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The Petroleum Resource Rent Tax 1987: The case for contemporary reform

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ABSTRACT

Compelling insights into the Hawke Government's (1983-1991) political and consultative processes, which resulted in the Australia's *Petroleum Resource Rent Tax Assessment Act 1987 (PRRT)* are provided by this original research. The private papers of Dr Craig Emerson (a ministerial economic advisor in the 1980s petroleum tax reform) allow a unique perspective into 1984 of the government's policy process via hand-written files, annotated draft reports, and personal observations. Retrieved files from the National Archives of Australia from the 1980s complete the investigation and show a focus on the taxation of oil, a liquid form of petroleum.

Contemporary developments in the extraction of gas (another form of petroleum) and the lower than expected receipts for government have raised concerns about the effectiveness of petroleum taxation in Australia. The PRRT revenue take since the 2002-03 financial year has fallen, despite new business investments of A$200 billion for integrated gas projects. A key question concerns modifications necessary to the current fiscal regime for petroleum to facilitate an equitable return to the Australian community. Findings point to necessary changes to the petroleum fiscal regime required to arrest falling revenues. This research is significant for its unique review of Australia's petroleum taxation from the 1980s to the rise in the 2000s of natural gas projects for LNG export. It forms an important contribution to the current federal PRRT Review.

Keywords: fiscal policy, Australia, petroleum, gas, oil crisis, oil crisis 2014, taxation, resource rent tax, tax reform, royalty

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Introduction

Australia's first legislation for a resource rent tax took effect in 1988 and applied to petroleum production from future offshore petroleum fields in Commonwealth waters, other than fields in Victoria's Bass Strait, and the North West Shelf off the West Australian coast.[1] Although the Hawke Labor Government held a majority in the House of Representatives from 1983 to 1987, it lacked a majority in the Senate which meant a reliance on the Australian Democrats party to pass the legislation. The period from the Hawke Government's election in March 1983 through to the detailed resource tax policy announcement in June 1984 is referred to by this author as the preparatory phase. This time-frame is marked by two Ministerial Statements which outlined the Government's intention for a petroleum resource rent tax. The author was fortunate to be given access to Dr Craig Emerson's private papers which provide a rich lode of materials, covering the political machinations between key Labor government figures, federal bureaucrats and petroleum industry leaders from late 1983 through to the middle of 1984. Craig Emerson's private papers include inter-departmental communications from his time with the Department of Resources and Energy, and outline the Hawke Government's (1983-1991) progress towards petroleum resource rent from 1983. In 2015 the Emerson papers were made available to the author, who prepared a detailed 'finding list' for the collection.[2] The author visited the National

[1] For the Explanatory Memorandum for the *PRRT Bill 1987* see, http://www.austlii.edu.au/au/legis/cth/bill_em/prrtb1987338/memo_0.html.
[2] See Appendix for a detailed list of Craig Emerson's Private Papers.

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Archives of Australia in 2015 to read and check the newly released government files from petroleum reform period.[3]

This paper is divided into two parts. Section 1 provides an overview of the primary documents concerning the political and consultative process that later resulted in the *Petroleum Resource Rent Tax Assessment Act 1987* (Cth). The petroleum resource rent tax (PRRT) is a tax at the rate of 40 per cent from the sale of petroleum commodities, such as crude oil, less cash outlays on exploration, capital and certain general expenses. When compared to a royalty levied on production value, a resource rent tax on profits is claimed as a more efficient way of capturing economic rent. The PRRT legislation applies to exploration permits awarded on or after 1 July 1984 and recognises associated expenditures on or after 1 July 1979.[4]

Section 2 shifts to contemporary tax issues concerning petroleum extraction for projects in Commonwealth (federal) waters. The Australian Budget (2016-17) forecast lower overall PRRT revenues of only $800 million to 2020,[5] despite new business investment of A$200 billion for integrated gas projects Australia-wide (Department of Industry and Science 2015). Criticisms and concerns about these falling petroleum revenues led to an announcement in late 2016 of a federal PRRT Review and related resource taxes (Morrison 2016). The Review aims to investigate the extent to which Commonwealth oil and gas taxes are operating as intended while ensuring an equitable return to the community.

Taking into account the PRRT Review aims, this research will undertake an economic and fiscal analysis to evaluate both the impact of 'low oil price shock' and changes to taxation

[3] See the Reference list for the more relevant NAA files.
[4] Relevant government files on petroleum tax reform can be found at the National Archives of Australia, Canberra: Commonwealth Record Series A1690/62, A1690/63 and A1690/64.
[5] There was a minor update to A$950 million of PRRT revenue for 2016-17 in the government's 'Midyear Economic and Fiscal Outlook' report in December 2016 http://www.budget.gov.au/2016-17/content/myefo/html/

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design to facilitate an equitable return to the Australian community. The scope of this paper is limited to petroleum from basins in Commonwealth waters. In the context of low oil prices, the research models alternative fiscal regimes with a focus on government revenue. The analysis of modelling results provide the basis for recommendations to the federal PRRT Review for legislative reform.

1. PRRT: historical overview

The petroleum resource rent tax legislation was the culmination of a resource policy of the Australian Labor Party (ALP) that, from 1977, had been included in its platform (eg. ALP 1980). From 1983 the leading ALP figures who can be credited with facilitating the petroleum resource rent tax include Bob Hawke (as Prime Minister), Peter Walsh (as Resources and Energy Minister) and Paul Keating (as Federal Treasurer). Surprisingly, the memoirs by these figures, and biographies thereof, have little or no detail on this important initiative on tax reform for minerals (eg. Carew 1988, Gordon 1993, Hawke 1994, Walsh 1995, Watson 2002, D'Alpuget 2010, Day 2015, Edwards 1996, Evans 2014, O' Brien 2015).

Australia's first and foremost paper on resource rent taxation was co-authored by Anthony Clunies Ross and Ross Garnaut (1975). Over the period 1983-85 Garnaut was the senior economic advisor to Bob Hawke. Craig Emerson provided considerable analytical support (as Assistant Private Secretary) to Minister Walsh in the Department of Resources and Energy in 1984. Emerson had built up academic expertise in economic rent tax theory (eg. Emerson 1978, 1983, 1984, Emerson and Lloyd 1983, Emerson and Garnaut 1984), and was recommended by Garnaut for recruitment as an economic advisor. Emerson was later to become a Minister in the Rudd and Gillard Governments (2007-13).

