and what are the features of a typical PPP structure internationally and in South Africa;
- what is the state of the South African PPP market including framework and number of projects procured;
- what financing options and models are available to PPPs worldwide; and
- what financing solutions have been employed on South African projects?

2.2. What is a PPP?

One has to be wary as the interpretation and nature behind the term PPP may differ between countries, and even within countries. There is no global standardised or globally accepted standard defining the term PPP (Bovaird, 2004).

Grimsey and Lewis define PPPs as agreements where public sector bodies enter into long-term contractual agreements with private sector entities. The agreements can be for the construction or management of public sector infrastructure facilities, or for the provision of services (using infrastructure facilities) to the community on behalf of a public sector entity (Grimsey and Lewis, 2002).

The European Commission defines a PPP as “an arrangement between two or more parties who have agreed to work cooperatively toward shared and/or compatible objectives in which there is shared authority and responsibility, joint investment of resources, shared liability or risk-taking and ideally mutual benefits” (European Commission, 2003).

Ng and Loosemore describe a PPP as an arrangement between the public and private sector where private sector parties “participate in, or provide support for the provision of infrastructure-based services”. According to their definition, the project normally involves a concession agreement with a private consortium which sets up a special purpose vehicle using contracts secondary to the concession to finance, design, build, operate and maintain an infrastructure project for a set period of time known as the concession period (Ng and Loosemore, 2007).

While the definitions and frameworks of PPPs may vary, there is some commonality among most projects procured under a PPP framework. Prior to procurement of a PPP

project, the public sector public sector decides on the services to be provided as well as on the quality and performance standards of such.

Typical sectors for PPP type projects include, but are not limited to:

- Transport including toll roads, bridges, tunnels and rail systems;
- Utilities such as water and waste management;
- Energy including traditional and renewable energy power stations; and
- Social infrastructure such as serviced accommodation, schools, hospitals and prisons.

During the partnership, the responsibilities of the private and public sector can vary from project to project. Each of the building, operation, financing and maintenance can be allocated to either the public sector or the private party, in part or in whole. At the end of the partnership, the asset can be transferred back to the public sector or the private party can maintain ownership. PPPs usually take the form of one of the following structures (Kwak, 2009):

- Operation-Maintenance;
- Design-Build-Operate;
- Design-Build-Finance-Operate;
- Build-Operate-Transfer; and
- Build-Own-Operate.

Certain types of PPP projects are self-sustainable as they provide a revenue stream to the private party, which allows for a profitable project without further support. Where there is such a revenue stream, there may also be a concession payment back to the public sector. Other projects provide some revenue streams but require top-up

payments by the public party in order for the project to become feasible as a PPP. Top-up payments may come in the form of up-front payments, guaranteed off-take agreements¹ or subsidies², among others. Some projects do not provide any revenue streams to the private party and need public sector support through availability-type payments. These payments are generally made on a monthly basis for as long as the asset is available. This payment can be referred to as an availability payment or unitary payment. Typical examples of availability type PPP projects include projects such as buildings, hospitals and schools where the private party builds, maintains and operates the infrastructure asset but does not occupy or use it themselves (Asian Development Bank, 2008).

Ngamlana suggests there are two types of PPPs in South Africa based on the South African regulatory framework around PPPs (Ngamlana, 2009):

- Projects in which the private party performs an institutional function; and
- Projects in which the private party acquires the use of state property for its own commercial purposes

PPPs cover a wide range of different structures and mechanisms, which can also be grouped into Greenfield and Brownfield projects. Gross defines Greenfield projects in line with the US Department of Transportation's description of design-build-finance-operate procurements (Gross, 2010).

¹ In the case of PPPs, guaranteed offtake agreements generally refer to an agreement between a public party and the private party, where the private party also is the producer of a resource, and the public party guarantees a minimum offtake of such resource. This provides the private party with revenue and offtake certainty.

² Subsidies, in case of PPPs, generally refer to direct fiscal contributions or grants to the private party which may be used to pay for (part of) the construction and/or operating costs.

Under the definition, “the private sector is responsible for all or a major part of project financing as well as facility design, construction, operation, and maintenance. Typically, the facility reverts to the State after 25+ years. Revenues to the private sector can come from direct user charges, payments from the public sector, or both” (US Department of T and value for money in order for the project to progress to the next phase transportation, 2004).

Gross suggests that Brownfield projects generally refer to operating leases of existing facilities, which involve little new construction. Despite the different nature thereof, these projects are also considered to be a form of PPPs (Gross, 2010).

It should be noted that Brownfield projects are different to Greenfield projects as without major construction forming part of a Brownfield PPP, less financing is required and construction risks are eliminated. Financing costs therefore typically play a much smaller role in such projects.

2.3. The structure of a PPP

While the financing function is generally allocated to the private sector, the public sector may also provide financial support, which can come in various forms including grants, contributions and/or availability payments. Lenders play a big role in PPP type projects with build-operate-transfer type projects typically being highly geared (Zhang, 2004). Typical gearing ratios are discussed in more detail in section 2.6 of this study.

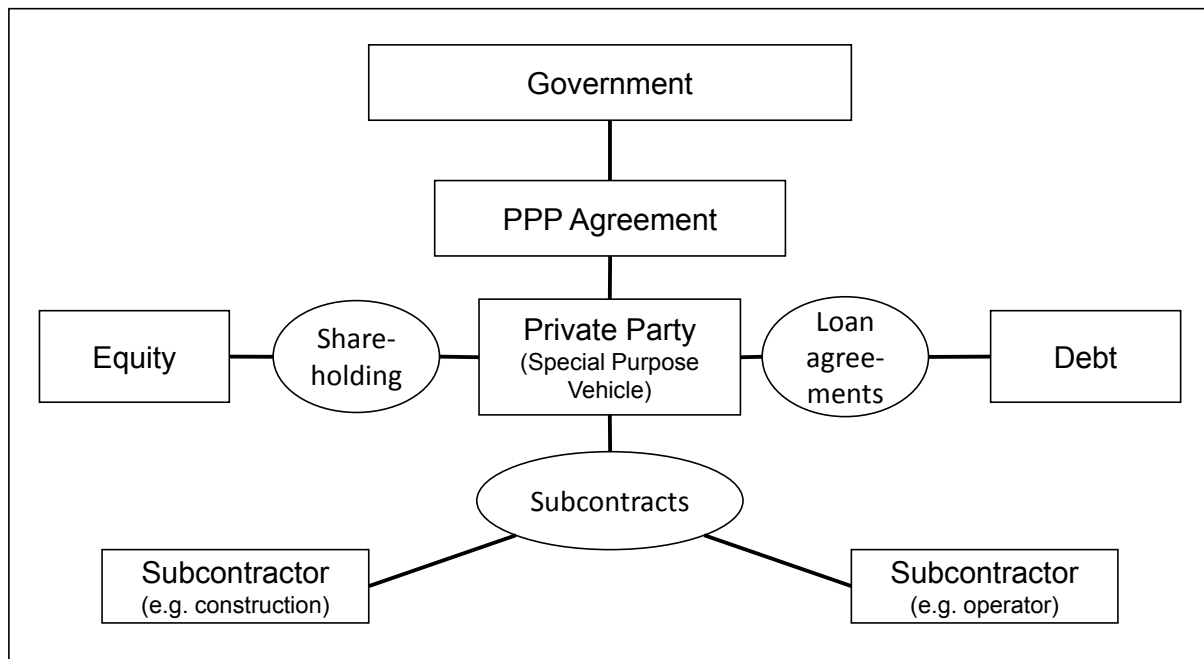
The funding and involvement of lenders is heavily influenced by the type of project, country and lending environment. As PPPs tend to be of a very long-term nature, the selection of the right private-sector partner is a critical element for a successful PPP (Zhang, 2005).

While PPPs can have a variety of structures, a typical PPP structure always contains a contractual agreement which defines the roles and responsibilities of the parties resulting in an element of risk sharing or risk transfer (Asian Development Bank, 2008).

According to Akbiyikli, an SPV is created to run the project where the project's cash flows are the principal source for repayment of debt and the project's asset are the principal collateral for any borrowings. Once operational, lenders have little or no recourse over the credit of the project's owners, and debt service has to be met from within the project's cash flows. The shareholders invest equity into the SPV where the shareholders usually consist of the construction company, the operation company, and the facilities management and maintenance company. Depending on the size of the deal and equity funding requirements, among other factors, developers may also seek outside equity investors (Akbiyikli, 2006).

The following figure presents the generic structure for PPPs in South Africa, as adapted from the interpretation by the South African National Treasury (PPP Unit, 2004).

Figure 1: Generic PPP structure



Source: PPP Unit, 2004

2.4. PPPs in South Africa: the South African PPP cycle and PPP manual

South Africa has a dedicated PPP Unit, which falls under the National Treasury. This unit was established in 2000 after the South African cabinet commissioned a task team in 1997 which ran six pilot projects (PPP Unit, 2004).

Subsequent to the pilot projects, Treasury Regulation 16 of 2004 was issued under the Public Finance Management Act 1989. The regulation sets out rules that govern the development and execution of a PPP contract and prescribes a four-stage process for the approval of national and provincial PPPs by the National Treasury. The approvals are known as Treasury Approval I, IIA, IIB, and III. The PPP unit has produced a PPP manual and a set of standardised provisions for PPP contracts to guide contracting agencies through the project cycle (Irwin, 2010).

The PPP project cycle, as per the South African PPP manual, can be broken down into a project preparation period and a project term. Together these include the following distinct phases:

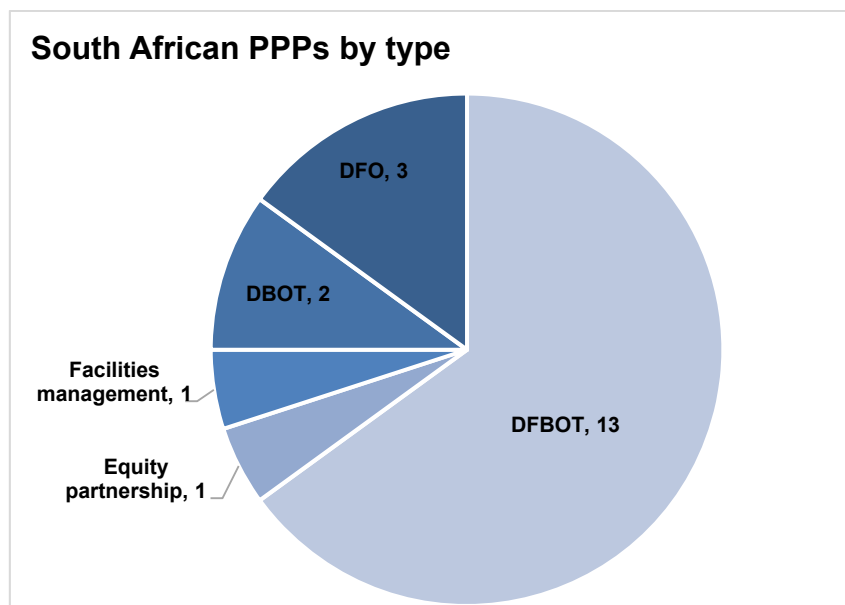
- **Phase I - Inception:** the project is registered with the relevant treasury and a project officer is appointed.
- **Phase II - Feasibility Study:** a feasibility study is produced which needs to demonstrate that a project has both affordability and value for money in order for the project to progress to the next phase. Phase II concludes when Treasury Approval I is given.
- **Phase III - Procurement:** bid documents including a draft PPP agreement are prepared and need to be signed off in the second approval process with Treasury Approval IIA. Bidders are pre-qualified in a Request for Qualification (RFQ) process and a Request for Proposal (RFP) is issued together with a draft PPP agreement. Bids are evaluated and a preferred bidder is selected. Further approval (Treasury Approval IIB) needs to be given in order for the project to progress to the next part of the procurement stage during which terms are negotiated with the preferred bidder and the PPP agreement is finalised. A further approval is required (Treasury Approval III) in order for the parties to the agreement to be able to sign the documents and progress to Phase IV.
- **Phase IV – Development; Phase V – Delivery; and Phase V – Exit:** these final three phases present the actual development, delivery and exit by the private party, which was chosen during the procurement process. During these phases outputs are measured, performance is monitored and regulated, and disputes are settled (PPP Unit, 2004).

2.5. South African PPPs

To date 20 PPP projects have been procured under Treasury Regulation 16. Out of these 20 PPP projects, 13 projects were procured as DFBOTs (design, finance, build, operate and transfer). Out of the remaining seven projects, three projects were procured as DFOs (design, finance and operate), two as DBOTs (design, build, operate and transfer), one as an equity partnership and one as a facilities management contract. The three DFOs related to five year fleet management services (PPP Unit, 2013).

The figure below summarises this breakdown of South African PPP projects by type.

Figure 2: Breakdown of South African PPPs by type



Source: Own summary based on data as per PPP Unit (2013)

While the number of PPP projects signed under Treasury Regulation 16 is relatively small, it should be noted the figures exclude an additional 6 pilot projects as well as other deals with similar structures which have been procured under an exemption from Treasury Regulation 16. These projects fall outside of the definition of South African PPPs but many follow a similar framework and structure.

The most prominent example, which has received such an exemption, is the South African Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The programme has successfully channelled private sector expertise and investment into grid-connected renewable energy in South Africa. The REIPPPP was exempted from national PPP regulations by defining the national government-owned power utility Eskom in its role as the off-taker and contractor as a non-government agency. As of 2014, the REIPPPP program has procured 64 new renewable energy projects through 3 rounds of procurement with further procurement rounds in the planning (Eberhard, 2014).

2.6. Funding of PPP projects – on overview

In this section of chapter 2, we discuss what financing options and models are available to PPPs worldwide.

The funding of a PPP project typically consists of senior debt and equity but may also include other forms of junior debt and in some cases grant funding. PPP projects tend to be heavily geared with only small amounts of equity. Akintoye suggests a typical equity to debt ratio of around 10:90 to 15:85 (Akintoye, 2001). Spackman suggests the typical gearing is as high as 90% debt with only 10% equity (Spackman, 2002), while Zhang suggests a more moderate debt to equity ratio with a range of 80:20 to 65:35 (Zhang, 2004). The actual debt to equity ratio for a project will depend on various factors such as lender risk appetite, project risk factors and certainty of cash flows, among others.

In terms of repayment, senior debt enjoys priority over all other forms of finance while junior or mezzanine debt is subordinated to such but still ranks above equity. The senior debt is priced on the basis of the underlying cost of funds to the lender plus a

margin to cover default and other types of risks. (The World Bank, 2012). Since debt typically accounts for a significant portion of total funding, arguably a lot of optimisation can be achieved through structuring a deal and choosing the optimal type of debt finance.

One key attribute of senior debt lent to PPPs and project finance deals is that principal and interest are not normally repaid until the construction phase has been completed and the project has entered the operating phase (Akbiyikli and Eaton, 2004).

Such a structure is necessary, as cash flows in a project finance deal are ring fenced. All debt repayments and distributions have to be met from cash within the project where cash can come either from the raising of finance or the generation of revenue. Since revenues tend to become available only once the project is operational, debt service typically is deferred until such time.

Senior debt finance can take the form of bank debt or bond finance. Typical debt providers include commercial banks, investment banks, infrastructure funds, development banks, pension fund and life insurance companies, but debt can also be raised directly on capital markets. The latter generally is done through rated deals which tend to take the form of bond finance (The World Bank, 2012). The type of debt finance used on a specific deal will depend on the suitability for a project, availability, depth of the financial market as well as lender appetite.

Akbiyikli suggests that bank debt tends to be more expensive than bonds with higher rates and shorter loan duration while bonds can offer lower rates and longer durations (Akbiyikli, 2006). While the difference in interest rates is not always evident, especially in markets with significant competition among lenders, regulation such as Basel III requires banks to more closely match the duration of assets with liabilities, a concept

referred to as Asset Liability Management. While this is partly market dependent, a typical bank's asset duration is heavily driven by deposits, which tend to be of a short-term nature. This can make it challenging for banks to lend large amounts (such as those required by PPPs) long-term. Bonds on the other hand are either issued on capital markets or privately placed. This makes them more accessible to large institutional investors such as pension funds and insurance companies which typically seek to invest in long-term assets.

Sheppard suggests that debt financing of leveraged PPPs and similar project finance deals is complex. It is however integral to a successful project where the success is partly dependent on the availability of debt financing. Sheppard explains that limited access to debt can severely damage an economy's ability to attract private investment in infrastructure, as project sponsors will rarely finance infrastructure projects with equity only or take the project debt fully onto the balance sheet (Sheppard, 2006).

Some markets view these projects as too risky or may not have an appetite to invest in them. Consequently, such markets may require credit enhancements to make a project more attractive to investors. For example, the 2007-08 financial crisis significantly reduced the availability of debt financing for PPP projects and similar investments. During the crisis, fewer lenders were prepared to lend to PPP projects in both developed and developing markets, while at the same time lending terms became tougher (The World Bank, 2012).

Credit enhancements may be required where investors do not have sufficient risk appetite to lend to a project, for example due to high or excessive construction risk. Such credit enhancements tend to be provided by the public sector through government schemes, for example such as through the IUK guarantee scheme in the

UK. Monoline insurance companies, such as Assured Guarantee, Ambac and MBIA, are private sector initiatives, which provide a similar product that can also improve the credit rating of debt. The key difference between the two solutions is that a government guarantee typically provides a guarantee to debt funders which will have the backing of the government, or a government institution, while the monoline insurer is a corporate providing an insurance policy. A monoline insurer issues an insurance policy to lenders, which will pay out in the event of a default, thereby improving the credit rating of debt. The credit enhancement is dependent on the strength and rating of the monoline insurer. In the case of a government guarantee, the rating will be driven by the rating of the government or institution. The key commonality between the two is that both solutions increase the credit rating of a bond in order to make the debt more attractive to investors, which are seeking to invest in higher rated securities.

