Brattle Report to the Commission of Inquiry into the UBS Loan

THE IPIC AND UBS TRANSACTIONS

PREPARED BY

Toby Brown
Rand Ghayad
George Oldfield
Alberto Vargas

Brattle

TABLE OF CONTENTS

I. Introduction and summary of opinions

I.A. Introduction

1. The Royal Commission of Inquiry has been established by the Government of the Independent State of Papua New Guinea to investigate certain financial transactions connected with the Government's investment in the Papua New Guinea Liquefied Natural Gas Project (PNG LNG project) and the Government's purchase of shares in Oil Search Limited.

2. The Brattle Group has been retained by MinterEllison, technical assistants and international solicitors assisting the Commission to provide expert evidence on certain questions relating to the Commission's terms of reference. We have been asked to address specific issues which we quote in the body of our report at the start of the relevant section, and we also reproduce the list in full in section I.B.

3. The authors of this report are Dr Toby Brown, Dr Rand Ghayad, Dr George Oldfield and Dr Alberto Vargas. Toby Brown, Rand Ghayad and Alberto Vargas are employees of the Brattle Group, and George Oldfield is a Principal Emeritus of the Brattle Group, having recently retired from his full time consulting position at Brattle.

4. George Oldfield is an expert in financial economics, including corporate bond valuation, financial derivatives, and risk management. He has given expert witness testimony, provided expert consulting reports, authored numerous professional articles, and received several teaching excellence awards. Dr Oldfield joined The Brattle Group from the US Securities and Exchange Commission, where he served as an Economic Research Fellow specializing in employee stock option and financial derivatives pricing, disclosure rules for corporate pension funding and executive compensation, and asset-and mortgage-backed securities. He has spent much of his career in academia, most recently as the Richard S Reynolds, Jr Professor of Finance at the College of William and Mary's Mason School of Business. He also has taught at Dartmouth College's Tuck School and Cornell University's Johnson School. Dr Oldfield also worked in investment banking, serving as a Managing Director in PaineWebber's Capital Markets Division, where he managed the financial engineering function. Later he developed and managed the company's analytic and trading risk management systems. He holds a PhD and an MA in Finance from The Wharton School, University of Pennsylvania. George Oldfield is

principally responsible for our analysis of the nature and pricing of the IPIC and UBS transactions.

5. Rand Ghayad has extensive experience advising governments and other sovereign entities on complex financial and economic matters, including debt restructuring and fiscal and monetary policy issues. Dr Ghayad is currently advising the Federal Oversight Board of Puerto Rico and its counsel on the macroeconomic and financial models underlying the Board's revised Fiscal Plan for Puerto Rico in connection with its debt restructuring. He has also assisted corporations, the US Department of Justice, and the Securities and Exchange Commission in developing economic and financial analyses in a variety of high-profile investigations involving false claims, Ponzi schemes, financial market fraud, and shams. Before joining Brattle, Dr Ghayad was an economist at the International Monetary Fund. There, he advised countries on a broad range of macroeconomic and financial issues, from the comprehensive surveillance review to institutional modernization initiatives, including the Fund's overall response to COVID-19. He has also worked at the Brookings Institution, the Federal Reserve Bank of Boston, and MIT's Institute for Work and Employment Research. He holds a PhD in Economics from Northeastern University and an MA in Financial Economics from Boston University. Rand Ghayad is principally responsible for our analysis of sovereign debt as a possible alternative source of financing.

6. Alberto Vargas provides economic, statistical, and financial analysis in complex financial litigation and regulatory investigations in the US, Europe, Australia, and Latin America. In particular, Dr Vargas has extensive experience in securities litigation. He has consulted on multiple private-label residential mortgage-backed security (RMBS) securities fraud cases, supporting experts working on loss causation, damages, due diligence, and sampling reports. He has also supported multiple experts at the class certification phase of 10b-5 securities fraud cases, addressing market efficiency and price impact arguments. Further, he has consulted on reports assessing the credit ratings assigned to several synthetic credit default obligations. Dr Vargas has also worked on statistical sampling analyses for multiple litigations, supporting experts in statistical sampling spanning the financial and health care industries. Additionally, Dr Vargas has provided financial and statistical analyses on multiple internal and regulatory investigations around the alleged manipulation of LIBOR, Euribor, ISDAfix, and other reference rates. Prior to joining Brattle, Dr Vargas gained experience at international economics consulting firms in Washington, DC and London, and as an investment banking analyst in Mexico City. Alberto Vargas worked with George Oldfield to build valuation models of the IPIC and UBS transactions.

7. Toby Brown heads Brattle's Sydney office. He specializes in energy markets and infrastructure regulation, and has consulted for oil and gas producers, pipelines, utilities and regulators in Australia, New Zealand, Europe, the United States and Canada. He provides litigation support in a wide range of commercial disputes, including damages estimation, valuation and pricing. Dr Brown's disputes experience includes LNG pricing, gas pricing arbitrations, a rail access arbitration, a National Electricity Rules dispute over electricity network prices, and commercial litigation relating to infrastructure valuation and valuing intellectual property. Dr Brown's consulting experience includes gas and electricity wholesale market design, network access pricing, and advising on best practices for infrastructure access based on experience in different jurisdictions worldwide. He has advised AEMO, AEMC and market participants. He has particular expertise in incentive-based regulation of energy networks. Prior to joining Brattle, Dr Brown worked at the UK energy regulator, Ofgem. He holds a DPhil in Chemistry from the University of Oxford. Toby Brown is principally responsible for our analysis of the Government's objectives for the PNG LNG investment and the purchase of the Oil Search shares, and our analysis of Oil Search's PRL-15 transaction.

8. Resumes of the authors are attached at Appendix A.

I.B. Assignment

9. We have been asked to address the following specific issues.

    a. The strategic objectives of the Government in entering into each transaction and whether there were other ways of achieving those objectives that may have had a better outcome for the Government.

    b. Consider the terms of the transactions and advise whether any of them were unusual or out of market in their commercial context, including the fees paid.

    c. Advise on the financial and strategic risks and rewards arising from the transactions for the Government, including the option structure established by the collar element of the UBS Loan.

    d. Consider whether any strategies, such as hedging, could and should have been undertaken by the Government to ameliorate the risks of the transactions.

    e. Analyse trading in Oil Search shares from the period of time leading up to the Government's acquisition of shares in Oil Search through the UBS Loan to its disposal of those shares and in particular, trading arising from the collar loan.

f. Assess the loss suffered by the Government through the UBS Loan transaction and consider how that loss compares to the outcomes of any alternative strategies available to the Government.

g. Advise whether the price paid by Oil Search for the interest in PRL-15 is objectively justifiable, assuming an arm's length transaction between buyer and seller.

I.C. Summary of opinions

10. We summarise our main conclusions in this section. Citations in this summary section are to the relevant sections of our report where source materials are cited.

I.C.1. The IPIC transaction

The Government's objective[1]

11. The objective of the Government of Papua New Guinea in entering into the IPIC transaction was to fund the State's equity contributions to the PNG LNG project, and thereby to allow Papua New Guinea to share in the expected profits from that project. We estimate that the value of the State's share of the project was about USD 3,000 to 5,000 million at the time of the IPIC transaction. In late 2008 when the IPIC transaction was being negotiated, the PNG LNG project was at the point where the project's five-year construction program was about to begin. Thus the State's interest in the project was an asset which would require about USD 1,000 million of investment by the State from 2009 to 2014 before profits were expected to flow back to Papua New Guinea from 2015 onwards. The IPIC transaction provided the financing for this USD 1,000 million of investment.

Alternative financing options[2]

12. One possible alternative to the IPIC transaction that might have provided the necessary financing could have been to sell part of the State's equity share in the project. Selling approximately one-fifth of the State's 19% interest could have released sufficient funds to provide financing for the balance of the four-fifths share. At about the same time as the IPIC transaction, one of the other PNG LNG participants sold an interest of about this size, suggesting that this alternative might have been feasible. A second alternative could have been to sell the entire interest and attempt to realise the full USD 3,000 to

[1] See sections III.A and III.C.

[2] See section IV.

USD 5,000 million value up front. However, we are not aware of any similar transactions having taken place at that time, so we have no information on whether this would have been feasible.

13. We have considered whether the State might have been able to issue sovereign debt in 2009 as an alternative to the IPIC transaction. We think that this would not have been possible due to a combination of factors, including unfavourable global market conditions in the aftermath of the Global Financial Crisis (GFC) and the poor outlook for Papua New Guinea's economy at that time.

Nature of the transaction and how it was priced[3]

14. When the Government entered into the IPIC transaction, the State owned a large number of Oil Search shares, worth about AUD 850 million in November 2008 when the transaction documents for the IPIC exchangeable bond were signed.[4] The main characteristics of the IPIC transaction were that the State effectively borrowed AUD 1,681 million from IPIC for a period of five years and agreed to pay interest and to transfer its Oil Search shares to IPIC at the end of the five years. If at the end of the five years the shares were worth less than AUD 1,681 million (AUD 8.55 per share), the State would make up the difference in cash, while if the shares were then worth more than AUD 8.55, IPIC would keep all the shares and thus benefit from that upside.[5] Thus from March 2009 to March 2014 the State continued to be exposed to the downside risk of the Oil Search share price, and the upside risk up to AUD 8.55, but had transferred to IPIC all of the possible upside in the Oil Search shares above AUD 8.55. A fair interest rate for such an exchangeable bond would have been lower than the fair rate on a regular bond which did not give the lender the benefit of the upside in the Oil Search share price above AUD 8.55: at the outset, IPIC expected to receive not only the interest payments and the principal at maturity (as with a regular bond), but it also had a chance to receive more than the principal amount if the share price rose above AUD 8.55.

15. We have modelled the value of the IPIC bonds to test whether the transaction was fairly priced.[6] IPIC's expected return from the bonds depended on the expected performance of the shares, and on whether IPBC would be willing and able to pay if the cash top-up

3 See section V.

4 This is the value of the State's Oil Search shares at the market price of AUD 4.33 on 21 November 2008 (the last trading day before the IPIC transaction documents were executed).

5 The IPIC bonds had other features but these are the main contributions to the value of the bonds.

6 By "fairly priced" we mean that other potential lenders might have been willing to lend under similar conditions.

was ultimately required. We do not have the information to make an assessment of IPIC's exposure to IPBC credit risk,[7] and in any event any such assessment would be subject to uncertainty and judgement. We also have not seen any evidence on how IPIC itself judged its exposure to IPBC credit risk. The interest rate IPIC charged was fair if IPIC assessed the credit risk as non-negligible, but was too high if there was no risk of IPBC failing to pay a required cash top-up. For comparison purposes, the risk-free rate on November 24, 2008 (the day after the bond deed was signed) was 3.96%,[8] while the semi-annual interest rate paid to IPIC was equivalent to an annual rate of 5.1%.[9] However, in addition to the interest payments, IPIC also benefitted from the possibility that the Oil Search share price would rise above AUD 8.55, which provided IPIC with an additional expected return.

16. To illustrate the magnitude of the relationship between credit risk and fair pricing, we have valued the bonds at the time the bond documentation was executed. If we assume that there was no credit risk—ie, that it was certain that IPBC would ultimately pay any cash top up that was required on maturity—the bonds were worth 119% of face value.[10] Conversely, if it was certain that IPBC would not pay any cash top up that might be required on maturity, the bonds were worth 69% of face value. Thus, issuing the bonds for 100% of face value is consistent with fair pricing of a bond with a non-negligible degree of credit risk.

I.C.2. The UBS transaction

The Government's objective[11]

17. The objective of the Government in entering into the UBS transaction was to invest AUD 1,225 million in Oil Search shares. By issuing these shares, Oil Search received AUD 1,225 million, somewhat greater than the amount it agreed to pay on around the same date for an interest in PRL-15 (Oil Search had agreed to pay USD 900 million for the PRL-15

---

[7] There is no direct market evidence about Papua New Guinea credit risk generally because Papua New Guinea had no outstanding sovereign debt at this time. IPIC would have had to form a judgement about the risk that IPBC might fail to pay a required cash top-up, for example by forecasting future revenues available to IPBC and assessing the consequences of default for IPBC and the Government generally in terms of limiting access to future financing.

[8] This is the zero-coupon interest rate for Australian Government bonds reported by the Reserve Bank of Australia.

[9] When comparing interest rates in our report we adopt a standard convention that a rate of X% requires the payment of X% of the loan principal at the end of each 12-month period.

[10] ie, the interest rate was higher than a fair rate of interest if there was no credit risk.

[11] See sections III.B and III.C.

interest, and at the time the shares were issued for AUD 1,225 million this sum was equivalent to USD 1,100 million).

18. The documents we have reviewed suggest that a significant reason for the Government wishing to invest in Oil Search was that it expected the share price to increase over time. In addition, the Government may have anticipated an additional strategic benefit for Papua New Guinea—a benefit additional to any benefit it expected the State to get from dividends or an appreciating share price. However, the nature of that strategic benefit is not explained in the documents we have reviewed. In particular, the documents we have reviewed do not explain how the desired strategic benefits would depend on the State being a substantial shareholder in Oil Search. The Government may also have wanted to obtain a "blocking" stake of more than 10% of the shares in order to be able to prevent a future takeover of Oil Search.

Alternative financing options[12]

19. We think that the State was in a strong position to raise sovereign debt in 2014 because of favourable global market conditions and an improved overall growth outlook for Papua New Guinea's economy. External market conditions in 2014 were much more favourable than in 2009: interest rates were low and had been low for some time, and central banks around the world were maintaining easing measures. Papua New Guinea's economic indicators had also improved relative to 2009, backed by an acceleration of structural and fiscal reforms in the years leading up to 2014. Several countries with similar profiles to Papua New Guinea were able to raise sovereign debt funding in 2014. We consider that it may well have been possible for the State to issue AUD 1,225 million of sovereign debt at that time. However, the prospects of a successful debut issuance could have been weakened if the Government had announced that the intended use of the proceeds was to buy shares.

Nature of the transaction and how it was priced[13]

20. The nature of the UBS transaction was that the State borrowed money from UBS to buy shares in Oil Search, and also entered into options over most of those shares. The State paid AUD 8.20 per share to Oil Search in return for the shares. However, the effect of the options was that the State's exposure to the share price was limited for the shares covered by the options. Up to the expiry of the options (two years), if the share price fell

---

[12] See section IV.B

[13] See section VI.

significantly, the State's maximum exposure on the shares covered by the options was AUD 0.82 per share, and the State's maximum upside if the share price rose significantly was AUD 1.80 per share.[14] About 92% of the State's Oil Search shares were hedged in this way, while the State was fully exposed to share price movements on the remaining 8%. The State pledged all of its Oil Search shares as security for the money it borrowed from UBS. Furthermore, as a result of the hedging in the collar, UBS had reduced exposure to Papua New Guinea credit risk: even if the Oil Search share price fell, the put component of the collar would allow most of the total principal outstanding to be repaid. Thus the Government was able to fund the purchase of 74% of the shares at a reduced interest rate (the "Collar Loan" component of the transaction). The balance of the shares were purchased with a second loan from UBS that had a higher interest rate (the "Bridge Loan" component). Note that the number of shares hedged (92% of the total) was greater than the number of shares funded with proceeds of the Collar Loan (74%). The proceeds of the Bridge Loan funded 26% of the total shares purchased: 18% that were hedged under the Collar Loan and 8% that were unhedged. The proceeds of the Bridge Loan also funded fees to UBS and advisors.

21. The UBS transaction allowed the Government to achieve its objective of investing in Oil Search shares, and had the benefit of requiring no up-front cash payment. In our view, however, there are several unusual features of the UBS transaction.

    a. The interest rate on the Collar Loan was stated to be 4.95%. However, all of the interest charge was paid up front rather than over the life of the loan. The interest charge on the IPIC bonds was 2.5% every 6 months, which is equivalent to 5.1% every 12 months in arrears. The UBS Collar Loan interest charge was equivalent to 5.3% every 12 months in arrears.

    b. The Collar Loan did not expose UBS to any Papua New Guinea credit risk—at worst, the State could satisfy all of its obligations at maturity by returning to UBS the shares and the put options it held under the collar. The collar exposed UBS to the market risk associated with Oil Search's share price. However, UBS stated that the collar was "nil premium", meaning that the value of entering the collar was zero to both UBS and the Sate. Therefore, if the collar was "nil premium" as UBS stated, there was no net cost to UBS to provide the hedging in the collar to the State, and so UBS could in turn have purchased similar hedging from other market participants also at net zero cost. This would have exposed UBS to the credit risk of

[14] The fact that the maximum upside is larger than the maximum downside does not indicate any imbalance in the State's favour, because the share price was expected to rise over time. In fact, as we explain later, the maximum upside should have been larger in order to balance the AUD 0.82 per share downside.

the counter-parties to its hedging transactions. We do not know the magnitude of this credit risk. We would expect it to be small because we would expect UBS to be able to hedge with credit-worthy counter-parties such as major banks. If this risk was indeed small, then for pricing purposes the Collar Loan can be treated as being close to a risk-free asset from UBS's perspective. However, the interest rate UBS charged was well above the market rate for a risk-free loan.[15] Thus, we think that the interest rate charged was likely to be higher than a fair rate of interest: UBS charged a spread over the risk-free rate, but we have not identified any significant risk that UBS was bearing and could not hedge at a nil-premium (and which would therefore require compensation through a spread). The two year risk-free rate on 27 February 2014 was 2.6%. The difference between the interest rate charged and the risk-free rate was worth about AUD 56 million.[16]

c. UBS stated that the magnitude of the downside protection the State received and the upside gain it gave up under the collar structure were selected such that the collar structure was "nil premium"—ie, UBS did not charge the State for the collar protection. We have not been provided with any information about how in fact UBS priced the collar, and we do not know the market price of the options that made up the collar.[17] We have therefore relied on a standard model[18] to analyse the collar. This model suggests that UBS actually benefitted from the collar, and that if the collar had been fairly priced either UBS should have paid the State at least AUD 25 million for the collar, or the collar should have been adjusted to give the State more downside protection or more scope for upside gain.

d. The mismatch between the term of the Bridge Loan and the term of the Collar Loan, together with the cross-default provision, would have put UBS in a strong bargaining position when the Bridge Loan expired if the State had not been able to repay the Bridge Loan.

---

15 The market rate for risk-free loans can be observed, for example from the prices at which Australian government bonds are trading.

16 If the State had paid interest on the Collar Aggregate Exchange amount (AUD 904.6 million) at 2.6% for 2.13 years (the average time to expiry), it would have paid AUD 50.8 million, whereas it actually paid AUD 106.6 million of interest on the Collar Loan.

17 Some options on Oil Search shares were quoted on an exchange, so market prices are available for those options. However, not all the options that made up the UBS collar were exchange traded.

18 The Black–Scholes model, which has been the standard model for valuing options since its publication in 1973. Related work was cited when Robert Merton and Myron Scholes were awarded the Nobel prize for economics in 1997.

e. We are not in a position to quantify the UBS exposure to Papua New Guinea credit risk.[19] However, the maximum amount at risk was smaller in the UBS case than for IPIC, because of the collar.[20] Furthermore, Papua New Guinea's economic prospects were better in 2014 than in 2009 as the influence of the GFC had abated and the economy was entering a period of anticipated growth with the completion of the PNG LNG project. The interest rate on the Bridge Loan was higher than the interest rates charged on sovereign debt issued by two first-time issuers in 2014, and the Bridge Loan had a shorter term and was partly secured, both factors that would tend to reduce credit risk and thus interest rates. In 2014 Kenya and Ethiopia issued unsecured sovereign debt with a 10 year term with an interest rate of less than 7%, while the interest on the Bridge Loan started at over 8% and increased during the term.

22. UBS charged fees of approximately AUD 13 million for the collar and initial term of the Bridge Loan. This amount is slightly more than 1% of the amount that the Government raised to invest in Oil Search shares. This level of fees is not unreasonable.

I.C.3. Risks and rewards of the transactions[21]

23. Prior to entering into the IPIC transaction, the State owned a large number of Oil Search shares. It was therefore exposed to upside and downside risk associated with the Oil Search share price. As a result of the IPIC transaction, the State gave up some of the upside potential while retaining all of the downside risk. However, as a result it obtained the financing it needed for the PNG LNG project at a reduced rate of interest. The financing enabled the State to realise profits from its equity stake in the PNG LNG project.

24. At the time the State entered into the UBS transaction, the Government knew or should have known that it would imminently transfer its Oil Search shares to IPIC as the IPIC bonds matured. Had the Government not entered into the UBS transaction, from March 2014 onwards the State would have had no Oil Search shareholding and would thus not have had direct exposure to the upside or downside risks of the Oil Search share price. The State did, however, have its share of the PNG LNG project, the value of which was

---

[19] As noted above in relation to the IPIC transaction, we do not have any information on how UBS assessed the credit risk, and Papua New Guinea had no outstanding sovereign debt (which could otherwise have provided information on how the market generally assessed Papua New Guinea credit risk).

[20] In the IPIC case, 100% of the principal borrowed was theoretically at risk because the Oil Search price could have fallen to zero. In the UBS case only 25% of the total borrowed was at risk (the AUD 335 million in principal from the Bridge Loan) because 75% was protected by the collar.

[21] See section VII.

partially correlated with the value of Oil Search shares (since Oil Search also had a share in the PNG LNG project).

25. As a result of the UBS transaction, the State took on some exposure to the Oil Search share price. This exposure was limited by the operation of the "collar" derivatives that were part of the UBS transaction.

26. The Oil Search share price rose by approximately 85% during the five-year term of the IPIC bonds. During the term of the UBS loans, the Oil Search share price fell. Because of the share price increase from 2009 to 2014, the State was able to settle almost all of its obligation when the IPIC bonds matured using gains from holding Oil Search shares, and was required to pay IPIC only a relatively small cash top-up. If the share price had not increased to the same extent, or had fallen, the State would have been required to pay IPIC a large sum. In contrast, because the Oil Search share price fell from 2014 to 2016, the State would not have had gains from holding Oil Search shares to offset its obligations to UBS.[22]

I.C.4. Hedging[23]

27. Financial risk refers to the fact that many investments have uncertain returns. Many types of financial risks can be neutralised or offset by purchasing the right kind of financial instrument. Where an investor does this, the risk thus offset is said to be "hedged". For example, an oil producer is exposed to oil price risk: the oil producer's revenues will rise if the oil price goes up and fall if it falls. The producer can hedge its risk by purchasing a financial instrument with a price that will go down if the oil price goes up, and go up if the oil price goes down.[24] The producer's overall exposure to changes in the oil price is thus reduced or hedged.

28. The IPIC transaction did not expose the State to new risks because the State already owned Oil Search shares. In effect, the IPIC transaction somewhat reduced the extent to which the State could benefit from an increase in the Oil Search share price during the term of the bonds (without changing the State's exposure to the share price falling). Once the bonds matured, the State would have no direct exposure to the Oil Search share price. Thus the transaction did not create new risks that could have been hedged.

---

[22] As explained further in section X, we do not currently have information about exactly when the UBS transaction was unwound or the price at which the State's Oil Search shares were sold.

[23] See section VIII.

[24] For example, the price of a put option increases as the price of the underlying instrument falls, and vice versa.

29. The UBS transaction (the purchase of 149 million Oil Search Shares and the two UBS loans) created an exposure to the Oil Search share price that the State would not otherwise have had. However, achieving exposure to the Oil Search share price was one of the Government's objectives in entering into the transaction.

I.C.5. Trading in Oil Search shares[25]

30. We have been asked to consider UBS trading in Oil Search shares in the run up to the transaction with the State and afterwards.

31. We have access to limited information on UBS transactions in Oil Search shares. The information we have seen suggests that UBS borrowed large numbers of Oil Search shares around the time of the transaction and sold them (ie, UBS "shorted" the shares). This is consistent with UBS seeking to hedge its exposure to Oil Search shares that would arise because of the transaction with the State, and is thus expected behaviour.

32. In our view, there was nothing inherent in the UBS transaction which gave UBS an opportunity to trade Oil Search shares to the benefit of UBS that was not already available to it in the market. We have not seen any indications that this happened.

I.C.6. The State's losses from the UBS transaction[26]

33. We have been asked to quantify the State's losses resulting from the UBS transaction. We interpret this request as requiring us to add up the financial flows to and from the State associated with the UBS transaction, between the time that the State purchased the 10.01% interest in Oil Search and the time when it ceased to own Oil Search shares. This would quantify the financial result for the State of what actually transpired relative to an alternative hypothetical situation where the State did not borrow money from UBS and did not purchase Oil Search shares.

34. We have not been able to quantify the State's losses because we have not been provided with the necessary information. In order to do this we would need to know when the State sold its shares, and we would need to have details of the later transactions when the original UBS loans were modified.[27]

---

25 See section IX.

26 See section X.

27 We understand that the Bridge Loan was extended and then replaced with a collar type transaction, and that the original Collar Loan was also modified before it matured.