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The Hawke Government, in its quest to implement a resource tax policy, had to face determined opposition to the concept of a rent tax from the Australian Petroleum Exploration Association (APEA) and the two largest petroleum companies in Australia: Esso and BHP. In March 1984 a publication disseminated by Esso, 'The Case Against a Resource Rent Tax' (1984) contained much rhetoric and unsubstantiated claims about the theoretical deficiencies of the proposed tax and foreshadowed not only practical implementation problems, but also significant reductions in Australian oil exploration. The Esso criticisms gained momentum through petroleum industry newspaper advertisements (APEA 1984) that railed against a resource rent tax. The tactic of industry-funded newspaper advertisements has a familiar ring. The more recent 2010 equivalent of a newspaper campaign against a rent tax, but this time with an expensive television advertising component, was that by the Minerals Council of Australia. This industry association campaigned in concert with BHP Billiton, Rio Tinto and Xstrata against the proposed Resource Super Profits Tax (RSPT)(Kraal 2012, pp.79-80, Minerals Council of Australia 2012). The RSPT morphed into the Minerals Resource Rent Tax (MRRT) and took effect in 2012 under a Labor Government, but was subsequently repealed by the succeeding conservative, Liberal-National coalition Government.[6] Garnaut (2012, p.6) has long maintained his argument that the failure to support the MRRT legislation has left considerable taxation power, and revenue from hard-rock mineral resources, to the States via royalties — a mechanism that does not adjust for interstate equity and redistribution.

In order to help contextualise the PRRT, it is necessary to consider issues about the respective rights over minerals of the Commonwealth and the States, which is covered in the following sections.

[6] *Minerals Resource Rent Tax Repeal and Other Measures Act 2014 (Cth),* https://www.comlaw.gov.au/Details/C2014A00096.

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Royalty revenues from petroleum

Cullen (1988) and Eccleston and Woolley (2014, p.217) have explained how common law jurisdictions have historically granted sub-national governments the constitutional right to apply levies to land and resources, of which royalties are an example. At the time of federation, the Australian Constitution, section 114, had the purpose of addressing the distribution of taxing rights between the Commonwealth and States. By 1967 a settlement between the Commonwealth and the States provided, *inter alia*, for a national and uniform offshore mining regime and revenue sharing of royalties. The Commonwealth's jurisdiction for mineral royalties was the whole of the offshore area and the States was onshore and coastal areas.[7]

The advent of the first oil shock in 1973 caused a rise in oil prices. Thus the success of oil production in Victoria's Bass Strait gave impetus to a dispute on the division of royalty revenues between Commonwealth and States (Cullen 1988, pp. 219-227). The dispute led to an important case in 1975, N.S.W. v. The Commonwealth (the Seas and Submerged Lands case), with the finding in the Commonwealth's favour, 'that it enjoyed sovereignty seaward from the low water line.'[8] Later on, in what is referred to as the '1979 settlement' it was agreed the Commonwealth's jurisdiction for petroleum (oil and gas) resources was seaward of the three nautical mile boundary. For coastal water projects that lie within the low-tide mark and the three nautical mile boundary, the taxing rights are held by both a State and the Commonwealth. Finally, only the States have jurisdiction for onshore minerals, where revenue is raised through royalties. In a unique arrangement under the *Petroleum Revenue Act 1985 (Cth)*, Federal royalties and levies may be waived if, in agreement with the licensee, a State

[7] Related Commonwealth legislation included the *Petroleum (Submerged Lands) Royalty Act 1967 (Cth).*
[8] (1975) C.L.R. 337.

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imposes a resource rent royalty shared with the Commonwealth; for example, petroleum production from Barrow Island, Western Australia.

Crude oil excise, 1975

In 1975 the Whitlam Labor Government (1972-1975) introduced an excise (also called the 'crude oil levy') at the rate of $2 per barrel of crude oil. The levy was in response to world-wide increases in oil prices. The Federal crude oil levy was payable by petroleum producers and added to the government *fixed price* for Australian crude oil. A royalty was also paid by producers, based on the net wellhead value of the product. From September 1975 the Whitlam Government introduced a two-tier system. For producers with 'new oil' discoveries (post-14 September 1975) production was subject to prices set at import parity, less the crude oil levy payable to the Federal Government. However for pre-14 September 1975 discoveries (referred to as 'old oil') producers paid no levy, but received the (lower) price set by the government.[9]

The graph below depicts the sharp increases in prices per barrel of crude oil, from the time of the 1973 Arab-Israeli War, and shows that the 1975 crude oil levy was well-timed. However, the levy lacked tax neutrality,[10] for it was seen as dampening the 'appetite' for the risk required in exploration to find new oil fields. The levy was also seen as a disincentive to developing marginal oil fields because it is levied at the production level − before taking into account the fixed costs of production − to determine net profit (Garnaut and Clunies Ross 1979).

[9] *Excise Tariff Act 1921 (Cth) as amended*.
[10] A tax lacks 'neutrality', when its design is seen to affect business decisions.

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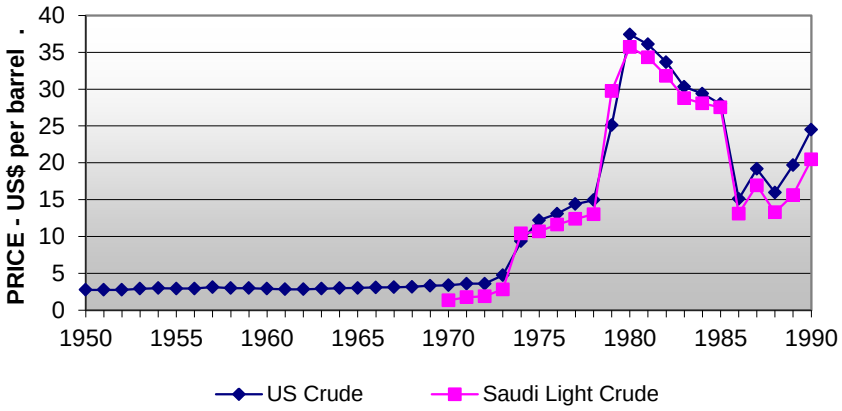
Graph 1. US and Saudi Crude Oil Price: 1950 - 1990



Source: 'History and Analysis of Crude Oil Prices', WTRG Economics.

http://www.wtrg.com/prices.htm

Extension of import parity pricing for crude oil, 1976

In 1976 the Fraser Coalition Government (1975-1982) commissioned the Industry Assistance Commission (IAC) to inquire into prices for pre-1975 'old oil' and post-1975 'new oil'. At the time, Australia's major oil fields were in the Gippsland Basin, Bass Strait, Victoria. These off-shore oil fields are under Commonwealth jurisdiction. The IAC recommended that the prices paid to producers for Gippsland 'old oil', including future production from the not-yet-developed Mackerel and Tuna oilfields, were to be progressively increased between 1976 and 1980 towards the import parity price, less a $2 per barrel levy to the Government. For producers from the lesser oil fields of Barrow Island crude (off coastal Western Australia), Moonie crude (from the Surat Basin in Queensland), and fields not yet in production, the IAC recommended immediate pricing at import parity from January 1977, less the crude oil. The Fraser Government adopted the IAC recommendations in its August 1978 Budget. By the financial year 1980-81, further rises in the levy and oil prices had taken place, resulting in a tax take

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from the crude oil levy equalling 71 per cent of the 'total price paid by refiners to producers for Australian crude oil' (Cullen 1988, p. 225).