2.6.1. Equity – the lowest layer of funding

The equity layer of financing is a precondition to the availability of third-party debt funding which is the lowest ranking capital layer of a PPP. In the case of project failure equity investors are likely to bear the highest risk of loss as the equity is subordinated to all other types of financing (Akbiyikli, 2006).

As most PPPs tend to be highly geared, a large part of the funding requirement is borrowed from banks and other financial institutions so that equity only presents a small fraction of the project's total funding requirement (Asenova and Beck, 2003).

Esty suggests that, as opposed to public companies which have a large number of equity investors, a typical project finance deal only has two or three shareholders (Esty, 2004).

Shareholder funding does not necessarily have to take the form of equity but can also partly come in the form of shareholder loans. Shareholder loans are a form of debt, which typically is subordinated to all other forms of debt but ranks above equity. Shareholder loans, from an accounting point of view under IFRS, constitute debt on the project's balance sheet. Lenders, however, view shareholder loans as equity finance, which does not negatively impact a project's ability to take on additional debt. Under South African tax legislation, the interest on shareholder loans is tax deductible at the project level and is taxed as interest income at the investor level. As the payment of interest on shareholder loans is not subject to solvency and liquidity requirements under the South African Company Act, using shareholder loans (as opposed to pure equity) has the benefit of allowing investors to extract cash from a project where it is not possible to pay dividends due to negative retained earnings but positive cash balances (as is usually the case in the early operating years of a PPP).

2.6.2. Mezzanine financing and subordinated debt

In terms of seniority, mezzanine or subordinated debt ranks below senior debt but above equity. There can be several layers of mezzanine financing and subordinated debt in a transaction. Shareholder subordinated debt (or shareholder loans as discussed above) also are a form of subordinated debt which tends to rank below mezzanine financing provided by a third party. Mezzanine financing usually is unsecured and ranks below senior debt in terms of repayment, as a result of which it is more expensive and usually only accounts for a small portion of total funding. Mezzanine financing may also be used when senior debt providers wish other parties to take on some of the risks of the project (National Audit Office, 2001).

2.6.3. Bank finance

Bank finance is typically provided by a commercial bank or a group of banks forming a syndicate. Funds are arranged through direct negotiations between the project company and the bank, with repayment terms typically being flexible and specific to each project. Repayments can therefore often be negotiated to be sculpted to match project cash flows. The flexibility of bank debt may also allow for a negotiation of early repayments or refinancing options. Funds can be drawn on as and when required, with interest charged only on the amounts drawn. Any undrawn amounts typically attract commitment fees to compensate the lender for making the funds available. Such commitment fees tend to be lower than the interest on any amounts drawn. Banks themselves tend to conduct their own due diligence in order to assess the risks and price the debt. Even during operations of the project, the bank will monitor the project carefully to ensure operating viability and step in where necessary (National Audit Office, 2001).

Akintoye suggests that the key advantages to bank debt are that it tends to be flexible, is quick to deliver and offers easy refinancing options (Akintoye, 2001).

This flexibility makes bank debt very attractive for PPPs. Spackman suggests that bank finance is the most common type of debt for PPP projects, especially among smaller projects, with terms as long as 25 years (Spackman, 2002). It should however be noted that Spackman's research dates back to 2002, and that the ability to lend long-term has since been affected for many commercial banks.

Nonetheless, recent research suggests that 70% to 80% of all project finance deals are still funded by commercial banks, although rated deals funded through capital markets are increasingly being used as a substitute (Orr and Kennedy, 2008).

2.6.4. Bond finance – an alternative to commercial bank debt

Bond finance is an alternative debt financing method to the more traditional bank finance. In a bond-financed deal, funds are provided by bond investors, which can include anyone from large institutions to individual investors. Bond finance is arranged through an intermediary bond arranger who sells the bonds into capital markets. This process introduces some uncertainty over funds due to a risk of there being insufficient uptake in the market. The uncertainty can be reduced through the appointment of a bond underwriter who will purchase any part of the issue not sold to other investors. While underwriting provides certainty around uptake, the underwriting will attract additional fees. There may also be uncertainty around pricing prior to the issuance. While arrangers typically are able to estimate the price of a bond based on the rating and market testing, the final pricing is unknown until bonds are actually issued (National Audit Office, 2001).

Bond issues can either be wrapped or unwrapped, where in a wrapped bond issue, scheduled payments of principal and interest are guaranteed by a monoline insurer and, as a result of the guarantee, the bonds are rated in line with the higher corporate rating of the insurer thus reducing the cost of borrowing. The monoline insurance does attract a fee, which is borne by the project sponsors. In an unwrapped bond issue there is no guarantee and a bond's rating (if rated) is based on the project itself (Akbiyikli, 2006). Monoline insurance is discussed in more detail in section 2.6.5 of this paper.

Bond issues generally tend to be rated by an external rating agency to assess the riskiness of an issue. In such a rated deal, the rating agencies conduct the due diligence and debt is priced according to the rating assigned to the transaction. This

is different to a deal with bank debt where the lenders would conduct their own due diligence and price the debt internally (Orr and Kennedy, 2008).

While bond financing arguably is not as flexible as bank finance, some flexibility may be achieved through the repayment terms as well as the interest structure, which can take on various forms. Akbiyikli explains that there are three typical interest structures in a project finance bond issue; floating rate, fixed rate and index linked. A bond that is linked to a floating interest rate will have an interest rate, which varies according to an underlying base rate. A bond with a fixed rate will have an interest rate that is set on issuance and does not vary with any underlying changes to the general interest rate. Alternatively, a bond may be index-linked where the principal amount of the bond escalates according to movements in a selected index, for example the CPI index which measures consumer price inflation (Akbiyikli, 2006).

Repayments of bonds tend to take place at fixed dates and generally at the maturity of the bond (as is the case with bullet structures). Due to these fixed repayment dates, bond financing offers little flexibility. Further, it may be difficult to make early repayments or refinance and there is no room to renegotiate interest or principal payments. As opposed to bank finance, funds are not drawn on as and when required, but are received upon the sale of the bond which results in interest being paid on the full amount from the date of issue. Bond investors can seldom thoroughly assess the risks of the projects themselves and may need to rely on the arranger. Once the project is funded, bond investors have very little or no influence over the operations of the project (National Audit Office, 2001).

As discussed above, the typical payment profile of a bond is based on a single drawdown with a bullet repayment. This type of profile may present an issue for project

finance deals as the debt service does not match the profile of the project cash flows. For large projects, it is therefore not uncommon for financiers to arrange a rolling bond issue program where smaller tranches of bonds are issued over time and throughout the construction period. The issuances are aligned with the profile of construction costs thereby avoiding unnecessary interest. Where repayments take the form of bullet payments, such a rolling bond issuance program will typically issue bonds of varying tenors³ to create a repayment profile to more closely match repayments with project operating cash flows. Alternatively, a project may also issue amortising bonds, which is particularly attractive to smaller projects with lower financing requirements, for which a rolling bond issuance programme is not feasible. Amortising bonds tend to come with their own challenges as they present a more complicated structure with the success depending on market appetite.

Key advantages for using bonds to finance PPPs generally include the availability of tenor as well as more favourable credit terms and margins. The biggest drawback is that bond issuances are considered inefficient for small transactions. Bond finance is also not as easily refinanced as bank debt making it less attractive to investors seeking a refinancing or an early exit (Akintoye, 2001).

2.6.5. Monoline insurers – credit enhancement for project bonds

Monoline insurers are institutions that specialise in insuring bonds, a process referred to as "wrapping". Through the monoline insurance, bond investors are guaranteed to receive all payments of interest and principal in a timely manner. The insurance increases the credit rating of the bond, making it cheaper to issue the bond in the first place (National Audit Office, 2001).

³ The tenor refers to the term length of debt or a loan.

A wrapped bond structure distinguishes itself from bank finance through having no cash sweeps, no margin step-ups, no swap credit spread, allowing for longer tenors (up to 40 years subject to concession length) and offering lower arrangement fees (bond arrangers are likely to be cheaper than bank lenders). The disadvantages are the additional costs of two ratings (underlying bond and guarantee) and drawing the bond upfront. Assured Guarantee suggests that current (European) infrastructure deals are typically rated in the BBB category with many fixed income investors' mandates requiring investments to be A-rated, thereby creating demand for the guarantee product (Assured Guaranty, 2013).

The key benefit to a wrapped bond is that the all-in-cost of debt including guarantee fee tends to be less than the all-in-cost of the unwrapped bond. Regan therefore describes credit wrapping as an AAA guarantee of the borrowing consortium's debt obligations to lenders purchased for a fee which is less than the difference in borrowing costs between the two rating standards (Regan, 2010).

According to Spackman, this credit enhancement can increase the credit rating of the bonds to an AAA rating (or equivalent). The monoline insurer carries out the due diligence work which would otherwise be undertaken by the purchasers and also guarantees the bond (Spackman, 2002).

We note that many authors suggest that monoline insurers may uplift the credit rating to AAA. While monoline insurers used to be able to enhance the credit rating of bonds to an AAA rating (or equivalent), this no longer is the case as monoline insurers were downgraded during and subsequent to the 2007-08 financial crisis. A recent publication by international monoline insurer Assured Guaranty suggest that current

enhancements are able to provide AA (S&P) rated guarantees (Assured Guaranty, 2013).

The table below presents the S&P and Moodys ratings for various monoline insurers and shows how they have evolved since the 2007-08 financial crisis. Several of the insurers were heavily impacted by the crisis, not least due to their involvement in the underwriting of subprime mortgage-related bonds, as well as the spill over effects into the broader structured credit markets (Galliard Capital Management, 2013).

Table 1: Ratings of monoline insurers

Monoline insurer ratings (S&P/Moodys)	Oct 14	Dec 2009	Dec 2008	Dec 2007
Assured Guarantee	A2/AA	Aa3/AAA	Aa2/AAA	Aaa/AAA
Ambac	Withdrawn/Caa2	Caa2/CC	Baa1/A	Aaa/AAA
FGIC	Withdrawn/Not rated	Caa3/CC	Caa1/CCC	Aaa/AAA
Syncora (XCLA)	Ca/Rehabilitation	Caa3/CC	Caa1/CCC	Aaa/AAA
MBIA	B2/A-	B3/BB+	Baa1/AA	Aaa/AAA

Source: 2014 data as per company websites; 2007 to 2009 data as per Galliard Capital Management (2013)

While beneficial to many, the guarantee product is not appropriate for all transactions. According to Orr and Kennedy, the underlying or natural rating of most infrastructure projects tends to be around Baa3 (or equivalent), which is at the divide between investment grade and non-investment grade. Project sponsors usually want the transaction to reside around this rating to still offer lenders confidence that the loan will be fully repaid on time, while saving money through avoiding other enhancements. For such transactions introducing a guarantee product to increase ratings would not necessarily be beneficial (Orr and Kennedy, 2008).

2.6.6. An alternative funding model: PEBBLE

With ever evolving financing markets, which are becoming more competitive in some places but more inaccessible in others, market participants are seeking to develop new and alternative financing solutions. One such new financing solution combines funding from alternative credit providers and banks alongside one another. PEBBLE is a financing structure that has been developed by the firms Allen & Overy, a multinational law firm headquartered in London, and Dutch bank ING. PEBBLE is an open market standard freely available for use by all financiers of infrastructure. The structure aims to facilitate the funding of Greenfield project financing by institutional investors such as pension funds and insurance companies. The solution was developed in response to European capital markets becoming inaccessible to new Greenfield projects and long term bank debt drying up (Allen & Overy LLP, 2012).

According to the PEBBLE Intercreditor Agreement Term Sheet, the PEBBLE structure involves provision of sub-senior debt to enable a diverse range of prospective infrastructure financiers to more readily access the market through targeting of the liquidity needs. The PEBBLE structure constitutes a senior A Note and a B Loan, which is provided by banks. The B Loan is subordinated to the A Note and serves as a first loss piece. The more expensive (due to the higher risk) B Loan is repaid during the riskiest phase of the project and before the A Note, with a maturity of 8 to 10 years. The B Loan has two functions; to enhance the credit of the A Note, and for the lenders of the B Note to act as controlling creditors. The A Notes are subscribed for by institutional investors and feature a fixed drawdown and amortisation schedule to minimise negative carry. The A Notes and the B Loan are drawn in a ratio of 85:15. The structure further incorporates a construction revolving facility provided by commercial banks. This facility is drawn on to meet construction costs and acts to

smooth the drawdown profile of the A Note and B Loan. PEBBLE aims to enable infrastructure financiers to opt for the risk return profile that best matches their appetite. For example, a bank wishing to provide long term funding may choose to fund both A Notes and B Loan. An insurance company seeking a high credit quality may choose to subscribe only for the A Note. A bank with a preference for a shorter maturity debt instrument may fund purely the B Loan (Allen & Overy LLP, 2012).

2.6.7. Public finance as an alternative or substitute to private finance

Private finance is not a defining characteristic of a PPP. Instead of the private party raising finance, governments also have the ability to finance PPPs themselves, either in whole or in part (co-financing). Providing public finance, and thereby reducing the amount of private capital investment needed, may however have the adverse effect of reducing risk transfer to the private party. Through lesser risk transfer, private sector incentives to create value for money may be decreased. The rationale for government financial support to PPPs is strengthened during periods of capital market disruption when private financing is inaccessible or expensive (The World Bank, 2012).

Typical structures where government finances the projects but other aspects are transferred to the private party include Operation-Maintenance, Design-Build-Operate and Build-Operate-Transfer contracts. But even Design-Build-Finance-Operate (- and Transfer) projects can be run with government co-financing the deal through a contribution or grant. Common examples include major projects requiring significant initial capital outlay, as is often the case with rolling stock infrastructure projects. Other examples include projects procured during adverse market conditions where it may be too expensive to raise private capital. The World Bank PPP reference guide suggests that governments may choose to provide finance for PPP projects in order to:

- Avoid excessive risk premiums;
- Mitigate government risk; or
- Improve the availability or reduce the cost of finance.

The reference guide suggests several options available to governments, which include providing loan or grant finance directly to the project company, as well as providing a government guarantee on a commercial loan. Instead of direct lending from government, an intermediary such as a government-owned development bank or other finance institution can also provide the funding. Another alternative is for governments to retain the on-going responsibility for capital expenditures and thereby not transfer the financing function to the private sector (The World Bank, 2012).

According to the reference guide, many governments have established publicly owned development banks and other finance institutions, which may provide a range of financial products to PPP projects so that project developers do not have to seek funding from commercial banks. These financial institutions may be capitalized by government, and can often access concessional financing, providing lending at commercial rates to the private party. Such government support became particularly relevant during the 2007-08 financial crisis when several PPP projects were unable to raise sufficient finance as a result of the reduced appetite for the financing of these type of projects (The World Bank, 2012).

2.6.8. Multilateral development banks as an alternative credit provider

Multilateral development banks are institutions, which were created by a group of countries with the objective of providing financing and professional advice for the purpose of development. These institutions offer bank finance similar to that offered by commercial lenders. With the rise of multilateral development banks and

infrastructure often being at the centre of economic development, these institutions have started to play a key role in the financing of PPPs and other infrastructure projects. Multilateral development banks may provide an attractive alternative financing solution to commercial bank debt where bond finance is not available. Orr and Kennedy suggest that multilateral development banks have advantages over commercial banks in the areas of social and environmental management, political risk management, project development, serving as lifelines in times of crisis, venture financing for micro infrastructure, creating transparent legal and regulatory environments, designing collective institutions, and providing debt relief (Orr and Kennedy, 2008).

Notably, there has been a rise in both the number of these institutions, as well as in their involvement in deals since the 2007-08 financial crisis. This increase may be linked to a government response to the loss of liquidity of debt financing experienced during the crisis.

Since development banks are able to offer similar products to those offered by commercial banks, such banks often see multilateral development banks as direct competitors. The involvement of these institutions is widely welcomed on deals for which commercial lenders have limited appetite and to which they are not able to provide financing, as this involvement enables the development of a project in the first place. Their involvement on more attractive deals is however often criticised, especially by commercial banks. Depending on the development bank's policies and investment focus, commercial banks may find themselves bidding for a stake in the same deal as the development banks. As government-backed development banks generally operate on a non-profit basis, these institutions often are able to offer financing terms which commercial lenders are unable to compete with. Some critics

view this as government intervention in a competitive market and warn of a crowding-out of commercial banks, who find themselves priced out of deals they would otherwise have competed in (Counter Balance, 2009).

2.6.9. Government Finance Guarantees: Debt Guarantee, the UK Credit Guarantee Finance model and the Australian Supported Debt Model

In a debt guarantee, the public sector will provide a guarantee over the debt of a project, which may be full or partial and may even be withdrawn over time. As opposed to direct state capital contributions, debt guarantees present a contingent government liability for borrowing limit purposes. Debt guarantees may reduce the overall debt funding costs and improve the value for money of a transaction. Regan suggests that debt guarantees are beneficial as they tend to preserve the traditional incentive frameworks inherent in the PPP procurement method, provide flexibility to consortia as refinancing options remain available, do not require the state to assume a loan administration role, and only present a small cost to the state (Regan, 2010).