35. We propose to prepare a supplementary report if such information becomes available.

I.C.7. The PRL-15 transaction[28]

36. The Government used the funds it borrowed from UBS to buy newly-issued shares from Oil Search, and Oil Search in turn used most of the funds it received from the State to purchase a share of PRL-15 (the Elk–Antelope gas fields in Papua New Guinea). We consider that the price Oil Search paid for this interest was similar to the price Total paid at about the same time to acquire a share of the same licence, after adjusting for the size of the interest acquired and the structure of the purchase price.

37. Oil Search agreed to pay more up-front than Total, but Total also agreed to larger contingent payments than Oil Search (the contingent payments depended mainly on the results of further testing of the amount of gas in the fields). At the time of the transactions, publicly-available information suggested that the fields were thought to contain between 5 and 11 tcfe.[29] If it later turned out that the fields contained more than 7 tcfe, then Oil Search would pay more than Total on a per tcfe basis, while if the fields contained less than 7 tcfe, then Oil Search would pay less than Total.

II. Scope of this report

38. This report is based on our analysis of documents provided by MinterEllison, as well as other public information. These documents are cited in the body of our report.

39. This report provides a financial and economic perspective on the matters we were asked to examine. This report does not examine the legal framework within which the various subject transactions took place nor assess whether the actual transactions or potential alternative courses of action were or would have been legal.

40. Where relevant to Brattle's assignment, this report considers the objectives of the Government in entering into the financing arrangements and corresponding investments. We rely on statements in the various documents we reviewed in preparing this report to identify the Government's objectives.

41. This report discusses transactions denominated in USD and in AUD. Over the relevant time frame (2008 to 2018) the USD /AUD exchange rate was quite volatile. Care is

[28] See section XI.

[29] See Table 5 below.

therefore needed in converting between currencies. We plot the AUD/USD exchange rate in Figure 1.

FIGURE 1: AUD/USD FX SPOT RATE

Source: Bloomberg, L.P.

III. The objectives of the financing transactions

42. We have been asked about "[t]he strategic objectives of the Government in entering into each transaction".

43. The IPIC transaction raised funds that were used to enable the State to participate in the PNG LNG project as an equity partner. The UBS transaction raised funds that were used to purchase shares in Oil Search (and puts and calls on those shares). Thus the objectives of the Government in entering into the financing transactions include its objectives in using the funds raised in the way that it did.

44. We have identified the Government's stated objectives by reviewing NEC policy papers and related documents.

III.A. The State's investment in the PNG LNG project

45. The financing raised through the IPIC transaction was used to enable the State to fund its equity participation in the PNG LNG project. As a result of the PNG LNG Gas Agreement (between the Government and the various commercial participants in the PNG LNG project), the State had the right to acquire 22.5% of the undivided participating interests in various of the key production licences underpinning the PNG LNG project,[30] corresponding to about 19% of the project overall.[31] The PNG LNG Gas Agreement set the acquisition price for the State to buy in equal to the corresponding shares of the expenditure that the commercial parties had already incurred up to that point, interest on these amounts since the expenditure was incurred at LIBOR plus 2%, and a lump sum of USD 22.2 million.[32] After buying in to the project, the State effectively became a commercial participant with a 19.4% equity interest,[33] and was thus responsible for paying a share of all project costs, including the significant expenditure required to construct the project.

46. In order to obtain its equity interest in the project and ultimately a share in the project's profits, the PNG LNG Gas Agreement obliged the State to make payments to cover its share of the following items:

    a. the expenditures that had been made prior to the PNG LNG Gas Agreement, interest, and a lump sum;[34]

    b. Front End Engineering and Design (FEED) costs incurred after signing the PNG LNG Gas Agreement, but before the Final Investment Decision (FID) of the project had been taken;[35] and

    c. the investment needed to build the project.[36]

---

30 *PNG LNG Gas Agreement*, clause 10.2(b).

31 The amount of the State's interest is slightly different in various of the source documents we have reviewed. We have not attempted to reconcile the precise amount or how it may have changed over time because this is not material to the conclusions we reach.

32 *PNG LNG Gas Agreement*, clause 10.7(e).

33 See, for example, NEC Policy Submission No 167/2008, paragraph 1a [WIT.0027.0001.0471]. The State's equity interest was smaller than 22.5% because it did not acquire interests in all of the gas fields feeding the project.

34 *PNG LNG Gas Agreement*, clause 10.7(e).

35 NEC Decision No. 190/2009, Policy Submission 163/2009 p. 2 [WIT.0015.0001.0615].

36 Since the result of the PNG LNG Gas Agreement was that the State would participate in the project as an equity owner.

47. The total amount of the State's share of pre-FEED costs, including interest and the lump sum, was about USD 113 million, and the total buy-in including FEED was USD 294 million (this figure includes all costs up to June 2009, and an estimate of remaining FEED costs).[37]

48. The PNG LNG project was structured in such a way that, after FID, the project vehicle itself was able to borrow money (ie, the project was "project financed"). As a result, approximately 70% of project capital expenditure was funded with debt, with the remaining 30% contributed by the equity participants in proportion to their equity shares. The State currently holds a 16.8% interest in the project via Kumul Petroleum Holdings Limited, while Mineral Resources Development Company (MRDC) additionally holds a 2.8% interest as a corporate trustee for landowner interests.[38] Thus, of the approximately USD 18 billion expected construction cost,[39] the State's equity contribution would be about USD 1,000 million.[40,41]

49. The State's right to buy in to the project was valuable because the cost of exercising the right was small relative to the expected profits of the project. The State's buy-in right was priced at sunk cost, and the market value of the equity share was much larger: for example, we can benchmark the market value from a transaction in which the equity share among the commercial parties was adjusted at about the same time as the State was exercising its buy-in right. In October 2008 AGL sold a 3.6% interest in the PNG LNG project (as well as some other assets) to Nippon Oil for USD 800m.[42] This price corresponds to a value for the project as a whole of about USD 15 to 25 billion

---

37 NEC Decision No. 190/2009, Policy Submission 163/2009 p. 2 [WIT.0015.0001.0615]. A similar figure (USD 287 million) is in *Appointment of Financial Advisors to: The Independent State of Papua New Guinea, Background Notes*, Dairi Vele, Director, Gas Projects Co-ordination Office, 8 August 2013, p. 5 [WIT.0014.0002.0878].

38 https://www.pnglng.com/About/History

39 *PNG LNG: A World Class Financing Venture*, Steven Kane (Exxonmobil Gas & Power Marketing Company), undated and downloaded from https://www.gti.energy/wp-content/uploads/2018/12/1-6-Steven_Kane-LNG17-Paper.pdf). This appears to have been a conference presentation (a slide version of the paper suggests it was presented at the *17th International Conference and Exhibition on Liquefied Natural Gas (LNG 17)* on 16 April 2013).

40 18 billion x 30% x 19% = 1.03 billion.

41 The USD 18 billion total construction cost is the estimate as at Financial Close in March 2010 (according to the Steven Kane conference paper and slides cited above). *NEC Policy Submission 167 of 2008* (dated 28 October 2008) also gives a figure of USD 1,000 million for the State's equity contribution (paragraph 7).

42 *AGL to sell PNG assets for approximately AUD 1.1 billion net*, AGL ASX and media release of 30 October 2008. The ASX release specified the sale price but did not identify the purchaser. It was later revealed to be Nippon Oil. The 3.6% was before the State's buy in, so represented 3.13% of the project after the State's buy in.

(depending on how much of the USD 800 million AGL transaction price should be allocated to other assets that were sold along with the share in the PNG LNG project).[43] This implies that the State's equity stake was worth USD 3,000 to 5,000 million. Thus the State's return from buying in was between USD 2,700 million and USD 4,700 million.[44]

50. The USD 2,700 million was an expected return—the State paid about USD 294 million for an asset that was expected to generate future profits with a present value (net of construction and other costs) of at least USD 3,000 million in 2008. However, the asset would not produce any profits and thus cash distributions to its owners until 2014 at the earliest. Furthermore, between 2009 and 2014 the State would need to invest around USD 1,000 million before seeing any profits (ie, the asset the State had obtained was an investment opportunity, albeit one that was expected to produce a large return). The IPIC transaction provided the State with the funds it needed to make that investment.

51. Thus the Government's objective in investing in PNG LNG was primarily to realise the significant value of the buy-in right provided by the PNG LNG Gas Agreement. This objective is explained in the NEC Policy Submission seeking approval for the IPIC transaction.[45] For example, the policy submission explained that the anticipated return from the 19.4% share in the PNG LNG project was around USD 850 million per year, while the annual return from the Oil Search shares that were to be given up was only around USD 16 million.[46]

III.B. The State's investment in Oil Search shares

52. The financing raised through the UBS transaction was used to buy Oil Search shares.

53. The State had held shares in Oil Search between 2002 and 2014. The State had originally acquired the shares when Oil Search merged with Orogen Minerals, a company in which the State held 51% of the shares.[47] In turn, the State's shareholding in Orogen Minerals arose from the 1996 partial privatisation of the Mineral Resources Development Company (MRDC). MRDC transferred the State's interests in various oil, gas and mineral

---

[43] An Oil Search presentation (Macquarie Australia Conference 2009, 6 May 2009, slide 34) estimated that just under 40% of the AGL sale price could be allocated to oil assets.

[44] The value of the equity stake, minus the buy in to obtain the equity stake.

[45] *NEC Policy Submission No 167 of 2008*.

[46] At paragraph 18.

[47] Orogen Minerals Limited ASX release, 21 March 2002.

projects to Orogen Minerals.[48] The State retained 51% of the equity in Orogen, with 49% being sold in the privatisation.[49]

54. When approving the merger of Orogen and Oil Search in 2002, the Government said: "'The decision was clear-cut,' Sir Mekere [the late Right Honourable Sir Mekere Morauta KCMG, the then Prime Minister] said. 'The Oil Search scheme of arrangement offers more to Papua New Guinea, and in particular to the Gas-to-Queensland project [a forerunner of the PNG LNG project],[50] than a recent counter-proposal from Santos. This decision means that the State can now sell its 51% shareholding in Orogen to Oil Search. I regard NEC's decision as a major incentive for a Papua New Guinea-owned oil and gas industry, for exploration and development of the nation's rich resources, and as a big step towards final agreement on a go-ahead for the gas project.'"… …"NEC also considered that the Oil Search offer represented the best way to move the gas project ahead, and at the same time allow the state to participate in its undoubted upside. The Oil Search offer meant that the State would hold 18 percent of Oil Search's shares, making it the largest shareholder. This shareholding is worth about K500 million."[51]

55. The 2003 Oil Search annual report lists the State (IPBC) in its list of the twenty largest shareholders, with 196.6 million shares accounting for 17.65% of the issued capital as at 31 March 2004.[52] That shareholding did not change until 2014 when the IPIC bonds described above matured and were exchanged for the State's Oil Search shares (the 2013 Oil Search annual report lists IPIC as its largest shareholder, with 196.6 million shares as at 14 March 2014).[53] In 2014 the 196.6 million shares represented a smaller fraction of the total issued capital (13.17% rather than 17.65% in 2004) because Oil Search had issued new shares over time.[54]

48 *Privatization in progress 1995–2005, Chapter 18. Privatization Policy in Papua New Guinea* (Tim Curtin, Australian National University, available at http://press-files.anu.edu.au/downloads/press/p78541/mobile/index.html.

49 *PNG oils $260m privatisation float*, AFR (19 September 1996).

50 At the time, the expectation was that the gas resources would be exploited by constructing a pipeline to Queensland. That plan was known as the "PNG Gas Project" but was ultimately dropped in favour of an LNG export concept which became the PNG LNG project (see, for example, https://www.pnglng.com/About/History).

51 Orogen Minerals Limited ASX release, 21 March 2002.

52 *Oil Search Limited Annual Report 2003*, p. 71. We were not able to locate a copy of the 2002 annual report.

53 *Oil Search Annual Report 2013*, p. 131.

54 Between 31 March 2004 and 14 April 2014 the number of ordinary shares increased by 382.9 million. About 40% of this total is accounted for by the 149.4 million shares Oil Search issued to the State in 2014.

56. In April 2013 the NEC discussed financing arrangements relating to retaining the State's shareholding in Oil Search (perhaps by re-purchasing the IPIC bonds), and "noted the strategic investment positive and negative implications of not retaining the Oil Search Shares".[55] IPBC was directed to explore raising funds to redeem the IPIC bonds (estimated at AUD 1.8 billion) and also to explore raising funds needed for the expansion of the PNG LNG project (Train 3).[56,57]

57. A March 2013 NEC submission suggested that IPIC was interested in selling its bonds.[58] The same paper also states that IPBC has a "strategic interest" in investing in Oil Search, but IPBC's reasoning is not explained.[59] The document describes various aspects of Oil Search which, in IPBC's view, make Oil Search a good investment and/or a good choice for developing projects in Papua New Guinea. However, the document does not explain why it was necessary for IPBC to invest in Oil Search, except because of the anticipated appreciation of the share price.[60] The paper also indicated that the then Prime Minister considered the State's investment in Oil Search to be of strategic importance, but did not explain why.[61]

58. In a document of August 2013, the "Gas Projects Co-ordination Office" noted that the Prime Minister had "expressed a desire to retain all or a substantial portion" of the

---

55 NEC Decision No. 117/2013 of 5 March 2013, p. 1. [WIT.0015.0001.0725]

56 *Ibid.*

57 At that time, an option for expanding the PNG LNG project was being discussed (for example, expansion of the PNG LNG project is mentioned in the 2013 and 2014 Oil Search annual reports). The expansion did not ultimately take place.

58 "IPBC has learned that IPIC has been negotiating recently to sell the bonds held at IPIC. It is understood that it is a requirement due to a review of funds in the United Arab Emirates (UAE) by a US based consultancy firm and IPIC has been purportedly advised to concentrate in investments in downstream processing." (NEC Policy Submission No. 85 of 2013, p. 2. [WIT.007.0004.0357]).

59 For example, paragraph 6 of the document explains that IPBC owns part of the PNG LNG project, that Oil Search specialises in operating in Papua New Guinea, and that there are good growth prospects for the PNG LNG project. While stating that these facts give rise to a strategic interest, the underlying logic is not set out.

60 *Ibid*., section B

61 *Ibid*., section C. The views of the Prime Minister were as follows: "The Government is now undertaking a major milestone in management of its asset ['this asset' may refer to the Oil Search shares, the share in the PNG LNG project, or both]. This milestone will entail the restructuring and consolidation of the mining, petroleum and state utilities including other investments and assets. The objective is to transform the current framework or form of investment vehicle that will endeavour to achieve: High efficiency in areas of service infrastructure and service delivery; Capacity to be able to pull together substantial finance in pursing investments and transformation exercises; Robust framework and structure that will allocate legal, commercial, financial and technical risks; and Effective mechanism to deliver the Government's objectives in terms of service provision to 100% population by 2020. In this regard, ownership of the Oil Search share is very Strategic in positioning the Government to realize its objectives and targets in the mid to long term."

State's Oil Search shareholding after the IPIC bond matured, and the state wanted to secure an equity position of between 10.01% and 19.99% of the total issued capital after the bonds had matured.[62,63]

59. The same document also indicated that the Government was aware that it would have to make a cash top-up when the IPIC bonds matured if the Oil Search share price was then less than AUD 8.55, and suggested that if the State were to purchase Oil Search shares in the period before the IPIC bonds matured, this would both allow the State to increase its shareholding in Oil Search, and at the same time reduce the risk of having to make a cash top up payment (on the theory that the State's actions in purchasing shares would tend to cause the share price to be higher than it would otherwise be).[64]

60. An NEC paper of November 2013 on "Refinancing IPIC Exchangeable Bond"[65] includes the following statements:[66] "the Oil Search shares are a strategic holding for the State based on the underpinning asset value that is held in the underlying equity holding, plus the future earning opportunity along with a dynamic management of the Oil Search holding for the first time in the portfolio",[67] "the overwhelming advice is to 'seed' the refinancing with a monetised collar. This is effectively a loan that is non-recourse to the State. If the share price of Oil Search falls the State will be protected from the fall and provides participation in the upside capital appreciation to a cap level, of the Oil Search share price. This form of lending is dynamic in terms of management.",[68] and "The Monetised Collar will be an actively managed instrument that the State will hold and dynamically manage for best outcomes, where the repayment of this funding will come from cash or script settlement at the discretion of the NEC at the time". [69] These statements suggest that the benefits of the proposed options for refinancing the IPIC bond were thought to be to maintain exposure to the Oil Search share price, and to have a "dynamic" structure different from the prior IPIC arrangements. We are not sure what

62 *Appointment of Financial Advisors to: The Independent State of Papua New Guinea, Background Notes*, Dairi Vele, Director, Gas Projects Co-ordination Office, 8 August 2013, p. 2 (page number is missing) [WIT.0014.0002.0878].

63 We understand that a holding above 10% was sufficient to be able to block a full takeover, while acquiring 20% of shares would trigger an offer for all outstanding shares.

64 *Ibid.*

65 NEC Statutory Business Paper No. 179 / 2013 [WIT.0015.0001.0786], section B4.

66 When we have quoted from NEC papers we have reproduced the wording of the original document as written as well as we are able. In some cases the quality of the copies we received is not perfect.

67 *Ibid*., p. 2.

68 *Ibid*., p. 2.

69 *Ibid*., p. 11.

the paper meant by “actively managed” or “dynamically managed”, but this would seem to imply ongoing trading of Oil Search shares.

61. The same November 2013 NEC paper also has a section headed “Why Buy Back the Oil Search Shares”.[70] The reasons given are as follows.

    a. First, to release the General Business Trust assets. The IPIC bonds prevented IPBC from pledging these assets as security on other loans, so if IPBC were to repurchase the bonds these assets would become available to use as security on other loans. However, this reason would have been no longer relevant by March 2014, since the IPIC bond was maturing anyway.

    b. Second, IPBC apparently expected the Oil Search share price was to go up over time.[71]

    c. Third, IPBC observed that the Oil Search share price had gone up between 2008 and 2013. The paper does not explain why this would have been relevant to the refinancing decision.

    d. Fourth, the refinancing options were said to have lower interest costs (presumably, lower than the IPIC bonds), and “the preferred tenders are substantially cheaper than what was arranged almost five years ago”.

    e. Fifth, “**Strategic Asset Value**: Oil Search is a PNG-domiciled and operated company with substantial producing assets held in PNG. It is an active participant in the up-stream exploration activities. Any new discoveries of hydrocarbon reserves in PNG will be in the State's beneficial interest if it continues to hold its interest and position on the company.”

62. A March 2014 NEC paper seeking approval for the UBS transaction and related matters stated “Oil Search has expressed a strong desire for the State to maintain a material shareholding in Oil Search so that the State shares in the additional upside from Oil Search's completed and producing projects, PNG LNG (in final commissioning) and the new Elk/ Antelope gas field development”.[72]

63. We note that the affidavit of Mr Dairi Vele also explains that the acquisition of Oil Search shares would have the benefit of enabling the Government to block a takeover of Oil

---

70 *Ibid*., pp. 11–12.

71 For example, the document cites and includes extracts from equity analyst reports anticipating that the Oil Search share price would rise.

72 NEC Policy Submission 67 of 2014, p. 3 [WIT.0014.0007.1183]

Search, and thereby avoid the risk that a new owner of Oil Search might cause the company to close down its operations in Papua New Guinea.[73]

III.C. Conclusions on objectives

III.C.1. IPIC transaction

64. We conclude that the Government's objective in entering into the IPIC transaction was to realise the substantial value of the back-in rights provided by the PNG LNG Gas Agreement. After paying around USD 300 million to exercise the back-in right, the State had an equity share in the PNG LNG project that was worth at least USD 3,000 million at the time of the IPIC transaction.[74] In order to obtain a return from that asset in the form of a share in the future profits of the PNG LNG project, the State needed to contribute equity investment of about USD 1,000 million over the construction phase of the project between 2009 and 2014. The IPIC transaction provided the State with the financing to make that investment.

III.C.2. UBS transaction

65. Based on our review of NEC papers and other official documents,[75] it seems that in 2013 the Government was looking for financing that could be used for a combination of all or some of repurchasing the IPIC bonds, buying Oil Search shares (to support the share price), and buying Oil Search shares to increase the Government's exposure to the company. By February 2014 IPIC had determined to exchange the bonds for the Government's shareholding in Oil Search, so at that point the purpose of the financing was simply to purchase replacement shares.

---

73 "A 10.1 % share [note: the State in fact acquired a 10.01% share] in Oil Search prevents any foreign takeover of Oil Search. Oil Search is the biggest company in PNG and in the top 25 on the Australian Stock Exchange. To lose Oil Search to overseas interests and have then Oil Search leave would be devastating to the PNG economy due to the tax it pays and the jobs it creates" (Affidavit of Mr Dairi Vele, p. 65).

74 See discussion above, paragraph 49.

75 NEC Decision No. 117/2013 of 5 March 2013 [WIT.0015.0001.0725]; NEC Policy Submission No. 85 of 2013 [WIT.007.0004.0357]; *Appointment of Financial Advisors to: The Independent State of Papua New Guinea, Background Notes*, Dairi Vele, Director, Gas Projects Co-ordination Office, 8 August 2013 [WIT.0014.0002.0878]; NEC Statutory Business Paper No. 179 / 2013 [WIT.0015.0001.0786]; NEC Policy Submission 67 of 2014 [WIT.0014.0007.1183].

66. The main reason set out in the papers explaining why the Government wanted to buy Oil Search shares that we have reviewed seems to be that the Government believed that the shares were undervalued and that the price of the shares would rise over time.[76]

67. We have also seen some statements suggesting (without explanation) that investing in Oil Search shares was "strategic".[77] Our understanding of the term "strategic investment" in relation to shares is a situation where the investor expects an additional return over and above the ordinary return that all investors in that share would receive through dividends and share price appreciation. For example, a strategic investor might value the ability to influence corporate decision making by buying enough shares that the investor has right to nominate a board director, or might anticipate having access to valuable information about the company's operations that would not be available to outsiders. Alternatively, an investment could have strategic value to an investor because it hedges a risk in the investor's existing portfolio. For example, in principle the owner of an airline might invest in an oil producer in order to hedge the risk that an increase in oil prices would hurt the airline's profits.[78]

68. The papers we have reviewed do not explain how owning Oil Search shares would provide value to Papua New Guinea over and above any dividends and share price appreciation that the State might receive (and which all other Oil Search shareholders would receive). We have considered what logic might underpin the Government's view that investing in Oil Search would bring strategic benefits. One possibility could be that perhaps the Government thought that Oil Search might modify its operations in a way that harmed Papua New Guinea (such as ceasing to contribute to the construction of infrastructure that would be of public benefit) *in consequence of the Government ceasing to be a shareholder*. If so, that could constitute a source of strategic value for Papua New Guinea from buying replacement shares.[79] Another possibility is that the Government may have thought that it would have less influence over Oil Search decision-making if it did not buy replacement shares, and that by retaining such influence it could continue to achieve better outcomes for Papua New Guinea from influencing Oil Search decision-making. A third possibility is that the Government may

---

76 For example, see NEC Statutory Business Paper No. 179 / 2013 [WIT.0015.0001.0786], paragraph 31: "**Growing Asset – Long Term Benefit to State**: Market analysts Oil Search share price to trend upwards…".

77 For example, see NEC Decision No. 117/2013 of 5 March 2013, p. 1. [WIT.0015.0001.0725].

78 It would also be possible to hedge the oil price exposure directly using oil derivatives. This would allow the airline investor to hedge its oil price exposure without taking on the risks associated with the success or failure of a specific oil company's operations, but the hedge would not extend as far into the future as buying shares of an oil producer.

79 This suggestion is made in the oral evidence of the Honourable Peter O'Neill, CMG, MP on 17 June 2021 at transcript p. 1,456.

have thought that transferring the shares to IPIC could increase the risk of Oil Search being taken over, that new owners would behave in a way that was less beneficial to Papua New Guinea, and that buying replacement shares would reduce the risk of such a takeover.

69. We note that the State purchased shares equivalent to 10.01% of the total number of Oil Search shares outstanding. We are instructed that 10% was sufficient to block a full takeover. The Government may have been concerned about the risk that Oil Search could be taken over, although we do not know why the Government thought that a takeover might be harmful to Papua New Guinea. However, we also note that the State's stake appears to have been diluted shortly afterwards so that the stake fell below 10%. For example, a notice of a change in substantial shareholding dated 14 April 2014 listed the total number of Oil Search voting shares as 1,496 million,[80] implying that the State at that point held 9.98% of the voting shares.

70. We conclude that a significant objective for the Government was to benefit from dividends and/or a rising Oil Search share price. The Government may also have had a strategic investment objective, although the documents we have reviewed do not explain why or how the proposed shareholding would influence Oil Search behaviour to the benefit of Papua New Guinea. Further, if the Government's objective included holding more than 10% of the shares in Oil Search, as appears to be the case, it failed to maintain this holding after about a month of acquiring the shares.

IV. Alternative financing options

71. We have been asked "whether there were other ways of achieving those objectives [of the financing transactions, described above] that may have had a better outcome for the Government". In this section we consider alternatives to the IPIC and UBS transactions, including the possibility that the State might have been able to raise sovereign debt finance.