1.2 Early literature on resource rent taxation

Adam Smith (1776- 1812) and David Ricardo (1819) are the best known, pre-20th century advocates of taxing economic rent from the produce of land and mineral resources. Although Lewis Gray (1914) wrote about economic rent from minerals, it took until 1948 for E. Cary Brown (1948) to more closely consider taxing economic rent from mineral extraction. He addressed the shortcomings of collecting revenue from minerals via production-based royalties, compared with the alternative of income-based taxation. His approach, termed the 'cash flow method', applies tax to the difference between project cash inflows and cash outflows (both capital and recurrent). In cases where net cash flow happens to be negative, including start-up capital investment, the government provides a cash contribution based on a set rate of tax, multiplied by the negative cash flow. A government also provides cash contribution to any negative cash flows associated with decommissioning a project at the end of its economic life. Thus under the Brown approach, a government shares equally in all losses and profits, being effectively a joint venture partner with its level of equity participation determined by the pre-set tax rate. The Brown cash flow method was advocated for Australia by Swan (1976).

Later, Garnaut and Clunies Ross (1975, 1979) posited their variation on the 'Brown tax' whereby a resource rent tax (RRT) would only be levied on the annual net positive cash flow of a project. In their variation, instances of net negative cash flows would not receive government cash contributions. Rather, such net negative cash flows would be carried forward with interest (the accumulation rate) to preserve their value to the investor. For this reason it is described as a one-sided tax; where the government taxes high profits but does not compensate

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for any ultimate losses. Since 1977 a progressive form of the RRT has been applied in Papua New Guinea from time to time (Emerson and Kraal 2016).

The next refinement was the allowance for corporate capital (ACC) in a cash flow method derived by Boadway and Bruce (1984). The ACC is somewhat different from the Garnaut and Clunies Ross RRT, for under the ACC method, capital expenditure is not fully deducted when incurred. Rather, capital expenditure is depreciated over its effective life. In instances of net negative cash flow, the negative amount is carried forward at the 'allowance for corporate capital' rate (accumulation rate) to preserve its value. This method includes a 'tax credit' for project losses, refundable as a cash payment by the government. The ACC method was first proposed for application to the capital-intensive minerals industry in 2010 and labelled as the Resource Super Profits Tax, and is the precursor to the previously mentioned Minerals Resource Rent Tax (Australian Government 2010).

The Australian Petroleum Resource Rent Tax is based on the Garnaut and Clunies Ross method, and is still an operative tax, despite criticisms that a resource rent tax would potentially stifle exploration (Esso Australia Ltd 1984) and concerns about the neutrality test (eg. Ball and Bowers 1983, Fraser 1993, Ball and Bowers 1984, Mayo 1979) and the efficiency test (Fraser 1999).

1.3 Narrative of government progression toward tax reform

The Australian Labor Party recognised the need for reform to encourage further mineral exploration. Its original resource rent tax policy was to apply to all mineral resources, but by mid-1983 discussions initiated by Hawke's Labor Government proved futile, as the States would not relinquish their royalties from hard rock minerals for a share of the proposed resource rent tax. Thus by December 1983 the Hawke Government narrowed the focus to petroleum.

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The Government (1983) released a discussion paper that presented its case for a resource rent tax for petroleum, which would be a replacement for royalties and the crude oil levy. It called for public submissions. Prime Minister Bob Hawke was well-known for his consensus approach, and encouraged this engagement. The submissions received were summarised by Department of Resources and Energy (DRE) staff in January 1984.[11]

The DRE analysis showed industry attempts to discredit the RRT; such as industry stating it was theoretically unsound, claiming an RRT is unsuited to the high risk nature of the industry and calling for a tax offset[12] for exploration costs. In response, in the Government (1984a) issued a position paper that examined the provision of an RRT tax offset for unsuccessful petroleum exploration and the likely effect of a tax offset on business decisions and government revenue. The position paper was made available both to the States' energy ministers and the oil industry.

Hawke Government RRT meetings, 1984

Over the first six months of 1984 there were multiple meetings on the subject of an RRT. Reports of these meetings indicate concerted attempts by the Hawke Government to consult with targeted industry stakeholders, such as Esso and BHP, and representatives from the governments of Victoria, South Australia and Western Australia. The DRE, the Industry Development Corporation (IDC) and the Treasury were the key government agencies involved, and Peter Walsh was the most regular participant in these RRT discussions.

[11] Craig Emerson, Private Papers (Submissions tab): Craig Emerson Report 24/1/84 for submissions from the Australian Petroleum Exploration Association, Esso, BHP, CSR, Santos, West Australian Petroleum, Woodside and the Australian Mining Industry Council.
[12] A tax offset is in effect a partial remission or cancellation of tax that would otherwise be payable by a taxpayer. A tax offset is also known as a tax rebate or tax credit.

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The final decisions on the RRT design and rates were made by a small coterie comprising Hawke, Walsh, Keating, Ross Garnaut — and Bernie Fraser (seconded from Treasury). Emerson and a small number of high-level bureaucrats were also in attendance at these meetings. For instance, on 27 February 1984 a meeting was held to discuss the feasibility of scheduling a ministerial announcement for an RRT to be effective from 1 July 1984.[13]

The range of meetings resulted in the Hawke camp conceding to the external pressure from industry, and internal Keating/Treasury demands, by excluding Bass Strait from the RRT, thus amending the Government's April (1984) position paper.[14] Despite the Bass Strait concession, industry still complained about the negative impact of the crude oil levy. The Hawke Government also accommodated the States' intractability by narrowing the RRT coverage only to offshore petroleum projects that had not yet reached development stage, referred to as 'greenfields' projects. Thus to this day, onshore petroleum projects still remain subject to the States' royalty regimes.

The April (1984b) position paper not only excised Victoria's Bass Strait from the RRT, although it remained subject to royalties and the crude oil levy, but also the North West Shelf project (situated off the coast of Western Australia).

Government bureaucrats and agencies

The archival documents show how roles were split between the government bureaucrats and agencies to bring the RRT project to fruition. The Department of Resources and Energy (DRE) responsibilities covered dealings with the States (Victoria, South Australia and Western

[13] Craig Emerson, Private Papers (Notes tab): Craig Emerson Diary extract, 16/1/84 to 29/5/84, p 7.
[14] Craig Emerson, Private Papers (Notes tab): Department of Prime Minister and Cabinet. Record of meeting with J Kirk, Esso, 30/3/84. Minute, Department of Prime Minister & Cab, 4/4/84, re: Record of meeting with B Loton and R Fynmore, BHP, 30/3/84. Government parties in attendance at both meetings: Prime Minister, Treasurer, Minister for Resources and Energy, R Garnaut and C Emerson.