Government Debt Guarantees may also be beneficial for deals that are not financeable by commercial lenders due to project risks. This is common for projects which have high construction risks which lenders may not be prepared to take on. To make a deal financeable, the public sector can provide a debt guarantee, guaranteeing timely payment of all interest and principal payments.

Credit Guarantee Financing is an alternative to debt guarantees that was introduced in the UK in 2003 as a form of financing for PPPs. Credit Guarantee Financing was trialled on two UK PFI hospital deals but has not been used in the UK since. A variation of the structure has however been piloted in Australia and is discussed in further detail below. Credit Guarantee Financing provides a mechanism for using public debt capital

to finance PPPs. In the Credit Guarantee Financing model, Treasury provides a debt facility to the project essentially replacing bank loans with government gilts. The debt provided by Treasury is guaranteed by the consortium's bankers or a credit enhancement agency such as monoline insurer. The model's objective is to reduce the consortium's cost of capital and thereby improve the long run and overall value for money outcome for the public sector. As opposed to traditional project finance where debt is only secured by recourse to the project's underlying assets, the Credit Guarantee Financing model offers full recourse debt, thereby affecting the traditional incentive mechanisms of conventional project finance and PPP arrangements. While the Credit Guarantee Financing model remains an option for future projects, there currently is no commitment to proceed further with this type of financing. Regan suggests that while the Credit Guarantee Financing model can lower the cost of capital and improve Value for Money, the mechanism also creates a number of practical problems. Such problems include:

- an implicit risk transfer back to central government;
- Treasury having to assume the role of an arm's length lending bank;
- an additional layer of contractual complexity;
- reducing competitive tension in the bidding process; and
- altering the incentive mechanism part of conventional PPPs (Regan, 2010).

The Supported Debt Model is a variation of the Credit Guarantee Financing model, which run as a pilot by the Australian Queensland Government. The Supported Debt Model distinguishes itself from the Credit Guarantee Financing in that the public sector refinances a predetermined level of project debt when the PPP is commissioned and operational. Further, private financiers still need to provide construction and residual

junior debt finance, thereby preserving the traditional PPP incentives. Compared to the Credit Guarantee Financing, the Supported Debt Model does not require credit enhancement or supporting private guarantees while the lower cost of state debt reduces life-cycle finance costs. In the Supported Debt Model, private junior debt providers assume a stronger role in the administration of the transaction in order to preserve the important incentive framework of a PPP. This does however result in a requirement for higher levels of more expensive privately sourced mezzanine finance or equity capital (Regan, 2010).

2.7. Infrastructure and PPP financing in South Africa

In this section of chapter 2, we discuss the state of the South African PPP financing market and assess what financing solutions have been employed on South African projects to date.

This section presents an overview of the current Infrastructure and PPP financing market in South Africa. For many deals, earlier ones in particular, limited information has been made available publicly, making it challenging to perform an in-depth analysis of the project structures and financing arrangements of closed deals. Nonetheless, sufficient information is available to conclude that the South African PPP and infrastructure project finance market is still little developed and financing is largely reliant on bank debt. It should be of particular concern that there has been almost no use of alternative financing methods to bank finance.

While bond financing is a common form of debt financing for infrastructure projects in developed markets, especially mega projects, Sheppard suggests that Africa in particular has not been very successful in raising project finance through project bonds. South African PPPs are no exception to this observation. Within Africa, most

bond financing was raised for South African projects through local currency issues on South African capital markets. Notably, most of these bond issues relate to corporate bonds (Sheppard, 2006).

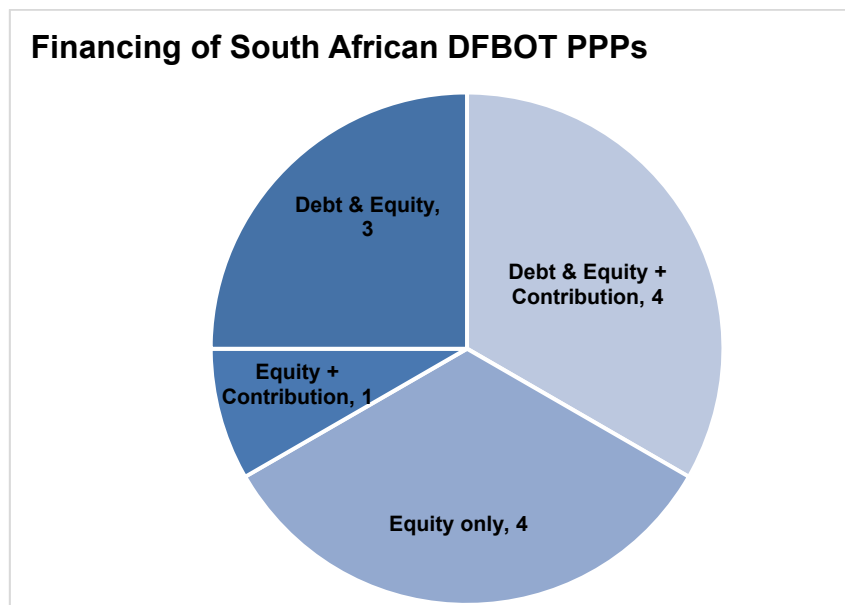
The lack of development on the South African financial market may well be a result of a lack of interest in and coverage of developing infrastructure finance markets, which has led to the markets having to rely on themselves. According to Orr, much attention has been given to investment and development practises of Western investors while little attention has been paid on the sources of investment in emerging market infrastructure. As a result, developing country investors have increasingly taken on the role of project lead sponsors, with over 40% of investment between 1998 and 2004 in emerging market infrastructure coming from within the developing markets themselves (Orr, 2007).

The lack of interest in and coverage of the market may however also be driven by the market simply not being ready for a more significant involvement of international investors. A PWC study analyses the rise of non-bank infrastructure project finance across various regions. Using available capital outside of the banking system, sufficient governance and transparency in financial reporting, balanced tax and commercial policies and project-specific credit support as criteria, the study analyses the current market conditions around the world by the relative feasibility and attractiveness of financing infrastructure projects through capital markets. Africa, including South Africa, is categorised as a region which still has significant hurdles to overcome, before an infrastructure project bond market is likely to develop, but where pilot initiatives are being developed. The study suggests that while South Africa has a developed bond as well as sizable life insurance and pension markets, institutional investors still lack the appetite for construction risk. Even in the secondary market,

appetite has been limited with only few institutional investors buying into projects post completion. A key driver behind the lack of appetite from institutional investor may be the fact that, despite a number of PPPs and other projects allowing private sector participation, the overall infrastructure market in South Africa remains dominated by state owned utilities such as Transnet and Eskom who finance infrastructure on balance sheet (PWC, 2013).

Despite the market clearly still being in an early development phase, there have been a number of successful PPPs in South Africa. Specifically, there have been 20 PPPs signed under Treasury Regulation 16 with 13 projects taking the form of DFBOT contracts. Unfortunately, only very high-level information has been published on the financing structure and contracts of these projects. The available data, as published by the South African PPP Unit, suggests that four of these projects were financed with only equity, three projects were financed with debt and equity, four were financed with debt and equity as well as a government contribution and one project was financed with equity and a government contribution. For one of the projects, the financing structure was listed as “to be confirmed”. This is summarised and presented in the figure below (PPP Unit, 2013).

Table 2: Financing of South African DFBOT PPPs



Source: Own summary based on data as per PPP Unit, 2013

The number of DFBOT PPPs making use of leverage is very low. Only seven of the DFBOT PPPs signed under Treasury Regulation 16 made use of leverage with the remainder being financed using equity only. It should however be noted that this analysis only considers PPPs signed under Treasury Regulation 16. A number of PPP pilots, including two prison PPPs, were signed before the regulation was put in place. Other projects, with structures similar to those of a PPP, were granted exemptions from the regulations with the South African Renewable Energy Independent Power Producer Procurement Program (REIPPPP) being the most prominent example.

The reason for the low number of projects is not clear, but contract difficulties and lengthy procurement could potentially have played a role. Davis suggests that build-own-transfer and build-own-operate models do not appear to work as well in the developing world. Consequently, other models for partnerships between the private and public sector may be needed to provide greater assurance of project viability well

as greater incentives for performance by government parties (Davies and Eustice, 2005).

The REIPPPP employs a similar partnership model to PPPs. Under the REIPPPP, project developers enter into 20 year Power Purchase Agreements with the South African public utility provider, Eskom. The REIPPPP has been granted an exemption from the South African national PPP regulations, and projects procured under the programme therefore cannot be technically be classified as PPPs. Nonetheless, there are numerous similarities between the two projects including the structure and typical financing arrangements. While previous PPPs may have provided limited room for the development of a deep project finance market, the landscape may now be changing due to the significant size and number of projects procured under the REIPPPP. 64 projects were awarded contracts under the first three rounds of procurement. 56 out of the 64 projects were project financed, and while most of these projects made use of bank debt, one of the Round 1 projects (Touwsrivier Solar Park) issued a bond valued at R1 billion. This bond issue presented the first South African investment grade project finance infrastructure bond. Approximately two-thirds of funding across the three procurement rounds was debt, a quarter of funding took the form of equity and shareholder loans with the remainder of funding coming from corporate finance. Looking at the debt funding, 64% has come from commercial banks (R57 billion), 31% from development finance institutions (R27.8 billion), and 5% from pension and insurance funds (R4.7 billion). 86% of debt was raised from within South Africa with the remainder being international funding. The commercial lending market for the REIPPPP was dominated by the five large South African commercial banks – Standard Bank, Nedbank, ABSA, RMB, and Investec. These banks have all played lead debt arranging roles, although not for all deals, and in a number of projects also

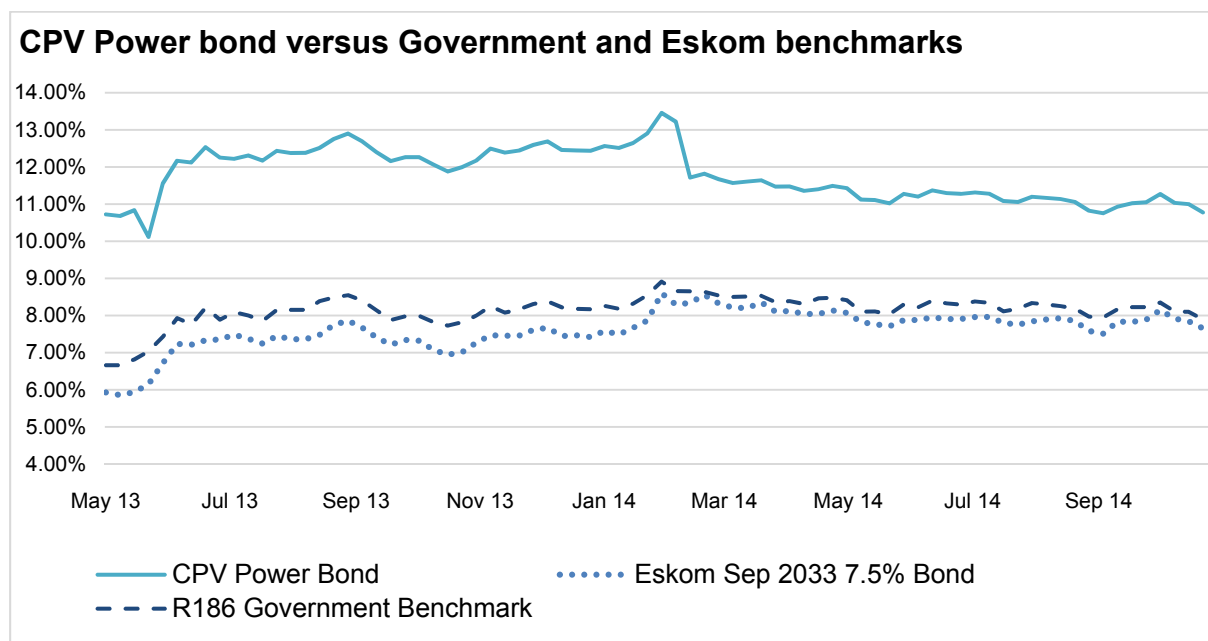
participated as co-senior lenders or providers of subordinated mezzanine debt. Development banks have also played a key role in the funding of these deals. Significant local debt funding has come from the Industrial Development Corporation and the Development Bank of Southern Africa. The Industrial Development Corporation participated in 20 deals and the Development Bank of Southern Africa in 16 deals, mostly in arranging vendor financing for Black Economic Empowerment partners and community participation. International development banks involved in the REIPPPP included the International Finance Corporation and the Danish Export Credit agency with three projects each, and the Netherlands Development Finance Company, the African Development Bank, European Investment Bank and the Overseas Private Investment Corporation, with one project each. Commercial lenders were not the only providers of finance and local insurance and pension funds also used the REIPPPP to gain exposure to infrastructure deals with Old Mutual, Sanlam, and Liberty all having been involved. Eberhard suggests that commercial banks are expected to sell some of their debt to secondary capital markets to position themselves for ongoing debt exposure in future REIPPPP rounds (Eberhard, 2014, Department of Energy, 2011-2013).

Notably, the REIPPPP was used as a platform for the issue of the first South African investment grade infrastructure bond. This infrastructure bond is held entirely by institutional investors, was issued in April 2013 and listed on the Johannesburg Stock Exchange in June 2013. The bond was raised to finance the construction of a 44 MWh Concentrated Photo Voltaic Plant located in Touwsrivier in the Western Cape which was awarded preferred bidder status under the first procurement round of the program. The bond was rated Baa2.za by Moody's Investor Service and offers a fixed coupon rate of 11% over a 15 year period (leaving a five year tail to the end of the 20 year IPP

contract). Repayments are based on an amortizing profile (principal and interest are repaid simultaneously) giving the bond a modified duration of 7 years (Deloitte, 2013).

The bond was issued through an SPV, CPV Power Plant No.1 Bond SPV (RF) Ltd, an affiliate of the project company, Soitec Solar GmbH. The following figure presents the yield of the bond over time since its issue in early 2013. The same figure also presents the yield on the R186 government bond (a benchmark bond with similar maturity) and the yield of a vanilla fixed rate Eskom bond maturing in 2033. The Eskom benchmark is relevant in that Eskom is the counterparty to the independent power producer whose credit rating therefore will be impacted by creditworthiness of Eskom.

Figure 3: CPV Power bond versus Government and Eskom benchmarks



Source: Thomson Reuters

Being a state-owned utility, the yields on Eskom bonds closely track those of similar government bonds. While Eskom is a counter party to the solar SPV, bonds issued by the SPV attract an additional risk premium over the Eskom bond. This is due to a number of reasons including availability risk (solar power is only generated when the sun is shining) and project risks (operating, managing, maintenance and financing).

Initially, the CPV Power bond attracted a premium of approximately 5% over the government benchmark bond. This spread narrowed to approximately 3% after about one year of trading and currently sits at 2.88% to Eskom and 3.12% to government (as at October 2014). It should also be noted that the CPV Power bond is relatively illiquid with significant amounts being held by large institutional investors.

Historically, most PPP financing in South Africa has come from traditional bank debt with the REIPPPP being no exception. As shown in the above review of financing under the REIPPPP, most funding of recent deals has come from traditional sources indicating that there still is a lack of innovation in the South African project finance market. Nonetheless, institutional investors and development banks, both local and international, have started to show an increased interest in South African deals signalling that investors are slowly opening up to South African PPPs and project finance deals, and perhaps even taking on construction risks. Further, the issuance of the first investment grade infrastructure project bond and its narrowing spread after one year of trading may be a sign that the South African project finance market may be developing and readying itself for alternative financing solutions.

3. Prison PPPs in South Africa – a case study

3.1. Introduction

This chapter explores South African prison PPPs as a case study. The case study analyses the first two and only South African prison PPPs which have been subject to significant criticism over their costs. Particularly, we focus on the following research questions:

- what was the background to the procurement of the prisons and what were the key terms and details of the projects;
- what were the total cost of the prisons;
- what were the financing terms and were these fair; and
- could alternative financing solutions or structures have been used to bring savings to the public sector?

This chapter is laid out in a number of sections. First, we provide a background and an overview of these projects before reviewing key terms including the project structure, project costs and financing terms in more detail. We then calculate, analyse and benchmark the total costs of the projects before turning our attention to the financing costs. Financing costs are broken down (into cost plus a margin), analysed and benchmarked to assess whether the costs were priced competitively. We then isolate the impact of financing on the total cost of these projects and analyse if money could have been saved through employing some of the alternative funding methods discussed in chapter 2 of this paper.

Based on the review of funding options available and the case study analysis, we draw a conclusion about the state of the South African PPP financing market and make a

number of recommendations for the future procurement of such projects. To conclude the case study, we discuss the future for PPP prisons in South Africa.

3.2. Background

Around the millennium, South Africa found itself at a significant shortage of prison space, which led to an overcrowding in the existing state-owned prison system. In order to address the problem of overpopulation, South Africa's departments of Correctional Services and Public Works imported a procurement model of privately built and operated prisons from the UK. The prisons were to be procured as PPPs and government called for private sector bids for the design and construction of 11 maximum security prisons. Shortly after the public announcement, the number of prisons to be procured was revised down to only two contracts due to an underestimation of costs. In 2000, the South African government signed two 25-year concessions for maximum security prisons in Bloemfontein and Louis Trichardt. The winning consortia were responsible for designing, building, financing and operating the prisons before transferring them back to government after a 25 year operating term (a DFBOT contract) (Farlam, 2005).