[80] *Change in Substantial Shareholding – Notice Pursuant to Section 116 Of The Securities Act 1997 (Papua New Guinea)*, notice sent to the ASX by the Commonwealth Bank of Australia on 16 April 2014.

IV.A. Alternative financing for the investment in the PNG LNG project in 2009

IV.A.1. Sale or partial sale of the State's interest in the PNG LNG project

72. We explained above that the Government's primary objective in entering into the IPIC transaction was to fund the investment opportunity associated with the equity share in the PNG LNG project the State obtained after exercising its buy-in right under the PNG LNG Gas Agreement.

73. In order to receive a return from this asset, the Government needed to be able to invest about USD 1,000 million from 2009 to 2014 as the PNG LNG project facilities were built.[81]

74. One alternative way for the State to realise the value of this asset could have been to sell it before a significant amount of construction had taken place. We estimated above that the value of the asset was USD 3,000 to 5,000 million around the time of the IPIC transaction. Although one of the PNG LNG participants sold a 3.6% interest in late 2008, we do not know whether it would have been feasible for the State to sell its larger interest. Had it done so, and if it were able to obtain a unit price in line with what was paid for the smaller AGL stake, we estimate that the State might have received USD 3,000 to 5,000 million rather than needing to find USD 1,000 million to finance its share of the construction.[82]

75. A different alternative could have been to sell part (about one fifth) of the State's interest in the PNG LNG project. This stake would have been similar in size to the equity interest that AGL sold in late 2008. Since the State's interest was worth about USD 3,000 to 5,000 million, it might have been possible to raise USD 600 to 1,000 million from selling 20% of this interest. Such a sale would also have reduced the State's future equity contributions from about USD 1,000 million to 800 million.[83] The Secretary of the Treasury, Mr Dairi Vele suggests that prior to the IPIC transaction, Petromin was

[81] See discussion above in section III.A.

[82] See discussion in section III.A above.

[83] If the State had sold 20% of its stake, the funding requirement associated with the remaining 80% would be correspondingly reduced.

advocating this approach, while IPBC was advocating an approach more like the one that was ultimately used.[84]

76. We note that an NEC policy paper says:[85] "The most fundamental question to those advocating the sell down of the State's 19.4% equity to finance reduced equity using proceeds from the sell down is why sell down when the returns are extremely attractive and the exchangeable bond transaction allows State to afford the full equity at effectively no cost?". This statement seems to imply that the Government was confident that the Oil Search share price would increase over time (thereby reducing the cost to the State of the IPIC transaction) and that the Government expected greater returns from holding its equity in the PNG LNG project than from selling it.

IV.A.2. Issuing sovereign debt in 2009

77. The GFC spread rapidly from late 2007 and led to a global downturn of uncertain duration and severity. The associated decline in commodity prices took its toll on resource rich economies and resulted in large fluctuations in the value of their currencies. Despite the positive sentiment associated with the PNG LNG project at that time, the impact of the GFC was still being felt in Papua New Guinea in 2009 primarily through lower demand for its export commodities. According to the International Monetary Fund (IMF), the GFC significantly affected the Papua New Guinea economy through the exchange rate. Owing partly to lower commodity prices, the current account shifted into a deficit in 2009 leading to a depreciation in the currency by 12 percent in nominal effective terms in 2009.[86] This depreciation was the main factor driving an increase in external debt at end-2009.

78. In line with global developments, the IMF was projecting deteriorating growth for Papua New Guinea, with a slowdown in both the non-mineral and mineral sectors.[87] Real GDP growth was projected to decline to under 4 percent in 2009 from an estimated 7 percent in 2008. According to the IMF, the fiscal balance was also projected to turn negative, and remain in deficit over the medium-term due to falling mineral revenues. Given the risk of further deterioration in the global economy, the outlook was highly uncertain and

84 Affidavit of Dairi Vele, paragraphs 85–6.

85 NEC Policy Submission No 167/2008, paragraph 45. [WIT.0027.0001.0471]

86 "Papua New Guinea: 2010 Article IV Consultation: Staff Report and Public Information Notice," International Monetary Fund, accessed June 24, 2021, https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Papua-New-Guinea-2010-Article-IV-Consultation-Staff-Report-and-Public-Information-Notice-23943.

87 "Papua New Guinea: 2010," IMF.

vulnerable to additional weakening in the terms of trade.[88] With this backdrop, the IMF Debt Sustainability Analysis (DSA) revealed significant vulnerabilities in external debt ratios and concluded that Papua New Guinea was at *moderate* risk of external debt distress over the medium-term.[89]

79. The 2009 funding outlook was hampered by an unusually high degree of uncertainty and bleak global economic conditions. With the rise in global risk aversion, external financing conditions tightened substantially in 2009.[90] Sovereign bond market conditions were particularly unstable, and the uncertainty prevailing in the market caused market participants all over the world to become much more risk averse. In its Regional Economic Outlook from 2009, the IMF noted the challenges in the sovereign debt market at that time, with foreign investors exiting from government securities, spreads on the international bonds increasing, and options for new sovereign issues narrowing significantly.

80. The OECD's 2009 report on government debt issuances emphasised that the explosion in global borrowing needs had worsened conditions for borrowers to issue new debt, increased borrowing costs, and led to postponed or less successful auctions.[91] During this period, borrowing needs increased significantly in response to soaring costs of finance sector support schemes and other crisis-related expenditures. The significant rise in the cost of financing, particularly for external debt, and the dramatic widening in credit default swap (CDS) spreads for Asian sovereign, corporate, and financial borrowers were noted in the IMF's 2009 review on Asia and the Pacific.[92] These dramatically increased borrowing needs, in turn, led to sharply increased competition in raising funds.[93] Issuance conditions therefore became tougher with reports from the OECD indicating occasional weak demand at auctions, which in some cases led to postponed, failed or cancelled auctions.

---

88 "Papua New Guinea: Staff Report for the 2008 Article IV Consultation," International Monetary Fund, accessed June 24, 2021, https://www.imf.org/external/pubs/ft/scr/2009/cr09112.pdf.

89 The IMF's debt sustainability analysis rated Papua New Guinea at a moderate risk of debt distress in 2009. However, an assessment of public and external debt revealed heightened vulnerabilities against shocks from slower export and economic growth which were related to uncertainties of the global economic recovery and the construction phase of the PNG LNG project.

90 IMF Regional Economic Outlook, 2009

91 Hans J. Blommestein and Arzu Gok,. "OECD Sovereign Borrowing Outlook 2009," *Financial Market Trends* 96, (2009/1): 2, accessed June 24, 2021, https://www.oecd.org/daf/fin/financial-markets/43002899.pdf.

92 IMF 2009 Regional Economic Outlook: Asian and Pacific

93 Hans J. Blommestein and Arzu Gok,. "OECD Sovereign Borrowing Outlook 2009," *Financial Market Trends* 96, (2009/1): 2, accessed June 24, 2021, https://www.oecd.org/daf/fin/financial-markets/43002899.pdf.

81. Debut sovereign issuances were virtually non-existent during the GFC, with investors retreating from risky asset classes. The IMF's review of debut international bond issuances for 2008 and 2009 reveals that only two countries—Senegal and Georgia—tapped the international capital market, and Senegal (a low-income country), did so at a significant premium.[94] According to the IMF, Senegal raised USD 200 million through a 5-year sovereign bond paying a coupon of 8.75 percent, at a time when the average JP Morgan Global Emerging Markets Bond Index (EMBI) interest rate stood at 6.68 percent (a spread of 337 basis points).[95] Part of this difference can be attributed to the premium that Senegal had to pay to access capital markets for the first time but another driver of the premium can be attributed to the size of the bond itself. [96] Experience from different countries shows that poor market conditions tend to limit the amount of funds raised by a typical debut bond issue. The size of the bond tends to be relatively smaller than a typical debut bond issue under more favourable market conditions, and also when compared to more seasoned countries with prior issuances.[97] Because countries that made prior issues have established a track record—by, among other things, having issued at least one outstanding bond—there is little uncertainty about the spread at which these countries will sell their subsequently-issued bonds. That is, there already exist benchmarks for repeated-access countries that would inform market participants about the spreads that each country's subsequent bond issues are likely to carry. This was not the case, however, for Papua New Guinea.[98]

82. The challenges for a low-income developing country (LIDC) issuing sovereign bonds were reflected in an almost complete absence of such issues in the period 2007–2009, as shown in Figure 2 below. The number of issuing countries only started to increase in

---

[94] Anastasia Guscina, Guilherme Pedras, and Gabriel Presciuttini, "First-Time International Bond Issuance—New Opportunities and Emerging Risks," International Monetary Fund (July 2014): 6, accessed June 24, 2021, https://www.imf.org/en/Publications/WP/Issues/2016/12/31/First-Time-International-Bond-Issuance-New-Opportunities-and-Emerging-Risks-41762.

[95] https://www.imf.org/external/pubs/ft/wp/2010/wp10140.pdf.

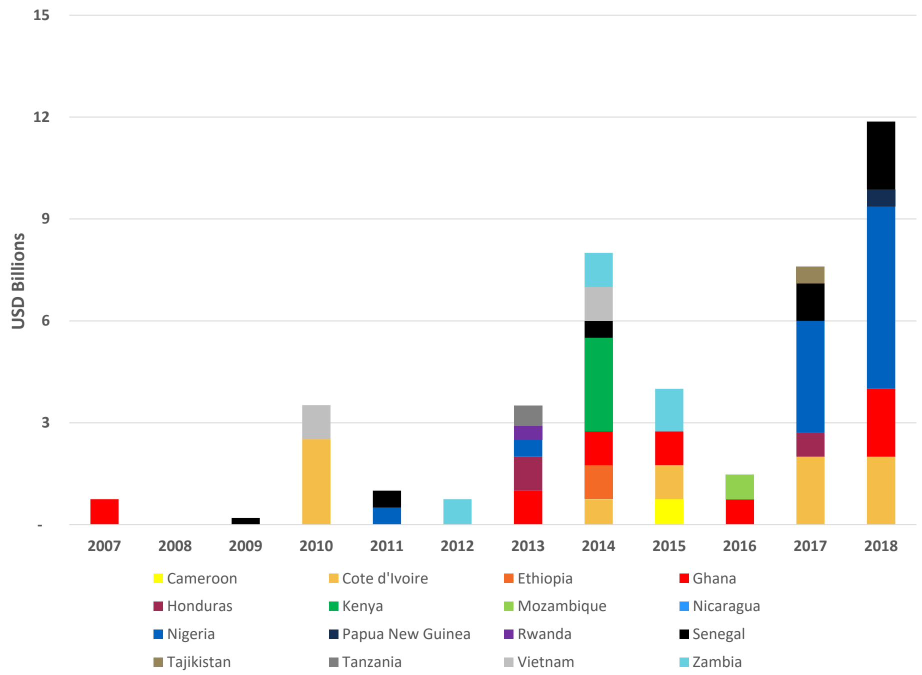
[96] Senegal issued a sovereign bond for the first time in December 2009. Part of the premium on the Senegalese issue can also be attributed to its size as it was smaller than typical debut bond for sovereign issuers (USD 200 million in contrast to USD 500 million on average).

[97] Cheikh A. Gueye and Amadou N. R. Sy, "Beyond Aid: How Much Should African Countries Pay to Borrow?" assessed June 24, 2021, https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Beyond-Aid-How-Much-Should-African-Countries-Pay-to-Borrow-23939.

[98] Papua New Guinea made its first attempt at a sovereign bond issuance in 1999, with JP Morgan and UBS leading a USD 250 million issuance. At the time, the country had a B1/B+ credit rating. The attempt rapidly fell apart when the leads discovered proceeds might end up being used for re-payment of mercenaries. "Papua New Guinea cooks up bond debut," Papua New Guinea Mine Watch (June 2016), https://ramumine.wordpress.com/2016/06/17/papua-new-guinea-cooks-up-bond-debut/.

2013, supported by prolonged low global interest rates and portfolio diversification strategies in mature markets, with investors looking for additional yield.

FIGURE 2: LOW INCOME DEVELOPING COUNTRIES BOND ISSUANCES (USD BILLIONS, 2008-2018)



Sources and Notes: Bloomberg, L.P.; Based on van der Wansem, et al, World Bank, "Issuing International Bonds: A Guidance Note," April 2019. Kenya's 2014 Bond Issuances include its USD 2 billion 10-year bond(s) and its USD 750 Million 5-year bond.

83. Against the backdrop of high borrowing needs and tightened external financing conditions, the State's prospects of raising funds from the international bond markets would have been minimal in 2009. If the authorities were to consider issuing a debut sovereign bond in 2009, they would have been subject to magnified sovereign bond spreads as was the case in Senegal's first-time international bond issuance in April 2009.[99] In an environment of tight liquidity conditions and high global market volatility, a first-time issuer like the State would have struggled to attract foreign investors at reasonable borrowing costs. Without a benchmark and with limited information on the State's creditworthiness, the spread would have been much larger than the typical spread for comparable countries with an established track record and also much higher

[99] Sovereign bond spreads were above 1,200 bps for countries with similar characteristics to Papua New Guinea in 2009. World Bank, "International Development Association Program Document for the Economic Governance and Poverty Reduction Credit," 47223-GH (2009).

than spreads in periods of lower volatility.[100] The situation would have been especially problematic given the IMF's assessment of Papua New Guinea's deteriorating fiscal balance in 2009, which would have made it harder to service the debt.

84. This conclusion is consistent with views expressed in a 2008 NEC paper.[101]

IV.B. Alternative financing for investing in Oil Search shares in 2014

IV.B.1. Issuing sovereign debt in 2014

85. above shows that conditions in international bond markets were much more favourable in 2014 than in 2009, and there was ample international financial liquidity**.** Such a positive outlook, driven by decreased global market volatility, significantly impacted investor risk appetite. Relatively low levels of volatility resulted in strong investor appetite for new asset classes and higher-risk instruments.[102] Short-term interest rates were low and stable at the short end while long rates fell due to pressure from the asset purchase programs of the major central banks. Overall, this period provided sovereign issuers with a borrowing environment where the acute stress on government securities markets had subsided.

86. In addition, Papua New Guinea's economic growth and outlook 2014 were favourable with the economy entering a transitional growth period, as new LNG production and exports commenced.[103] The PNG LNG project was originally slated to begin in the fourth quarter of 2014, but was completed ahead of schedule with exports commencing in May 2014.[104] As a result, the IMF projected that Papua New Guinea's economic activity would expand by 5.8% in 2014 and then surge by around 19.5% in 2015. [105] The external

---

[100] Anastasia et al., "First-Time International Bond."

[101] *NEC Policy Submission No. 167/2008*, paragraphs 35, 42–4 [WIT.0027.0001.0471].

[102] OECD, *OECD Sovereign Borrowing Outlook 2014* (Paris 2014), accessed June 24, 2021, https://doi.org/10.1787/sov_b_outlk-2014-en. https://read.oecd-ilibrary.org/governance/oecd-sovereign-borrowing-outlook-2014_sov_b_outlk-2014-en - page95

[103] International Monetary Fund, "Papua New Guinea: 2014 Article IV Consultation-Staff Report," (2014), 4, accessed June 24, 2021, https://www.imf.org/external/pubs/ft/scr/2014/cr14325.pdf.

[104] Moody's Investors Service, Sovereign and Supranational, Papua New Guinea, 2014.

[105] The first shipments of LNG were made in 2014. According to the IMF, the successful completion of the LNG project has demonstrated a new level of capacity to undertake large-scale commercial development and has increased investor confidence in developing large projects in the future.

position was also favourable and projected to improve over the medium-term. Additionally, the IMF was projecting a favourable debt situation in 2014. With external debt ratios well below the IMF indicative thresholds[106], Papua New Guinea was assessed to be at low risk of debt distress.[107]

87. The IMF's periodic reviews of economic activity in Papua New Guinea in the years leading up to 2014 observed progress on multiple fronts, including an acceleration in structural and fiscal reforms.[108] The increased focus on inclusive growth and the initiatives that the government was taking to promote good governance was encouraged and welcomed by the IMF. These reform efforts, along with maintaining robust growth, keeping inflation under control, and ensuring that the external current account deficit was being financed without difficulty, are considered by the IMF as necessary preconditions to attract investors to debut international issues. Progress along various areas was discussed in reports issued by the IMF, the Asian Development Bank and Moody's.

   a. According to the IMF's Article IV Consultation from 2014, Papua New Guinea built a record of good economic performance, maintaining a positive medium-term outlook and a favourable debt profile with an external position that was expected to improve over time. The IMF commended the Government for their efforts in strengthening Papua New Guinea's institutional capacity for debt management by developing a comprehensive risk management framework.

   b. The IMF also reported in its Article IV Consultation from 2014 that Papua New Guinea succeeded in bring inflation under control, downward from the peaks observed during the LNG construction boom, and projected it to remain reasonably low given the global outlook for commodity prices.[109]

   c. According to the Asian Development Bank, a Medium-Term Debt Strategy was also developed by the Department of Treasury for 2013-2017 with the objective of

---

106 The PV of PPG external debt over GDP was around 26.1 percent in 2014, which is significantly below the 40 percent of threshold.

107 Countries with different policy and institutional strengths, macroeconomic performance, and buffers to absorb shocks, have different abilities to handle debt. Different indicative thresholds for debt burdens are used depending on the country's debt-carrying capacity.

108 The reviews are known as "Article IV consultations" because they are required by Article IV of the IMF's Articles of Agreement. During an Article IV consultation, an IMF team of economists visits a country to assess economic and financial developments and discuss the country's economic and financial policies with government and central bank officials.

109 International Monetary Fund, "Papua New Guinea: 2014 Article IV Consultation-Staff Report," (2014), 4, accessed June 24, 2021, https://www.imf.org/external/pubs/ft/scr/2014/cr14325.pdf.

minimizing the cost of debt consistent with the Government's tolerance for financial risk.[110] The strategy was based on anchoring of fiscal targets by capping the government's debt ratios and included a plan for developing an efficient market for government securities. An important component of the Debt Strategy was the partnership with bilateral and multilateral lenders, such as World Bank, who offer concessional finance to Papua New Guinea.

d. Moody's reported in its 2014 Credit Analysis Report that Papua New Guinea's debt structure had also improved significantly.[111] The Government's dependence on foreign currency-denominated, concessional debt decreased steadily to an estimated 25.6 percent of GDP in 2013 from 69.1 percent of GDP in 2002. As of end-2013, kina-denominated borrowing comprised about three-quarters of the debt stock, significantly mitigating currency risk.[112]

e. Moody's assessment of Papua New Guinea's fiscal strength was "High" in 2014, reflecting the government's relatively low debt burden, high debt affordability, and the ability to meet a significant portion of financing needs with local currency debt issued onshore.[113] Moody's also noted that political risks did not pose a significant threat to the country's near-term growth outlook.

f. According to the IMF, Papua New Guinea made progress in the areas of data dissemination, transparency, conduct of its own macroeconomic policies, and its implementation of structural reforms.[114] Additionally, the IMF welcomed Papua New Guinea's stepped-up efforts to strengthen its public financial management and operational deficiencies, as well as its commitment to address money laundering.

88. The Government explored tapping into international bond markets in 2013 but then decided to retreat and rely instead on domestic funding.[115] The Treasury had contracted Barclays to underwrite a maiden Eurobond offering in early 2013, following the example of neighbouring Fiji that raised USD 250 million and USD 400 million in two bond issues. However, a report by Oxford Business Group revealed that, based on the Central Bank's

---

110 https://www.adb.org/sites/default/files/evaluation-document/149325/files/in38-15.pdf.

111 Moody's Investors Service, Papua New Guinea. June 5, 2014

112 Moody's Investors Service, Papua New Guinea. June 5, 2014

113 Moody's Investors Service, Papua New Guinea. June 5, 2014

114 International Monetary Fund, "Papua New Guinea: 2014 Article IV Consultation-Staff Report," (2014), 4, accessed June 24, 2021, https://www.imf.org/external/pubs/ft/scr/2014/cr14325.pdf.

115 The Report: Papua New Guinea 2014; Oxford Business Group. https://oxfordbusinessgroup.com/analysis/preserving-stability-and-financing-deficit

advice, and given abundant kina liquidity, the Treasury decided to rebalance its borrowing profile towards local-currency Treasury bills and longer-term government bonds (inscribed stock)[116] rather than external financing.[117]

89. The State's stand-alone creditworthiness in 2014 was more favourable than in 2018 when it raised USD 500 million in its debut sovereign dollar bond.[118] Access to international markets depends on the perceived credit risk, often measured by a country's credit rating.[119] Many investors have limits on the minimal rating they can invest, but it is not only the rating itself which is important. According to the World Bank, an international rating of B3 is generally considered the minimum for issuance in the international capital markets. With a B1 Long Term Foreign Currency rating from Moody's, two grades above B3, Papua New Guinea had both a lower debt burden and a narrower fiscal deficit than the B1 median, while external leverage compared favourably against other similarly rated countries. The State's B1 rating and stable outlook reflected an expectation that the government would undertake fiscal consolidation in line with its Medium-Term Fiscal Strategy and maintain a high rate of economic growth in the context of relatively low inflation and a sustainable external payments position.

90. Success stories from other first-time issuances, with similar or lower credit profiles than Papua New Guinea, suggest that the State was in a strong position to tap into the international bond markets in 2014.[120] Several low-income countries successfully tapped into Eurobond financing in 2014, with some issuing at ratings lower than Papua New Guinea. This has been supported by prolonged low global interest rates, the ease with which funds can be raised, and emerging portfolio diversification strategies in mature markets, which have motivated investors to look for new sources of additional yield. Ethiopia and Kenya, two low-income and resource rich countries, were able to raise funds by accessing the international bond market for the first time in 2014, for USD 1,000 to 2,000 million, with the same long term credit rating of B1 as Papua New

[116] https://www.bankpng.gov.pg/financial-markets/domestic-money-and-bond-market-operations-and-development/government-inscribed-stock/

[117] The Report: Papua New Guinea 2014; Oxford Business Group. https://oxfordbusinessgroup.com/analysis/preserving-stability-and-financing-deficit

[118] Papua New Guinea issued its first sovereign bond in October 2018, raising USD 500 million that was heavily over-subscribed. The bond carried a yield of 8.375% over 10 years. Papua New Guinea's rating at the time was B2 as reported by Moody's.

[119] Country risk is measured using Moody's Long Term Issuer Credit Rating. Where Moody's ratings for a country are not available, the equivalent rating from either S&P or Fitch is used.

[120] The majority of first-time issuers issued at least USD 500 million, the minimum size for a bond to be included in a bond index (eg, JP Morgan EMBI Global). In addition, almost all recent first-time sovereign issuers placed fixed coupon, bullet bonds, with maturities of 5 or 10 years.

Guinea.[121] Based on the experience of Kenya and Ethiopia in 2014, it seems likely that the State could have issued around USD 1,000 to 2,000 million in 2014 at a reasonable rate, as shown in Table 1.[122]

TABLE 1: FIRST ISSUANCE COMPARABLES FOR PAPUA NEW GUINEA BORROWING COST

Issuer [A]	Issue Date [B]	Tenor [C]	Amount ($000s) [D]	Coupon (%) [E]	UST Yield (%) [F]	Spread over UST (%) [G]
Kenya	6/24/2014	10-Year	2,000,000	6.875	2.590	4.29
Ethiopia	12/11/2014	10-Year	1,000,000	6.625	2.190	4.44

Source: Bloomberg, L.P.; Resource Rich nations: https://www.worldometers.info/.
Notes: UST yield refers to the U.S. Treasury yield.
The criteria for selecting comparable countries were based on the following characteristics: (i) they belong to the group of lower to middle income countries based on the World Bank Group classifications and are rich in oil and/or natural gas, (ii) have a credit rating that is three groups above or below that of Papua New Guinea, but high enough to issue debt, and (iii) issued sovereign debt for the first time in 2014.

91. Other seasoned low-income issuers, with similar ratings to Papua New Guinea, were also successful in issuing sovereign debt in international capital markets around this period. At B2, Ghana, another resource rich country, accepted 8.125% coupons on its USD 1,000 million international debt market sovereign bonds issued in 2014.[123] Pakistan also was able to issue international bonds in 2014 despite ratings lower than Papua New Guinea, at Caa1, for USD 2,000 million.[124] Mongolia, with lower ratings than Papua New Guinea, managed to raise capital by going on the international market a year later.[125] Senegal, Sri Lanka, Vietnam, and Zambia similarly issued bonds, totalling about USD 9,500 million.[126]

[121] Ethiopia: 29766LAA4, Moody's B1, December 2014, USD 1,000 million, 10-year, 6.625% coupons in the Euro-Dollar market; Kenya: 491798AE4, Moody's B1, June 2014, USD 2,000 million, 10-year, 6.875% coupons through private placement.

[122] The spread is the difference between coupon on a bond and the contemporaneous US Treasury Bill rate for bonds of comparable tenure.

[123] Ghana, ID – EK4901865, Moody's B2, September 2014:, USD 1,000 million, 12-year, sinkable, 8.125% coupon sovereign debt international bond issued in the Euro-Dollar Market. Bloomberg, L.P.

[124] Pakistan, ID – 695847AK9, Moody's Caa1, April 2014, USD 1,000 million, 10-year, debut 144A international bond issued on the Luxembourg Exchange. Bloomberg, L.P.