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Australia), cash bidding, products (eg. crude oil, condensate), project definition, joint ventures, treatment of existing projects, end-of-project-life adjustments and Ministerial briefings.[15] The DRE staff members, led by Alan Woods, worked closely with their minister, Peter Walsh, and were generally supportive of Labor's RRT 'after realising the strength of Walsh's resolve.'[16] Treasury Secretary, Bernie Fraser (who developed considerable influence over Keating), was responsible for uplift rates and tax rate proposals, treatment of unsuccessful exploration costs and changes in regulations for project ownership. Working in conjunction with the Australian Tax Office, other Treasury responsibilities included the drafting of joint Ministerial Statements, Cabinet submissions on the RRT; and private royalties (eg. the Weeks royalties in Bass Strait). The Industry Development Corporation (IDC) was responsible for drafting the discussion and position papers (upon receiving RRT materials from the responsible departments). It conducted the painstaking work of summarising the feedback from industry on position papers.

1.4 Summary of PRRT key dates

The list below summarises the key dates between 1983 and 1998 concerning the original form of the PRRT. Note the delay between joint press release of Keating and Walsh on 27 June 1984 and Royal Assent for the legislation in December 1987. The reasons for the delay were minor issues with the timing of the Bill's drafting. The major reasons for delay were the changes of ministers for resources and energy. Peter Walsh was moved to become Finance Minister in December 1984, Gareth Evans took his place, but was then shifted from resources and energy after the July 1987 Federal election. Alan Griffiths became the replacement minister when the PRRT was enacted in December 1987.

[15] See for example, Craig Emerson, Private Papers Industry (Industry tab): Craig Emerson, handwritten notes for Ross Garnaut, 'An RRT for the petroleum industry', 23/3/84.
[16] Craig Emerson, Private Papers (Notes tab): Craig Emerson Diary extract, 16/1/84 to 29/5/84, p 7.

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Petroleum Resource Rent Tax: key dates 1983 to 1998

Month	**Activity**
December **1983**	Govt. general discussion paper: the case for a resource rent tax (RRT).
February **1984**	Govt. position paper. Examination of provision of an RRT loss offset for unsuccessful exploration and its effect on business decisions and government revenue.
14 April **1984**	Govt. position paper. Outline of Government's intention for an RRT only on offshore petroleum projects, development stage ie. 'greenfields' projects, but excluding Bass Strait and the North West Shelf (NWS). Ministerial Statement issued. Joint Press Release. Ministerial Statement by PJ Keating, Treasurer, and P Walsh, Minister DRE, 'greenfields' projects to be subject to an RRT with effect from 1 July 1984.
27 June **1984**	Joint Press Release. Ministerial Statement by PJ Keating, and P Walsh. Taxation arrangements for the petroleum sector to take effect from 1 July 1984. More details on 'Greenfield' offshore developments.
20 May **1985**	Joint Press Release. Ministerial Statement by PJ Keating, Treasurer, and Gareth Evans, QC, Minister DRE. RRT treatment for the Jabiru development, NT, and 'End-of-Project-Life adjustments.'
December **1987**	*Petroleum Resource Rent Tax Assessment Act (1987),* Royal Assent. The legislation excluded Bass Strait and the North West Shelf projects.
January **1988**	*Petroleum Resource Rent Tax Assessment Act (1987)* effective January 1988.
January **1988**	*Petroleum Excise (Prices) Act 1987* effective January 1988. Oil pricing at import parity ended, and domestic crude oil supply and marketing arrangements were fully deregulated.

The list below summarises the key PRRT dates between 1990 and 2015. Of most interest is the inclusion of Bass Strait in the PRRT regime from July 1990, which came in at the request of Esso and BHP. Further, in 1991 a major tax concession concerned exploration cost deductibility, which was widened from a project to a company wide basis. These costs could be transferred to other projects with a notional taxable profit.

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Subsequently in 2004, under the Howard Government (1991-2006), another major concession involved an uplift of 150 per cent on PRRT deductions for exploration expenditure incurred in offshore frontier areas. Other major changes included the 2005 introduction of the Gas Transfer Regulations.[17]

Last, from July 2012, the PRRT extended to onshore oil and gas projects, including the North West Shelf project, oil shale projects and coal seam gas projects

[17] *Petroleum Resource Rent Tax Assessment Regulations 2005 (Cth). Repealed by the Petroleum Resource Rent Tax Assessment Regulation 2015 (Cth).*

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Petroleum Resource Rent Tax: key dates 1990 to 2015[18]

Year	Amendment
July 1990	*Petroleum Resource Rent Legislation Amendment Act 1991 No. 80, 1991.* From fiscal year 1990-91 the Act applied to Bass Strait production.
1991	In 1991 exploration cost deductibility was widened from a project to a company wide basis. This enables undeducted exploration expenditure incurred after 1 July 1990 to be transferred to other projects with a notional taxable profit held by the same entity. In the case of a company in a company group, the expenditure is also transferable to other PRRT-liable projects held in the group.
2001	The October 2001 legislative amendments allow the Tax Commissioner to apply a gas transfer price formula in the absence of an arms-length sale in an integrated gas to liquids project. The reference date for the five year rule applying to expenditure uplifts was changed to refer to the date nominated in a 'Statement of Receipt' issued when all information pertinent to the application for a production licence is supplied to the 'Designated Authority'.
2003	Amendments removed an inconsistency in relation to tolling fees. In a tolling situation, the property of one project, such as the platform or processing facilities, may be partially used to produce its own petroleum and partially used to process petroleum sourced from third party projects. Amendments ensure that all partial usage situations are treated in the same way and do not impact on efficient commercial arrangements. The amendments also ensure that double taxation, black hole expenditures or understatement of net

[18] Source: Department of Industry Innovation and Science, http://www.industry.gov.au/resource/Enhancing/ResourcesTaxation/PetroleumResourceRentTax/Pages/PRRTHistory.aspx

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	assessable receipts do not affect government or industry.
2004	In May 2004 the government introduced a measure to encourage petroleum exploration in remote offshore areas. This involves an uplift of 150 per cent on PRRT deductions for exploration expenditure incurred in designated offshore frontier areas. Up to 30 June 2008, the measure applied to pre-appraisal exploration expenditure in the initial term of the exploration permit granted for a designated area.
2005	In 2005 the Government introduced the *Petroleum Resource Rent Tax Assessment Regulations 2005*, known as the *Gas Transfer Regulations*. The objective of the Regulations is to provide a framework to determine the price for gas in the case of an integrated gas-to-liquids (GTL) project. The framework enables a PRRT liability to be calculated in the upstream component of an integrated GTL project where there is no arm's length price or comparable uncontrolled price. The Regulations allow for a gas transfer price to be determined by the Commissioner of Taxation, either by an advanced pricing arrangement agreed with the PRRT taxpayer (i.e. an uncontrollable comparable price), or by a Residual Pricing Mechanism. In the circumstances where an advanced pricing arrangement or uncontrollable comparable price does not exist, the Residual Pricing Mechanism prevails.
2005	In May 2005 the Government announced further policy changes to the PRRT designed to reduce compliance costs, improve administration and remove inconsistencies in the PRRT regime. These changes, which became effective from 1 July 2006, include: • allowing deductions of transferable exploration expenditure when calculating quarterly instalments and of Fringe Benefits Tax for PRRT purposes