According to Ramagaga, the South African overcrowding problem at the time was severe. The existing 241 prisons held a total of 162 162 prisoners but only had capacity for 118 154 people overcrowding the available prison space by as much as 37% (Ramagaga, 2001).

The first project procured as a PPP was the Manguang prison in Bloemfontein in the Free State (the "Bloemfontein prison") which opened in July 2001 and became fully operational in January 2002. The second project was the Kutama-Sinthumule prison

at Louis Trichardt in Limpopo (the “Louis Trichardt prison”) which opened in February 2002 (Open Society Foundation for South Africa, 2003).

Shortly after the appointment, the two PPP prisons became a topic of debate as the institutions were contracted to operate at much higher standards than prisons built and run by the public sector. Higher standards meant that these two prison PPPs attracted much higher costs on a per prisoner basis than what existing public prisons were costing at the time. Critics of the PPP prisons argued that the costs far outweighed the claimed benefits of privatisation, and went as far as saying that high costs of these two prisons impacted the rest of South Africa’s corrections system. Inquiries and reviews into the issue have shown that thousands of public sector jobs had to be frozen due to the money being allocated to the private prisons. While the two privately run prisons provided some additional capacity to the overall system, this was not nearly enough to address the general problem of overpopulation in the prison system. Since then, South Africa’s prison population has continued to rise resulting in even more overcrowding in the public prison system. As the private prisons are protected from overcrowding, additional prisoners have had to be accommodated within the state-run prisons (Open Society Foundation for South Africa, 2003).

In 2002, the South African National Treasury conducted a review of the two prison PPP deals providing some background to the deals and analysing their costs. The review explained that the projects were initiated in 1997 with the procurement undertaken by the South African Department for Correctional Services which also set the design specifications for the projects. According to the South African National Treasury, the specifications were designed with “inputs in mind rather than outputs”. More specifically, the specifications for the prisons were imported from UK prisons which had much higher standards than what was the norm for existing prisons which

resulted in a lack of parity to the rest of the country's correctional services system. The review also found that at the time of planning of the prisons, Treasury regulations for the procurement of PPPs were not yet in place. This lack of regulation meant that no feasibility study was conducted to test affordability, risk transfer and value-for-money. While the high specifications were a key factor contributing to the high cost of the prisons, this was deemed to be not the only cause. The review found that, among other factors, the high base interest rates at the time of the deals and a "higher than normal return on equity, reflecting the perceived risk of early deals", pushed up the long-term cost of the prisons to the public sector (National Treasury, 2003).

Du Plessis suggests that it was due to the high specifications and a high cost of financing at the time of procurement, that these prisons came at a cost which was forecast to take up roughly five per cent of the Department of Correctional Services' annual budget until at least 2026. In an effort to reduce costs, the Department of Correctional Services commissioned a consortium to try find ways to make the private prisons more cost-effective. The consortium reported back in 2006 concluding that the contracts were inflexible and changes to the terms were impossible (du Plessis, 2012).

3.3. Project Summary

The Bloemfontein prison contract was signed in March 2000 with an opening date of July 2001 and a full capacity date of January 2002. The Louis Trichardt prison contract was the second South African PPP prison contract with an opening date of February 2002 and a full capacity date of September 2002. Both prisons were built within a timeframe of less than 1.5 years and with a similar capacity for around 3000 inmates. The Bloemfontein facility was the smaller of the two providing space for 2928 inmates while Louis Trichardt provided space for 3024 inmates. The table below summarises

the key dates for each of the two prisons including contract and opening dates (National Treasury, 2003).

Table 3: Summary of prison PPP dates

Project:	Bloemfontein	Louis Trichardt
Number of inmates	2928	3024
Contract signed	24 March 2000	11 August 2000
Opening date	1 July 2001	19 February 2002
Full Capacity date	January 2002	September 2002

Source: National Treasury (2003)

3.4. Project Economics

The total capital expenditure for the Bloemfontein prison was R435 million (approximately R954 million in real⁴ 2014 terms) of which R270 (approximately R592 million in real 2014 terms) related to construction costs. Total capital expenditure for the Limpopo prison was R392 million (approximately R829 million in real 2014 terms) of which R303 (approximately R640 million in real 2014 terms) million related to construction costs. On a per inmate basis, the Bloemfontein prison came in slightly more expensive than Louis Trichardt costing R148 566 per inmate compared to R129 630 (National Treasury, 2003). It is noted that the pre-operating interest/fees for Louis Trichardt were significantly lower than for Bloemfontein. While insufficient information is available to determine the driver behind this difference with certainty, it is possible that the difference may have been caused by different drawdown profiles and

⁴ Figures presented in real terms in this paper have been restated or rebased to real terms using the South African CPI as published by Stats SA.

Cash flows originally expressed in nominal terms were restated to real terms by dividing each cash flow by the CPI index for the period in which such cash flow was incurred, and then multiplying by the CPI index applicable to the period into whose money of the year it was being restated to.

Cash flows originally expressed in real terms as at a different period were rebased to real terms as the respective period, by dividing each cash flow by the CPI index applicable to the period in whose money of the year it was originally expressed in, and then multiplying by the CPI index applicable to the period into whose money of the year it was being restated to.

priorities. The low pre-operating interest/fees for Louis Trichardt suggest that equity may have been drawn down before debt with most debt being drawn down towards the end of the construction period.

Table 4: Summary of prison PPP costs and capacity

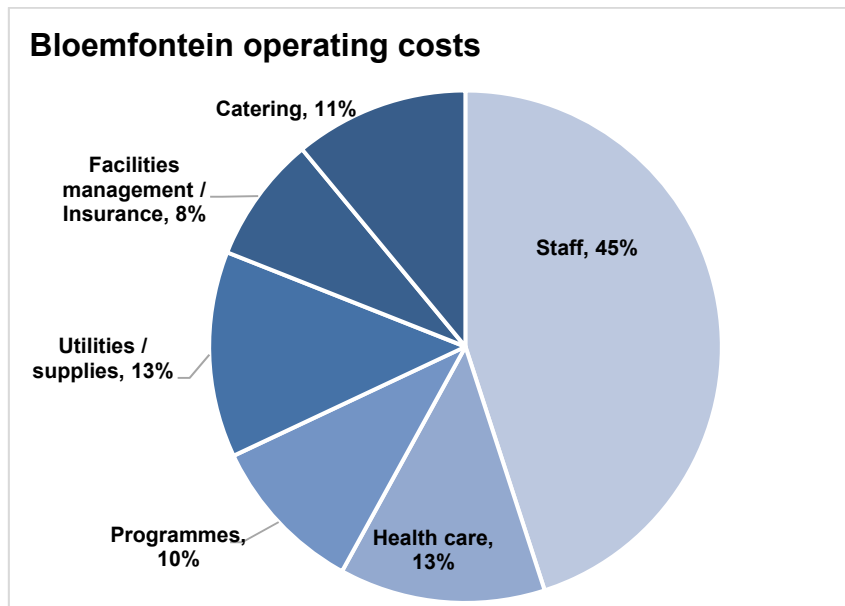
Project:	Bloemfontein		Louis Trichardt	
	<i>Nominal</i>	<i>Real ('14)</i>	<i>Nominal</i>	<i>Real ('14)</i>
Number of inmates	2928		3024	
Total capital expenditure (R' million)	435	954	392	829
Construction (R' million)	270	592	303	640
Pre-operating interest/fees (R' million)	104	228	26	55
Start-up costs (R' million)	58	127	49	104
Capital expenditure per inmate (R actual)	148 566	325 678	129 630	273 978
Construction cost per inmate (R actual)	92 213	202 145	100 198	211 774

Source: Nominal figures as per National Treasury (2003), real 2014 figures based on own calculations

Limited information on the operating costs of the two prisons has been made public restricting our ability to analyse such in detail. For reference we include the following figures which provide limited insight showing the make-up of operating costs for each prison as provided by National Treasury (National Treasury, 2003).

The first figure presents the breakdown of operating costs for Bloemfontein.

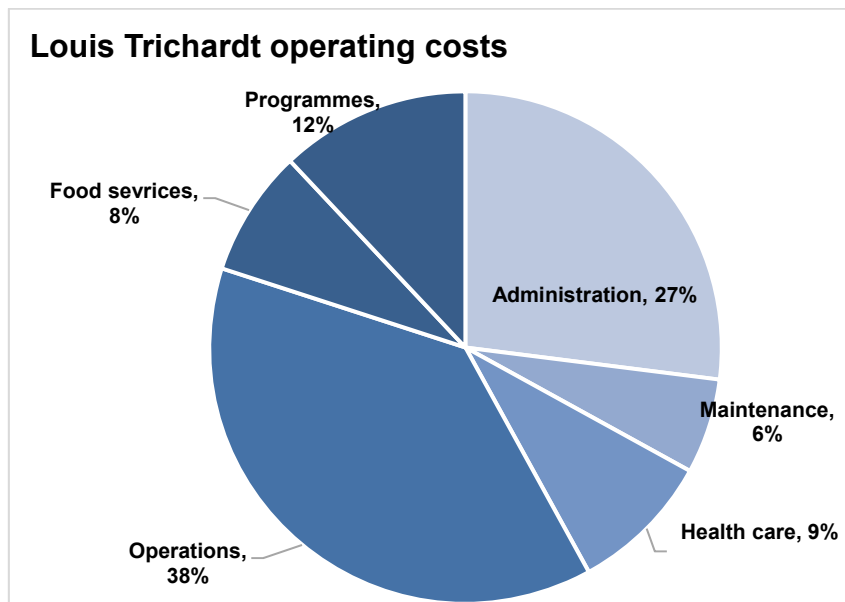
Figure 4: Bloemfontein operating costs



Source: Data as per National Treasury (2003)

The next figure presents the breakdown of operating costs for Louis Trichardt. It is noted that the categories for Louis Trichardt differ slightly to those presented for Bloemfontein due to the data available.

Figure 5: Louis Trichardt operating costs



Source: Data as per National Treasury (2003)

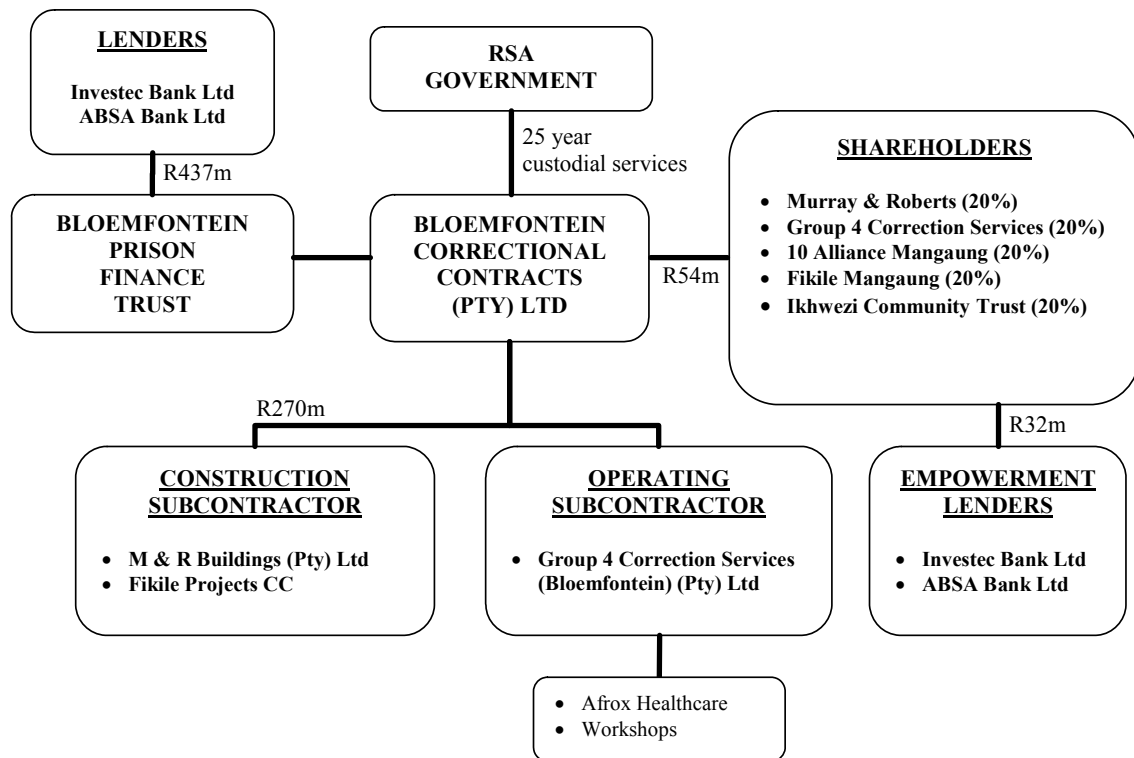
3.5. Ownership and contractual relationships

3.5.1. The Bloemfontein prison

Bloemfontein's PPP contract carried a 25-year operating term. The project was financed by five equity investors each taking a 20% stake in the project. Notably, a large portion of the equity finance was financed by loans from empowerment lenders to the equity providers. Effectively, this increased the overall gearing on a look-through basis from an equity to debt ratio of 11:89 to a ratio of 5:95. The lenders provided financing to the SPV through a special trust, which was set up to provide debt finance to the project. Construction and operations were subcontracted to separate providers out of the project SPV. Overall, the structure resembled that of a standard PPP. While the project gearing was high, this is not uncommon for projects receiving an availability payment based revenue stream (National Treasury, 2003).

The figure below depicts the ownership structure of the Bloemfontein PPP project.

Figure 6: Bloemfontein prison PPP ownership structure



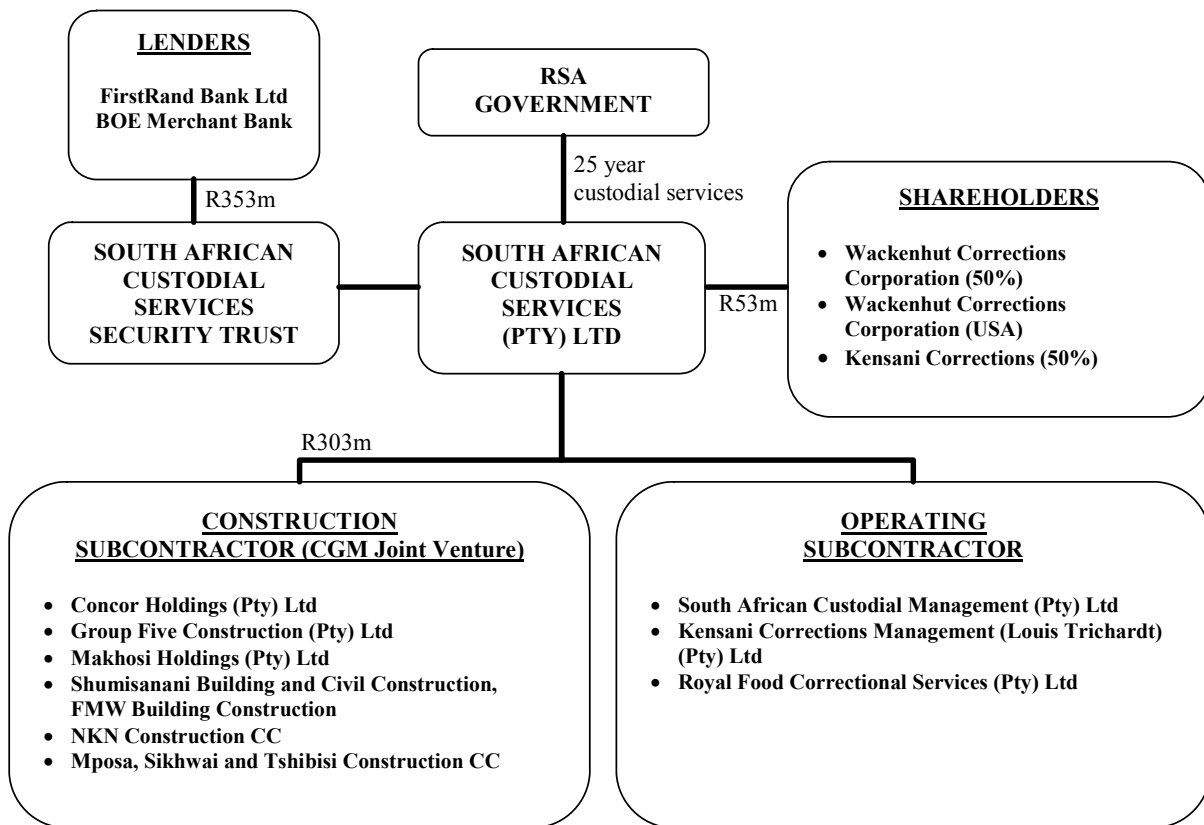
Source: National Treasury (2003)

3.5.2. The Louis Trichardt prison

The Louis Trichardt PPP contract also carried a 25-year operating term. Two equity investors financed the project, each taking a 50% stake in the project. The lenders provided financing to the SPV through a special trust set up to provide debt finance to the project. As with the Bloemfontein PPP, construction and operations were subcontracted to separate providers out of the project SPV. As with the Bloemfontein contract, the structure for the project also resembled that of a standard PPP contract (National Treasury, 2003).

The figure below depicts the ownership structure of the Louis Trichardt PPP project.