[125] Mongolia, ID - EK9902678, Moody's B2, June 2015, USD 1,000 million, 3-year, 7.5% coupon, Euro Medium Term Note market. Bloomberg, L.P.

[126] Senegal: ID - EK4044732, Moody's B1, July 2014, USD500 million, 6.25% coupon in the Euro-Dollar market; Sri Lanka, rated B1 by Moody's in 2014, issued bonds in both 2014 and 2015 – In 2014, it issued a USD 1,000 million, 5-year, 6% coupon bond in the Euro-Dollar market in January, and issued a USD500 million international bond, 85227SAM8, with 5.125% coupons in April; Vietnam was active in the 2014 sovereign debt market at Moody's B1 for the first time in 4 years with its USD 1,000 million, 10-year international bond (92671CAA6) issued in the Euro-Dollar market with 4.8% coupons in November 2014; Zambia: 988895AE8, Moody's B1 equivalent, April 2014, USD 1,000 million, 10-year, 8.5% coupons in the Euro Dollar

92. A sovereign bond issuance of around AUD 1,225 million (corresponding to the amount the State invested in Oil Search shares) would not have endangered Papua New Guinea's debt sustainability.[127] The IMF Debt Sustainability Analysis (DSA) from 2014 assessed the impact of the UBS transaction on debt ratios and concluded that an increase of AUD 1,200 million in non-concessional debt, in 2014, would have increased the public debt from 35 percent to around 42 percent only. Public and publicly guaranteed (PPG) external debt would have also risen from 9 percent to about 16 percent in 2014. These ratios would have fallen over the medium term as the bond is repaid. The public external debt service ratios would have followed a similar profile, with higher debt service initially rising as a result of the bond but subsequently falling to very low levels, reflecting Papua New Guinea's relatively small external debt stock as well as the fact that most of its public external debt is highly concessional.[128] Table 2 below provides a summary of the IMF's Debt Sustainability Analysis in 2014. The table compares the present value of debt obligations to different indicative thresholds. The estimates suggest that with a AUD 1,200 million in non-concessional debt, Papua New Guinea's debt metrics would have continued to be well below the IMF indicative thresholds for debt sustainability.

market. *See* Bloomberg, L.P.; Binh Minh, Ho, "UPDATE 1-Vietnam to sell rare $1 bln sovereign bond, first since 2010," Reuters, October 30, 2014, accessed June 24, 2021, https://www.reuters.com/article/vietnam-economy-bonds/update-1-vietnam-to-sell-rare-1-bln-sovereign-bond-first-since-2010-idUSL4N0SP1G320141030;

[127] A key factor in determining the size of a debut international bond issue is whether it endangers the country's debt sustainability. Ms Magdalena Polan, Mr Udaibir S Das, and Mr Michael G. Papaioannou, *Strategic Considerations for First-Time Sovereign Bond Issuers,* International Monetary Fund (2008), accessed June 24, 2021, https://www.elibrary.imf.org/view/journals/001/2008/261/article-A001-en.xml.

[128] Concessional loans are loans that are extended on terms substantially more generous than market loans. This is achieved either through interest rates below those available on the market or by grace periods, or a combination of these.

TABLE 2: PUBLIC AND PUBLICLY GUARANTEED (PPG) EXTERNAL DEBT BURDEN THRESHOLDS FOR PAPUA NEW GUINEA

Category	Description	2014
[A]	[B]	[C]
PPG-GDP	PV of PPG-GDP	26.1
	IMF Threshold	**40**
PPG-Exports	PV of PPG-Exports	56.1
	IMF Threshold	**150**
PPG-Revenues	PV of PPG-Revenues	98.5
	IMF Threshold	**250**
Debt Service-Exports	DS-Exports	1.4
	IMF Threshold	**20**
Debt Service-Revenues	DS-Revenues	2.7
	IMF Threshold	**20**

Sources and Notes:
[3]: https://www.imf.org/external/pubs/ft/dsa/pdf/2015/dsacr15318.pdf;
The IMF DSA framework focuses on the present value (PV) of debt obligations for comparability, as terms extended to LICs vary considerably and many are concessional. A 5-percent discount rate has been used since 2013 to calculate the PV of external debt; PPG-Revenues ratio not reported for 2018.

IV.B.2. Utilizing multilateral partial guarantees to support sovereign debt financing in 2014

93. A partial guarantee from the World Bank acts as a credit enhancement and would have been very impactful in increasing investors' appetite to invest, sending a positive signal to the market and improving tenors.[129,130] The World Bank's policy advice and its potential role in co-ordinating and catalysing other assistance would have been instrumental had the Government approached investors in 2014 for long dated financing. Given's Papua New Guinea's status as a first-time issuer, guarantees would have helped mobilise substantial private financing from institutional long-term investors by sharing with private lenders the risk of payment or debt service default or the occurrence of other specified risks that may arise due to a government's failure to fulfil its obligations.

[129] The WB started issuing guarantees in 1983 for the purpose of attracting private co-financing for WB-financed projects. The existing policy is that WB guarantees remain partial in nature given that they are aimed at leveraging private financing.

[130] Although the financing mobilised with Guarantees is obtained from commercial sources, a Development Policy Objective which is consistent with policy guidance is prepared for each Guarantee operation in the same as way for traditional WB loan operations. Eligible Guarantee projects need to follow the WB's standard environmental and social safeguards, and integrity and anti-corruption requirements, along with other considerations.

94. Experience from other countries, such as Ghana, demonstrates that partially-guaranteed bond issuances can be impactful for borrowers looking to access long dated financing. In this regard, the USD 1 billion Ghana 2030 sovereign Eurobond issued in 2015 benefited from a USD 400 million World Bank partial guarantee, allowing sovereign access to the bond market to raise much needed financing at a time when Ghana's sovereign credit rating had been deteriorating as a result of heightened balance of payments and fiscal deficits.[131]

IV.B.3. The intended use of proceeds can affect the prospects of a successful debut issue

95. What the borrower says to potential lenders about the intended use of funds can influence the prospects of success.[132] The IMF offers some considerations for countries contemplating a debut issue to improve the chances of meeting the objectives of the issue and lowering its costs. Some are broader and more strategic in nature, which can be best addressed in the context of an asset-liability management framework and a medium-term debt management strategy, while others are primarily tactical and related to the execution of the issue, although no less important.[133] Among a list of preconditions is an offering memorandum which requires the disclosure of a substantial amount of data, providing investors with a deeper look at the economic situation of the issuing country and a better assessment of the country's prospects for successfully meeting its debt service payments. The IMF highlights that the use of proceeds is a critical consideration for investors and a key factor impacting the prospects of successfully raising funds in international capital markets.[134]

96. Unorthodox use of bond proceeds is not uncommon but can result in a higher cost of borrowing or lack of investor demand. The IMF notes in its review of countries that entered the international capital markets for the first time that bond proceeds have been used for a variety of purposes, including funding of infrastructure development

---

[131] "New World Bank guarantee helped Ghana secure US1 billion, 15-year bond," World Bank Group (2015), https://www.worldbank.org/en/news/feature/2015/11/18/new-world-bank-guarantee-helps-ghana-secure-us1billion-15-year-bond.

[132] According to the IMF, "In addition to the use of the debut bond proceeds, proper attention should be given to the following considerations: size of the debut issue; repayment structure of the debut bond; currency of denomination of the debut issue; asset and liability management implications of the debut bond; jurisdiction and law that will govern the debut bond; and selection of financial and legal advisors." IMF Working Papers 2008, Strategic Considerations for First-Time Sovereign Bond Issuers.

[133] Polan et al., *Strategic Considerations*.

[134] Polan et al., *Strategic Considerations*.

projects (Bahrain and Sri Lanka), easing budget financing pressures (Ecuador and Egypt), or financing in part the country's repayment of existing debt (Indonesia, Poland, Ukraine).[135] However, the IMF also notes that in a number of new issues the issuers have specified only "general governmental use" as the intended use of proceeds, when in fact proceeds were used to pay down expensive debt or to fund investment projects. These situations led to higher spreads on the debut bonds.[136] Ghana's experience, in contrast to others, provides an unconventional example of how proceeds from a USD 750 million 10-year Eurobond issuance in 2007 were used. While the stated intention was to use the proceeds to build public infrastructure, Ghana ended up spending 17% of the proceeds (USD 127 million) on purchasing shares in South African mining company AngloGold and purchases of oil.[137] The remaining proceeds were used for infrastructure investments, primarily in electricity generation and distribution.

97. While the State was in a strong position to tap the international debt market in 2014, the prospects of a successful debut issuance would have been weakened if the Government had announced that the intended use of the proceeds was to buy shares.

IV.C. Concessional financing

98. Papua New Guinea is eligible for concessional assistance from multilateral organizations, typically in the form of loans at below-market interest rates. As a 'blend' country, the government is eligible to source concessional financing from both the International Development Association (IDA) and the International Bank for Reconstruction and Development (IBRD). According to the World Bank, blend countries are those that are eligible for IDA funding based on per capita income but which are at the same time deemed credit-worthy by the markets. The World Bank allows these countries limited IDA funds supplemented by the market-based IBRD, forming a 'blended' loan package.[138] IDA resources focus on core investments in agriculture, transport infrastructure, while IBRD resources include catalytic financing for high-return inclusive infrastructure such as renewable energy, including through guarantees to leverage co-

[135] Polan et al., *Strategic Considerations*.

[136] Polan et al., *Strategic Considerations*.

[137] World Bank, "International Development Association Program Document For the Economic Governance and Poverty Reduction Credit in The Amount of SDR 193.9 million to the Republic of Ghana," 47223-GH (2009).

[138] Three criteria are used to determine which countries can access IDA resources are a country's relative poverty, using per capita income, a country's lack of creditworthiness to borrow on market terms, both from IBRD and from private creditors and a country's record of "good policy performance," defined by the Bank as "the implementation of economic and social policies that promote growth and poverty reduction".

financing from other sources.[139] Additionally, Papua New Guinea is eligible for some concessional borrowing from the Asian Development Bank (ADB) to support roads, water transport, primary health and microfinance.[140]

99. Financing sufficient to support the Government's expected equity investment in the PNG LNG project could not have been entirely funded from concessional resources in 2009. World Bank reports noted that the absence of a supportive environment for public-private partnerships was a key obstacle to IDA investments in 2008-2011.[141] Lack of government consensus on public and private roles in the energy sector slowed progress in multilateral engagement during this period, with significant momentum building from November 2011 onwards.[142] In this context, the IDA would likely not have considered providing financing (as a loan to the Government) for a largely private investment in upstream gas development in 2008 or 2009.

100. Even if the Government had approached the World Bank Group IDA in 2009, the IDA envelope for Papua New Guinea would have likely been no more than USD 40 million per year and the proceeds would have been geared to specific development projects.[143] Thus financing through concessional loans would not have been sufficient to fund the State's investment in the PNG LNG project. Alternatively, Papua New Guinea's 'blend' status in 2009 would have made it creditworthy to pursue "IBRD-enclave financing" to fund an investment project.[144] However, while the enclave loan is typically geared to a range of sectors that generate strong export revenues, such as extractives (as here) or agricultural commodities, its head-room would have been very small[145] and not of much use, nor would it have had any meaningful financing cost impact.

101. The bottom line is that the option for Papua New Guinea to obtain financing from IDA/IBRD may have been available in theory, but would have been insufficient for the scale required to finance the State's share of the PNG LNG project in 2009.

[139] World Bank Report No. 71440-PG.

[140] The IMF directs its financial assistance to resolving a country's balance of payment problem, and cannot be provided for any other purposes.

[141] Prior to 2009, the Bank's relationship with Papua New Guinea was uneven as a result of policy differences resulting eventually in the suspension and later cancellation of the Forestry Conservation Project. Between 2003-2006, the World Bank did not approve any loans or credits for Papua New Guinea, Papua New Guinea 2010 Article IV Consultation IMF Country Report

[142] World Bank Report No. 71440-PG

[143] Papua New Guinea 2010 Article IV Consultation IMF Country Report

[144] An Enclave loan is typically considered when the country is seeking World Bank financing above and beyond its IDA envelope.

[145] Papua New Guinea 2010 Article IV Consultation IMF Country Report

102. Similarly, the amount of concessional loans that would have been available to the State from IDA and IBRD in 2014 would have been inadequate for an investment of the scale of the 2014 transaction. In addition, the use of the funds to buy shares in Oil Search would have been inconsistent with these organisations' mandate to support specific development projects.

V. The IPIC transaction

103. We have been asked to "[c]onsider the terms of the transactions and advise whether any of them were unusual or out of market in their commercial context, including the fees paid". We address these questions in this section for the IPIC transaction and in section VI for the UBS transaction.

104. It appears from some of the documents we have reviewed that there has been some confusion about the nature of the transactions, and the rights and obligations the State acquired as a result.[146] We therefore begin this section and section VI with a description of the key features of the transactions.

V.A. The nature of the IPIC transaction

105. On 5 March 2009 IPBC issued exchangeable bonds to IPIC with a term of 5 years and a coupon of 5%. The aggregate principal amount of the issuance was AUD 1,681 million, and unless otherwise agreed, on maturity (or default) the bonds would be exchanged for the entirety of the State's Oil Search shareholding (196,604,177 shares). IPIC also had a right to exchange the bonds for the shares during most of the lifetime of the bonds. The face value of the bonds was equivalent to AUD 8.55 per share (the share price on the issuance date was AUD 4.82).[147]

[146] For example, *Appointment of Financial Advisors to: The Independent State of Papua* New *Guinea, Background Notes*, Dairi Vele, Director, Gas Projects Co-ordination Office, 8 August 2013, p. 10 [WIT.0014.0002.0886], states "The exchangeable bond transaction can be considered a deferred settlement sale transaction in as much as bond-holders can choose whether or not to take delivery of shares in 2014, and in circumstances where they choose not to do so, IPBC is likely to have to sell the shares to meet part of the cash settlement for the outstanding principal at any rate.". This description is not accurate: the bond-holders could not choose to take cash rather than shares on maturity, as we explain below.

[147] 196.6 million shares x AUD 8.55 is equal to the AUD 1,681 million principal amount the State received.

106. Although the bonds were issued on 5 March 2009, the pricing of the bonds appears to have been agreed earlier. The key documentation was signed on 23 November 2003.[148] Furthermore, the key terms of the transaction appear not to have changed from those described in the Freehills Board Information Pack of October 2008.[149] An NEC paper of October 2008 references a negotiation period of 5 months and agreement in September (ie, negotiations from sometime in April to sometime in September 2008).[150] The Oil Search share price ranged widely during this period, as shown in Figure 3. It seems possible that the deal was agreed at the end of a period when the share price had mostly been in the range AUD 5.00 to 6.00 per share, although when the transaction documents were executed, the share price was AUD 4.33.[151] The NEC paper cited above mentions a "$6.00 reference price".[152]

107. Between the end of September 2008 and 5 March 2009 (when the bonds were issued), the share price was usually below AUD 6.00 and fell close to AUD 3.00 in late October. It therefore seems likely that, when the Freehills advice was tabled, when the NEC decisions about the bond were taken (in October 2008), when the bond Deed Poll was executed (23 November 2008), and when the bonds were finally issued (5 March 2009), the share price was below the prevailing price when the bonds had been negotiated.

[148] For example, the Bond Deed Poll.

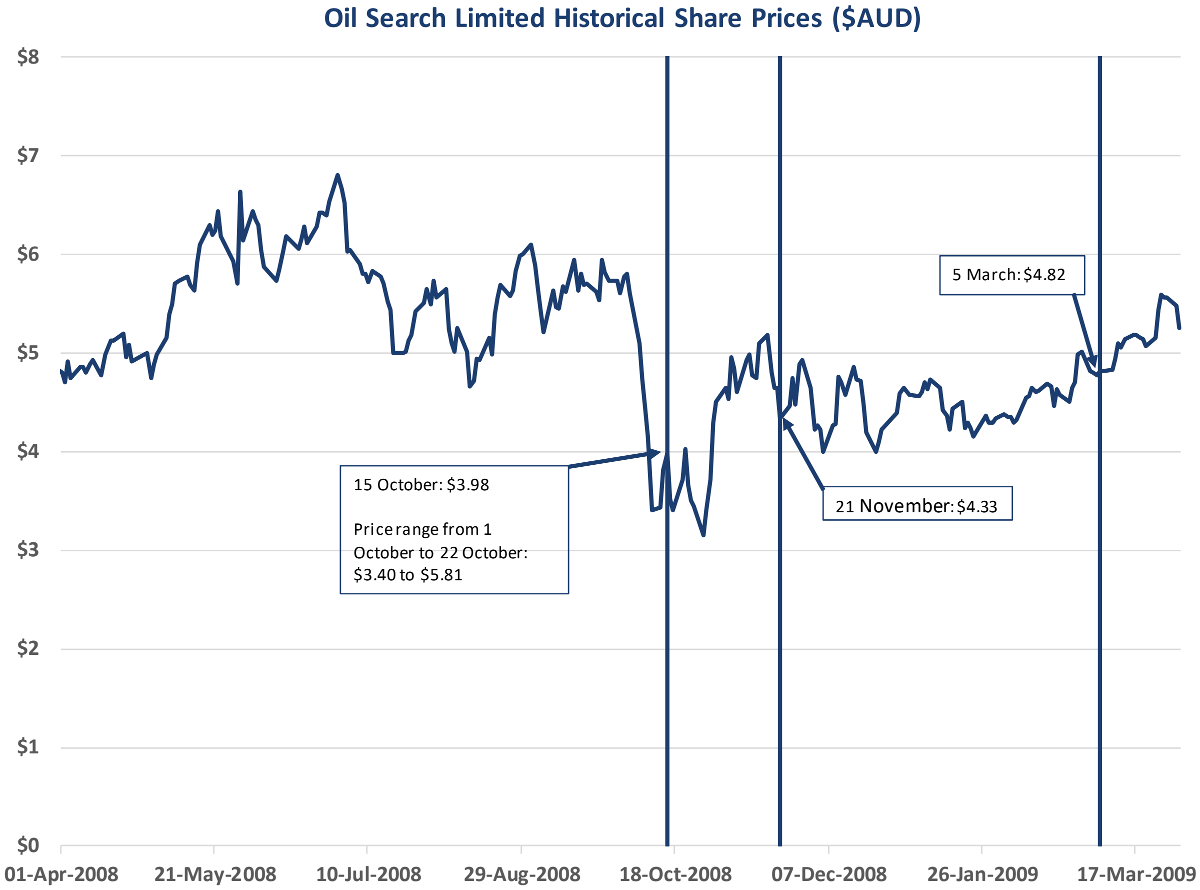
[149] *Project Kumul Board Information Pack*, Freehills, October 2008 [WIT.0026.0001 .0628]. In particular, the Freehills document contains the aggregate proceeds, interest rate, and key conditions for exchange and early redemption.

[150] *NEC Policy Submission 167 of 2008*, paragraphs 11 and 27. [WIT.0027.0001.0471]

[151] The documents were executed on 23 November 2008, a Sunday. The closing price on 21 November was AUD 4.33.

[152] *Ibid*., table after paragraph 27.

FIGURE 3



108. The value of the bonds, and hence whether they were fairly priced, depends on the share price on the date the bonds are valued: all other things being equal, the higher the share price when the bonds are valued, the more likely it is that, by the time the bonds mature, the share price may have risen above AUD 8.55, creating upside for IPIC. We therefore value and price the bonds with a range of assumptions about the share price, in order to test the pricing of the bonds on the date of issue, the date when the documentation was signed, and the (uncertain) date when the pricing was agreed.

109. The Government intended to use the proceeds of the bonds to finance its investment in the PNG LNG project, as discussed above. The State had already exercised its back-in right before the IPIC bond was issued, but it needed to finance its equity contributions to the construction program, which was the purpose of the IPIC bond issue.

110. After 5 years the bonds would automatically be exchanged into Oil Search shares ("mandatory exchange"). If there was a shortfall between the value of the shares and the face value of the bonds (ie, the share price was then less than AUD 8.55), the State would have to make up the difference in cash. If the share price was more than AUD 8.55, then on mandatory exchange less than the full amount of the State's shareholding

would be delivered—only shares to the face value of the bonds—and the State would be left with the balance of the shares.[153] There were mechanisms in place to make adjustments to deal with changes in the number of Oil Search shares (for example, a rights issue).

111. IPIC could also exchange early at any time from 40 days after the issuance until 10 business days before maturity of the bonds.[154] Crucially, on early exchange IPIC would receive all of the shares (even if the share price was above AUD 8.55), but would not receive a cash top up if the share price was below AUD 8.55.

112. In addition, IPBC had the option to redeem the bonds but only if the share price had risen to AUD 11.115 (130% of AUD 8.55). On early redemption, IPBC would have to deliver only enough shares to correspond to the face value of the bonds (ie, IPBC would keep 30% of the shares). However, if the share price had risen to AUD 11.115 and IPBC were to have issued a notice of early redemption, IPIC retained the right to call for an early exchange.

113. We consider that if the share price had risen to AUD 11.115, IPBC would not in practice have been able to redeem early, but rather IPIC would have exchanged early (and IPIC would have had a strong incentive to do so, because by exchanging early IPIC would receive all of the shares and thus capture the value of the increased share price, whereas if IPBC were to redeem early IPIC would only receive shares equivalent to the face value of the bonds). In addition, we consider that if the trailing average share price just prior to the date of mandatory exchange had risen above AUD 8.55 but below AUD 11.115, IPIC would also have exchanged early (in order to capture the benefit of the increased share price).

114. The mechanics of the bond were such that IPIC's incentive to exchange early was not in fact triggered in March 2009 because although the share price at maturity was above AUD 8.55, it first reached a price above AUD 8.55 on 24 February 2014, while the last date on which IPIC had the right to exchange early was February 19th.[155]

115. We also consider that there were no foreseeable outcomes where IPBC would have been left holding any Oil Search shares. IPBC would only retain some Oil Search shares in circumstances where IPIC could have exchanged early and thereby obtained all of the

---

[153] Bond Deed Poll, section 7.

[154] Bond Deed Poll, section 10.

[155] The Exchange period is "the period from and including the day 40 days after the Issue Date to and including the day 10 Business Days before the Maturity Date." Bond Deed Poll, section 10.

shares, but for some reason did not do so. Since failing to exchange would allow the State to retain shares that IPIC would otherwise have obtained at no cost, we think that such an outcome would not have been reasonably foreseen.

116. Although it would have been possible for IPIC to sell the bonds back to IPBC (at whatever price was acceptable to both parties), there was no obligation on it to do so. Neither IPBC nor IPIC had a right to require a cash substitute for the shares.

117. Thus, at the time the bonds were issued, the expected cash flows were as follows.

   a. IPIC paid AUD 8.55 per Oil Search share (AUD 1,681 million in total) to IPBC at the outset.

   b. Until maturity, early redemption or exchange, IPIC would receive interest payments at 5% per annum payable semi-annually on 15 April and 15 October.

   c. In the "early exchange scenario":

      i. IPIC had the right to exchange the bonds for shares at any point starting 40 days after the Issue Date and until 10 Business days before the Maturity Date;

      ii. so if IPIC decided to exchange the bonds early, the last cash flow would be the interest payment immediately preceding the exchange of the bonds.

   d. In the "early redemption scenario":

      i. IPBC had the right to redeem the bonds early if prior to the maturity date the trailing average share price reached AUD 11.115 for 20 or more trading days during a period of 30 consecutive trading days;

      ii. but crucially, IPIC retained the right to exchange the bonds up until 5 business days before the Call Redemption Date[156] (and IPBC was required to give notice 25 business days before the Call Redemption Date,[157] so IPIC had 20 business days after notice of IPBC early redemption in which it could decide to exchange);

      iii. and if IPBC redeemed the bonds, IPIC would receive AUD 8.55 per share (the Aggregate Principal Amount) plus interest accrued up to the day immediately preceding the date of redemption.

   e. In the "hold to maturity scenario", IPIC would receive:

[156] Bond Deed Poll, s. 10.1.2

[157] Bond Deed Poll, s. 7.2

i. all the interest payments through the last interest payment date immediately preceding the Bond's maturity;

ii. and the principal amount plus the interest accrued from the last interest payment to the maturity date (and the principal amount would be paid entirely in shares if the share price at maturity was above AUD 8.55, and a cash top-up would be paid otherwise).

118. As noted above, since in a situation where IPBC has the right to redeem early, IPIC will always be better-off in the early exchange scenario, and since IPIC retains the right to trigger early exchange even after IPBC has triggered early redemption, the early redemption scenario was highly unlikely to occur but early exchange would be triggered either:

    a. if the conditions for early redemption are otherwise met; or

    b. if the trailing average share price is above AUD 8.55 just prior to maturity.

V.B. Pricing of the IPIC transaction

119. We have constructed a model of the IPIC bonds in order to test whether the pricing of the transaction was reasonable.

120. A key influence on pricing will have been IPIC's view of the credit risk associated with the transaction—ie, the risk that, at the end of five years, the Oil Search share price would be less than AUD 8.55 and IPBC would be unwilling or unable to make the cash top-up payment.