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	• allowing deductions of closing-down costs when moving from a production to an infrastructure licence • the introduction of the PRRT in the self-assessment regime • providing roll-over relief for internal corporate restructuring • introducing a transfer notice requirement for vendors disposing of an interest in a petroleum project • extending the lodgement period for PRRT annual returns from 42 to 60 days.
2008	The Federal Budget 2007-08 announced three policy changes to the PRRT that aimed to lower compliance costs and remove inconsistencies. Effective from 1 July 2008, the measures included: • a functional currency rule built into the PRRT, similar to that under income tax, to allow oil and gas producers to elect to work out their PRRT position in a foreign currency • the introduction of a 'look back' rule for exploration expenditure, to ensure that all exploration expenditure is deductible for PRRT purposes where a production licence is derived from a retention lease, on or after 1 July 2008 • where a petroleum project processes petroleum sourced from another petroleum project for a tolling fee, the tolling fee received is treated as a PRRT receipt, and the expenses incurred are treated as a PRRT deduction
2012	On 1 July 2012, the PRRT extended to onshore oil and gas projects, including the North West Shelf, oil shale projects and coal seam gas projects.
2015	The *Petroleum Resource Rent Tax Assessment Regulation 2015* known as the *Gas Transfer Regulations* took effect in December 2015. Repealed the *Gas Transfer Regulations 2005.* The objective of the Regulations is to provide a framework to determine the price for gas in the case of an integrated gas-to-liquids (GTL) project.

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2. Contemporary tax issues concerning petroleum extraction

2.1 Introduction

The global expansion in liquefied natural gas projects (Wood 2012) projects raises questions about the real economic contribution of this activity to the host country. In the United States, where liquefied natural gas (LNG) export licences are few, Cheniere Energy Inc (2016) is developing two liquefaction projects at the Sabine Pass LNG terminal which is expected to have production capacity by 2020 of around 4.5 mtpa,[19] and near Corpus Christi, Texas, with a nominal production capacity of 22.5 mtpa. The Trump administration to likely to further promote LNG trade, given the new Secretary of State is ex-CEO of ExxonMobil, Rex Tillerson (Parker and Davenport 2016, Mufson et al. 2016).

In the case of Australia, industry is espousing the economic rewards from the A$200 billion invested in LNG infrastructure (APPEA 2016: day 2, p.13, Fabri 2016, p.13). Agency data details seven large plants for LNG export, totalling 63 mtpa, are coming online or under construction in Australia, with some having commenced production (International Energy Agency 2015, p.194, Department of Industry and Science 2015). Thus the stage has been set for community expectations of significant amounts of taxes to be raised from these large gas projects.

However tax revenue figures have tempered the optimism. The Australian Budget (2016-17) figures show petroleum tax revenues of A$1.8 billion in 2014-15 and then lower forecasts to A$800million per annum to 2020. These budget papers claim low oil prices as the reason for

[19] MTPA: millions of tonnes per annum.

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the decreased revenue. However the announcement in late 2016 of a federal review into petroleum taxation has the scope to investigate beyond low oil prices in the search for possible reasons for the low tax take (Australian Government 2016, p. 19).[20] Thus the aim of this research to investigate the extent to which the current 'low oil price shock' and/or petroleum taxation design issues are disruptors to federal government revenue from integrated natural gas-to-LNG projects in Australia. Expectations of high revenues have centred on these projects. The aim extends to determining how international oil companies, which operate large but conventional gas extraction projects in Australia, are impacted by the downturn in world prices. A minor comparison is made to the US gas industry.

The Australian Government needs a more immediate flow of revenue from natural gas (a petroleum mineral resource) used as feedstock in integrated gas projects. In the context of 'low oil price shock' the question asked is: What might be the economic outcomes if Australia's fiscal regime for petroleum for integrated natural gas-to-liquids projects were modified to generate higher government revenue? The research also poses a minor question from a socio-legal perspective: How does Australia's gas extraction industry compare to that of the US?

This research paper is significant for its unique review of Australia's petroleum resource taxation since both the fall in oil prices from mid-2014 and the rise of gas projects for LNG export. Additional natural gas revenues from tax reform might contribute toward balancing the Australia's budget deficit and benefit the wider Australian community. This research has implications for other jurisdictions to consider a review of the taxation outcomes from the extraction of non-renewables, given the current low prices and grass-roots political change that is calling for, *inter alia*, the application of public funds to ageing infrastructure.

[20] 1 US dollar equals $1.29 Australian dollars.

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Background

In some jurisdictions, such as the United States, private ownership is the norm for natural resources both above and below the ground. Oil and gas resources are exceptions, whereby the US federal government owns about 25 percent, with much of it offshore (Lowe 2014, p.11). By contrast in Australia, the ownership of natural resources below the ground is vested in the community but managed by government. In the case of petroleum, extraction is based on a concession arrangement whereby the typical licence agreement includes a 'royalty' payment obligation to the government at an agreed rate that is applied to the net wellhead value of the resource. Australia's taxation of petroleum is on a project basis, whereas income tax is levied on a company basis.

There are now more gas reserves than oil in Australia (British Petroleum 2015). Figure 1 'LNG projects with installed capacity and operators' shows large integrated gas-to-LNG projects in Australia: offshore natural gas in the west, and onshore coal seam gas in the east. The accompanying Figure 2 below shows the taxation regimes (excluding the oil excise)[21] of selected LNG projects. Company tax and the petroleum resource rent tax (PRRT) apply to all. The exceptions are the state royalty that applies to coal seam gas in the east (onshore in Queensland) and the Commonwealth royalty that applies to the North West Shelf project (offshore Western Australia). Resource taxes are credited before determining the PRRT liability.[22]

[21] The crude oil and condensate excise is outside the scope of this paper. It only applies to coastal and onshore areas and the North West Shelf project, see https://industry.gov.au/resource/Enhancing/ResourcesTaxation/PetroleumResourceRentTax/Pages/CrudeOilExcise.aspx

[22] Section 35C, *Petroleum Resource Rent Tax Assessment Act 1987* (Cth). Hereafter referred to as the *PRRT Act 1987*. Resource taxes such as royalties and excise are 'grossed-up', that is increased by dividing it by the 40% PRRT rate, before deduction, eg. $2M royalty/40%= $5M.