Figure 7: Louis Trichardt prison PPP ownership structure



Source: National Treasury (2003)

3.6. Availability payments

While both projects were designed as availability payment type PPPs, the indexation mechanic of the availability payments for each project differed slightly. Both projects negotiated a variable and a fixed fee component. The fixed fee component is a non-indexed portion payable on a Rand per inmate capacity basis. The variable fee component is also payable on a Rand per inmate capacity basis, but is indexed at CPI inflation, which is further adjusted by a “K-factor”. The availability payment for both projects was thus adjusted by inflation plus the project specific factor on a semi-annual basis.

The Bloemfontein contract variable fee increased at inflation plus a factor of 0.623% in year one of operations. The factor thereafter slowly increased year on year to end

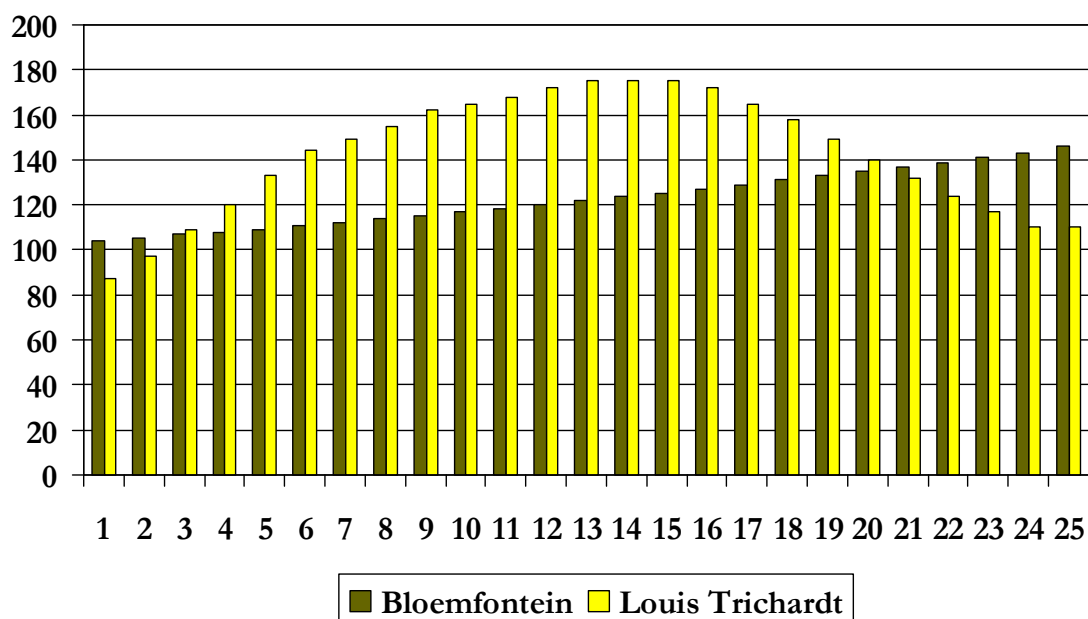
up at inflation plus 0.789% in year 25 of operations. This profile seems to have been sculpted to more closely match project cash inflows to cash outflows. The key driver behind this profile was the forecast inflation of staff and non-staff costs which were assumed to increase at a rate higher than CPI inflation (National Treasury, 2003).

The Louis Trichardt contract followed a slightly different schedule aiming to achieve a smoothing of returns, rather than a link to cost inflation. The K-factor for this contract was set at 1.06 (1 + 6%) from year two, then decreasing by 0.01 (1%) every second year until it reaches 1.00 12 years later (in year 14), and following which it steps down to 0.97 (1 – 3%). Based on this profile, revenues increase at a higher rate than CPI inflation during early years and at a lower rate in later years. Project Finance deals typically are cash constrained in early years, while the project is still ramping up and while debt levels are at their highest. For this reason, it is not uncommon for debt repayments to be sculpted during early periods, or for developers to negotiate capital grace periods to defer the repayment of debt principal. The downside for equity investors is that cash constraints during early years make it difficult to extract cash from the project, which can negatively impact equity returns. The K-factor for the Louis Trichardt contract would thus have allowed for a better smoothing of returns and resulted in the project being less cash constrained during early years.

The original forecast payment schedules are presented in real terms as prepared by National Treasury⁵ in the figure below (National Treasury, 2003).

⁵ It should be noted that the review by National Treasury does not make it explicitly clear at which base year these real fees are calculated at. Analysis does however suggest, that the numbers represent the real variable fee as at the respective opening date. With Bloemfontein opening in July 2001 and Louis Trichardt opening in February 2002, these two time series are calculated at different base dates and

Figure 8: Prison PPP payments as presented by National Treasury



Source: National Treasury (2003)

As previously discussed, the payments for both projects were broken down into a fixed and variable component. The payments for both prisons were payable per inmate on a monthly basis over a period of 25 years from the start of operations. The payments are summarised in the table below.

Table 5: Payments for the prison PPPs in real 2002 terms

Project:	Bloemfontein	Louis Trichardt
Monthly variable fee per inmate (R' actual, 2002)	132.20	86.45
Monthly fixed fee per inmate (R' actual, 2002)	83.50	73.91
Monthly total fee per inmate (R' actual, 2002)	215.70	160.36

Source: National Treasury (2003)

The combination of a fixed fee and variable with the variable fee being adjusted by a factor is a good example of how an availability type payment can be sculpted to smooth a project's cash flows. This technique is particularly useful for projects which have

are therefore not directly comparable. Nonetheless, these figures are useful in that they show the payment profile for each project in real terms.

cyclical or lumpy cash flow profiles. When paired with high gearing, cyclical or spiked cash flow profiles may present a challenge to projects using fixed rate debt⁶. Normally, in order for such project to be able to meet debt service and stay within covenant requirements, debt repayments have to be sculpted and significant reserve accounts may have to be put in place. While sculpting the debt usually is not a problem for bank finance, it is not as easy to achieve a sculpted repayment profile if bond finance is used. That said, there are still ways to effectively structure a project with bond finance even when project cash flows are lumpy. Such structures aim to manage variability and maximize flexibility while at the same time reducing cost. One such option is a structure, which combines bond finance with bank loans and/or facilities (such as a revolving credit facility). In such a structure, the more flexible bank loans and/or facilities act as a buffer for bond finance by offering more flexible repayment terms. Variability in cash flows is thereby absorbed by the more flexible bank loans and/or facilities while repayments on bonds remain fixed.

Crucially, having to sculpt debt may be seen by lenders as an indication of a more risky project, thereby attracting higher margins. Sculpting revenues presents an alternative to debt sculpting where the smoothing of cash flows is achieved through sculpting of cash inflows, rather than cash outflows. This technique can significantly decrease project risks and make a project more attractive from a financing perspective. A public sector considering this option should keep in mind that the required (real) budget requirement for a project would change from year to year (i.e. payments increase at a different rate than CPI). This may present a problem from a budgeting point of view in cases where a fixed portion of the budget would normally

⁶ Fixed rate debt is an attractive form of debt finance for PPPs, as fixed rate interest provides certainty over future interest payments.

be set aside (which may increase by CPI inflation each year). Another alternative solution is inflation linked debt which has a natural hedge to revenues which typically are also inflation linked. The key issue around inflation linked debt is that the market appetite for such typically is not as large as for fixed rate debt (although currently there is increased demand for inflation linked bonds due to inflation uncertainty). Nonetheless, it presents an attractive alternative which is analysed in more detail in section 3.9.7.

3.7. Analysis of total project costs

As the 2002 National Treasury review does not present the total public sector cost of the prisons, we estimate such ourselves by calculating the total estimated net present cost of payments⁷ at the respective contract dates. We note that the overall cost of the two prisons is relatively similar with the Louis Trichardt prison being approximately 5% more expensive on a per inmate basis than the Bloemfontein prison. The cost total cost is calculated assuming forecast inflation of 6% at contract date, as well as outturn inflation to 2014 and 6% thereafter.

Table 6: Net present cost of prison PPP payments

Project:	Bloemfontein	Louis Trichardt
Net present cost using forecast inflation of 6% (outturn inflation to 2014 and 6% thereafter)	R1,730 million (1,718)	R1,824 million (1,792)

Source: Own calculations

To assess National Treasury’s argument that specifications being imported from UK prisons led to high total costs, we compare the total project costs calculated above to the costs of a six Scottish PPP prisons procured at a similar time. Similar to the

⁷ Calculated by discounting the forecast payments over the project life. Discounted at 13.53% and 13.05% being the yield on the long-term (20 year) government benchmark bond at the time of agreement for Bloemfontein and Louis Trichardt respectively.

Bloemfontein and Louis Trichardt PPPs, these Scottish prison contracts were procured as PPPs of a design, build, finance, operate and maintain nature. Similarly to the South African prisons, the Scottish prisons were paid for using an availability payment mechanism over a 25 year operating period (PricewaterhouseCoopers, 2001).

The total cost for the Scottish prisons was calculated by PriceWaterhouseCoopers as part of a review commissioned by the Scottish Executive Justice Department using a similar methodology to the one we applied in calculating the net present cost of South African PPP prisons. We have converted this cost into South African Rand to present the total cost per prison before calculating the cost per inmate and per inmate per year. Notably, the total costs (discounted) of the South African PPP prisons were R1,717 million and R1,792 million respectively which is less than the average total cost of the UK PPP prisons with R2,140 million. Despite having similar total costs, the South African prisons offered approximately six times the capacity. On a per inmate basis, the cost per prisoner was R586,749 for Bloemfontein and R612,022 for Louis Trichardt, compared to an average cost per prisoner of R3,566,857 for the UK prisons. On a per inmate per year basis (based on the 25 year operating term), this translates to R23,470 and R24,481 for Bloemfontein and Louis Trichardt and an average of R142,674 for the UK PPP prisons. The cost per inmate in the South African PPP prisons was therefore approximately one sixth of the cost per inmate in the UK PPP prisons.

Table 7: Net present cost of prison PPP benchmarked against UK prisons

	Contract date	Total net present cost (A) ⁸	Capacity (B)	Cost per inmate (A/B)	Cost per inmate per year ((A/B)/25)
Bloemfontein	24/03/2000	R1,718 million	2928	R586,749	R23,470
Louis Trichardt	11/08/2000	R1,792 million	3024	R612,022	R24,481
Lowdham Grange	07/11/1996	R1,974 million	500	R3,948,820	R157,953
Kilmarnock	30/11/1997	R1,799 million	500	R3,598,731	R143,949
Ashfield	29/06/1998	R1,581 million	400	R3,953,720	R158,149
Forest Bank	02/07/1998	R2,551 million	800	R3,189,196	R127,568
Rye Hill	22/07/1998	R1,922 million	600	R3,202,979	R128,119
Dovegate	24/09/1999	R3,012 million	800	R3,765,346	R150,614
Average UK prison	n/a	R2,140 million	600	R3,566,857	R142,674

Source: Own calculations based on cost data as per PriceWaterhouseCoopers (2003)

The above analysis shows that even though specifications may have been imported from UK prisons, the cost per inmate was significantly lower for the South African prisons.

3.8. Financing terms

Both projects were financed with debt and equity. The Bloemfontein project employed senior debt while the Louis Trichardt Project used senior debt and subordinated debt. Both projects were highly geared with equity to debt ratios of 11:89 (5:95 on a look-through basis) and 13:87 respectively. The Bloemfontein prison negotiated debt with a 13 year tenor⁹, a 2.25% margin and no capital grace period. The Louis Trichardt Prison negotiated debt with a tenor of 18 years, a 2.50% margin and a 20 months capital grace period. The base interest rates at the time of agreement were fixed at 14.58% and 15% respectively (National Treasury, 2003). Based on an average inflation rate of 5.4% in the year 2000, we calculate the real base interest rates at

⁸ Total net present cost of UK prisons as at March 2001 and converted into South African Rand at an exchange rate of ZAR/GPB of 12.252.

⁹ The tenor refers to the term length of debt or a loan.

9.18% and 9.6% respectively. The cost of debt is analysed and benchmarked in more detail in section 3.9.3 of this paper. Detailed figures are presented in the table below.

Table 8: Financing terms of prison PPPs

Project:	Bloemfontein	Louis Trichardt
Funding		
Equity (R million)	54	53
Total debt (R million)	437	353
Total funding (R million)	491	406
Senior debt		
Debt:Equity ratio	11:89	13:87
Tenor (post construction)	13 years	18 years
Repayments	Quarterly	Monthly
Grace period	None	20 months
Nominal base interest rate	14.58%	15%
	(deferred start swap rate)	(ytm of R157)
Real base interest rate	9.18%	9.6%
Cost of Debt	2.25% margin	2.50% margin
Return on Equity	± 29.9%	± 25.1% nominal

Source: Data based on National Treasury (2003); real interest rate and debt to equity ratio based on own calculations

3.9. Analysis of financing

As suggested by the 2002 National Treasury review, the high costs of financing at the time of procurement were a key cost driver behind the two projects. Both projects were financed using a leveraged project finance structure. Financing costs can therefore be broken down into the cost of debt and the cost of equity. While the analysis presented in this paper will review both cost elements, the focus is on the cost of debt, which has received the most criticism.

3.9.1. Methodology

In the following analysis, we first discuss and benchmark the cost of equity and cost of debt for the two projects. Due to a lack of publically available comparator information on South African PPPs, this benchmarking exercise is limited to a high-level analysis.

Following this exercise and to show the impact of the cost of debt on total project costs, we estimate the cost of financing using the terms specified in the 2002 National Treasury review. We argue that market conditions at the time of procurement were less than favourable with base interest rates being close to a historic high.

Farlam argued that inflation-linked debt could have decreased the total costs of the two projects. To assess his argument, we estimate the total cost of financing using an inflation-linked debt structure.

Following the discussion of debt financing, we discuss the options and benefits of refinancing the original debt under more favourable market conditions. The 2002 National Treasury review analysed the benefits and challenges of refinancing the debt in detail, the results of which are summarised and discussed further in this section.

Lastly, we consider some of the alternative financing solutions discussed earlier in this paper and discuss whether any of these could have presented an alternative lower cost financing solution. We give particular focus to the option of a government contribution.

We perform the analysis of debt by isolating the estimated total debt service from the rest of the project, as insufficient detail was available to model the entire project cash flows in detail. As the Department of Correctional Services gave bidders the option of a partially indexed availability payment with a K-factor, the profile of cash inflows and

outflows would have matched very closely, with project revenues following the overall cost profile. The close matching of project cash inflows and outflows means that there should be limited interaction effects between individual cash flows, allowing us assess and compare individual cash flows in isolation. The costs calculated in this exercise can therefore be directly compared among scenarios.

3.9.2. Benchmarking the Cost of Equity

Equity returns for Bloemfontein and Louis Trichardt were shown to be 29.9% and 25.1% nominal (National Treasury, 2003), implying real equity returns of 23.2% and 18.6% respectively¹⁰. With 20-year government benchmark bonds yielding 13.53% on 24 March 2000 and 13.05% on 11 August 2000 (at the contract dates), the respective equity premia for Bloemfontein and Louis Trichardt can be calculated at 16.4% and 11.9% respectively. As the cost of equity contributes significantly to the overall project costs, an equity return benchmarking exercise should have been conducted during the feasibility study to test whether the equity returns were market related and fair. We note that at the time of procurement and due to the prison PPPs being the first South African PPPs, no or limited comparable transaction information would have been available at the time. The returns would therefore have had to be benchmarked against a different group of assets or projects.

Today there is limited potential to analyse the returns in hindsight by considering comparable project finance transactions which have taken place since. Some comparators can be taken from the South African REIPPPP, which, according to Eberhard, targeted 17% real equity returns in the first procurement round. This

¹⁰ Based on an average inflation rate of 5.4% in the year 2000.

equates to approximately 24% nominal based on a 6% CPI inflation¹¹. To isolate the effect of underlying market rates at the time, we calculate and base the benchmarking on the equity premium.

The equity premium is the excess equity return over and above a risk-free benchmark rate. The implied equity premium can therefore be calculated by subtracting a benchmark risk-free interest rate (such as the yield to maturity on a government bond with a similar maturity) from the total equity return as measures nominal equity IRR. This can be illustrated by the following equation where ERP presents the equity premium, E(r) the equity return and E(rf) the risk free rate.

$$ERP = E(r) - E(rf)$$

The nominal returns thus imply an equity risk premium of 15.5% with benchmark rates yielding approximately 8.5%. This would indicate that the prison PPPs may have been reasonably priced, keeping in mind that the procurements took place approximately 10 years apart and the projects had inherently different risk profiles (Eberhard, 2014).

Table 9: Prison PPP equity returns benchmarked against REIPPPP Round 1

	Nominal Equity IRR	Real Equity IRR	Equity premium
Bloemfontein	29.9%	23.2%	16.4%
Louis Trichardt	25.5%	18.6%	11.9%
REIPPPP Round 1	24.0%	17.0%	15.5%

Source: Equity IRRs based on National Treasury (2003) and Eberhard (2014); equity premia based on own calculations

There is no publically available comparator information on South African PPP deals and while international comparators are of limited significance, such international

¹¹ Based on the upper band of the South African target inflation rate and historical rates which have been close to 6% in recent years.

benchmarks may give a feel of whether the returns of South African Prison PPPs were within an acceptable range. The problem with this comparison is that it ignores macro, regulatory and legal factors specific to a project and country.