121. We first valued the bonds assuming that the credit risk was zero, and we then explore the consequences of credit risk for pricing.

V.B.1. Value of the IPIC bonds assuming no credit risk

122. In section V.A we described the cash flows associated with the transaction under three scenarios, exchange, redemption and holding to maturity. The value of the bonds when the pricing terms were agreed and the bonds were issued, and hence whether the pricing of the bonds was fair, depends on these expected future cash flows and the circumstances under which IPIC would decide to exchange or IPBC would decide to redeem the bonds.

123. At any point in time, IPIC's decision to exchange the bonds would depend on whether the bonds or the shares were more valuable. For example, if the share price on a day

was much lower (say AUD 4.00) than the Principal Value (AUD 8.55) discounted at the risk-free rate, then it would be optimal for IPIC to continue to hold the bonds and not to exchange, since exchanging the bond would be worth AUD 4.00 and not exchanging them is worth at least AUD 8.55 discounted at the risk-free rate.[158]

124. In contrast, consider the case where the conditions for early redemption had been met. The trailing average share price has to be over AUD 11.115 to trigger early redemption. If IPIC does not exchange the bonds, IPBC will redeem early and IPIC will receive shares to the value of AUD 8.55 plus accrued interest (a maximum of about AUD 0.22 per share). If IPIC exchanges the bonds, it will receive the current value of the shares (ie, at least AUD 11.115). Therefore, it would be optimal for IPIC to exchange the bonds.

125. These two examples illustrate the underpinnings of the procedure used to value the bonds. We used a standard procedure known as the "binomial model".[159] This model considers a range of possible prices for Oil Search's shares over time looking forward from the valuation date. For each such price and at each point in time, the optimal decision for the bond-holders is evaluated. The range and time path of share prices is calibrated based on an estimate of the volatility of the share price.[160] This then allows us to assess the expected value of the bond at each point in time, and in particular, at issuance and at the point the conditions of the loan were negotiated.

126. Under the assumption of no credit risk, (ie, assuming that IPBC would make any required cash top up payments at maturity), the bonds were worth AUD 119.30 per AUD 100 of principal on 23 November 2008 (the date on which the Bond Deed was signed).

127. The fact that we model the value of the bonds to be about 20% above face value implies that, if the bonds were fairly priced, there was a non-negligible risk that the State might fail to pay a required cash top up on maturity.

V.B.2. Impact of credit risk on value of the IPIC bonds

128. IPBC owned the State's stake in the PNG LNG project, as well as other assets in the General Business Trust (including Air Niugini, Kumul Telikom Holdings and PNG Power). The proceeds of the IPIC bonds were ring-fenced and could only be used to pay interest

[158] The five year risk free rate at issuance was 3.78%, so at any point before maturity AUD 8.55 discounted at the risk free rate was above AUD 7.10.

[159] See, for example, Hull, J. C. (2017). Fundamentals of futures and options markets, ch. 12.

[160] Where possible, expected future volatility is used (which can be derived from the market price of share options). In this case there is no relevant option pricing data, so we use measured historical volatility as a proxy for expected future volatility.

to IPIC or to fund the State's equity contributions for the PNG LNG project. The State's Oil Search shares were also placed into an escrow account.

129. IPBC undertook not to provide security over the assets of the General Business Trust to other lenders unless equivalent security was provided to IPIC.

130. We explained above that the State's interest in the PNG LNG project was worth USD 3,000 to 5,000 million at the time of the IPIC transaction. However, this asset was leveraged at the project level: on a book value basis the project gearing was 70%, but based on our estimate of the market value of the project, the gearing was in the range 30% to 45%. Adding the IPIC loan, the effective gearing of the State's interest was 50% to 70%.[161] Ultimately, since no cash flows were anticipated from the PNG LNG project before the bonds matured, we think that IPIC would have had limited ability to obtain payment if IPBC was unwilling or unable to pay.

131. We valued the bonds assuming that IPBC would not pay any top-up that might have been required. This is a "worst case" scenario in which we assume that, at maturity, IPIC will receive the Oil Search shares but will not receive any cash top up. Under this scenario, the value of the bonds was AUD 68.73 per AUD 100 of principal.

132. The fact that, in this worst case scenario, the bonds were worth less than face value implies that IPIC considered that IPBC was likely to pay a cash top up if one were required (albeit that, as noted above, there was some risk that IPBC would be unwilling or unable to pay).

V.C. Fees charged for the IPIC transaction

133. We have not seen any reference to fees charged by IPIC, so we assume that there were no fees or that they were effectively subsumed into the interest rate charged.

V.D. Conclusions on whether the IPIC transaction was reasonable

134. Our analysis suggests that, if IPIC thought that there was no doubt that the bonds would be repaid in full, the interest paid on the bonds was above the fair rate of interest. However, our analysis also suggests that if IPIC thought that IPBC would not honour its

[161] ie, the sum of the IPIC loan and the State's share of the project loans, divided by the sum of the State's share of the project loans and the value of the State's share of the project equity.

obligation to pay a cash top up on exchange if needed, then IPIC paid more for the bonds than they were worth. Thus our analysis is consistent with the bonds being fairly priced and there being a non-negligible risk that IPBC might fail to pay a required top up.

135. We also think it would have been difficult for IPIC to take action against IPBC if it defaulted on its obligations, since IPBC's assets are physically located in Papua New Guinea, and the main asset generating export revenues (the PNG LNG project) was not expected to start producing revenues until well after the bond matured.

136. Furthermore, in circumstances where the Oil Search share price was very low at maturity, we think that IPBC's willingness and ability to pay a top up would have been reduced. Since the PNG LNG project is a significant asset for both the State and Oil Search, circumstances that caused the Oil Search share price to be very low, such as low oil prices or delays in completing the PNG LNG project, would also have an adverse impact on IPBC and Papua New Guinea's economic prospects more broadly.

137. Thus we think it is certainly possible that IPIC viewed its exposure to IPBC credit risk as non-negligible, and thus that the IPIC bonds were fairly priced.

138. We have not seen any evidence explaining how IPIC analysed its exposure to IPBC credit risk.

139. There is no direct market evidence on IPBC or Papua New Guinea credit risk, because the State had no sovereign debt in 2009.

140. In principle, it might be possible to examine the financial performance of IPBC in order to make an assessment of IPIC's exposure to credit risk. However, we think that an attempt to reconstruct a reasonable forecast of IPBC financial performance from the standpoint of an observer such as IPIC in 2009 would necessarily be subjective, and thus of limited value. In any event, we have not seen any records of IPBC's financial performance that would be relevant to such an assessment.

141. Thus, with the evidence available to us, we conclude that it may have been reasonable to assume that IPIC's exposure to IPBC credit risk was non-negligible, and thus that the bonds were fairly priced.

VI. The UBS transaction

VI.A. The nature of the UBS Transaction

142. On 27 February 2014, the Government and Oil Search announced[162] that they had agreed that "the State [would] subscribe for 149.39 million shares in Oil Search Limited at AUD 8.20 per share", a total value of AUD 1,225 million. This subscription was financed through the UBS Transaction which consisted of two loans—the "Bridge Loan" and the "Collar Loan". The two loans were not independent transactions (for example, a default under the Bridge Loan would trigger a default under the Collar Loan).

143. Table 3 shows the amounts the State borrowed under the two loans, and the use of the funds.

TABLE 3[163]
UBS transaction proceeds and use

Bridge loan proceeds	335.0	UBS fees	13.0
Collar loan proceeds	1,011.2	Other fees	1.6
		Pre-payment of collar loan interest	106.6
		Purchase of OSH shares subject to collar hedging	1,123.5
		Purchase of OSH shares not subject to collar hedging	101.5
		Purchase of OSH puts and sale of OSH calls for collar (net)	0.0
Totals	1,346.2		1,346.2

Notes
Figures in AUD $m

144. Table 3 shows that the UBS transaction generated total proceeds of AUD 1,346 million. Out of the total amount borrowed, AUD 1,225 million was spent on Oil Search shares, thus covering the cost of the subscription announced on 27 February 2014. The rest was used to pay fees and pre-pay interest on the Collar Loan.

145. Although the Bridge Loan and Collar Loans were not independent transactions, the Bridge Loan had a term of 6 months while the Collar Loan had a term of two years.

[162] Oil Search ASX announcement of 27 February 2014 *Oil Search and PNG Government reach agreement on share placement*.

[163] Source: *Drawdown Notice; Collar Confirmation Side Letter; Participant Sponsorship Agreement*.

VI.A.1. The Bridge Loan

146. The proceeds from the Bridge Loan were used to pay AUD 14.6 million in fees and expenses and to purchase 39.1 million Oil Search shares.[164] 12.4 million of these shares would serve as collateral for the Bridge Loan, and were not hedged. The remaining 26.7 million shares were hedged under the Collar Loan (and were collateral for that loan).

147. In addition to the 12.4 million shares, the Bridge Loan also benefitted from a type of securitisation of the State's dividends from the PNG LNG project. Any cash flows from the PNG LNG project to the State were to be used to pay down the principal owing under the Bridge Loan.[165] The Government directed the relevant PNG LNG project entity to pay any distributions from the directly to UBS rather than to the State.[166]

148. The Bridge Loan had an initial term of 6 months, but could be extended once at the State's option for a further 6 months[167]. The interest rate was initially a spread of 5.5% over BBSY, increasing to 6.5% after 3 months, then to 7.5% after 6 months and finally to 9.5% after 9 months.[168]

149. The Bridge Loan had an establishment fee of 2% (of the total amount available to be borrowed), and an extension fee of 1.5% (of the amount then borrowed).[169]

150. Since the collateral for the Bridge Loan was only about one third of the loan value, and these shares were unhedged, the Bridge Loan exposed UBS to Papua New Guinea credit risk. This credit risk may have been somewhat mitigated by an arrangement whereby any cash flows from the PNG LNG project would go first to UBS. Only once the Bridge Loan had been fully repaid would cash flows go to the State. Although this arrangement was put in place as part of the UBS transaction, and there was a contractual undertaking to maintain this arrangement, it may have been difficult for UBS to enforce this provision.

151. As noted above, the State's share of the PNG LNG project was very valuable, but this asset did not begin to collect any revenue from its customers until mid-2014.[170]

---

164 *Drawdown Notice*.

165 *Payment Direction Deed*, clause 2.4.

166 *Payment Direction Deed*, clause 2.

167 Bridge facility agreement, pp. 12, 19 ("Termination Date")

168 Bridge facility agreement, p. 8 (definition of "Margin").

169 Bridge facility, section 8.

170 The first cargo of LNG was delivered in May 2014 (https://www.pnglng.com/About/History)

However, we understand that the cash generated by the project could not be distributed to the equity partners before "financial completion" which occurred on 6 February 2015.[171] The State's share of profits from PNG LNG directly via distributions to Kumul was USD 663 million in 2015.[172]

152. UBS provided a forecast of cash flows to be generated by the PNG LNG project in its October 2013 presentation to the IPIC Exchangeable Bond Review Committee. UBS forecast that there would be zero cash flows to equity holders in 2014, and USD 3,000 million in 2015.[173] These equity cash flows were the net available to be distributed to equity owners after meeting all project financial close requirements on the project's debt financing arrangements, and after meeting interest and principal repayments. UBS was thus forecasting that the State would have zero cash flow from the project in 2014, and USD 500 million in 2015.[174] These projections were consistent with analyst commentary at the time.[175]

153. We consider UBS exposure to Papua New Guinea credit risk further below.

VI.A.2. The Collar Loan

154. The Collar Loan had a principal of AUD 1,011.15 million (see Table 3), and was to be repaid in two years. A total of 137 million shares (the "Aggregate Number") collateralised the Collar Loan, so the Collar Loan principal represents a value of AUD 7.38 per collateralised share. The value per collateralized share is lower than the purchase price of the shares since the Collar Loan is collateralized by the shares purchased with the proceeds of the Collar Loan (110 million shares) plus 27 million shares purchased with proceeds from the Bridge Loan. In addition to the loan, UBS provided the State with 137 million put options (one put per share). The puts were at a range of different strike prices, but on average the strike price was AUD 7.38 per share, and the put options expired simultaneously with the Collar Loan was to mature. Since the put options gave the holder the right to sell the shares at the strike price, the combination of the shares and the put options would always be worth at least AUD 7.38 per share, no matter how far the share price fell. In return for receiving the puts from UBS, the State provided UBS

[171] *Oil Search Annual Report 2014*, Note 28 to the accounts.

[172] Affidavit of Mr Arthur Somare, table after paragraph 44 [WIT.0027.0001.0471].

[173] UBS, Presentation to IPIC Exchangeable Bond Review Committee, p. 38

[174] Applying the State's equity interest in the PNG LNG project of 16.8%, held by Kumul to the gross project cash flows. The State was forecast to receive approximately USD 500 million in 2015, USD 380 million in 2016, USD 365 million in 2017 and USD 250 million in 2018.

[175] See, for example, JP Morgan, "Oil Search – LNG fueled free cash flow returns – trickle or flood?", p. 8, Table 2: PNG LNG cashflow waterfall (OSH net) – JPM base case.

with 137 million call options. Again these options had a range of strike prices, but on average the strike price was AUD 10.00 per share. According to the transaction documentation, the value of the puts was equal to the value of the calls, so the State did not have to pay anything for the puts.

155. The Collar Loan required the State to pay interest, but the interest was "pre-paid" (ie, paid up front). Since the aggregate value of the options and the shares could never be less than AUD 7.38 per share, which was the amount the State owed under the Collar Loan, UBS had no credit risk under this loan. The security for the loan (the shares and the puts) could never be worth less than what the State owed, and the interest had already been paid up front. This means that UBS was not exposed to the State's credit worthiness under the Collar Loan, although it was exposed to the risk of the Oil Search share price (which could be hedged).

156. The put and call options were divided into 30 tranches with 4.57 million call options and the same number of put options per tranche, and each tranche represented portions of the principal that had different maturity dates ranging from 7 March 2016 years to 24 June 2016.[176] We think that the options were divided into tranches in this way so that the number of options expiring each day was manageable (relative to the expected daily trading volume in the market for Oil Search shares). Had they not been divided in this way, it might have been more difficult / expensive for UBS to manage its position at maturity if the State delivered shares in settlement of the loan. In the discussion below and in Figure 4, Figure 5 and Figure 6 for simplicity we ignore the different maturity dates for the different tranches.

157. Each tranche was further divided into five put–call pairs, as shown in Table 4.

[176] Collar Confirmation Side Letter, pp. 4-5.

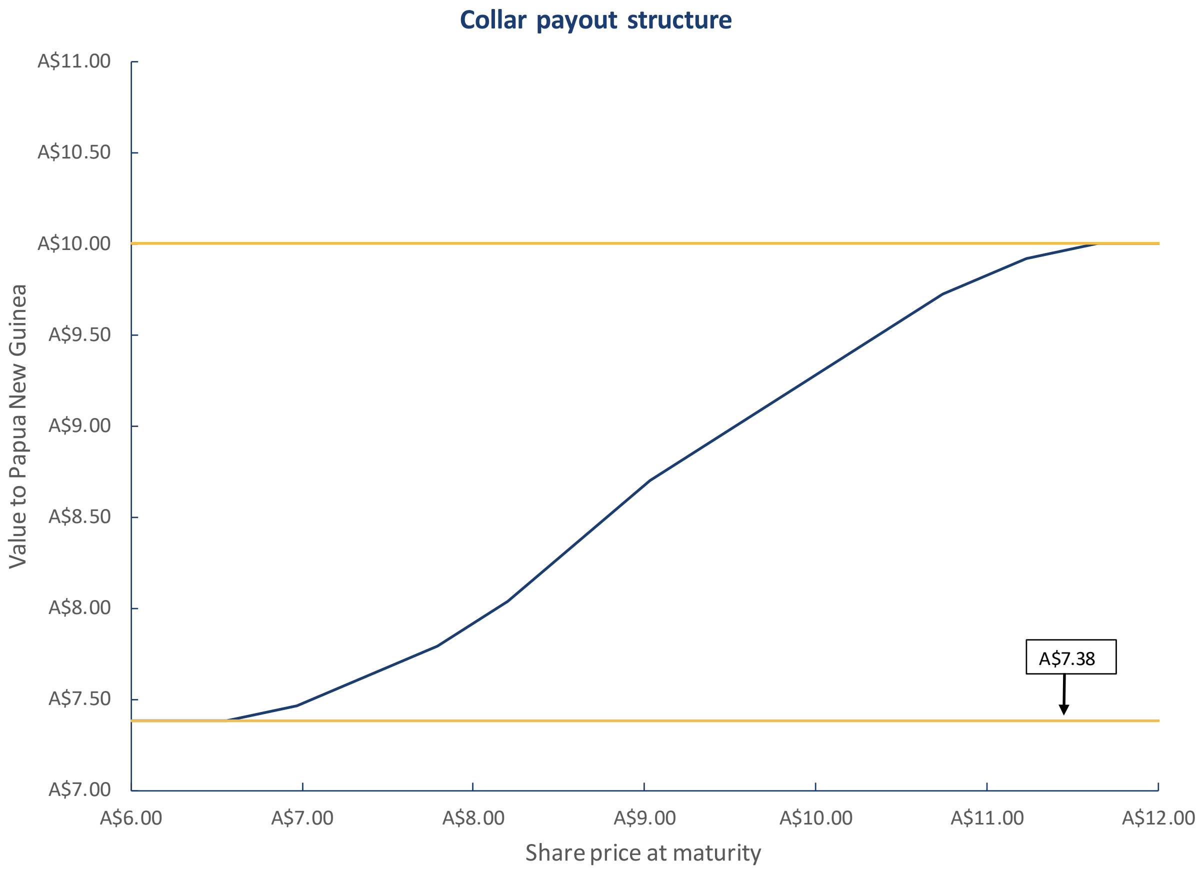
TABLE 4[177]

Composition of each Tranche	Put Strike (as % of A$8.20)	Put Strike (A$)	Number of Put Options	Call Strike (as % of A$8.20)	Call Strike (A$)	Number of Call Options
[1]	[2]	[3]	[4]	[5]		[7]
Component Collar A	80.00%	A$6.56	913,415	90.00%	A$7.38	913,415
Component Collar B	85.00%	A$6.97	913,415	110.12%	A$9.03	913,415
Component Collar C	90.00%	A$7.38	913,415	130.95%	A$10.74	913,415
Component Collar D	95.00%	A$7.79	913,415	136.90%	A$11.23	913,415
Component Collar E	100.00%	A$8.2	913,415	142.00%	A$11.64	913,415
	Avg. = 90%	**Avg. = A$7.38**	**Total = 4,567,075**	**Avg. = 122%**	**Avg. = A$10.00**	**Total = 4,567,075**

158. In Figure 4 we plot the "payoff" of the shares and the options combined (all of the tranches in aggregate). Figure 4 shows that when the share price at maturity is at any price below AUD 6.56, the value to the State is AUD 7.38, the amount of principal corresponding to each share. As the price increases from AUD 6.56 to AUD 11.64 the value to the State increases gradually to AUD 10.00 and remains at AUD 10.00 for any share price above AUD 11.64.

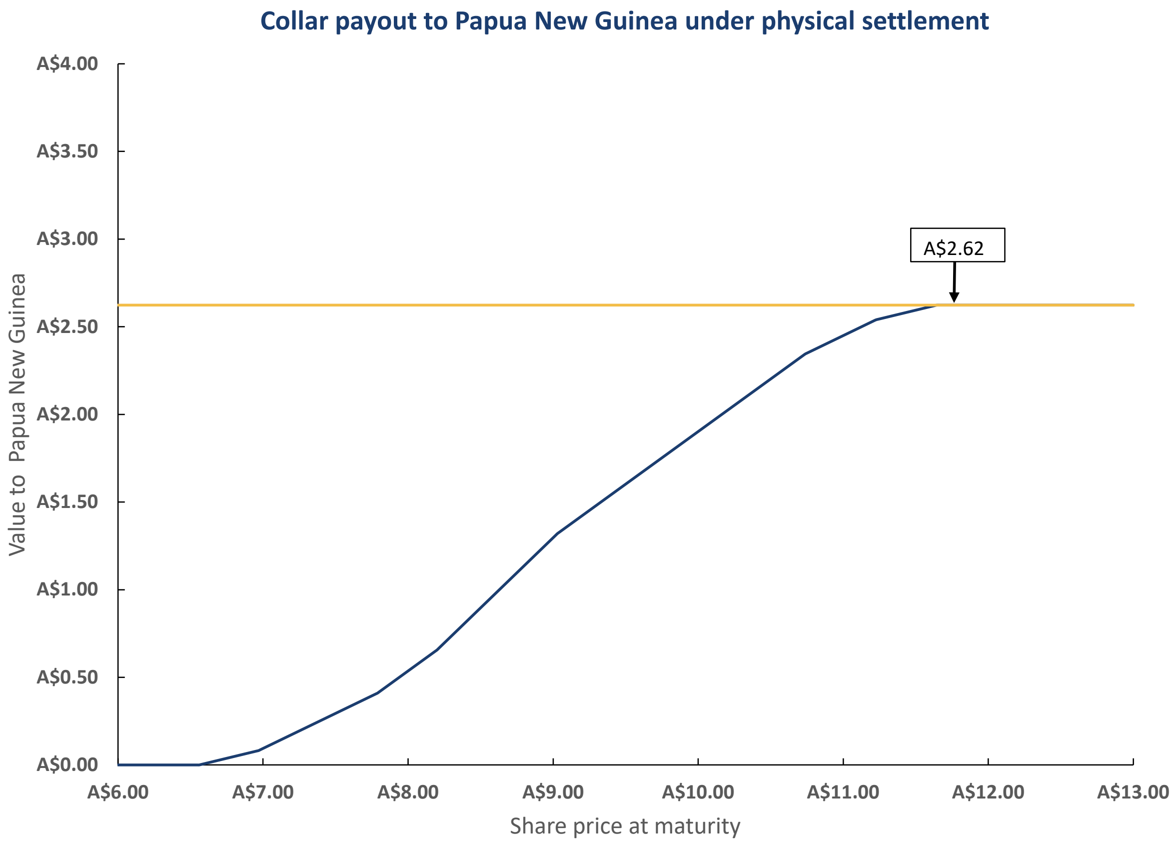
[177] *Collar Confirmation Side Letter*, Schedule 1.

FIGURE 4



159. In any event, the State owes AUD 7.38 per share (the outstanding principal) at the end of the term. Thus, the net that the State will receive is the amount shown in Figure 4 minus AUD 7.38. We plot this net amount in Figure 5. The maximum possible pay-out to the State would be AUD 2.62 per share. This pay out would have been achieved if at maturity the share price was above AUD 11.64 per share.

FIGURE 5



160. The preceding discussion illustrates the purpose of the Collar Loan. Since the principal of the loan was equivalent to AUD 7.38 per share, the value of the collar plus the shares is always sufficient for the State to pay the principal. The structure allows the State to guarantee the payment of the principal while still receiving part of the upside if the share price closes above AUD 6.56, while UBS keeps all the upside above AUD 11.64.

VI.B. Pricing of the UBS transaction

VI.B.1. The Collar Loan

161. As described above, the initial Exchange Amount for the Collar Loan was AUD 904,555,760, while the Notional amount of the loan was AUD 1,011,150,405. The difference between the two figures is the amount of “pre-paid interest” which UBS deducted from the principal amount owing. Thus, the State received AUD 904.6 million but it owed AUD 1,011 million (and the State was required to post sufficient shares and puts as security to cover the AUD 1,011).

162. The amount the State received was calculated as: Notional x (1-Rate x t/365),[178] where the Rate was set at 4.95%. This is equivalent of a bond paying a single coupon at issuance with a 4.95% rate. However, this is somewhat confusing, especially if the point of requesting a Rate of 4.95% was to obtain a loan with an interest rate below 5%. The pre-paid 4.95% rate on the collar was equivalent to a 5.34% yield, that is, a bond with a principal equal to AUD 904 million (the Aggregate Exchange Amount) and that pays back principal plus interest of AUD 1.01 billion after two years pays a yield of 5.34%.

163. As described above, each tranche consists of 4.6 million European Call options with 5 different strikes and 4.6 million European Put options with 5 different strikes.[179] Therefore, pricing each tranche is a matter of calculating the price of each of the options that make up each tranche, for each of the thirty tranches. This can be done using the standard Black Scholes option pricing formula. By doing this we find that the value to the State of holding the collar positions was negative AUD 25 million,[180] assuming that the value of the shares on the valuation date was AUD 8.20. This means that the State should have been paid AUD 25 million to enter the collar. Alternatively, this can be interpreted as the State paying AUD 25 million more in upfront interest than the AUD 107 million disclosed in the loan documents. Contrary to what was indicated in the documentation we have reviewed,[181] the options that made up the collar were not at a nil-premium position (that is, the calls that the State gave UBS were more valuable than the puts UBS gave the State).

164. Alternatively, the strike prices on the options (shown in Figure 6) could have been set in a manner that did lead to a nil-premium position. One such way to do this would be to increase the strike prices of the call options across the board. The Side Letter[182] presents the strike prices of the options as a percentage of AUD 8.20. If the strike price for each call was set 8.9 percentage points higher, the resulting collar would have been nil-premium. Figure 6 shows the payoff structure of this alternative collar and it illustrates how, under the alternative structure, the State would have benefited of the potential upside in Oil Search's shares.