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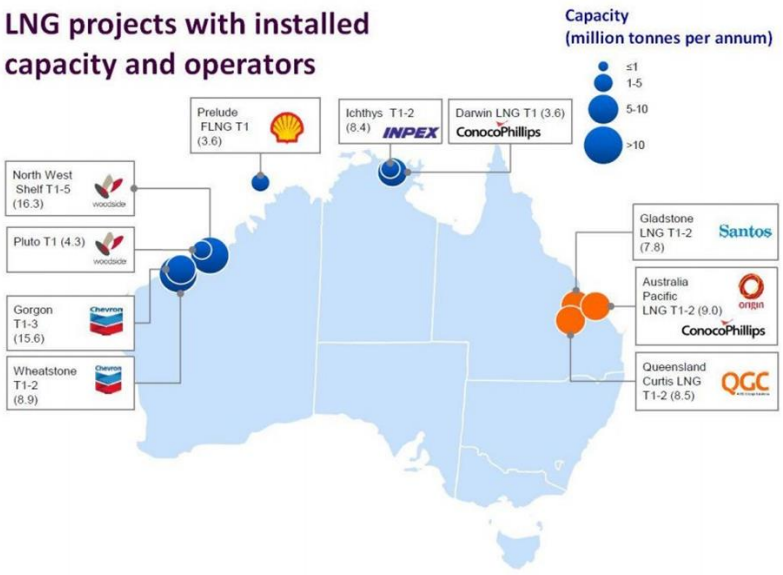
Non-North West Shelf petroleum projects, offshore of Western Australia, are subject the PRRT only. Those projects include Chevron's Gorgon and Wheatstone; Woodside's Pluto LNG project; and Inpex's Ichthys project.

Figure 1



Source: Santos Ltd, with permission.

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Figure 2

Current taxation regime for selected LNG projects									
					PROJECT NAME				
			Prelude (delayed project)*	Ichthys (start-up late 2016)*	Pluto LNG*	Wheatstone (start-up 2017)*	Gorgon*	North West Shelf**	East coast: three coal seam gas projects +
Company Tax			yes	yes	yes	yes	yes	yes	yes
Petroleum Resource Rent Tax (PRRT)			yes	yes	yes	yes	yes	yes	yes
State royalites									yes
Commonwealth roylaties								yes	
		MTPA#	3.6	8.4	4.3	8.9	15.6	16.3	25.3
	*	Project natural gas from offshore waters, under Commonwealth (federal) jurisidiction.							
	**	Crude oil and condensate excise also applies to the North West Shelf project.							
	+	Project coal seam gas from onshore, under state jurisidiction							
	#	Millions of tonnes per annum, gas production							

Source: Author

Resource taxation of petroleum projects

The accepted justification for resource taxation in addition to company tax is that due to the finiteness of mineral resources extraction can only occur once. In Australia, taxation on petroleum can comprise *ad valorem* royalties (production-based) and /or a rent tax (a profits-based). As royalties are paid almost immediately once extracted, on the net wellhead value, traditional concerns include that payment of an impost before net profit is determined, thus argued as a strong deterrent from investment in marginal projects (eg. Garnaut and Clunies Ross 1975). Further, a royalty-only regime lacks *progressivity* as a flat royalty rate does not adjust to differences in project profitability. By contrast, rent tax theory argues that a profits-based resource tax is decision neutral and embodies progressivity. A rent tax is designed to take into account an investor's hurdle rate, so when net cash flows are low, tax is not paid.

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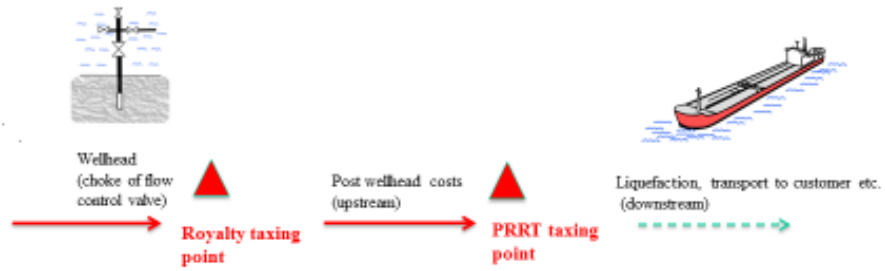
A rent tax is not paid when net cash flow profits are low, which take in to account the investor's hurdle rate (Garnaut and Clunies Ross 1979). Figure 3 shows the different taxing points.

Figure 3. Different taxing points for royalties and the PRRT



Source: Author

The petroleum resource rent tax (PRRT) was legislated as a secondary tax to raise revenue that embodied design elements to encourage the exploration. Back the 1980s the government made the point that it 'is unrealistic to expect that highly profitable discoveries of new oil … can remain exempt from … secondary taxation' (Commonwealth Government 1984, p. 6).[23] The PRRT was specifically designed for oil, as gas development in the mid-1980s was minor (Kraal 2016 forthcoming). The PRRT is a tax at the rate of 40 per cent on the sale of petroleum commodities such as crude oil and natural gas. The PRRT uses cash flow concepts, so in years where expenses are greater than revenues, an 'uplift' rate is applied to the excess expenses and compounded forward at the uplift rate.[24] The uplift rate corresponds with the return on capital

[23] For historic reasons, the North West Shelf gas project is subject to PRRT, royalties and excise.
[24] An uplift rate (also known as a threshold, augmentation or accumulation rate) is an indexation factor, is an agreed percentage plus the long term bond rate plus

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thought to be required by an investor (Garnaut 2010, p. 349). The carried forward expenses are then deducted against revenue in the following or future years. Generally, the type of expenditure determines the 'uplift' rate. For example, undeducted exploration expenditure of less than 5 years is uplifted by 15 percent plus the long term bond rate (LTBR). For undeducted capital and operating costs, the uplift rate is 5 percent plus LTBR.[25] After determining all cash inflows, (gross receipts) for the year *less* cash outlays on exploration, capital, certain general expenses and uplifts on carry-forward expenditure, the net amount (taxable profit) is subject to the PRRT.[26]

PRRT statistics

The PRRT revenue take since the 2002-03 financial year has decreased (see Appendix 1). Figure 4 below shows recent Australian Tax Office statistics. In 2014-15 only eight of 149 tax returns paid PRRT on taxable profit. In 2014-15 only $1.2 billion was collected in PRRT. In 2014-15 'carry forward expenditure' was A$187 billion. Expenditure in excess of assessable receipts are compounded forward at the uplift rate, and are a factor in delaying revenue.

[25] Class 2 ABR general expenditure, Division 3, *PRRT Act 1987*.
[26] For taxable profit, see s. 22, *PRRT Act 1987*.

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Figure 4. Petroleum Resource Rent Tax Statistics 2012-13 to 2014-15

Items	2012-13	2013-14	2014-15
Number of PRRT returns with profits	155	147	149
Number of PRRT returns with PRRT paid	9	9	8
	A$bill	A$bill	A$bill
Assessable receipts	26	30	26
Taxable profit	3	4	3
PRRT paid on taxable profits	1.2	1.7	1.2
Carry forward expenditure	128	160	187

Source: Australian Taxation Office statistics 2014-15. https://www.ato.gov.au/about-ato/research-and-statistics/in-detail/tax-statistics/taxation-statistics-2013-14/?page=10#GST_and_other_taxes_detailed_tables

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2.2 Literature Review

The rapid downturn in oil prices since mid-2014 was unforeseen by the industry. By April 2015 some participants at the American Petroleum Institute's 2015 Tax Forum in Houston, showed mild pessimism about the fall in oil prices, with claims such as 'we've seen this movie before' and hopes for an 'upturn soon' (Landry and Mellen 2015). Topics concerned the divestment of oil and gas interests, which is typical of action taken in a downturn (McGinley and Rafte 2015). In terms of global issues, the presenters were more concerned with transfer pricing and profit shifting (Abrams and Sierra 2015, Blair and Cisnal de Ugarte 2015). None of the conference presenters were pessimistic enough to speculate that a continued decline in oil prices might result in oil companies having only meagre profits to shift in 2015 and 2016. By the time of the American Petroleum Institute's 2016 Tax Forum, delegates had accepted lower oil prices over the longer term (eg. Scott and Swiech 2016). The fall in oil prices affects natural gas markets as there is a gas-to-oil price link, particularly for pricing contracts for the Asia Pacific region (Roger and Stern 2014).