With this caveat in mind, we consider a number of PFI deals in the UK healthcare sector, which were procured at a similar time as the two South African Prison PPPs. The deals considered are typical social infrastructure DBFO PFIs procured between 1997 and 2002. Hellowell shows the equity returns for the 10 PFI deals between 1997 and 2002 to have a range of between 12.43% and 22.58%. This suggests an average return of 16.56% and a median of 15.65%. (Hellowell, 2013). Based on these figures we calculate the range of equity premia at between 7.93% to 16.90%¹² with the average implied equity premium at 11.20% and the median equity premium at 10.63%. The approximate real equity IRRs¹³ have a range of 9.69% to 19.59% with a mean of 13.72% and a median of 12.82%

¹² Based on 25 year UK gilt rates in the month of contract start.

¹³ Based on UK RPIX target inflation at the time of procurement.

Table 10: Equity returns for the prison PPPs benchmarked against UK PFIs

	Contract start	Nominal Equity IRR	Real Equity IRR	25 year gilt at contract start	Implied equity premium
North Cumbria	Nov-97	17.80%	14.93%	6.31%	11.49%
Norfolk/Norwich	Jan-98	18.64%	15.75%	5.91%	12.73%
Durham and Darlington	Mar-98	14.52%	11.73%	5.68%	8.84%
Lanarkshire (Hairmyres)	Mar-98	22.58%	19.59%	5.68%	16.90%
Lanarkshire (Wishaw)	Jul-98	15.43%	12.61%	5.32%	10.11%
Nottingham University	May-99	14.79%	11.99%	5.58%	9.21%
NHS Lothian	Aug-98	19.72%	16.80%	5.18%	14.54%
East/North Hertfordshire	May-01	15.86%	13.03%	4.72%	11.14%
Hull/ East Yorks. Hosp.	May-01	13.86%	11.08%	4.72%	9.14%
Sandwell/West Birming.	Dec-02	12.43%	9.69%	4.50%	7.93%
Mean of comparators	n/a	16.56%	13.72%	n/a	11.20%
Median of comparators	n/a	15.65%	12.82%	n/a	10.63%
Bloemfontein	Mar-00	29.9%	23.2%	n/a	16.4%
Louis Trichardt	Aug-00	25.5%	18.6%	n/a	11.9%

Source: Dates and nominal IRRs based on Hellowell (2013); all else based on own calculations

With the equity premia for Bloemfontein and Louis Trichardt at 16.4% and 11.9% respectively, both project's equity returns fall within the range of comparative UK PFI equity premia at the time. While Louis Trichardt's equity premium is only 0.70% above the mean of comparators (11.9% - 11.2%), Bloemfontein's equity premium is closer to the upper end of the range.

It is worth noting that while payments extend over the life of the project, debt is repaid over a much shorter period. The time between the debt maturity date and the end of the project is typically referred to as the tail. The tenor of debt (measured from the start of operations) was 13 years in the case of Bloemfontein and 18 years in the case of Louis Trichardt implying a tail of 12 years and 7 years respectively. It is during this period, that equity investors typically extract significant cash due to lower overall costs, which free up project cash flow. Despite the longer tail, the equity premium of

Bloemfontein was 4.5% higher than the equity premium of Louis Trichardt. The shorter tenor also resulted in the average gearing for Bloemfontein being significantly lower than for Louis Trichardt, which in theory should have decreased equity returns, all else being equal. Further analysis indicates that increasing the tenor of the Bloemfontein debt to 18 years while decreasing the leverage to 87:13 (in line with the financing terms of Louis Trichardt) would have increased the equity IRR from 29.9% to approximately 33.9%¹⁴. Arguably, this could also be used as a basis to compare the returns of the two projects. With both projects having been procured at approximately the same time, being of similar sizes and with contracts under similar terms it is therefore not clear how the excess equity return for the Bloemfontein prison could have been justified. Perhaps, it is a premium for the project being a first-of-its-kind with contract signed about 6 months prior to Louis Trichardt.

Presented below is a summary of the results of the benchmarking exercise. The equity premium should be used as a basis of comparison as this measure strips out the effect of the high base interest rates at the time of procurement, which is an external country and time specific factor. For completeness, we also present the nominal and real equity IRR. Based on the equity premia, the return for Louis Trichardt seems to fall within reasonable range while the return for Bloemfontein seems to be at the high end of the range, albeit arguably still within reason.

¹⁴ Assuming a base availability payment of R215.7 per inmate in real April 2000 terms with 61.3% of the payment being indexed at CPI inflation bi-annually. CPI was assumed to be forecast at 6% at the time of the agreement, and adjusted for a K-factor of 0.623% increasing to 0.789% over 25 years. Debt was assumed to be amortised.

Costs, as a balancing figure, were levelised over 25 years and increased at CPI inflation. Operating costs were assumed to be tax deductible and construction costs were assumed to be amortised for tax purposes over a period of 25 years.

Table 11: Prison PPPs equity return benchmark summary

	Nominal Equity IRR	Real Equity IRR	Equity premium
Bloemfontein	29.9%	23.2%	16.4%
Louis Trichardt	25.5%	18.6%	11.9%
REIPPPP Round 1	24.0%	17.0%	15.5%
Mean of UK hospital PPPs	16.6%	13.7%	11.2%
Median of UK hospital PPPs	15.7%	12.8%	10.6%

Source: Equity IRRs based on National Treasury (2003), Eberhard (2014) and Hellowell (2013); mean, median, and equity premia based on own calculations

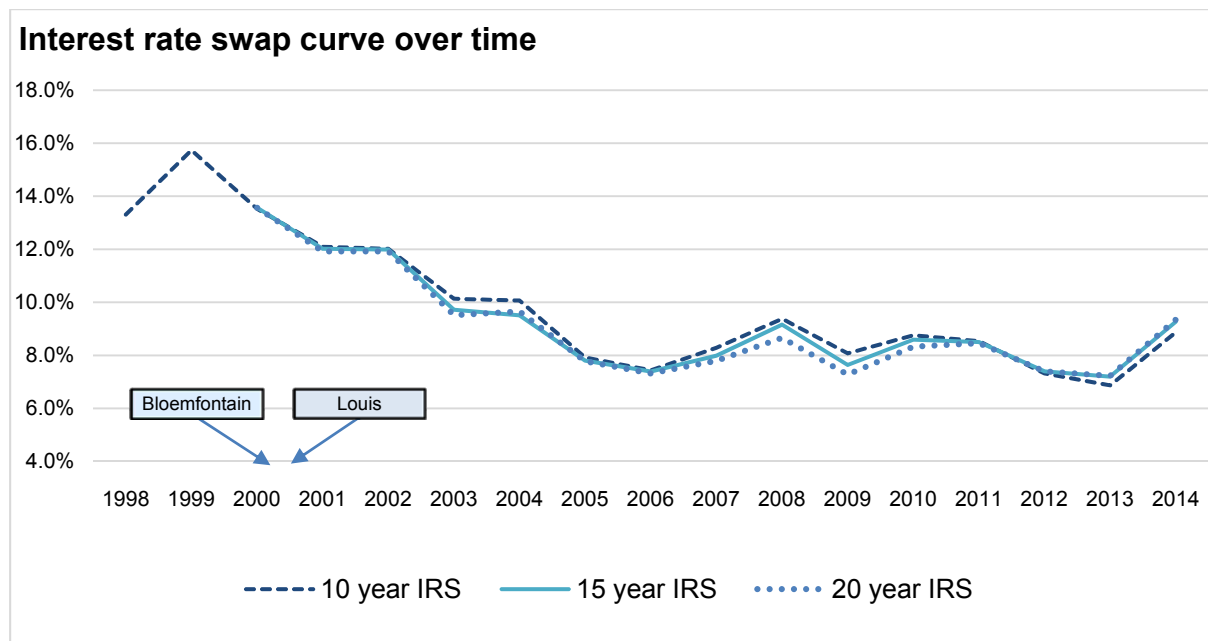
3.9.3. Benchmarking the Cost of Debt

In reviewing the cost of debt financing, we break down the all-in cost of debt into base rate and credit margin. The credit margin is set by lenders and is negotiated and priced according to the risk of the project. The base rates are market driven to the extent that interest rates are linked to such. In the case of these two deals, both projects made use of fixed rate debt, which would have been set in line with market rates plus a swap margin. Complicating the benchmarking analysis of debt margins is the fact, that all debt lent to South African PPPs has been financed by commercial lenders in private deals. Ideally, we would have conducted a detailed analysis of the credit margins, but data on comparable South African credit margins at the time of procurement is not available. We do note that credit spreads for the two projects were quoted at 2.50% and 2.25% respectively. With margins being of similar magnitude while coming from different and competing lenders, it seems fair to assume that debt margins were priced competitively. To obtain an understanding of the magnitude, we compare the margins to the spread of the CPV Power bond discussed in section 2.7. This bond, when first issued in March 2013, attracted a premium of approximately 5% over the South African government benchmark bond. This spread narrowed to approximately 3% after about one year of trading. Notably, this spread is significantly higher than the margins of

2.25% and 2.5% on the two South African prison PPPs. As such we conclude that there is an indication that the debt margins were priced competitively and limit further analysis to the base rate.

As the following analysis will show, South Africa was experiencing a period of high interest rates at the time of procurement. The figure below presents the 10, 15 and 20-year interest swap rates as observed in the South African market in January of each year between 1998 and 2014. With both Bloemfontein and Louis Trichardt reaching financial close around the year 2000, both projects financed the deals and locked into interest rates at a time at which rates were close to a 16-year high as observed in the market. The closest available benchmark for the base rates are the 15-year market swap rates which were quoted at 14.09% and 13.21% respectively. We note this is slightly lower than the rates of 14.58% and 15% as referenced in the 2002 National Treasury review. It is not clear what could have caused the difference.

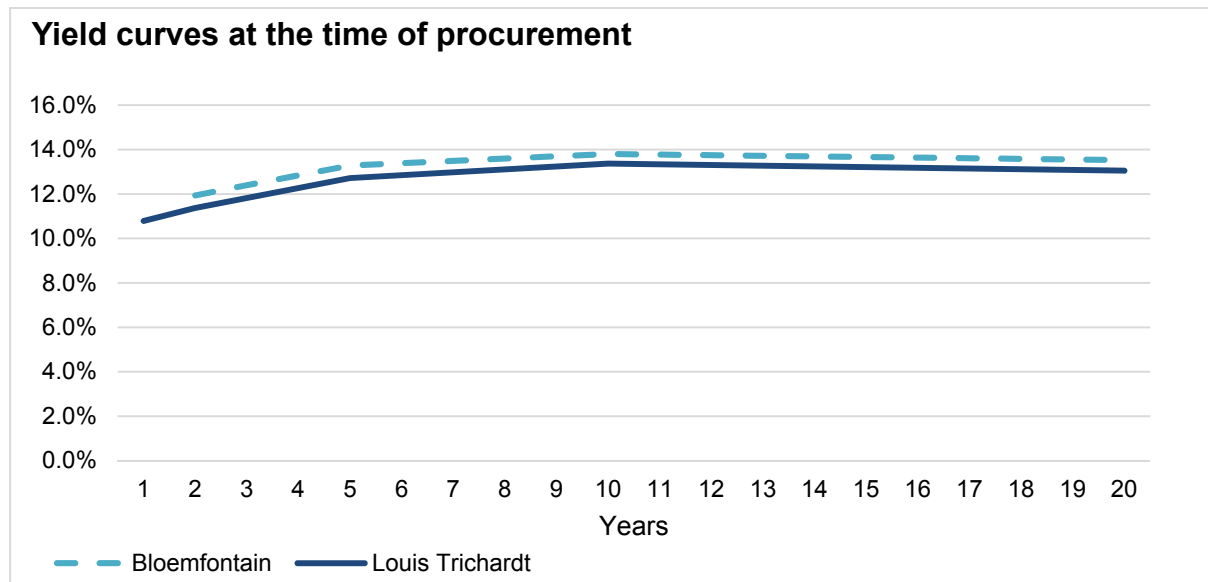
Figure 9: Interest rate swap curve at time of prison PPP procurement



Source: Thomson Reuters

The high swap rates seem to have been driven by high market rates as well as an expectation for market rates to stay high for a prolonged period, as indicated by the yield curve at the time of procurement. The figure below presents the interpolated yield curve at the contract date for both Bloemfontein and Louis Trichardt. The yield curve was steep at the short end before flattening out with a small decrease at the long end for both projects. Short-term yields at the time were between 11% and 12% while long-term yields were between 13% and 14%.

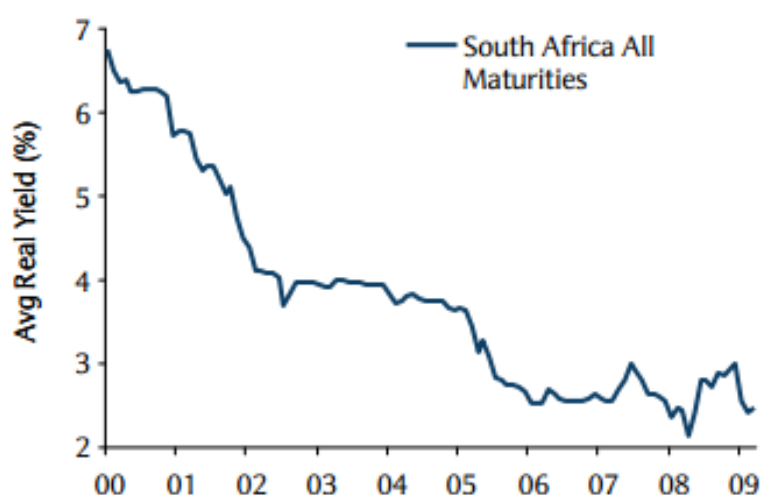
Figure 10: Yield curves at time of prison PPP procurement



Source: Thomson Reuters

The unusually high interest rates are further illustrated by the market implied real yields at the time of procurement. The following figure presents the real average yield of South African inflation linked bonds between March 2000 (when the first inflation linked bond was issued) and 2009. The real yield in 2000 was approximately 6.5% compared to an average real yield of 2.47% over the period from 2000 to 2009 (Barclays Capital, 2009).

Figure 11: Historic real yields on South African inflation linked bonds



Source: Barclays Capital (2009)

The above analysis suggests that the contractual base rates as referenced by the 2002 National Treasury review were higher than the market implied benchmark rates, albeit still within reasonable range. To analyse the contractual base rates in more detail, further information on the term sheets would be required (National Treasury, 2003). Crucially, both projects locked into fixed rate debt at a time when market rates were unusually high.

3.9.4. Discussion of the project rate of return

The above analysis argued that both projects locked into fixed rate debt at a time when market rates were unusually high while the actual credit margins seemed reasonable. Based on an analysis of equity returns, Louis Trichardt seemed reasonably priced while the return for Bloemfontein was at the high end of the range. Crucially, both projects were financed using leveraged structures with high debt levels. With debt being cheaper than equity and also benefitting from a tax shield, this meant that the much lower cost of debt was the key driver behind the total cost of capital. Overall, Bloemfontein had a nominal project IRR of 18.27% while Louis Trichardt had a project

IRR of 18.50% (National Treasury, 2003). By comparing this to the government benchmark rates at the time of procurement, we calculate that the projects came at a 4.74% and 5.45% premium over the risk free rate. It could be argued that this premium represents the cost of privatisation and risk transfer to the private party.

Table 12: Prison PPPs project returns

Project:	Bloemfontein	Louis Trichardt
Cost of Equity	29.90%	25.00%
Cost of Debt (pre-tax)	16.83%	17.50%
Cost of Debt (post-tax)	12.12%	12.60%
Debt:Equity ratio	11:89	13:87
Project IRR (A)	18.27%	18.50%
Government benchmark rate (B)	13.53%	13.05%
Premium (A – B)	4.74%	5.45%

Source: Cost of Equity, pre-tax Cost of Debt and Project IRR based on National Treasury (2003); gearing and post-tax cost of debt based on own calculations

3.9.5. Discussion of floating rates and inflation-linked debt

The 2003 National Treasury review suggests that high base interest rates at the time pushed up the long-term cost of the prisons to government. The review does however not make any suggestions as to how this could have been avoided (National Treasury, 2003).

In his discussion of the contracts, Farlam agrees with the points made by National Treasury but suggests that the high base interest rates could have been avoided in favour of floating interest rates or CPI-linked debt (Farlam, 2005).

While Farlam's argument of using floating interest rates may have reduced the overall project costs in the hands of the private party, financiers and developers would unlikely have agreed on such financing terms as it would have exposed them to interest rate risk. In a typical PPP, project cash flows are ring-fenced and all costs and debt service

have to be met from the project cash flows. In the case of a default, lenders cannot seek compensation from beyond the project's assets and cash flows, as debt finance tends to be of a non-recourse nature. Floating interest rates create a risk of base interest rates rising unexpectedly causing the project to run into cash flow constraints. In extreme cases, the project may run into a scenario where interest rates increase so far, that project cash flows are no longer sufficient to meet debt service. Assuming financiers and developers would nonetheless have agreed on using floating interest rates, this would unlikely have led to cost reduction for the public sector. The deal was negotiated at a time when base interest rates were high. Market forecasts, as shown by the long-term swap curve as well as the yield curve at the time, were for interest rates to remain high. As such, developers would have priced the deal under the assumption that interest rates would remain high for years to come. All else equal, the best estimate of interest rates at the time would have been the long term yield curve in which case pricing would have been similar under both floating and fixed rates. Arguably, some saving could have been achieved through the saving of the swap margin that would have been avoided by financing the project using floating rates. Offsetting this saving would have been higher credit margins and equity return requirements reflecting the increased risk around the uncertainty of interest rates. On a net basis, the latter would likely have outweighed the benefits of the former while it is questionable if lenders would have agreed to such a structure in the first place. Assuming the project had still been financed using floating interest rates and without any increase in costs, a fall in base interest rates would only have reduced the costs in the hands of the private party and not the public sector. As there was no way of predicting the future drop in interest rates at the time of agreement, the project would

have been priced under the high base rates and, without a gain share, a drop in interest rates would have been to the benefit of the private party only.