[178] Long Form Collar Confirmation and ISDA Credit Support Annex dated 12 March 2014, p. 3.

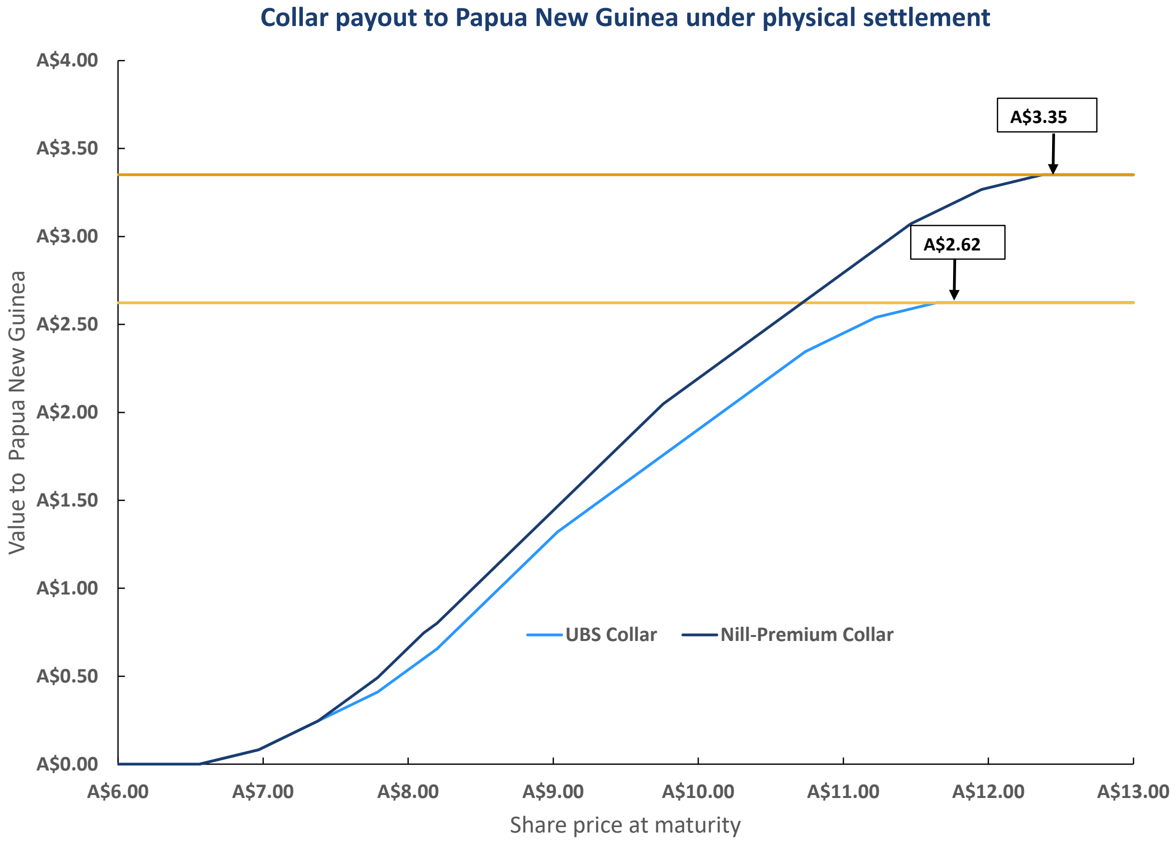
[179] A "European" option can only be exercised on its expiry date. In contrast, an "American" option can be exercised at any time until it expires.

[180] Using 27 February 2014 as the pricing date and AUD 8.20 as OSH's spot price and the implied volatility reported by Bloomberg for a 2 year option and a 105% moneyness. 105% moneyness was chosen as this is the average moneyness of the options that constitute the collar.

[181] No cash moved between the State and UBS as consideration for the collar. In addition, the *Commitment Letter* dated 27 February 2014 lists the component options that made up the collar and states the premiums as "nil" (table on p. 4 of Annexure II). [WIT .0015.0001 .1063]

[182] Collar Confirmation Side Letter dated 12 March 2014, p. 3.

FIGURE 6



VI.B.2. The Bridge Loan

165. As described above, the Bridge Loan paid monthly interest based on the 1-month BBSY rate plus a margin, where the margin was 5.5% for the first three months and then increased every three months to a maximum of 9.5% for months ten through twelve (if the loan was extended). At issuance BBYS was approximately 2.68%,[183] meaning that the rate paid on the Bridge loan would start at approximately 8.18%, increase after that and could reasonably be expected to be over 12% for the last three months of the loan.

166. While this loan did expose UBS to the State's credit risk, it was partially collateralized by shares that were worth approximately one third of the principal. In contrast, in 2014 two low income countries (Kenya and Ethiopia) issued sovereign bonds that were not collateralised and paid interest rates below 7%, for terms much longer than the rate of

[183] Due to the lack of availability of BBSY data, we use the BBSW rate on 9 March 2014 (2.63%) and add 5 basis points to reconstruct an implied BBSY rate of 2.68%. See ANZ Investment Bank, "Maximum Rate Facility Overview", https://www.anz.com/documents/FXOnline/MRF_1.pdf, accessed 5 July, 2021.

the Bridge Loan. This suggests that the rates paid for the Bridge Loan were unreasonable.

VI.B.3. Cross default condition

167. The Bridge Loan had a principal of AUD 335 million and was collateralised by 12.4 million shares. This means that at the reference price the shares collateralising the Bridge Loan were worth AUD 101.5 million, less than a third of the principal. Furthermore, the shares would fully collateralise the principal only if the share price was above AUD 27.06 (an extremely unlikely event).

168. As described above, an event of default in the Bridge Loan would result in an event of default in the collar. Therefore, if the State defaulted on the Bridge Loan, UBS would receive (or rather would not have to return) all 149 million shares, those collateralizing the Bridge Loan and those collateralizing the Collar Loan. As shown in Table 4, the total principal for both loans was AUD 1,346 million. Therefore, if Oil Search's share price was above AUD 9.01 when a default event occurs, the value of the shares would exceed the principal on both loans.

169. In other words, as long as the price is above AUD 8.20 if a default event occurs after one year, UBS will recover the amount it paid out at issuance[184] and if the price was above AUD 9.01, UBS would recover everything it was owed.[185]

VI.C. Fees charged for the UBS transaction

170. UBS charged fees of approximately AUD 13 million for the collar and initial term of the Bridge Loan. This amount is slightly more than 1% of the amount that the State raised to invest in Oil Search shares. This level of fees does not appear unreasonable for a complex transaction.

[184] AUD 335 million in principal from the bridge loan and AUD 905 million for the Aggregate Exchange Amount of the Collar Loan.

[185] AUD 335 million in principal from the bridge loan and AUD 1,011 for the Final Exchange Amount of the Collar Loan

VI.D. Conclusions on whether the UBS transaction was reasonable

171. We find the UBS transaction to be unusual in multiple respects. First, the interest rate on the Collar Loan was described as 4.95% but was equivalent to a 5.3% rate paid in arrears. Second, the Collar Loan exposed UBS to no credit risk and by UBS's own representations, the market risk it remained exposed to could be hedged at a nil premium, hence having an interest rate several percentage points above the risk-free rate was not reasonable. Third, UBS represented that the collar was nil-premium, meaning that the downside protection the State was purchasing from UBS was worth the same as the upside gain it was giving up to UBS; yet, we find that the upside gain that the State was giving up was worth approximately AUD 25 million dollars more. Fourth, the mismatch between the term of the Bridge Loan and the term of the Collar Loan, together with the cross-default provision, would have put UBS in a strong bargaining position when the Bridge Loan expired if the State needed to refinance the Bridge Loan. Fifth, the Bridge Loan paid interest that began at a rate of approximately 8% and would reach 12% by the end of the extended term (BBSY plus 9.5%). This was unreasonably high since it was higher than the rate paid by issuances of unsecured sovereign debt in 2014 by other low income countries that were first time issuers.

VII. Risks and rewards of the transactions

172. We have been asked to "[a]dvise on the financial and strategic risks and rewards arising from the transactions for the Government, including the option structure established by the collar element of the UBS Loan".

VII.A. The IPIC transaction

173. Prior to entering into the IPIC transaction, the State owned a large number of Oil Search shares. It was therefore exposed to upside and downside risk associated with the Oil Search share price: the State owned an asset with a value that fluctuated over time, and over an extended period of time the value could increase or decrease, perhaps significantly.

174. As a result of the IPIC transaction, the State gave up some of the upside potential in its investment in Oil Search shares, while retaining all of the downside risk: during the term of the IPIC bond (March 2009 to March 2014), if the Oil Search share price exceeded AUD 8.55 per share, the State would see no benefit from the price increase above AUD

8.55, and all of the State's shares would be transferred to IPIC to satisfy its obligations to IPIC; however, if the share price in March 2014 was less than AUD 8.55, the State would owe some fraction of the AUD 1,681 million principal to IPIC in cash, in addition to the shares; and the greater was the gap between AUD 8.55 and the share price, the more the State would owe IPIC in cash.

175. Nonetheless, as a result of the IPIC transaction the State obtained the financing it needed for the PNG LNG project. The financing enabled the State to realise profits from its equity stake in the PNG LNG project. These profits are currently flowing back to the State.[186]

176. We explained above that the pricing of the IPIC bonds is consistent with a fair rate of interest if the resultant exposure to credit risk is non-negligible. On that same assumption, the rate of interest IPBC paid to IPIC is less than would have been paid under a regular bond that did not transfer to IPIC the upside above AUD 8.55.

177. The financial consequences for IPBC of the IPIC bonds maturing were thus strongly dependent on the performance of the Oil Search share price. Over the five-year term of the bonds, the Oil Search share price increased by approximately 85%,[187] and because the share price at maturity was close to AUD 8.55, IPBC did not have to make a large payment to IPIC.[188] Had the Oil Search share price increased by less than 85%, the top up payment would have been larger. For example, if the share price had increased by 50%, the top up payment would have been approximately AUD 260 million.[189] However, although the outcome was influenced by the performance of the Oil Search share price, IPBC's financial position was already exposed to the Oil Search share price in 2009 by virtue of its investment in Oil Search shares. Thus the sensitivity of the financial outcome for IPBC to the Oil Search share price was not created by the IPIC transaction itself.

186 See, for example, the Affidavit of Mr Arthur Somare, table after paragraph 44 [WIT.0027.0001.0471].

187 From AUD 4.82 on 5 March 2009 to AUD 8.92 on 5 March 2014.

188 For example, a document attached to the Affidavit of Mr Wapu Sonk (an email dated 14 February 2014) states that the top up would be between AUD 50 million and 100 million (attachment WRS-8).

189 (150% x 4.82) / 8.55 x 1,681 million = AUD 1,421 million recoverable value from the Oil Search shares. The difference between the value recoverable from the Oil Search shares and the principal value of the IPIC Exchangeable Bond is approximately AUD 260 million.

VII.B. The UBS transaction

178. At the time the State entered into the UBS transaction, the Government knew that the State would imminently transfer its Oil Search shares to IPIC as the IPIC bonds matured. This transfer occurred on 5 March 2014.[190] Had the Government not entered into the UBS transaction, from 5 March 2014 onwards the State would have had no Oil Search shareholding and would thus not have had direct exposure to the upside or downside risks of the Oil Search share price.[191]

179. As a result of the UBS transaction, the State took on some exposure to the Oil Search share price. This exposure was limited by the operation of the "collar" derivatives that were part of the UBS transaction. Over the two-year term of the Collar Loan, if the Oil Search share price moved up or down from the price at which the State purchased its shares, the State would gain by up to AUD 1.80 per share or could lose up to AUD 0.82 per share (a maximum gain of AUD 247 million or a maximum loss of AUD 112 million). In addition, the State was fully exposed to the Oil Search share price on its unhedged shares. The State invested AUD 101 million in unhedged shares. The State's potential gain on this investment was unlimited, and its potential loss was the whole of this amount. For example, if the Oil Search share price had increased by 10% over the two year term of the Collar Loan, across all of its Oil Search shares the State would have gained AUD 78 million, whereas if the share price had decreased by 10%, the State would have lost about AUD 89 million. [192]

180. The State's exposure to the Oil Search share price during the term of the UBS transaction was less than its exposure during the term of the IPIC transaction, because of the limits created by the collar component. However, the State would not have been exposed at all after 5 March 2014 but for the UBS transaction,[193] whereas the IPIC transaction itself did not create the State's exposure to the Oil Search share price during the 2009 to 2014 period.

181. Since the Oil Search share price fell from 2014 to 2016, the State would not have had gains from holding Oil Search shares to offset its obligations to UBS.

---

[190] IPIC Notice of Change in Substantial Shareholding, dated 10 March 2009.

[191] The State would, however, retain its share of the PNG LNG project, the value of which was partially correlated with the value of Oil Search shares (since Oil Search also had a share in the PNG LNG project).

[192] These figures do not include the costs of the UBS transaction and assume that the Bridge Loan was paid off or otherwise refinanced.

[193] By "UBS transaction" we mean the combination of the Collar Loan and the Bridge Loan (which incorporated the State's investment in Oil Search shares, used as collateral for the loans).

VIII. Hedging

182. We have been asked to "[c]onsider whether any strategies, such as hedging, could and should have been undertaken by the Government to ameliorate the risks of the transactions".

183. "Hedging" means the reduction or elimination of a financial risk. Financial risk refers to the fact that many investments have uncertain returns.[194] Many types of financial risks can be partly or completely offset by purchasing the right kind of financial instrument. Where an investor does this, the risk thus offset is said to be "hedged". For example, an oil producer is exposed to oil price risk: the oil producer's revenues will rise if the oil price goes up and fall if it falls. The producer can hedge its risk by purchasing a financial instrument with a price that will go down if the oil price goes up, and go up if the oil price goes down.[195] The producer's overall exposure to changes in the oil price is thus reduced or hedged.

184. When the State purchased Oil Search shares in 2014, it also obtained put options as part of the Collar Loan. The put options gave the State the right to sell the Oil Search shares to UBS at a pre-determined strike price. Thus, over time if the share price fell towards the strike price, the value of the put would rise, partly offsetting the fall in the share price. Thus, under the Collar Loan, the State's exposure to Oil Search shares was partially hedged.

185. The IPIC transaction did not expose the State to new risks because the State already owned Oil Search shares. In effect, the IPIC transaction somewhat reduced the extent to which the State could benefit from an increase in the Oil Search share price, because the State would not benefit at all from increases above AUD 8.55. The State remained fully exposed below this price during the term of the IPIC transaction Thus the IPIC transaction did not create new risks that could have been hedged.

186. The UBS transaction created an exposure to the Oil Search share price that the State would not otherwise have had: but for the UBS transaction, the State's exposure to the Oil Search share price would have ended when its shares were transferred to IPIC on 5 March 2014. During the term of the UBS transaction, the State's exposure to the Oil Search share price was less than it was during the term of the IPIC transaction. This

---

[194] An investment in an Australian government bond is generally considered to be free from risk: the future cash flows from that investment can be predicted with certainty.

[195] For example, the price of a put option increases as the price of the underlying instrument falls, and vice versa.

partial hedging resulted from the collar component of the UBS transaction. However, achieving exposure to the Oil Search share price was one of the Government's objectives in entering into the UBS transaction. Thus, hedging the exposure would have conflicted with the State's objective in entering into the transaction in the first place.

IX. Trading in Oil Search shares

187. We have been asked to "[a]nalyse trading in Oil Search shares from the period of time leading up to the Government's acquisition of shares in Oil Search through the UBS Loan to its disposal of those shares and in particular, trading arising from the collar loan".

188. We have not been provided with any non-public information concerning trading in Oil Search shares. Publicly-available information includes:

    a. daily volumes of trading in Oil Search shares—that is, the total number of shares purchased each day;

    b. daily information on the volume of "short interest"—that is, on each day, the aggregate number of shares which market participants have borrowed and sold to create a short position, the value of which would increase if the share price were subsequently to go down; and

    c. information on "substantial holdings" (interests in over 5% of the shares, and changes to such interests of more than 1%).

189. Investors with an interest in Oil Search shares are obliged to disclose their interest[196] when it increases above 5% of the total shares on issue (a "substantial shareholding"), and investors with an interest in more than 5% of the total shares on issue are also obliged to disclose movements in their interest.[197] This obligation is on a consolidated basis across related entities (so that the obligation applies to UBS as a whole, rather than individual entities or funds within UBS). UBS first disclosed a substantial shareholding in Oil Search on 3 March 2014, and stated that the substantial shareholding arose because

[196] We understand that "interest" is defined fairly broadly, such that both UBS and IPBC disclosed their interest in the same shares. Generally, an entity has an interest in securities when it holds shares, controls voting, controls the disposal of those shares or has some power, whether held jointly or individually to control the exercise of voting or disposal of shares: for corporations listed on the ASX, see *Corporations Act 2001* (Cth), s 608. Oil Search was also listed on the PNGX, and subject to similar obligations under the *Securities Act 1997* (PNG), ss 112, 113.

[197] For corporations listed on the ASX (including Oil Search), see *Corporations Act 2001* (Cth), s 671B; Australian Securities Exchange, *Listing Rules* (at 5 June 2021), r 3.17. See also the continuous disclosure obligations under Papua New Guinea law in the *Securities Act 1997* (PNG), ss 115–117.

of transactions that happened on 26 February 2014 (ie, its interest rose over 5% on 26 February).[198] UBS ceased to have a substantial shareholding on 26 September 2017.[199] Between those dates UBS filed various notices of changes to its substantial shareholding.

190. In Figure 7 we show a timeline created from reviewing notices available from the ASX website under the Oil Search ticker ("OSH").

[198] See UBS substantial interest notice dated 3 March 2014.

[199] See timeline below.

FIGURE 7: TIMELINE OF UBS SHAREHOLDINGS IN OIL SEARCH MARCH 2014 – SEPTEMBER 2017

UBS interests in Oil Search shares	ASX announcements
2014	
(Less than 5.00%)	**25 February 2014** Oil Search requests its shares be placed in an immediate trading halt.
	27 February 2014 Oil Search and PNG announce that PNG has subscribed for 149.39 million shares in Oil Search at $8.20 per share. PNG also confirms that it has received a Mandatory Exchange Notice from IPIC relating to the exchange of Oil Search shares under the Exchangeable Bond. Oil Search also announces it is to acquire a 22.835% gross interest in PRL-15 through the acquisition of the Pac LNG Group Companies. The fixed component of the consideration is USD $900 million.
109,811,413 of 1,343,361,150 **(8.17%)**	**3 March 2014** UBS files a Notice of Substantial Shareholding as a result of entering into stock borrow transactions for over 85 million shares on 26 and 27 February (in connection with funding arrangements with the Government of Papua New Guinea).
(Less than 5.00%)	**7 March 2014** UBS files a Notice of Cessation of Substantial Shareholding after the sale of 82,000,000 shares via a book build at AUD 8.20 per share.
184,015,580 of 1,492,751,394 **(12.33%)**	**12 March 2014** UBS files a Notice of Substantial Shareholding as a result of entering into security deed arrangements with PNG. UBS Nominees Pty Ltd acquired 137,012,250 shares on trust for PNG, whilst PNG acquired 12,377,994 shares in its own name.
202,523,375 of 1,519,022,225 **(13.33%)**	11 July 2014 UBS files a Notice of Change in Substantial Shareholding.
206,303,686 of 1,522,692,587 **(13.55%)**	8 October 2014 UBS files a Notice of Change in Substantial Shareholding.
193,521,205 of 1,522,692,587 **(12.71%)**	**23 December 2014** UBS files a Notice of Change in Substantial Shareholding. NPCP Investments Limited transferred the title to the 12,377,994 shares previously held by PNG to UBS under a new equity derivative arrangement. NPCP Investments Limited also assumed PNG's liabilities to UBS under the previous equity derivative arrangement over the 137,012,250 shares held by UBS Nominees.
2015	
209,611,462 of 1,522,692,587 **(13.77%)**	27 August 2015 UBS files a Notice of Change in Substantial Shareholding.
186,343,336 of 1,522,692,587 **(12.24%)**	30 November 2015 UBS files a Notice of Change in Substantial Shareholding.
2016	
200,372,118 of 1,522,692,587 **(13.16%)**	**23 February 2016** UBS files a Notice of Change in Substantial Shareholding. KPIL Limited entered into an amended equity derivative arrangement over the 149,390,244 shares held by UBS AG Australia Branch. UBS entered into an equity derivative financing with JPM Securities plc in respect of 74,694,900 shares subject to the KPIL agreement on 22 February 2016.
2017	
216,582,026 of 1,522,692,587 **(14.22%)**	22 March 2017 UBS files a Notice of Change in Substantial Shareholding.
232,113,603 of 1,523,631,192 **(15.23%)**	11 August 2017 UBS files a Notice of Change in Substantial Shareholding.
(Less than 5.00%)	**26 September 2017** UBS files a Notice of Cessation of Substantial Shareholding. The equity derivative financing with KPIL and JPM Securities had been unwound, with UBS AG, Australia Branch disposing of 149,390,244 shares at market value.

Source: Notices of Substantial Shareholdings, ASX.

Notes: Timeline entries in grey are Notices filed because of unconnected transactions. Note that the number of interests on the left-hand side in green boxes indicates the number of shares in which UBS and its affiliates held interests in. Whilst this includes shares that UBS held directly, it also includes shares that UBS had some power of control over (such as shares subject to security interests in favour of UBS). UBS was required under law to recognize interests in shares at the time that the interest arose.

191. We have also considered what trading behaviour we might expect UBS to undertake as a result of the Collar Loan transaction it entered into with the State. UBS was in effect "long" Oil Search shares because the State could satisfy its obligation when the Collar Loan matured by delivering Oil Search shares to UBS. Thus, if it did nothing else, from 12 March 2014 onwards UBS was in effect exposed to the Oil Search share price in a way directionally similar to the exposure it would have had if it had purchased Oil Search shares outright. In order to hedge this exposure, therefore, we would expect UBS to sell Oil Search shares. To implement this hedging strategy UBS would have to "borrow" Oil Search shares from other market participants.

192. Based on the transactions disclosed in the appendices to substantial shareholding notices filed by UBS, UBS seems to have borrowed a net total of about 91 million Oil Search shares between 24 February 2014 and 6 March 2014. Over the same period, UBS sold a net quantity between 82 million and 165 million shares. The larger figure is the sum of sale transactions (net of purchases) in the appendices of the same substantial shareholding notices. 82 million is the sum disclosed in the substantial interest notice itself.[200] We do not know why there is a discrepancy between the notices and the underlying transactions disclosed in the appendices to the notices. In any event, borrowing a large number of shares and selling them is consistent with UBS implementing the type of hedging strategy we would expect to see.

X. The State's losses from the UBS transaction

193. We have been asked to "[a]assess the loss suffered by the Government through the UBS Loan transaction and consider how that loss compares to the outcomes of any alternative strategies available to the Government".

194. We analysed pricing of the UBS financing transaction in section VI above. That analysis is necessarily done from the perspective of the point in time that the transaction was entered into because it seeks to test whether the transaction was fairly priced at the time the transaction was entered into.

195. An analysis of decision-making concerning these transactions is also necessarily done from the perspective of the point in time that the relevant decisions were taken. Hindsight and information about what actually happened—for example, to the price of Oil Search shares—is not relevant because it was not known at the time.

[200] UBS substantial interest notice dated 7 March 2014, reporting a change ("82 million shares" "sale of shares via a book build" and at a price of AUD 8.20).

196. We have also been asked to estimate the magnitude of losses the State incurred as a result of entering into the UBS transaction, with the benefit of hindsight. This is a different question. The UBS transaction exposed the State to risks in the sense that the cash flows associated with the transaction were uncertain at the time the transactions were entered into. In particular, the transaction gave the State exposure to the Oil Search share price. Our analysis above identified a range of possible outcomes that could have been anticipated at the time the transaction was entered into. In this section of our report we identify what the outcome was within the range.

197. The UBS transaction allowed the State to raise money to buy shares in Oil Search, and the Oil Search shares purchased were security for the loans from UBS to the State. Because the UBS loans were secured on the Oil Search shares purchased with the borrowed funds, we assess the cost of the UBS loan to the State by comparing the actual financial outcome with an alternative in which there was no loan and the State did not buy Oil Search shares.

198. We understand (from notices of substantial shareholding) that the Bridge Loan was extended and then converted into a collar loan in December 2014.[201] In February 2016 it appears that the main Collar Loan was also adjusted, and then the adjusted collar was unwound in September 2017.[202] Thus it appears that the UBS transaction did not ultimately mature according to its terms.

199. We have not been able to quantify the State's losses because we do not have any information about the terms on which the Bridge and Collar loans were adjusted, nor on what terms the adjusted transactions were subsequently unwound.

200. In order to quantify the State's losses we would need to examine the equivalent of account statements for the Bridge Loan, the Collar Loan, and their replacements.