The literature review undertaken for this paper sought to limit papers from 2015 to mid-2016 to capture findings about the impact of low oil prices on fiscal policies. Apart from annual petroleum industry statistics from the International Energy Agency (2015), a general review of petroleum industry literature for the Asia Pacific region, revealed research papers that mainly looked through the prism of high oil prices. The literature covered criticism of fuel subsidies, (Bujang et al. 2016, Cheon et al. 2015, Foo 2015). It extended to price-related oil conflict impacts and concern for future energy supplies, (Cheon and Urpelainen 2015, Coglan 2015). Other research covered petroleum in the context of stability of supply, and the connection to fiscal policies and/or political systems; national oil companies and propensity for international success; and correlations between differing political systems and energy industry success

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(Cunado et al. 2015, Jones Luong and Sierra 2015, Meckling et al. 2015, Metcalf and Wolfram 2015, Wilson 2015, Shum 2015, IMF 2015). Given that quality, empirical research can take two years or more from writing to publication, it is not surprising that the reviewed literature was about policy issues in the context of *high prices*, as the oil price only began its current fall from mid-2014.

Similarly to the above, it was found that recent research articles about Australia's taxation of petroleum were not set in the context of low prices either.

However a review of the plenary presentations and papers from the 2016 Australian Petroleum Production and Exploration Association (APPEA) 'LNG 18' conference on liquefied natural gas revealed some government policy aims and industry responses to low oil price shock.[27] For instance, according to the Australian Prime Minister, Malcolm Turnbull, his government aims to help the LNG industry by 'reducing regulation, speeding up the process of environmental approvals, making the workforce more efficient and reducing production costs through skills migration initiatives' (APPEA 2016: day 1, p. 11). Turnbull's Resources and Energy Minister, Josh Frydenberg, claimed that the federal government can help lower the cost of petroleum exploration by de-risking it through the use of satellites to gather geological information and make the information free to the public. He stated, 'We can drive down the cost of doing business here' in Australia (APPEA 2016: day 3, p. 4).

Three petroleum company chief executives at 'LNG 18' took the opportunity to provide fiscal advice to the Australian Government. Total's chief executive, Patrick Pouyanne, implied that Australia should enact some complementary fiscal initiatives to those of the UK Government, which has 'taken measures to adapt its fiscal terms to the new low oil price

[27] APPEA, LNG 18, 18th International Conference & Exhibition on Liquefied Natural Gas, 11-15 April 2016, Perth, Australia http://lng18.org/

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environment' in the form of incentives for new projects (APPEA 2016: day 3, p. 2). Similar advice came from Chevron chief executive, John Watson, who stated, 'Australia needs to improve its investment setting for natural gas projects. Taxes and their fiscal terms and environmental policy … need to work together. There is competition from the United States, Canada and East Africa,' noting demand for LNG will be increasing over the next 20 years (APPEA 2016: day 2, p. 4). Grant King of Origin Energy, stated that LNG projects might be challenging, 'but host nations can benefit handsomely from such investments'(APPEA 2016: day 1, p. 3).

The Premier of Western Australia, Colin Barnett's comments on petroleum fiscal matters were the exception to those of the CEOs and Federal politicians. Barnett stated that it is important that 'a host country shares in the economic development of a natural resource' (APPEA 2016: day 2, p. 2). A Western Australia parliamentary inquiry (2014, p. 246) reported that Western Australia 'receives limited revenue benefits…from LNG' projects such as Woodside's Pluto, and Chevron's Gorgon and Wheatstone. The state government of Western Australia has further concerns about revenue levels and the latest floating LNG technology, as the PRRT was designed and implemented before this technology. The Western Australia parliamentary inquiry (2014, p. 245) recommended that the federal government re-examine the PRRT.

In APPEA's general petroleum conference later in 2016,[28] there were a range of papers about the LNG industry in Australia and the impact of low prices (Kavonic 2016, van Geuns 2016, Graham and McManus 2016) but the were no comments on government fiscal policies. Observations have since been made by industry about petroleum taxation reform, but lack

[28]APPEA 2016, 56th Conference, 5-8 June, Brisbane, Australia, http://eventcampaign.com.au/enews/appea/2016/APPEA2016-enews8.html (accessed 26 October 2016).

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substance (Fabri 2017). Some fiscal policy points can be found in contemporary academic literature, but they only re-state the theories of natural resource taxation (eg. Hogan and McCallum 2010, Ergas et al. 2010, Eccleston and Woolley 2014). Other academic research, in the context of high prices, suggest a hybrid fiscal system that combines resource taxes (eg. Garnaut 2010, pp. 347, 353, Hogan 2012, pp. 250-252, Freebairn 2015, p. 600).

In summary, the literature reviewed in the current time of low oil prices reveals calls by the petroleum industry for more fiscal incentives, and responses by Federal government of cost lowering initiatives. Academic papers re-state resource tax theories, none of which have been tested against integrated gas projects. The aberration is the view of Premier Colin Barnett, who spoke about natural gas/petroleum taxation flaws and the need for re-examination. The research questions for this paper, in the context of *low oil price shock*, cover the concerns raised by Barnett of low government revenues from petroleum resources. The research framework revisits current rent tax theory.

2.3 Methodology and Data

2.3.1 Methodology

The methodology addresses two questions that follow the next sections.

Research Question 1 (RQ1)

Research Question 1 asks: What might be the economic outcomes if Australia's fiscal regime for petroleum for integrated natural gas-to-liquids projects were modified to generate higher government revenue?

The method of modelling of alternative fiscal regimes is the most appropriate for this question. As mentioned, this paper's scope is limited to gas and liquids extracted from basins situated in Commonwealth waters (off Western Australia) where production is only subject to

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the PRRT.[29] One initial project is modelled from the cluster of such offshore projects that are or will shortly extract natural gas from basins in Commonwealth waters. These projects are also called gas-to-liquid (GTL) projects.

The FARI model

The tool used for modelling variations in resource tax design is the IMF's Fiscal Analysis of Resource Industries (FARI) model, which is *Excel*-based. The Fiscal Affairs Department of the International Monetary Fund (IMF) uses the FARI model in its analysis of resource industries. FARI is primarily used for work on fiscal regime design, as well as for revenue forecasting. The FARI model is a tool for revenue analysis, allowing the comparison of actual revenues with its tax gap analysis outputs. This research uses the standardised public version of FARI that became available in 2016 (Luca and Mesa Puyo).