While using floating rates may not have been an option, the overall economic environment should still have been considered more carefully. At the time of procurement there was no way of knowing that interest rates would fall in future but such a scenario should at least have been considered. The analysis would have shown the impact on the project including the potential gains of a refinancing at more favourable conditions. Refinancing of debt is a common practise among PPPs with the contracts normally specifying terms for gain-shares to the public party. While the benefit of a gain-share can easily be identified in hindsight, it has to be acknowledged that gain-share clauses were not a common feature of PPPs in the early 2000s, even in developed markets. Since then, PPP frameworks have become more developed and gain-share clauses are a common feature in many markets. Refinancing is discussed in more detail in section 3.9.8.

While using floating interest rates presents a risk to developers and financiers, inflation-linked debt can reduce risks by creating a natural hedge between interest and project revenues where such revenues escalate in line with inflation. For the two PPPs, linking interest rates to CPI inflation would have had the benefit of interest costs being hedged to the availability payments. To hedge the CPI exposure, bidders would likely have asked for a lower fixed and a higher indexed payment, which would have reduced the costs to the public sector under a scenario of low or falling inflation. Quantifying the impact of financing the deal using CPI linked debt is not straightforward. While there is clear benefit to the reduced risk from hedging interest rates through revenues, the overall impact is a function of various factors including the all in cost of debt. The

scenario of financing the project with CPI linked debt is analysed in more detail in section 3.9.7.

3.9.6. Estimated cost of debt financing under original terms

3.9.6.a. Assumptions

We estimate debt finance costs as at project start date and under original project terms, where available. A number of simplifying assumptions have had to be made where information published was insufficient.

Specifically, no information on the repayment terms beyond what is summarised in the table in section 3.7 has been published for either project. As such it is unclear what repayment profiles have been applied to the senior debt. Repayment profiles for bank debt in a project finance deal can take various forms including annuity style amortisation (keeping total debt service fixed), straight-line payments (keeping principal repayments fixed), bullet repayments as well as sculpted repayments. Additionally, some deals make use of a cash sweep, which uses excess cash to repay some of the outstanding debt early, thereby changing the overall debt repayment profile. For the purposes of this analysis and in absence of any additional information, senior debt was assumed to be repaid using an annuity style amortisation profile. Such a repayment profile assumes total debt payments consisting of principal and interest to be the same in each repayment period. During earlier debt service periods, interest payments make up the majority of total debt service while principal repayments are the balancing figure. Over time and as principal is paid down, the principal portion of the total payment increases and the interest portion declines while the overall payment remains constant.

Subordinated debt was excluded from the analysis for Bloemfontein, as information on the terms was insufficient to conduct a detailed analysis.

3.9.6.b. *Estimated costs at the time of agreement*

The table below presents the total debt service for the Bloemfontein prison. In net present value terms, we calculate total debt service in 2001 for Bloemfontein as at R503 million¹⁵ (an equivalent of R1,103 million in 2014 real terms). The net present value for the Louis Trichardt facility is estimated at R446 million¹⁶ (an equivalent of R943 million in 2014 real terms).

For Bloemfontein, the net present cost of interest only is calculated at R351 million¹⁷ (an equivalent of R789 million in 2014 real terms). The interest cost for the Louis Trichardt facility is estimated at R367 million¹⁸ (an equivalent of R801 million in 2014 real terms). Measured as a percentage of total project costs¹⁹, interest on debt made up approximately 20.3% in the case of Bloemfontein and 20.1% in the case of Louis Trichardt.

¹⁵ Discounted at 13.53% being the yield on the long-term (20 year) government benchmark bond at the time of agreement.

¹⁶ Discounted at 13.05% being the yield on the long-term (20 year) government benchmark bond at the time of agreement.

¹⁷ Discounted at 13.53% being the yield on the long-term (20 year) government benchmark bond at the time of agreement.

¹⁸ Discounted at 13.05% being the yield on the long-term (20 year) government benchmark bond at the time of agreement.

¹⁹ As measured by the NPV of payments, see section 3.6.

Table 13: Prison PPP cost of debt service under original terms

Project:	Bloemfontein	Louis Trichardt
Debt service		
Total debt service	R1,211 million	R1,339 million
NPV of debt service (2001)	R503 million	R446 million
NPV of debt service (2014, real)	R1,103 million	R943 million
NPV of debt service as % of total cost	29.1%	24.5%
Interest		
Total interest on debt	R722 million	R933 million
NPV of interest (2001)	R351 million	R367 million
NPV of interest (2014, real)	R789 million	R801 million
NPV of interest as % of total cost	20.3%	20.1%

Source: Own calculations

3.9.7. Estimated cost of debt financing using index linked debt

3.9.7.a. Assumptions

In a typical inflation linked-debt structure, drawdowns and interest are calculated on a real basis before an inflation uplift is applied to both elements. Interest is calculated based on a real interest rate plus a credit margin. The real interest rate typically is fixed for the term in which case a swap margin would apply (but can be floating as well). The inflation uplift, which is applied to both interest and capital, is typically linked to the same index which revenues are escalated at.

In calculating the estimated cost of inflation-linked debt, a forecast CPI inflation rate of 6%²⁰ was assumed. The credit margin was assumed to be the same as under the original terms with 2.25% for Bloemfontein and 2.50% for Louis Trichardt. The real interest rates were thereby calculated by deflating the swap rates at 6% forecast CPI inflation to arrive at implied real rates of 8.09% and 8.49% respectively. To check the reasonability of these rates, such can be compared to the real yield of a South African

²⁰ In line with the upper band of the South African target inflation band set at 3% to 6%.

government benchmark bond. For the purposes of this benchmarking exercise, we use the R189 inflation linked government bond. The R189 was the first South African inflation linked government bond, issued in March 2000 and yielded approximately 6.5% real at the time of procurement (Barclays Capital, 2009). While, this is slightly lower than the calculated real interest rates, the benchmark rate presents a floating real rate. By basing the calculated rates on the fixed rates (as per published terms), this calculation takes into account an estimate of the swap margin which would have had to be paid to fix real interest rates. Consequently, we have based the following on the calculated real rates but use the benchmark rate as a sensitivity factor.

3.9.7.b. Estimated costs at the time of agreement

The table below presents the estimated total debt service for the prisons assuming inflation linked debt. The benefit to the public sector can be calculated by comparing the NPV of debt service under inflation-linked debt to the NPV of debt service under the base case. For Bloemfontein this NPV in 2001 is calculated at R486 million²¹ (an equivalent of R1,065 million in 2014 real terms). The cost for the Louis Trichardt facility is estimated at R436 million²² (an equivalent of R922 million in 2014 real terms).

Table 14: Prison PPP cost of debt service using inflation linked debt

Project:	Bloemfontein	Louis Trichardt
Total debt service	R1,164 million	R1,317 million
NPV of debt service (2001)	R486 million	R436 million
NPV of debt service (2014, real)	R1,065 million	R922 million
Savings compared to base case	R17 million	R10 million
Savings as a percentage of total costs	1.0%	0.6%

Source: Own calculations

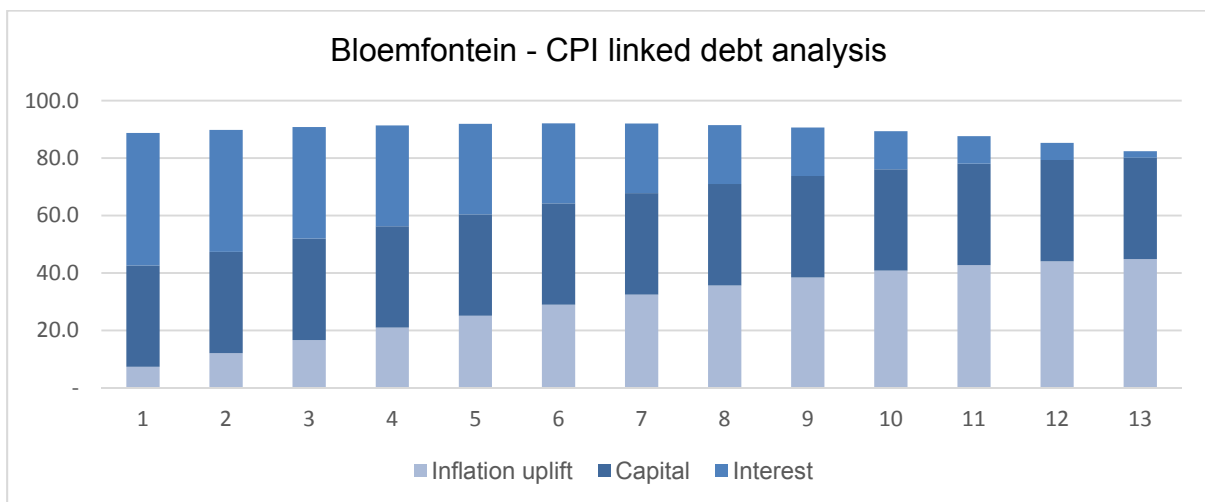
²¹ Discounted at 13.53% being the yield on the long-term (20 year) government benchmark bond at the time of agreement.

²² Discounted at 13.05% being the yield on the long-term (20 year) government benchmark bond at the time of agreement.

As shown in the above analysis, moving to inflation linked debt would only have introduced marginal benefits of approximately R17 million and R10 million respectively (0.98% and 0.55% as a percentage of total project costs). This confirms that the total cost of debt would remain high using inflation linked debt, as base rates remain the key driver behind the total cost of financing

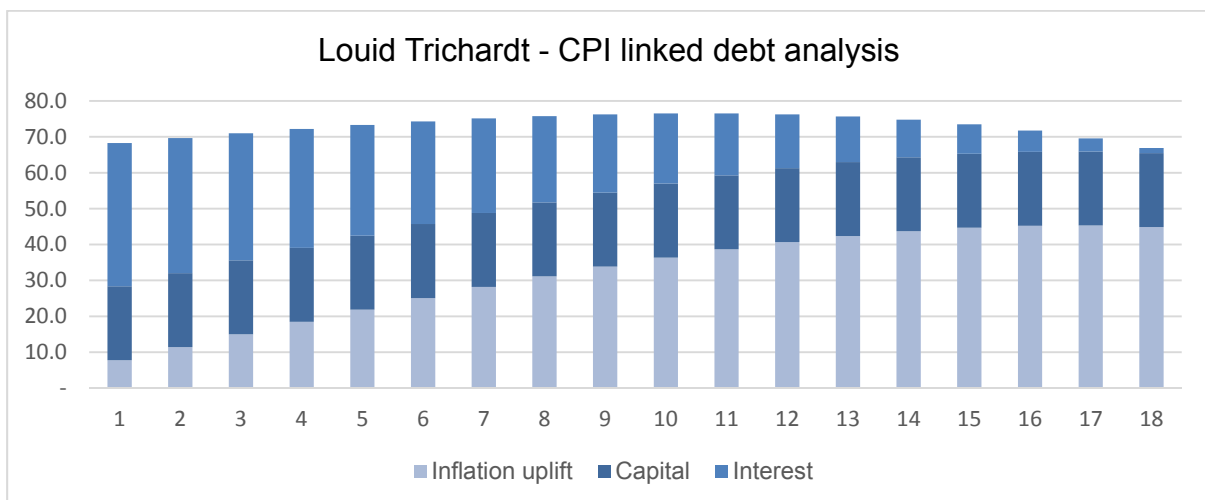
The following figures present the estimated debt service for inflation-linked debt under the assumptions outlined above.

Figure 12: Bloemfontein inflation linked debt profile:



Source: Own calculations

Figure 13: Louis Trichardt inflation linked debt profile



Source: Own calculations

3.9.7.c. **Sensitivity analysis of the estimated costs at the time of agreement**

As a sensitivity analysis, we repeat the previous analysis using a real interest rate of 6.5% based on the real yield of the R189 inflation linked government benchmark bond.

The table below presents the results of this analysis.

Table 15: Sensitivity analysis: prison PPP cost of debt service using inflation linked debt

Project:	Bloemfontein	Louis Trichardt
Total debt service	R1,085 million	R1,190 million
NPV of debt service (2001)	R449 million	R387 million
NPV of debt service (2014, real)	R984 million	R848 million
Savings compared to base case	R54 million	R59 million
Savings as a percentage of total costs	3.1%	3.2%

Source: Own calculations

Under the sensitivity, moving to inflation linked debt would have introduced benefits of approximately R54 million and R19 million respectively (3.1% and 3.2% as a percentage of total project costs) which is significantly higher than the benefits of R17 million and R10 million in the base case. Notably, this sensitivity analysis omits the cost of a swap margin which would reduce the benefit somewhat.

3.9.8. **Discussion on refinancing**

Many PPPs undergo a refinancing of debt upon (or even before) maturity which allows equity investors to extract cash and re-leverage thereby increasing equity returns. Refinancing generally is not considered in the original project assessment (and financial model) as the process is optional and terms and timing thereof are unknown at financial close. Refinancing may however offer significant benefits to investors resulting in equity return outperformance. A refinancing can take several forms including:

- Re-leveraging upon maturity of original debt: under this scenario, a project is re-financed with new debt upon maturity of the original debt. The new structure may have a different leverage than the original project.
- Refinancing existing debt at more favourable terms: Under this scenario, existing debt is refinanced with new debt under more favourable terms. Such a refinancing may incur breakage costs on the existing debt. The new structure may have a different leverage than the original project.
- Introducing additional leverage on top of original debt: under this scenario additional debt is introduced (generally in subordinated form) thereby increasing the leverage of the project.

Given the high base interest rates at financial close which decreased in the years thereafter, both projects would have been incentivised to refinance the original debt at cheaper terms. Typically, project risks are at their highest during the construction phase. As funding is raised pre-construction, initial margins consider this construction risk in the pricing. Once a PPP is operational, risks typically decrease so that debt can be raised at lower margins creating an incentive to refinance.

While refinancing can introduce cheaper debt, there are also a number of costs associated with the process which can reduce or eliminate benefits altogether. Breakage costs constitute a penalty fee for pre-paying debt and may be introduced by lenders to dis-incentivise borrowers from refinancing. It should however be noted that not all lenders are averse to refinancing with some lenders even incentivising refinancing.

Notably, both Bloemfontein and Louis Trichardt were financed on a fixed rate basis. With interest rates declining significantly post construction, the settlement value for the

debt increased substantially. No information on breakage costs has been published but the high settlement values were confirmed by the 2002 National Treasury review. The review suggests that in 2002, the settlement value was R531 million for Bloemfontein and R557 million for Louis Trichardt, compared to original values of R437 million and R353 million. The review considers refinancing the debt with inflation linked debt under original margins, reduced margins of 1.75% and no margins, with the conclusion that an NPV benefit could only be achieved if inflation was expected to be below 7.5% per annum (except if refinanced with government debt, which assumes no margin). (National Treasury, 2003).

The tables below summarises the assumption of the refinancing analysis performed by National Treasury.

Table 16: Prison PPPs refinancing assumptions

Project:	Bloemfontein	Louis Trichardt
Original Value (R'million)	437.0	353.0
Settlement Estimate (R'million)	531.0	556.7
Current Annual Payment (R'million)	83.3	68.9
Benchmark refinance date	31 September 2002	31 July 2002
Benchmark Ref. base rate (R153 as at 24th of September 2002)	11.80%	11.80%
Benchmark Ref. real rate (assuming full Government borrowing)	4.50%	4.50%
Margin for refinancing (full)	2.25 %	2.59 %
Margin for refinancing (reduced)	1.75 %	1.75 %

Source: National Treasury (2003), Thomson Reuters

The tables below summarise the results of the refinancing analysis performed by National Treasury. The numbers shown below present the net present cost of debt service using inflation linked debt in Rand million.

Table 17: Prison PPPs refinancing analysis: net present cost of debt service using inflation linked debt

Project:	Bloemfontein			Louis Trichardt		
INFLATION	EXCLUDING MARGIN (R'million)	REDUCED MARGIN (R'million)	HISTORICAL FULL MARGIN (R'million)	EXCLUDING MARGIN (R'million)	REDUCED MARGIN (R'million)	HISTORICAL FULL MARGIN (R'million)
3.00%	379.3	426.4	440.3	397.7	447.0	471.6
4.50%	413.5	467.8	480.0	433.6	487.3	514.2
6.00%	451.5	507.5	524.0	473.4	532.0	561.4
7.50%	493.7	554.9	573.0	517.6	581.7	613.8

Source: National Treasury (2003)

The 2002 National Treasury review stops the analysis at this point. To calculate the impact of each scenario, we therefore net off the above costs against the settlement value in order to calculate the implied benefit or cost of refinancing the project. Notably, this analysis may exclude some fees which would reduce the benefits shown below.