201. We will provide a further report on this question if more material becomes available.

XI. The PRL-15 transaction

202. We have been asked to "[a]dvise whether the price paid by Oil Search for the interest in PRL-15 is objectively justifiable, assuming an arm's length transaction between buyer and seller".

[201] See UBS notice of substantial shareholding dated 23 December 2014.

[202] See UBS notices of substantial shareholding dated 23 February 2016 and 26 September 2017

203. In February 2014 Oil Search agreed to acquire an interest in the PRL-15 licence.[203] PRL-15 relates to the Elk-Antelope fields in Papua New Guinea, and is the major resource currently underpinning a new LNG project under development in Papua New Guinea known as Papua LNG.[204] Oil Search agreed to pay USD 900 million for the interest, and financed the transaction with the proceeds of issuing new shares to the Government, in turn financed by the UBS transaction discussed above.[205]

204. In December 2013 PRL-15 was majority owned by InterOil, with a 75% share. On 5 December 2013 InterOil announced that it had agreed to sell a 61% gross interest to Total,[206] with a condition precedent of this deal being that InterOil would first buy out the 25% minority interests in the licence.[207] Thus the intention was that, after the deal with Total had completed, the minority interests would have been bought out, and Total would be the new majority owner with 61% and InterOil would retain 39%.[208] However, before the InterOil–Total deal could be completed, Oil Search was able to buy out most of the 25% minority interests. Ultimately the combination of the two deals resulted in Total having 40%, InterOil 35%, and Oil Search 23%. Other minority interests were left with 2%.[209,210] The price Total paid was adjusted pro-rata for the reduction in the interest transferred.

205. Since the two transactions were close together in time, we might expect that the two transactions would have a similar price (adjusted for the size of the interest changing hands). While Total obtained the largest interest and became the operator of the fields,

---

203 See Oil Search press release of 27 February 2014.

204 See Total press release of 5 May 2021 (*Papua New Guinea: Total and the Government of Papua New Guinea confirm the remobilization and the planning of the Papua LNG project*). Total plans for a final investment decision in 2023.

205 See Oil Search press release of 27 February 2014.

206 In this context, “gross interest” refers to the equity share before the State exercised its back-in rights.

207 InterOil Corporation Press Release, “InterOil Selects Total SA for PNG Gas Development”, 5 December 2013, https://www.marketscreener.com/quote/stock/TOTALENERGIES-SE-12324760/news/Total-SA-nbsp-InterOil-Selects-Total-SA-for-PNG-Gas-Development-17583517/. See also JP Morgan, “OSH puts the cat among the kumuls in buying Elk/Antelope minorities”, 27 February 2014.

208 Ibid.

209 Total Energie, “Total and InterOil close Elk-Antelope deal”, 26 March 2014, https://www.totalenergies.com/media/news/press-releases/total-et-interoil-finalisent-la-transaction-elk-antelope.

210 Note that the interests stated above are “gross” interests before the exercise of the State’s back-in rights.

Oil Search may have anticipated that it would be able to obtain the largest stake at the time it agreed to purchase the minority interests.[211]

206. Both the Total and the Oil Search transactions were made up of a fixed payment[212] and a variable payment that would depend on an updated estimate of the size of the fields that was to be made after drilling another appraisal well. As a result, for both purchasers the total amount paid would depend on how much gas the field was found to contain after the appraisal well had been drilled. Total paid a smaller fixed amount and agreed to pay a larger per unit variable amount, whereas Oil Search paid a larger fixed amount and a smaller per unit variable amount. In Table 5 we compare the price that would be paid by each acquirer at different 2C resource levels.

---

[211] Oil Search considered that, having acquired the minority interests in PRL-15 before the Total–InterOil deal had been completed, it had acquired notification and pre-emption rights over the InterOil share that was to be sold to Total. Commentators and analysts speculated that Oil Search intended to replace Total with Oil Search's partner in the PNG-LNG project, ExxonMobil, in a move designed to more efficiently develop the PRL-15 field. The dispute was taken to arbitration and ultimately Oil Search was unsuccessful, with the Total–InterOil deal completing as announced in March 2014. See Energy News Bulletin, *Oil Search 'pursuing' Elk-Antelope dispute*, 24 April 2014, https://www.energynewsbulletin.net/png/news/1092273/oil-search-pursuing-elk-antelope-dispute; Energy News Bulletin, *Oil Search arbitration could 'open door' for ExxonMobil*, 6 November 2014, https://www.energynewsbulletin.net/png/news/1094695/oil-search-arbitration-could-open-door-for-exxonmobil; Oil & Gas Journal, *InterOil wins arbitration over rights dispute with Oil Search*, 11 February 2015, https://www.ogj.com/general-interest/companies/article/17246980/interoil-wins-arbitration-over-rights-dispute-with-oil-search.

[212] In Total's case, part of the fixed payment was to be paid later when the project started producing LNG. We include both elements in the Total fixed payment.

TABLE 5: OIL SEARCH AND TOTAL'S ACQUISITION OF PRL-15 INTERESTS

			Elke-Antelope Field Volume Production (tcfe)					
		Sources	5.30	6.00	7.00	8.00	9.00	10.00
			[A]	[B]	[C]	[D]	[E]	[F]
OSH Acquisition								
[1]	Fixed Payment	Oil Search ASX Announcement	$900.00	$900.00	$900.00	$900.00	$900.00	$900.00
[2]	Variable Payment	See Notes	$0.00	$0.00	$0.00	$176.97	$353.94	$530.91
[3]	Total Indicative Price	[1] + [2]	$900.00	$900.00	$900.00	$1,076.97	$1,253.94	$1,430.91
[4]	Unit Price ($/mcfe)	[3] ÷ 22.84% ÷ Volume ÷ 1,000	$0.74	$0.66	$0.56	$0.59	$0.61	$0.63
Total Acquisition								
[5]	Fixed Components	Total Press Release	$539.00	$539.00	$539.00	$539.00	$539.00	$539.00
[6]	Variable Payment - Tranche 1	See Notes	$1,140.00	$1,140.00	$1,140.00	$1,140.00	$1,140.00	$1,140.00
[7]	Variable Payment - Tranche 2	See Notes	$0.00	$480.00	$880.00	$880.00	$880.00	$880.00
[8]	Variable Payment - Tranche 3	See Notes	$0.00	$0.00	$500.00	$1,500.00	$2,500.00	$3,500.00
[9]	Total Variable Payments	([6] + [7] + [8]) × 40.13%	$457.45	$650.06	$1,011.20	$1,412.47	$1,813.74	$2,215.01
[10]	Total Indicative Price	[5] + [9]	$996.45	$1,189.06	$1,550.20	$1,951.47	$2,352.74	$2,754.01
[11]	Unit Price ($/mcfe)	[10] ÷ 40.13% ÷ Volume ÷ 1,000	$0.47	$0.49	$0.55	$0.61	$0.65	$0.69

Notes:

The estimated Elke-Antelope Field volume productions are designed to show the range of likely transaction values. Independent analysis undertaken by InterOil in 2012 had indicated a low case scenario of 6.83 tcfe, a high case of 10.85 tcfe and a best case of 9.07 tcfe. In Oil Search's announcement of its acquisition of PRL-15 interests to the ASX, it estimated that PRL-15 gross contingent resources were 5.3 tcfe of gas, but also noted that a resource certification had been completed on behalf of the selling party in December 2013, which reported a recoverable raw gas resource of 7.0 tcfe.

Note that all equity interests and prices calculated after equity interests are before the PNG Government's rights to back-in.

[1], [5]: Total fixed payments in Oil Search and Total's transactions.

[2]: Variable payments of USD $775.00m per tcfe for Elke-Antelope volumes over 7.00 tcfe, applied to Oil Search's interest in PRL-15 of 22.84%.

[6]: Variable payments of USD $600.00m per tcfe for Elke-Antelope volumes over 3.50 tcfe, but smaller than 5.40 tcfe.

[7]: Variable payments of USD $800.00m per tcfe for Elke-Antelope volumes over 5.40 tcfe, but smaller than 6.50 tcfe.

[8]: Variable payments of USD $1000.00m per tcfe for Elke-Antelope volumes over 6.50 tcfe.

[9]: Applying the variable payments to Total's interest in PRL-15 of 40.13%.

[4], [11]: Indicative unit prices for comparison purposes.

207. Table 5 shows that if the volume turned out to be 7 tcfe then Oil Search and Total both paid about USD 0.55 per mcfe, while if the volume turned out to be smaller Oil Search paid more per unit of gas resource, and if it turned out to be larger, Oil Search paid less than Total.[213]

208. Analyst commentary at the time of the Oil Search transaction noted that Oil Search had agreed to a significantly larger fixed upfront payment when compared to the Total transaction. A report by Credit Suisse released in response to the announcement of the

[213] Note that the fixed component of the Total transaction was structured differently to the Oil Search transaction. Whereas Oil Search agreed to pay fixed consideration of USD $900 million, payable at transaction completion (which was expected to be within 2 weeks of the transaction's announcement on 27 February 2014), the fixed consideration agreed under the Total transaction was to be paid in a staged manner. Total agreed to pay USD $401 million at transaction completion, with a further USD $73 million payable on a final investment decision for an Elk-Antelope LNG project, and USD $65 million payable on first LNG cargo: See Oil Search, "ASX Announcement: Oil Search to acquire interest in PRL 15 (Elk-Antelope), providing core strategic position in future LNG developments in PNG", 27 February 2014; Total Energie, "Total and InterOil close Elk-Antelope deal", 26 March 2014, https://www.totalenergies.com/media/news/press-releases/total-et-interoil-finalisent-la-transaction-elk-antelope. In comparing the two transactions in Table 5, we have directly compared the entirety of the fixed consideration as a whole and have not considered the costs or risks associated with the structure of the two transactions.

Oil Search transaction stated that "the initial price paid to enter PRL-15 is a large number for an unquantified (albeit highly prospective) resource".[214] That analyst noted that Oil Search was paying a premium upfront compared to the Total transaction, but was paying "slightly less in the long-term if the resource proves to be at the top end of the range (>8/9 tcf)". Other analysts also agreed that the Oil Search transaction was "more 'front' loaded in terms of dollars committed",[215] and that Total had "offered a fixed price component much lower than [Oil Search], but a resource upside payment much higher."[216] One analyst said "It seems as though that OSH has paid a significant premium upfront to secure the minorities interests away from Interoil/Total. OSH has taken more risk by front loading the payments so that none of them depend upon project progress milestones such as FID or first LNG. While in the upside cases OSH will pay a little less per certified mcfe (say 15%) in the downside cases it has paid far more (up to 200% more)."[217] In contrast, another said "The look through transaction is that provided by Total and InterOil, due to complete at the end of 1Q'14. Although the Oil Search transaction is more 'front' loaded' in terms of dollars committed, at around the 7Tcf resource mark, the transactions are a wash."[218]

209. Our impression of analyst commentary at the time is that some analysts thought that the Oil Search and Total transactions were at a similar price, some thought Oil Search had over-paid, and some thought that Oil Search had achieved a favourable deal.[219]

210. Overall, we have not seen any evidence to suggest that the Oil Search PRL-15 acquisition was at a price that was not justified: the price Oil Search paid was similar to the price that Total paid.

Declaration

We confirm that our duty is to assist the Commission and that we have provided the above opinions impartially based on our expertise and experience. We have sought to

[214] Credit Suisse Equity Research, "Oil Search – Plenty of food for thought", 27 February 2014, p. 1.

[215] RBC Capital Markets Equity Research, "A result, a deal and a capital raising", 27 February 2014, p. 4.

[216] JP Morgan, "Oil Search puts the cat among the kumuls in buying Elk/Antelope minorities", 27 February 2014, p. 2.

[217] *Ibid*., p. 3.

[218] RBC Capital Markets Equity Research, "A result, a deal and a capital raising", 27 February 2014, p. 4.

[219] Morgan Stanley, "Oil Search Ltd: Consolidating gas next", 28 February 2014, p. 1: ("The price [for the Oil Search PRL-15 transaction] is reasonable in our view for a large and semi-proven gas resource"); RBC Capital Markets Equity Research, "A result, a deal and a capital raising", 27 February 2014, p. 3: ("on balance we see this [Oil Search PRL-15 transaction and share subscription to PNG] as a good deal for the tangible and intangible benefits it brings to OSH and its gas expansion options").

set out all of the assumptions used in our report and refer to all of the documentation upon which we have relied. We have made all enquiries relevant to our report that arise from the material that we have reviewed and have not omitted any matters of significance that are relevant to the issues we have been asked to address.

Signed by **Toby Brown** on behalf of The Brattle Group:

14 July 2021

Appendix A: Resumes of the authors

A.1 Toby Brown

A.2 Rand Ghayad

A.3 George Oldfield

A.4 Alberto Vargas

TOBY BROWN
Principal

Sydney +61.2.8123.0999 Toby.Brown@brattle.com

Dr Toby Brown heads Brattle's Sydney office. He specializes in energy markets and infrastructure regulation, and has consulted for oil and gas producers, pipelines, utilities and regulators in Australia, New Zealand, Europe, the United States and Canada. He provides litigation support in a wide range of commercial disputes, including damages estimation, valuation and pricing.

Dr Brown's disputes experience includes LNG pricing, gas pricing arbitrations, a rail access arbitration, a National Electricity Rules dispute over electricity network prices, and commercial litigation relating to infrastructure valuation and valuing intellectual property. Dr Brown's consulting experience includes gas and electricity wholesale market design, network access pricing, and advising on best practices for infrastructure access based on experience in different jurisdictions worldwide. He has advised AEMO, AEMC and market participants. He has particular expertise in incentive-based regulation of energy networks.

Prior to joining Brattle, Dr Brown worked at the UK energy regulator, Ofgem. He holds a DPhil in Chemistry from the University of Oxford.

EDUCATION

- DPhil in Chemistry, University of Oxford, 1999
- BA (Hons) in Chemistry, University of Oxford, 1995

PROFESSIONAL WORK EXPERIENCE

- Principal, The Brattle Group, 2015–present
- Associate then Senior Associate, The Brattle Group, 2006–2015
- Strategy then European teams, Ofgem, 2002–2006
- Consultant then Senior Consultant, Oxera, 1999–2002

AREAS OF EXPERTISE

- Natural gas and electricity markets
- Network regulation
- Infrastructure access and valuation

TESTIMONY

- Before the Alberta Utilities Commission, *Rebuttal evidence of Dr Toby Brown*, Proceeding 25422, September 2020.
- Before the Public Utilities Commission of Hawaiʻi, *PBR and Utility Capital Expenditure Needs – Approach in New Zealand*, docket number 2018-0088, June 2020.
- Before the Alberta Utilities Commission, *Written evidence of Dr Toby Brown*, Proceeding 25422, May 2020.
- Before the Public Utilities Commission of Hawaiʻi, *PBR Plan Design: Survey of Current US Practice*, docket number 2018-0088, May 2020 (co-authored with Pearl Donohoo-Vallett).

- In the High Court of New Zealand, *Brief of Evidence in the matter between Todd Petroleum Mining Company Limited and Vector Gas Trading Limited*, November 2019.
- Before the Canadian Energy Regulator, *Written evidence of Dr Toby Brown and Dr Paul R Carpenter for Petronas Energy Canada Ltd.*, Hearing Order RH-001-2019, NEB File OF-Tolls-Group1-N081-2019-01 01, August 2019.
- Before the Public Utilities Commission of Hawai'i, *Modifying the PBR framework in Hawai'i: Precedents for determining an annual revenue adjustment in Multi-year Rate Plans*, docket number 2018-0088, August 2019.
- Before the Public Utilities Commission of Hawai'i, *Modifying the PBR framework in Hawai'i: Comments on the PUC Staff proposal*, docket number 2018-0088, March 2019.
- Before the British Columbia Utilities Commission, *British Columbia Hydro and Power Authority Review of the Regulatory Oversight of Capital Expenditures and Projects,* Project No. 1598877, February 2019.
- Before the Public Utilities Commission of Hawai'i, *Improving the PBR Framework in Hawai'i, Addressing the risk of "Capex Bias"*, docket number 2018-0088, January 2019.
- In the Supreme Court of Victoria, *Affidavit in the matter between Lochard Energy (Iona Operations Holding) Pty Ltd, and Energy Australia Investments Pty Ltd,* September 2018.
- Before the Alberta Utilities Commission, *AUC-initiated next generation performance-based regulation generic proceeding,* Proceeding ID No. 20414, March 2016.
- Before the Alberta Utilities Commission, *Enmax Power Corp.,* Proceeding ID No. 21149, December 2015.
- Before the Public Utilities Commission of Hawai'i, *Incentive-based ratemaking: Recommendations to the Hawaiian Electric Companies*, Docket 2013–0141, May 2014 and September 2014.
- Submitted to the Independent Pricing and Regulatory Tribunal of New South Wales, *Wholesale Gas Price for AGL's VPA Proposal for 2014–16*, February 2014.

PUBLICATIONS AND PRESENTATIONS

These publications are available at http://brattle.com/experts/toby-brown.

A Review of International Approaches to Regulated Rates of Return, with John Anthony, Lucrezio Figurelli, Dan Harris, Nguyet Nguyen and Bente Villadsen, prepared for The Australian Energy Regulator, June 2020.

Implementing Recommended Improvements to Market Power Mitigation in the WEM, with Samuel A. Newell, prepared for Energy Policy WA, April 2020.

Financial Information Disclosed by Gas Pipelines in Australia: Under Part 23 of the National Gas Rules, with Paul R. Carpenter and Nguyet Nguyen, prepared for the Department of the Environment and Energy, October 2019.

Stakeholder Feedback on the AER's Process for the 2018 Rate of Return Instrument, with Nguyet Nguyen, Ben Qiu and Nick Vernon, prepared for the Australian Energy Regulator, June 2019.

International Review of Demand Response Mechanisms in Wholesale Markets, with Samuel N Newell, Kathleen Spees and Cathy Wang, prepared for the Australian Energy Market Commission, June 2019.

High-Impact, Low-Probability Events and the Framework for Reliability in the National Electricity Market, with Neil Lessem, Roger Lueken and Kathleen Spees, prepared for the Australian Energy Market Commission, February 2019.

Incentive Mechanisms in Regulation of Electricity Distribution: Innovation and Evolving Business Models, with Neil Lessem and Bill Zarakas, prepared for the Electricity Networks Association New Zealand, October 2018.

International Experiences in Retail Electricity Markets: Consumer Issues, with Agustin J. Ros, Serena Hesmondhalgh, James D. Reitzes, and Neil Lessem, Prepared for The Australian Competition and Consumer Commission, June 2018.

New Network Tariff Designs, with Neil Lessem, Presented at the Center for Research into Regulated Industries (CRRI) Western Conference, June 2018.

Electricity Distribution Network Tariffs: Principles and Analysis of Options, with Ahmad Faruqui, and Neil Lessem, Prepared for The Victorian Distribution Networks, April 2018.

Performance Based Regulation Plans: Goals, Incentives and Alignment, with William Zarakas, Léa Grausz, Heidi Bishop, and Henna Trewn, Prepared for DTE Energy, December 2017.

Near-Term Reliability Auctions in the NEM: Lessons from International Jurisdictions, with Kathleen Spees, Samuel A. Newell, David Luke Oates, Neil Lessem, Daniel Jang, and John Imon Pedtke, Prepared for the Australian Energy Market Operator, August 2017.

Lifting the Lid on Price Revision and Re-Opener Clauses: LNG Pricing and Price Review Triggers, with Dan Harris, and Léa Grausz, Presented at C5 Group's Long Term Gas Supply Contracts, Singapore, February 2017.

Market Power Mitigation Mechanisms for the Wholesale Electricity Market in Western Australia, with Samuel Newell, Walter Graf, James Reitzes, Henna Trewn and Kai Van Horn, Prepared for the Government of Western Australia Department of Finance, Public Utilities Office, September 2016.

Benefits and Costs of Integration in Transmission/Transportation Networks: An Application to Eastern Australia Gas Markets, with Paul Carpenter, James Reitzes, Jeremy Verlinda and Neil Lessem, prepared for the APA Group, August 2016.

The Tariff Transition: Considerations for Domestic Distribution Tariff Redesign in Great Britain, with Ryan Hledik, Ahmad Faruqui, Jürgen Weiss, and Nicole Irwin, Prepared for Citizens Advice, April 2016.

"Efficient Tariff Structures for Distribution Network Services", with Ahmad Faruqui and Léa Grausz, in *Economic Analysis and Policy*, December 2015, pp. 139–149.

International Review of Demand Response Mechanisms, with Samuel Newell, David Luke Oates and Kathleen Spees, prepared for the Australian Energy Market Commission, October 2015.

Structure of Electricity Distribution Network Tariffs: Recovery of Residual Costs, with Ahmad Faruqui, report prepared for the Australian Energy Market Commission, August 2014.

Incentive-based ratemaking: Recommendations to the Hawaiian Electric Companies, with Michael J. Vilbert and Joseph B. Wharton, report prepared for the Hawaiian Electric Companies and submitted to the Public Utilities Commission of Hawai'i in Docket No. 2013–0141.

International Experience In Pipeline Capacity Trading, with Dan Harris and Alessandro Massolo, report prepared for the Australian Energy Market Operator, August 2013.

Wholesale Gas Price for AGL's VPA Proposal for 2014–16 (public version), with Paul Carpenter, prepared for AGL and submitted to the Independent Pricing and Regulatory Tribunal of New South Wales, February 2014.

Estimating the Cost of Equity for Regulated Companies, with Bente Villadsen, Paul R. Carpenter, Michael J. Vilbert, and Pavitra Kumar, report prepared for the Australian Pipeline Industry Association, February 17, 2013.

Estimating the Cost of Debt, with Bente Villadsen, a report for the Dampier-Bunbury Pipeline, March 4, 2013.

Framework for Assessing Capex and Opex Forecasts as Part of a "Building Blocks" Approach to Revenue/Price Determinations, with Pinar Bagci, Paul R. Carpenter, and Philip Q Hanser, report prepared for the Australian Energy Market Commission, June 2012.

Approaches to Setting Electric Distribution Reliability Standards and Outcomes, with Serena Hesmondhalgh and William P. Zarakas, a report to the Australian Energy Market Commission, January 2012.

Does the Market Risk Premium Change Over Time?, discussion at the Australian Competition and Consumer Commission Regulatory Conference 2011, July 28, 2011.

Is "Cost-of-Service Plus Incentives" the Best We Can Do?, with William B. Tye, paper presented to the Australian Competition and Consumer Commission Regulatory Conference 2011, July 28, 2011.

Incentive Regulation: Lessons from other Jurisdictions, with Paul R. Carpenter and Johannes P. Pfeifenberger, presented at the Alberta Utilities Commission Performance Based Ratemaking workshop, the Van Horne Institute, May 26-27, 2010.

Price Re-Openers in Natural Gas Supply Contracts: Avoiding Costly Mistakes in Arbitration, with Paul Carpenter, Brattle Newsletter 2010 No. 1 (Energy).

Is the smart grid going to fare better in competitive markets?, with Ahmad Faruqui, presented at the Gulf Coast Power Association Spring Conference, Houston, TX, April 14, 2010.

Options for Reforming the Building-Blocks Framework, with Paul Carpenter, a report to the Australian Energy Market Commission, December 16, 2009.

Review of Incentive Power and Regulatory Options in Victoria, with Paul Carpenter, a report to the Australian Energy Market Commission, December 2009.

Incentives under Total Factor Productivity Based and Building-Blocks Type Price Controls, a report to the Australian Energy Market Commission, with Boaz Moselle, June 2009.

EU Climate and Energy Policy to 2030 and the Implications for Carbon Capture and Storage, a report for Alstom Power Systems, with Serena Hesmondhalgh and David Robinson, March 2009.

Use of Total Factor Productivity Analyses in Network Regulation: Case Studies of Regulatory Practice, a report to the Australian Energy Market Commission, with Boaz Moselle, October 2008.

Critique of the Industry Codes Governance Arrangements, a report to Ofgem, with Serena Hesmondhalgh, Boaz Moselle, and Simmons & Simmons, June 2008.

Models of Inter-regional Transmission Charging, a report to the Australian Energy Market Commission, with Boaz Moselle, March 2008.

International Review of Transmission Planning, presentation at Transmission and Distribution 2008, Amsterdam, March 12, 2008.

International Review of Transmission Planning Arrangements, a report to the Australian Energy Market Commission, with Boaz Moselle, October 2007.

RAND GHAYAD

Senior Associate

Washington, DC | +1.617.581.7523 | Rand.Ghayad@brattle.com

Dr. Rand Ghayad is an economist with nearly 15 years of experience in economic and financial consulting, holding positions in federal government, private sector, international organizations, and academia. He has extensive experience advising governments and other sovereign entities on complex financial and economic matters, including debt restructuring and fiscal and monetary policy issues. He is also an expert in regulatory compliance, focusing on anti-money laundering, sanctions, anti-bribery and corruption.

Dr. Ghayad has assisted corporations, the US Department of Justice, and the Securities and Exchange Commission in developing economic and financial analyses in a variety of high-profile investigations involving false claims, Ponzi schemes, financial market fraud, and shams. He has also worked on securities class actions requiring econometric damages analysis and valuation disputes, as well as conducted statistical and damages analyses related to alleged discrimination in hiring, promotion, and pay.