Table 18: Prison PPPs refinancing benefits: the implied benefit or cost of refinancing the project using inflation linked debt

Project:	Bloemfontein			Louis Trichardt		
INFLATION	EXCLUDING MARGIN (R'million)	REDUCED MARGIN (R'million)	HISTORICAL FULL MARGIN (R'million)	EXCLUDING MARGIN (R'million)	REDUCED MARGIN (R'million)	HISTORICAL FULL MARGIN (R'million)
3.00%	151.7	104.6	90.7	159.0	109.7	85.1
4.50%	117.5	63.2	51.0	123.1	69.4	42.5
6.00%	79.5	23.5	7.0	83.3	24.7	-4.7
7.50%	37.3	-23.9	-42.0	39.1	-25.0	-57.1

Source: Own calculations

While the review suggests that there would be a benefit to refinancing, we note that the NPV benefit under the more realistic assumption of reduced margins of 1.75% and a 6% inflation rate is only marginal, with R23.5 million for Bloemfontein and R24.7 million for Louis Trichardt. Still, some benefit could have been achieved by equity investors as inflation linked debt could have introduced annual cash flow benefits

allowing equity investors to extract cash sooner thereby increasing the overall equity IRR.

While the analysis presented by National Treasury does not suggest any substantial benefits to refinancing, the review only considers the benefit of refinancing at the start of operations. The project could also be refinanced at a later date, and it is likely that substantial benefits for equity investors could be achieved upon maturity of the original debt term. Debt in the Bloemfontein project, for example, only carried a 13 year tenor which could allow investors to refinance the project about half way through the term and under more favourable conditions (National Treasury, 2003).

It could be argued that the above analysis is arbitrary, as the original contract terms of the two PPPs did not include any refinancing provisions thereby entitling investors to the full upside of any refinancing gains. Interestingly, the UK government was in a similar situation with early PFI transactions signed prior to September 2002. Many of these projects did not include a clause for the sharing of refinancing gains as there was no standardised code. To address this issue, a gain share mechanic was introduced in subsequent PFI transactions and a voluntary code to enable private sector contractors to share refinancing gains with the public sector was published. It was expected that as a result of applying the code, the public sector would generally receive a 30% or higher share of refinancing gains (HM Treasury, 2002).

3.9.9. Alternative financing options

In this section we consider whether some of the alternative financing solutions, as discussed earlier in this paper, could have been beneficial for the two prison PPPs. Particularly, we discuss bond finance and a government contribution, as other options such as monoline insurance, PEBBLE, development bank finance and government

finance guarantees are either not applicable or would likely not have worked in a first-of-its-kind deal in a country which had no formal prior PPP experience at the time of procurement.

3.9.9.a. *Bond finance*

We discussed that bond finance presents an alternative to bank finance which can often turn out to be cheaper but also tends to be less flexible. Research suggests that bond financing requires a well-developed and active capital market with sufficient appetite for the bond issue. A key disadvantage to bond issues is that the cost of debt is unknown until the finance has been raised. For highly leveraged projects, such as these two PPPs, this can present a challenge. It can be argued that the size of the two projects was too small to reap any of the benefits of a bond issue. At the time of procurement, project bonds had not yet been tested in the South African market and this would have presented the first such bond issue. It is therefore questionable if bond finance could have worked for these projects. A private placement could have been considered, however due to lack of market data, it is not clear if there would have been sufficient appetite among investors.

3.9.9.b. *The case for a government contribution*

Financing costs presented a significant portion of total project costs. The financing costs, as discussed, were driven by the high base rates at the time of procurement. Section 2.6.7 discussed how public financing or co-financing could result in savings due to the lower cost of public finance. Given the high base rates, which lead to a high cost of debt and equity without a gain share mechanism, we argue that a government contribution towards the construction costs of these projects could have significantly decreased costs.

Providing a government contribution towards the construction costs of a PPP reduces private funding requirements by the same amount. As private funding tends to be more expensive than government funding (the cost of public sector funding is measured at the risk-free rate), providing a contribution can significantly reduce overall project costs. The disadvantage of a contribution is that it may decrease risk transfer as it reduces the private party's investment in the project. In certain circumstances, the reduction in risk transfer could result in a decrease in value for money which should be considered carefully in evaluating the option.

In South Africa, it is common for the public sector to provide a contribution to PPP projects, especially on projects with large capital outlays as evidenced by the 5 out of the 11 South African DFBOT PPPs which have received contributions ranging from 10% to 87% of capital value (PPP Unit, 2013).

To estimate the potential cost saving through a use of a government contribution, we calculate the difference in net present costs of a contribution and the net present cost of an amortising stream of cash flows presenting the cost of private financing. To calculate this stream of cash flows, we take a pro-rata portion of the capital costs drawn down over the construction period and calculate an amortising stream of cash flows over the project life based on the respective post-tax project IRR of each project. This is compared to the net present cost of a contribution provided for the same capital costs drawn on as-and-when the costs are incurred.

For the purposes of this calculation, a number of assumptions have had to be made. The 2002 National Treasury review suggests a "weighted average cost" of 18.27% for Bloemfontein and 18.50% for Louis Trichardt. National Treasury has not provided any background or further information on how these figures were calculated but it would

seem likely and reasonable to assume, that these figures present the whole-life post-tax project internal rate of return (the post-tax project IRR). We use this rate to calculate an amortising stream of cash flows which is then discounted back to contract date at the government discount rate, in order to calculate the implied net present cost to the public sector.

The table below presents the results of the analysis for the Bloemfontein prison PPP. As shown in the last row of the table, a government contribution could have brought significant cost savings.

Table 19: Estimated impact of a government contribution: Bloemfontein PPP

Bloemfontein				
Total capital costs	R435mn			
Contract length	25 years			
Post-tax Project IRR	18.27%			
Government discount rate	13.53%			
Contribution percentage	10%	25%	50%	75%
Contribution	R44mn	R109mn	R218mn	R326mn
Discounted contribution (A) ²³	R40mn	R101mn	R202mn	R303mn
Annual amortised cash flow ²⁴	R8.4mn	R20.9mn	R41.8mn	R62.7mn
Total amortised cash flows	R209mn	R523mn	R1,045mn	R1,568mn
Discounted amortised cash flows (B) ²⁵	R54mn	R135mn	R271mn	R406mn
Estimated cost saving of contribution measured at contract start (B – A) – NPV at contract start	R14mn	R34mn	R68mn	R103mn
Estimated cost saving of contribution as a percentage of total costs	0.81%	1.97%	3.94%	5.94%

Source: Own calculations

The next table presents the same analysis but for the Louis Trichardt prison PPP. The potential benefit of a contribution as compared to Bloemfontein is slightly larger despite lower capital costs due to the higher the post-tax project IRR and lower government discount rate at contract start date.

²³ The discounted contribution has been calculated by discounting the contribution back to contract start date at the government discount rate. The contribution was assumed to be provided on a pro-rata basis to capital expenditure. Capital expenditure was assumed to be incurred throughout the construction period.

²⁴ To calculate the annual amortised cash flows, we took a pro-rata portion of the capital costs drawn down over the construction period. We then calculated an amortising stream of cash flows over the project life based on the respective post-tax project IRR of each project.

²⁵ The discounted amortised cash flows was calculated by discounting the annual amortised cash flows back to contract start date at the government discount rate. The amortised cash flows were assumed to occur annually over a period of 25 years based on the contract operating period.

Table 20: Estimated impact of a government contribution: Louis Trichardt PPP

Louis Trichardt				
Total capital costs	R392mn			
Contract length	25 years			
Post-tax Project IRR	18.50%			
Government discount rate	13.05%			
Contribution percentage	10%	25%	50%	75%
Contribution	R39mn	R98mn	R196mn	R294mn
Discounted contribution (A)	R36mn	R90mn	R180mn	R270mn
Annual amortised cash flow	R7.8mn	R19.5mn	R39.0mn	R58.5mn
Total amortised cash flows	R195mn	R487mn	R975mn	R1,462mn
Discounted amortised cash flows (B)	R51mn	R127mn	R253mn	R380mn
Estimated cost saving of contribution measured at contract start (B – A) – NPV at contract start	R15mn	R37mn	R73mn	R110mn
Estimated cost saving of contribution as a percentage of total costs	0.82%	2.03%	4.00%	6.03%

Source: Own calculations

The analysis above shows that the cost savings from a contribution could have been significant for both projects. Subject to risk transfer and value for money considerations, the option of a government contribution should have been considered as part of the feasibility study and during the procurement process of these two projects.

3.10. Conclusion

The 2002 National Treasury review suggested that the operating costs of the PPP prisons (i.e. operating cost excluding financing) were relatively competitive but argued that total costs were nonetheless high due to specification being imported from UK PPP prisons. In our analysis, we compared the total cost of the prisons to a number of UK PPP prisons and found that the cost per inmate was approximately six times cheaper than the cost per inmate for UK prisons built around the same time.

Some have criticised the financing costs and suggested that these were a key driver behind the overall costs of the prisons. While our analysis confirmed that the financing costs of the PPP prisons were high, this seems to have largely been driven by unfavourable market conditions at the time of procurement, and not by excessive returns as some critics have suggested. Once we isolated the impact of high base interest rates at the time of procurement, we found, that financing costs seemed reasonably priced.

While alternative funding solutions, such as inflation linked debt or bond finance, may either not have been possible or not have been able to bring significant cost savings, there is a strong argument that the Department of Correctional Services should have explored other financing structures more closely and thereby should also have considered the option of a government contribution. While we acknowledge that the impact on risk transfer and value for money would also have had to be considered, our analysis showed that a government contribution could have resulted in significant cost savings of up to 6% of total project costs assuming a 75% contribution.

3.11. Lessons learned

A key issue with the two deals was the inflexibility of contract terms, which locked the public sector into payments driven by the high initial costs. Failure to consider and include clauses for gain-share mechanisms meant that there is no upside or claw back mechanism for the public sector. That said both prisons were procured at a time when gain share mechanisms were not common practise among PPPs, even in developed PPP markets.

While we have not discussed or examined the output specifications as part of this paper, the review done by National Treasury suggests that the specifications were set

unnecessarily high. Thus, the Department of Correctional Services should possibly have considered a more flexible and cheaper prison design. Together with a better structured financing solution that included a government contribution, overall costs could have decreased significantly.

3.12. The future of PPP prisons in South Africa

According to du Plessis and if the past is anything to go by, the future for PPP prisons in South Africa does not look bright. Following the procurement and building of the first two PPP prisons in Louis Trichardt and Bloemfontein, former president Thabo Mbeki, in his 2002 State of the Nation Address, announced the building of the next four new prisons in Nigel, Klerksdorp, Leeuwkop and Kimberley, with 3,000 bed spaces each. The announcement came a few months after the completion of the first two prison PPPs, but there was no indication of whether these new facilities would be state-controlled or be run as PPPs. Soon after one of the projects was cancelled due to problems with acquiring the land, the other three projects were advertised for procurement. None of the contracts ever were awarded and only the Kimberly prison was built as a public sector initiative financed and run by the state, and not as a PPP. In 2006, Mbeki announced the building of four more prisons in Paarl, Port Shepstone, East London and Polokwane. None of these prisons have been built to date. By 2008, the Department of Correctional Services decided to go ahead with four different prisons, all of which were in new locations being Klerksdorp, East London, Nigel and Paarl. These prisons were to be procured as PPPs and four consortiums were shortlisted. In November 2011, Correctional Services Minister Mapisa-Nqakula called a press conference to announce that the procurement of the new PPP prisons was cancelled because the tender requirements had changed to such an extent, that bids

fell short of the new criteria. It was estimated that each consortium had spent R20 million on their bids which were not recoverable (du Plessis, 2012).

While the unrecoverable bid costs most certainly were a large cost to the consortia, the actual cost of cancelling the projects may have been much bigger causing a lack of credibility for the public sector and the South African PPP framework. Bidders already have to bear significant risks in bidding for a contract and may choose not to tender for future projects if there is a lack of credibility and risk of procurements being cancelled.

4. Conclusion and recommendations

4.1. Conclusion

This study explored the wide range of funding options available to PPPs on world markets. Funding solutions discussed included various forms of private sector and public sector solutions. We discussed that private sector finance was not a defining characteristic of a PPP. This was illustrated by the various public sector solutions available, for example guarantees and contributions. Private sector solutions discussed included various forms of equity, debt and mezzanine financing. Given the highly levered nature of a typical PPP, debt plays a key role in the financing of PPPs. We therefore focussed on debt financing solutions and discussed the various options available. Debt financing solutions included bank finance and bond finance, the latter of which may be wrapped by a monoline insurer. In addition to some alternative and hybrid solutions, we also considered the role of multilateral development banks as lenders. Overall, we found that a wide range of financing solutions is available to PPP projects worldwide.

Comparing this to the financing solutions used on South African projects, we found that the South African market is heavily reliant on bank debt. While the South African PPP framework is well developed, the number of projects procured under the framework has been low. Perhaps too low for the market to properly develop a deep available PPP financing market. Li found that such an available financial market was one of the top three factors required for the development of successful PPPs in the UK (Li, 2005). Consequently, one should be concerned as the lack of alternative funding solutions for South African PPPs may be hindering the development of future projects and driving up costs.

While the recent REIPPPP cannot technically be classified as a South African PPP, the programme shared numerous similarities with PPPs. The REIPPPP was a positive development for the financing market as it caused an increase in interest among institutional investors and development banks, both local and international. The increase in involvement by such parties may be signalling that investors are slowly opening up to South African infrastructure project finance deals. The issue of the first investment grade infrastructure project bond, in particular, is a strong indication that the South African infrastructure project finance market may be developing and readying itself for alternative financing solutions.

We have shown how PPPs, such as the two prison PPPs discussed in the case study, can become more expensive than necessary when alternative funding solutions are not being considered as part of the procurement process. In the case study, we assessed the various criticisms of the PPP prisons but found, that the total cost (on a per inmate basis) was significantly lower than the cost of UK PPP prisons at the time, which the South African prisons were often compared against. We also found that financing costs, which received significant criticism, were driven by unfavourable market conditions. Once we isolated the unusually high market interest rates, we found that financing costs for the prisons seemed to have been priced competitively. Through the case study, we illustrated how a government contribution could have brought significant savings to the public sector. We do however note that the prisons were procured before South African Treasury Regulations for PPPs were put in place. Today, South Africa requires the Treasury to approve PPPs proposals in a four stage process before signing of a contract (Irwin, 2010). A feasibility study is conducted as part of the approvals process which aims to assess costs and value for money under various financing options (PPP Unit, 2004). It should be noted that while this process,

in theory, should result in more optimally structured deals, the final cost is still heavily impacted by the state and availability of suitable and effective financing solutions. Hence, a deep and available financial market should be one of the key objectives for policy makers and industry participants.

This research makes several contributions to the literature. First, and to this researcher's knowledge, this is the first known piece of research to assess and summarise the financing solutions used on South African PPPs and similar transactions.

Second, this research offers a comparison of the financing solutions available to PPPs in South Africa to those available in more developed markets across the world. This comparison and analysis provides significant insight into the state of the financing market for South African PPPs. By providing an overview of existing financing solutions and comparing this to solutions available in South Africa, it is now possible for future researchers to quickly comprehend the current state of the market and identify areas where that researcher can make further contributions.

Third, this thesis is the first study in South Africa (to this researcher's knowledge) to assess the first South African listed infrastructure bond. We believe that the listing of the bond presents a milestone in the development of the South African infrastructure financing market which may pave the way for similar structures in the future.

Fourth, the case study presented in this paper illustrates how alternative financing solutions can be used on South African projects to reduce costs by quantifying the impact of using such alternative financing solutions. This illustrates the importance for a thorough project and project structure assessment.

Fifth, this study provides equity benchmark returns for early South African PPP projects by comparing such to both local and international comparators. To this researcher's knowledge, this is the first piece of academic literature to assess and benchmark the returns of any South African PPP (pure PPPs, excluding exempted projects such as the REIPPPP).

Sixth, this study provides a response to some of the critics of the South African prison PPPs and expands on areas which the 2002 National Treasury review did not review or evaluate. Firstly, this study examines, calculates and benchmarks the cost financing. Secondly, the study also calculates the total cost of the South African prison PPPs and benchmarks this against a set of international comparators. This researcher hopes the findings, lessons and recommendations will inspire new research in the field of Public Private Partnerships in a South African or other context.

4.2. Scope for future research

The findings of this research offer a multitude of insights into future areas of study.

First, there is scope to further analyse the investor and developer appetite for alternative financing methods in the South African market. Specific focus could be giving to bond financing as well as the market appetite for inflation-linked debt.

Second, the case study only focussed on the first two South African prison PPPs which were procured before Treasury regulations were put in place. Since then, South African procurement of PPPs has been standardised with all PPPs having to follow standardised provisions. A future study could review the procurement of later PPPs procured under Treasury Regulation 16 of 2004 and discuss potential shortcomings thereof.

Third, we suggested that the market may be impacted by the state and availability of suitable and effective financing solutions. This paper has shown, that few alternative financing solutions are available in the South African market. There is scope to further test this argument by quantifying the potential impact of alternative funding solutions on other South African PPPs.

Fourth, the REIPPPP was used as a platform for the issue of the first South African investment grade infrastructure bond. The issuance of this bond may be a sign that the South African project finance market may be developing and readying itself for alternative financing solutions. A study could test the market readiness and appetite for South African PPP infrastructure bonds.

Fifth, while the equity financing was discussed as part of the literature review, further research could discuss the role of equity investors in PPPs. A future study could research who the typical PPP equity investors are, what their objectives are and what risks they have to bear.

Sixth, limited information has been published on the returns of South African PPPs. A study could aim to get access to such information, possibly in a redacted format, and perform a benchmarking exercise.

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