Before joining the Brattle Group, Dr. Ghayad was an economist at the International Monetary Fund. There, he advised countries on a broad range of macroeconomic and financial issues, from the comprehensive surveillance review and sovereign debt defaults to institutional modernization initiatives, including the Fund's overall response to Covid-19.

Previously, Dr. Ghayad was an economic consultant with the Brookings Institution, the Federal Reserve Bank of Boston, and MIT's Institute for Work and Employment Research. He has been retained to provide expert advice on labor market reforms to numerous governments, including France, the UK, Kuwait, and Qatar.

EDUCATION

Dr. Ghayad received his Ph.D. in Labor Economics from Northeastern University. He received his M.S. in Financial Economics and a Graduate Certificate in Financial Markets and Institutions from Boston University.

SELECTED PUBLICATIONS

"Elections and the Economy: What to do about Recessions?" (with Michael Cragg and Frank Pinter) *The Economists' Voice, 2016.*

"The Jobless Trap," *B.E. Journal of Macroeconomics (forthcoming).*

"Long-term Unemployment and the Beveridge Curve," (with William T. Dickens) *(forthcoming).*

*"*Growing Apart: The Evolution of Income vs Wealth Inequality," (with Michael Cragg) *The Economists' Voice, 2015.*

"A Decomposition of Shifts of the Beveridge Curve," *Federal Reserve Bank of Boston Public Policy Briefs, May 2013.*

"What Can We Learn by Disaggregating the Un-employment Vacancy Relationship?," (with William T. Dickens) *Federal Reserve Bank of Boston Public Policy Briefs*, December 2012.

"New Insights Into Long-Term Unemployment In The U.S. And Other OECD Countries," *International Labor Organization, Policy Paper*, September 2013.

"The Interaction of Managerial and Tax Transfer Pricing," *Bloomberg BNA Transfer Pricing Report, Vol. 24, No. 17,* January 2016.

"Making the Most of Document Analytics," *Law360,* Dec 2015.

"Big Data's Big Impact in Financial Investigations," *Law360,* May 2015.

"Tax Inequities," *The Huffington Post*, May 2015.

"Dodd-Frank Regulations and the Employment Puzzle," *The Huffington Post*, August 2014.

BOOK CHAPTERS

"Supporting Experienced Long-Term Unemployed Professionals," (with Ofer Sharone) *Transforming U.S. Workforce Development Policies for the 21st Century,* 2015. *Edited by Carl E. Van Horn, Todd Greene, and Tammy Edwards ed. Rutgers University Press.*

"How Can We Help The Long-Term Unemployed," (with Ofer Sharone) *The U.S. Labor Market after the Great Recession, 2015. Edited by Till von Wachter & Arne L. Kalleberg ed. Russell Sage Foundation Press. (forthcoming)*

SPEAKING ENGAGEMENTS AND PRESENTATIONS

2014: Advised the Prime Minister and Labor and Finance Ministers in France on the best practices to hiring the Long-term Unemployed in France.

2014: Met with President Obama and Gene Sperling at the White House to discuss the challenges of long-term unemployment and to plan new initiatives for developing a skilled and competitive work force.

2012-2014: Met regularly with senior staff at the Federal Reserve Bank of Boston to discuss new research on unemployment and monetary policy.

2014: Keynote speaker at Annual Labor Commissioner's meeting organized by the U.S. Department of Labor.

2014: Keynote speaker at the U.S. Department of Labor (Employment & Training Administration) semi-annual meeting on federal government job training and worker dislocation programs.

2014: Keynote speaker at a national conference on "The Crisis of Long-Term Unemployment" at the Massachusetts Institute of Technology.

George S. Oldfield
Principal Emeritus

Washington, DC | +1.202.955.5050 | George.Oldfield@brattle.com

Dr. George S. Oldfield received his M.A., and Ph.D. from the University of Pennsylvania, Philadelphia, PA, with a Finance concentration at The Wharton School, and his A.B. (Magna Cum Laude) in Economics from The College of William and Mary, Williamsburg, VA. His recent work at The Brattle Group has been on the evaluation of due diligence procedures by underwriters of mortgage-backed securities, security repurchase agreements, foreign exchange trading, and bank principal trading procedures. He has also worked on credit default swaps and mortgage derivatives, executive compensation, market-value measures of employee stock option plans, debt and equity portfolio strategies, and due diligence procedures for underwriting new issues of securities including 144A private placements. Dr. Oldfield was the director of Brattle's Washington, DC office from 2007 to 2014.

Prior to joining The Brattle Group in May 2006, Dr. Oldfield was an Economic Research Fellow at the U.S. Securities and Exchange Commission specializing in Rule AB disclosures, financial derivative pricing, corporate pension plan funding, and financial aspects of executive compensation disclosure. He was a member of the SEC's risk assessment subcommittee for credit derivatives. He is the coauthor of the SEC's two public statements on technical aspects of employee option pricing under Financial Accounting Statement 123 (Revised). He also was an examining officer in SEC Enforcement investigations.

Previously, as an investment banker, Dr. Oldfield was the Director of trading risk management and a member of his firm's executive asset-liability risk committee. The committee approved trading desks' business plans, risk exposures, capital allocations, and counter-party limits, as well as all underwriting and security distribution plans. He developed his firm's first comprehensive risk management system for principal trading, including fixed income, equity and foreign exchange derivatives and also matched book positions. Prior to that, Dr. Oldfield managed mortgage- and asset-backed structuring and trading, research for financial derivatives and mortgage securities, financial institutions investment banking services, and portfolio optimization transactions for institutional fixed income customers. He also raised over $2 billion for investment banking clients with underwritten issues of securities. Dr. Oldfield passed the Series 7 and 63 exams while at PaineWebber.

Dr. Oldfield has been a finance professor at the Amos Tuck School, Dartmouth College; the Johnson Graduate School of Management, Cornell University; and the Mason School of Business, the College of William and Mary. He taught graduate finance courses on a variety of topics including international finance and foreign exchange markets, fixed income securities, derivatives, equities, and investment banking. He published research on related topics widely in finance journals during his academic career.

During graduate school, Dr. Oldfield worked at the Federal Reserve Banks of New York and Philadelphia where he specialized in bank and bank holding company regulation. Before he started graduate school, Dr. Oldfield was a summer intern at Goldman Sachs in New York.

EXPERIENCE

Professional Experience

Economic Research Fellow, U.S. Securities and Exchange Commission, 2004-2006.

Managing Director, PaineWebber Capital Markets, 1986-1993

Economist, Federal Reserve Banks of New York and Philadelphia, 1969, 1971-1974

Academic Experience

As a finance professor, Dr. Oldfield taught graduate and executive courses in fixed income securities and derivatives, investment banking, international finance, and corporate finance. He won several teaching excellence awards. Dr. Oldfield has also published financial research articles in the leading professional journals. Recent publications have concerned corporate bond valuation, pricing financial derivatives and risk management.

- **Richard S. Reynolds Jr., Professor of Finance,** Mason School of Business, College of William and Mary, 1993-2004.
- **Research Director,** Wharton Financial Institution Center, the University of Pennsylvania, 1993-1994 (a joint appointment with my concurrent position at the Mason School, College of William and Mary).
- **Professor of Finance,** Johnson Graduate School of Management, Cornell University, 1977-1986.
- **Visiting Associate Professor of Finance** (Fall Semester), William E. Simon Graduate School of Business Administration, University of Rochester, 1983.
- **Assistant Professor of Finance**, Amos Tuck School, Dartmouth College, 1974-1977.

Recent Consulting Experience

- **Residential Mortgage Backed Securities.** Gave deposition testimony for plaintiffs in more than 15 cases concerning the adequacy of due diligence and disclosures in private label securitizations of subprime mortgages.
- **International Commercial Banking Company.** For a complaint against a hedge fund, evaluated the hedge fund's investment performance and reporting accuracy in taking long and short positions in several thousand different mortgage derivative instruments.

- **Federal Financial Institution Regulatory Agency.** For an administrative complaint against former senior executives of a regulated financial institution, calculated the damage to shareholders caused by accounting practices that influenced executive compensation.
- **Commercial Finance Company.** To prepare for possible tax litigation, analyzed the financial properties of several large cross-border lease transactions, including the method of lease finance and the likelihood of purchase option exercise by the lessee.

HONORS, PRIZES, AND AWARDS

Business Week Business School Survey "Master Teacher," 2002.

Frank Batten Young Scholars Research Program Founder, 1999-2004.

Dean's MBA Teaching Award, 1998.

Evening MBA Outstanding Professor Award, 1997.

MBA Faculty Excellence Award, 1996.

Guest Faculty Member, Amsterdam Institute of Finance, Amsterdam, the Netherlands, 1991.

Research Review Committee, The Garn Institute of Finance, University of Utah, 1989-1991.

Advisory Board for Finance, School of Management, State University of New York at Buffalo, 1988-1990.

Participant, The Legal Institute for Economists, 11th Annual Session, Dartmouth College, 1985.

Distinguished Visiting Research Scholar, Graduate School of Business, Simon Fraser University, Vancouver, B.C., 1985.

BOOK REVIEW

"The Trouble with Sunspots," *Strategy + Business* (Spring 2014).

SELECTED PROFESSIONAL PUBLICATIONS

With Sujay Dave, "How Prosecutors Misconstrued OTC Market-Making Practices," Law360 (June 25, 2019), Available at: https://www.law360.com/articles/1172417/how-prosecutors-misconstrued-otc-market-making-practices

With John Anthony, "Collateralized Loan Obligations: Subprime Déjà Vu?" Law360 (January 28, 2019), Available at: https://www.law360.com/articles/1122376/print?section=banking.

With Angela Lam and Ethan Moore, "How Blockchain Could Rescue 10b-5 Damages." Law360 (August 27, 2018), Available at: https://www.law360.com/assetmanagement/articles/1076695/how-blockchain-could-rescue-10b-5-damages.

With Paul Hinton and Andrew Newman, "The Johnson Conviction and Fallout for Forex Market," Law360 (December 6, 2017), Available at: https://www.law360.com/articles/991467/the-johnson-conviction-and-fallout-for-forex-market.

"The European Debt Crisis and the Role of the European Central Bank," with Michael Cragg, Jehan deFoneska, and Natalia Piqueira, *The Brattle Group Finance Newsletter,* (November 2012).

"Out of the Frying Pan and Into the Fire: Will the Dodd-Frank Swaps Proposal Reduce Systemic Risk?" with Julia Litvinova, *The Brattle Group Finance Newsletter,* Issue 01 (2011).

"Corporate Pension Plans: New Developments and Litigation," with Bente Villadsen and Urvashi Malhotra, *The Brattle Group Finance Newsletter,* Issue 01 (2010).

"Understanding the Credit Crisis Part 2: Getting Down the Mountain," with Michael Cragg and Jehan de Foneska, *The Brattle Group Finance Newsletter,* Issue 02 (2009).

"Lifeboats for Banks— Let the Holding Companies Swim," with Michael Cragg, *The Economists' Voice,* Vol. 6, Issue 6, Article 1 (2009). Available at: http://www.bepress.com/ev/vol6/iss6/art1

"Understanding the Credit Crisis: The Treasury, the Fed, and the Banking System," with Michael Cragg, *The Brattle Group Finance Newsletter,* Issue 02 (November 2008).

"Lawsuits Stalk Pension Fiduciaries," with Dennis Logue, *The Brattle Group Finance Newsletter,* Issue 01 (September 2008).

"Expanding Subprime Mortgage Crisis Increases Litigation Risks," *The Brattle Group Issue Brief* (March 2008).

"Subprime Mortgage Problems: What to Look For and Where to Look," *The Brattle Group Finance Newsletter,* Issue 01 (2007).

"Financial Auctions: A New Technique for Trading Financial Instruments," *PaineWebber Capital Markets Quantitative Research, Structured Finance Group* (March 1991).

"An Introduction to CMOs," *PaineWebber Capital Markets Quantitative Research, Structured Finance Group* (October 1990).

"Private Pensions: Who Gets What When," *Federal Reserve Bank of Philadelphia Business Review* (March 1974).

SELECTED ACADEMIC PUBLICATIONS

"ESOs for CFOs: Pricing Employee Stock Option Grants," *Journal of Applied Finance* (Spring/Summer 2008).

"Bond Games," *Financial Analysts Journal* (May/June 2004).

"Bits, Bets, and Making Book on an Index," *Journal of Risk* (Winter 2000/2001).

"Making Markets for Structured Mortgage Derivatives," *Journal of Financial Economics* (September 2000).

"Risk Management in Financial Institutions," with Anthony M. Santomero, *Sloan Management Review* (Fall 1997).

"The Economics of Structured Finance," *The Journal of Fixed Income* (September 1997).

"The Determination of Interest Rates," in *Handbook of Modern Finance,* Dennis E. Logue, ed. (New York: Warren Gorham Lamont, 1994), Third Edition, 2003 Revision, Chapter B1.

"Forward Options and Futures Options," with Robert A. Jarrow, *Advances in Futures and Options Research* (1988).

"The Stochastic Properties of Term Structure Movements," with Richard J. Rogalski, *Journal of Monetary Economics* (March 1987).

"The Microeconomics of Market Making," with Maureen O'Hara, *Journal of Financial and Quantitative Analysis* (December 1986).

"Futures Contract Options," with Carlos E. Rovira, *Journal of Futures Markets* (Winter 1984).

"Forward Contracts and Futures Contracts," with Robert A. Jarrow, *Journal of Financial Economics* (December 1981).

"Treasury Bill Factors and Common Stock Returns," with Richard J. Rogalski, *The Journal of Finance* (May 1981).

"On Lessees, Lessors, and Whether Pigs Have Wings," with Richard S. Bower, *Journal of Business Research* (March 1981).

"Common Stock Returns Over Open and Closed Trading Periods," with Richard J. Rogalski, *The Journal of Finance,* (June 1980).

"Corporate Debt and Corporate Taxes," with Harold Bierman, *The Journal of Finance* (September 1979).

"An Autoregressive Jump Process for Common Stock Returns," with Richard J. Rogalski and Robert A. Jarrow, *Journal of Financial Economics* (December 1977).

"Forward Exchange Price Determination in Continuous Time," with Richard J. Messina, *Journal of Financial and Quantitative Analysis* (September 1977).

"Managing Foreign Assets When Foreign Exchange Markets Are Efficient," with Dennis E. Logue, *Financial Management* (Summer 1977).

"What's So Special About Foreign Exchange Markets?" with Dennis E. Logue, *Journal of Portfolio Management* (Spring 1977).

"Financial Aspects of the Private Pension System," *Journal of Money, Credit, and Banking* (February 1977).

"Projecting Market Structure by Monte Carlo Simulation: A Study of Bank Expansion in New Jersey, with George R. Juncker, *The Journal of Finance* (December 1972).

TESTIMONY (Last Five Years)

Testimony Before the Tax Appeals Commission, Irish Tax and Customs, September 25, 2018.

Deposition Testimony on Behalf of Plaintiff /

> *Massachusetts Mutual Life Insurance Company v. Goldman Sachs Mortgage Company, et al. and*
>
> *Massachusetts Mutual Life Insurance Company v. Merrill Lynch, Pierce, Fenner & Smith, Inc., et al.,*

United States District Court, District of Massachusetts, Goldman Sachs Mortgage Company, *et al.,* Civil Action No. 3:11-cv-30126-MGM; Merrill Lynch, Pierce, Fenner & Smith, Inc., *et al.,* Civil Action No. 3:11-cv-30285-MGM, May 24, 2017.

Deposition Testimony on Behalf of Plaintiff /

> *Massachusetts Mutual Life Insurance Company v. DLJ Mortgage Capital, Inc., et al. and*
>
> *Massachusetts Mutual Life Insurance Company v. Credit Suisse First Boston Mortgage Securities Corp. et al.*,

United States District Court, District of Massachusetts, DLJ Mortgage Capital, Inc., *et al.,* Civil Action No. 11-cv-30047-MGM; Credit Suisse First Boston Mortgage Securities Corp., *et al.*, Civil Action No. 11-cv-30048-MGM, December 1, 2016.

Deposition Testimony on behalf of Plaintiffs /

> *Assured Guaranty (UK) LTD., in its own right and in the right of Orkney RE II PLC against J.P. Morgan Investment Management Inc. and*
>
> *AMBAC Assurance UK LTD., in the name of Ballantyne RE PLC against J.P. Morgan Investment Management Inc.,*

Supreme Court of the State of New York County of New York, Assured Guaranty (UK) LTD, Index No. 603755/2008, Part 39; AMBAC Assurance UK LTD, Index No. 650259/2009, Part 39, October 13, 2016.

Deposition Testimony on behalf of Plaintiff / *National Credit Union Administration Board, as Liquidating Agent of U.S. Central Federal Credit Union and of Western Corporate Federal Credit Union v. UBS Securities LLC*, U.S. District Court for the District of Kansas, Case No. 12-CV-2591 (JWL), August 18, 2016.

Deposition Testimony on behalf of Plaintiff / *National Credit Union Administration Board, as Liquidating Agent of U.S. Central Federal Credit Union, Western Corporate Federal Credit Union, and Southwest Corporate Federal Credit Union v. Credit Suisse Securities (USA) LLC, et al.*, U.S. District Court for the District of Kansas, Case No. 12-CV-2648 (JWL/JPO), August 16, 2016.

Deposition Testimony on behalf of Plaintiff / *National Credit Union Administration Board, as Liquidating Agent of Southwest Corporate Federal Credit Union and Members United Corporate Federal Credit Union v. Credit Suisse Securities (USA) LLC, Credit Suisse First Boston Mortgage Securities Corp.,* U.S. District Court for the Southern District of New York, Case No. 13-CV-6736 (DLC), January 28, 2016.

Deposition Testimony on behalf of Plaintiff / *National Credit Union Administration Board, as Liquidating Agent of Southwest Corporate Federal Credit Union and Members United Corporate Federal Credit Union v. UBS Securities LLC,* U.S. District Court for the Southern District of New York, Case No. 13-CV-6731 (DLC), January 26, 2016.

Deposition Testimony on behalf of Plaintiffs /

> *Assured Guaranty (UK) LTD., in its own right and in the right of Orkney RE II PLC against J.P. Morgan Investment Management Inc. and*
>
> *AMBAC Assurance UK LTD., in the name of Ballantyne RE PLC against J.P. Morgan Investment Management Inc.,*

Supreme Court of the State of New York County of New York, Assured Guaranty (UK) LTD, Index No. 603755/2008, Part 39; AMBAC Assurance UK LTD, Index No. 650259/2009, Part 39, November 19, 2015.

Deposition Testimony on behalf of Plaintiff / *Federal Home Loan Bank of Seattle, a bank created by federal law, v. Credit Suisse Securities USA LLC, et al.,* Superior Court of Washington for King County, Case No. 09-2-46353-1 SEA, March 12, 2015.

Deposition Testimony on behalf of Plaintiff / *Federal Home Loan Bank of Seattle, a bank created by federal law, v. RBS Securities, Inc., f/k/a Greenwich Capital Markets, Inc., et al.,* Superior Court of Washington for King County, Case No. 09-2-46347-6 SEA, March 12, 2015.

Deposition Testimony on behalf of Plaintiff / *Federal Home Loan Bank of Seattle, a bank created by federal law, v. Bank of America Securities LLC, et al.,* Superior Court of Washington for King County, Case No. 09-2-46319-1 SEA, March 5, 2015.

Deposition Testimony on behalf of Plaintiff / *Federal Home Loan Bank of Seattle, a bank created by federal law, v. Merrill Lynch, Pierce, Fenner & Smith, Inc., et al.,* Superior Court of Washington for King County, Case No. 09-2-46352-2 SEA, March 5, 2015.

Deposition Testimony on behalf of Plaintiff / *Federal Home Loan Bank of Seattle, a bank created by federal law, v. Goldman Sachs & Co., et al,* Superior Court of Washington for King County, Case No. 09-2-46349-2 SEA, February 12, 2015.

Deposition Testimony on behalf of Plaintiff / *Federal Home Loan Bank of Seattle, a bank created by federal law, v. Morgan Stanley & Co, Inc., et al.,* Superior Court of Washington for King County, Case No. 09-2-46348-1 SEA, February 12, 2015.

Deposition Testimony / *The Western and Southern Life Insurance Company, et al., v. Morgan Stanley Mortgage Capital, Inc. and Morgan Stanley Capital I, Inc. and Morgan Stanley & Co., Incorporated and Merrill Lynch, Pierce, Fenner & Smith, Incorporated,* Court of Common Pleas Hamilton County, Ohio, Case No. A1105563, December 2, 2014.

Deposition Testimony / *Starr International Co., Inc., v. United States,* In the United States Court of Federal Claims, Case No. 11-00779(TCW)(Fed. Cl.), June 19, 2014.

Deposition Testimony on Behalf of The Williams Capital Group L.P. */ In re: Lehman Brothers Securities and ERISA Litigation, The California Public Employees' Retirement System vs. Richard S. Fuld, Jr., et al, Civil Action No. 11-cv-01281-LAK,* U.S. District Court Southern District of New York, Civil Action No. 09-md-02017 (LAK), May 2, 2014.

Deposition Testimony / *Deutsche Bank National Trust Company v. Federal Deposit Insurance Corporation, as Receiver for Washington Mutual Bank, JPMorgan Chase Bank, National Association, and Washington Mutual Mortgage Securities Corporation,* U.S. District Court for the District of Columbia, Case No.: 09-CV-1656-RMC, April 23, 2014.

Deposition Testimony / *The Western and Southern Life Insurance Company, et al. v. DLJ Mortgage Capital, Inc., et al.,* Court of Common Pleas, Hamilton County, OH, Case No. A1105352, April 3 & 4, 2014.

Deposition Testimony / *Joel I. Sher, Chapter 11 Trustee for TMST, Inc., f/k/a Thornburg Mortgage, Inc. v. Barclays Capital, Inc.,* U.S. District Court, Northern Division of Maryland, Case No. ELH-11-01982, November 15, 2013.

Alberto Vargas, Ph.D.

Alberto.Vargas@Brattle.com
+1.202.908.2607

ACADEMIC BACKGROUND

2006 – 2012 **Massachusetts Institute of Technology** Cambridge, MA
PhD, Economics.
Fields: Econometrics and Financial Economics.
Thesis: Essays on Financial Economics.

2000 – 2005 **ITAM** Mexico City, MEXICO
BS, Applied Mathematics, Highest Honors.
Thesis: Cumulative Prospect Theory and an Application to Political Economy.

PROFESSIONAL EXPERIENCE

2019 – Present **The Brattle Group** Washington DC
Senior Associate
Provided statistical and financial analysis in international arbitrations, civil litigation and regulatory inquiries.
Case expertise includes:

- Tracing of pledged assets for a collateralized bond dispute.
- Valuation of telecommunication related assets.
- Statistical analysis of consumer surveys.

2012 – 2019 **Cornerstone Research, Inc.** Washington DC/London, UK
Senior Manager (2017-2019)
Manager (2015-2017)
Associate (2012-2015)
Provided economic, statistical and financial analysis in complex financial litigation and regulatory investigations in the USA, Europe, Australia and Latin America.
Case expertise includes:

- Worldwide internal and regulatory inquiries, and civil litigation surrounding interest rate, FX and commodities market manipulation.
- Mortgage backed securities: Civil litigation surrounding mortgage backed securities issued by major banks in the USA. Experience with damages, materiality, sampling, and due diligence analysis.
- Evaluation of credit rating procedures in structured products.
- Evaluation of statistical sampling methodologies in healthcare-related litigation.
- Class certification and damages issues in in securities fraud cases.
- Valuation of energy-related assets.
- Anti-trust telecommunications investigation in Latin America.

2008 – 2012	**Massachusetts Institute of Technology** *Teaching Assistant* Prepared materials, taught review and complementary lectures on microeconomics, econometrics, statistics and finance at the graduate and undergraduate level.	Cambridge, MA
2006	**Universidad Nacional Autonoma de Mexico** *Lecturer* Taught econometric analysis to actuarial science students.	Mexico City, MEXICO
2004 – 2006	**Evercore Casa de Bolsa (formerly Protego Casa de Bolsa)** *Risk Analyst* Calculated risk exposure of client and in-house portfolios, liaised with the Central Bank of Mexico for regulatory inquiries, and served as secretary of the risk committee of the board of directors.	Mexico City, MEXICO
2004	**Evercore Mexico (formerly Protego Asesores)** *Investment Banking Analyst* Conducted research, financial analysis and presentation preparation for corporate governance consulting projects for one of the largest energy firms in Latin America.	Mexico City, MEXICO

PROGRAMING LANGUAGES AND STATISTICAL SOFTWARE

MATLAB, R, Stata, C++.

HONORS AND AWARDS

CONACyT (National Council for Science and Tech.): Fellowship for doctoral studies. 2006 – 2011

ITAM: Ex-ITAM prize for undergraduate thesis (Honorable Mention). 2006

PERSONAL

Mexican citizen, permanent resident of the USA (Green card holder).