FARI's outputs show both the government and investor share of a resource project's total pre-tax and after-tax net cash flows. It calculates the fiscal outcomes; for example, rent taxes, royalties and company tax. FARI is set up to calculate discounted cash flow (DCF) models, which reflect fiscal regime parameters, tax accounting rules and specific tax payments to government. FARI's outputs include standardised economic indicators; for example internal rate of return. A suite of indicators evaluate how different combinations of fiscal terms compare along economic criteria, such as neutrality, revenue raising, timing of government revenue and progressivity.

The author has adapted FARI for the Australian fiscal regime for petroleum, and is thus a key tool in the methodology. The FARI's fiscal regime outputs is the project level. The results

[29] See s. 2E, PRRT Act 1987, where 'marketable petroleum commodities' are taxable but excluding processed products, such as liquefied natural gas (LNG).

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of a number of integrated gas projects can be combined to determine implications for the Federal Budget.

Project for Modelling

Chevron's Gorgon project is the selected case study for fiscal modelling (Chevron Australia 2016). The project is subject to the petroleum resource rent tax (PRRT) and the entity is also liable to company income tax (CIT) and Dividend withholding tax (DWT). This regime forms the *base case*. The Gorgon data is used to model four alternative fiscal designs (all with CIT and DWT):

i. Current PRRT (base case)
ii. PRRT and Royalties
iii. A modified version of the PRRT, where the uplift rate is set to zero for undeducted expenditure[30]
iv. Royalties and no PRRT

Chevron's *Gorgon* is one of the largest integrated gas projects in Australia. Chevron has invested $54billion on the Gorgon project, which became operational in 2016 (Department of Industry and Science 2015). Gorgon has a subsea gathering system that connects to pipelines and run to the shore. The Gorgon liquefaction plant is situated on Barrow Island, around 60 kilometres off the northwest coast of Western Australia. The onshore facilities include a three-train, 15.6 million tonnes per annum (MTPA) liquefied natural gas plant, for export gas, and a

[30] A design feature of the PRRT are the uplift rates. Undeducted expenditure is compounded forward at an uplift rate, until there is revenue against which the expenditure is deducted.

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domestic gas plant to provide energy into Western Australia (Chevron Australia 2016).[31] Strict environmental controls and the project's CO_2 large sequestration facilities on Barrow Island have added to the cost of the project.

2.3.2 Data

Production and costs

The project economics used in the FARI modelling is proprietary data from Wood Mackenzie, a reputable and internationally known data collection/analyst organisation.[32] Production data inputs to FARI include export and domestic natural gas, and condensate volumes. Costs include exploration, capital[33] and operating.[34]

Fiscal: Tax Rates

The PRRT and company income tax rates; and depreciation rates for certain capital costs are inputs.

Fiscal: Royalty calculation

The Gorgon project is not subject to production royalties, however a royalty regime is modelled in FARI. The royalty rate is 10% of the net well-head value, the calculation for which

[31] The Gorgon project is operated by an Australian subsidiary of Chevron (47.3 percent interest). Its joint venture partners are ExxonMobil (25 percent), Shell (25 percent), Osaka Gas (1.25 percent), Tokyo Gas (1 percent) and Chubu Electric Power (0.417 percent).
[32] Wood Mackenzie, https://www.woodmac.com/ . Other investigators can, in principle, obtain the data used in this modelling independently.
[33] Capital expenditure is classified in the FARI model as development costs (separated between tangibles and intangibles), and replacement capital costs are incurred in the production phase. In FARI these three expenditure categories as aggregates, each with a separate depreciation schedule (FARI p. 9).
[34] Operating costs are separated from capital costs and categorised. The categories are those directly related to recovery of the hydrocarbons from the ground; removal of impurities; pre-cooling for liquefaction; liquefaction; transportation costs incurred before the physical point where royalties or CIT are imposed.

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is based on the North West Shelf project's net-back method (Australian National Audit Office 2016, pp. 9,10, 23).

For a domestic gas royalty, the net-back calculation is sales revenue less operating costs and depreciation of capital assets from the inlet flange of the metering station at the boundary of the treatment plant to the well-head (point of valuation). For a condensate and export gas royalty, the net-back calculation is sales revenue less operating costs and depreciation of capital assets from the discharge flange on the product jetty of the treatment plant to the well-head (point of valuation).

Economic: Prices

i. LNG prices (FOB) as well as domestic gas and condensate prices are inputs.

ii. Gas transfer price. A gas transfer price (GTP) for gas feedstock used in the liquefaction process is needed, as there is no arm's length pricing for the selected integrated project. In such cases, taxpayers are required to use the gas transfer price methodology. As Gorgon's GTP is not publicly available, it is modelled in FARI based on guidance from the PRRT Regulations and a Tax Office Ruling (2015).[35] The GTP represents the price at the point at which feedstock gas transfers to the liquefaction process (the 'point of valuation').

Economic: Inflation and Discount rates

The fiscal calculations are performed in real and nominal terms. There is one inflation rate that is compounded and applied to revenues and costs, although a range of discount rates can be used. A discount rate is selected for the net present value (NPV) of government revenues that

[35] *Petroleum Resource Rent Tax Assessment Regulation 2015 (Cth) No. 254*

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approximates the government's real discount rate. A second discount rate is used to quantify the effect of a fiscal regime on the investor.

Once the NPVs are derived, indicators are used, such as the average effective tax rate (AETR)[36] indicates how much revenue a fiscal regime raises and is one of the definitions of 'government tax take.' Other indicators include the marginal effective tax rate (METR).[37]

Economic: Financing assumptions

Project financing assumptions can be input. An assumed interest rate can be applied if debt financing is assumed for the project data. Financing of 70 percent of development costs are assumed at an interest rate of 5 percent.

2.3.2. Research Question 2 (RQ2)

Research Question 2 asks: 'How does Australia's gas extraction industry compare to that of the US? The qualitative, socio-legal perspective of the question requires methods that include access government and political candidate websites; revenue agency websites; and interviews of industry executives. A narrative is prepared based on the results from an enquiry into a jursidictional comparison. Aspects to be considered in the 'low oil shock' context, are industry structure; short and long term investment outlook; industry technical innovations; approaches to gas pricing; and government fiscal policies.

[36] The AETR (average effective tax rate) is the ratio of the NPV of government revenue (composed of royalty, company tax, PRRT and withholding tax) to the NPV of the pre-tax net cash flows of a successful project, both calculated in discounted value. The AETR thus indicates how much revenue a fiscal regime raises and is one of the definitions of 'government take.'

[37] The METR reflects the burden placed by the fiscal regime on a project at the margin of viability (i.e. projects that lie at the far end of a sector's cost curve), thus indicating the extent to which the regime affects business investment decisions.

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RQ2 data

The data sought includes website information on revenue statistics and fiscal policies; transcriptions of industry executive interviews; case study material from the web; interviews; industry conference papers; and project site visits.

The RQ2 results and discussion are not included in this version of the paper.

2.4. RQ1: Results and Discussion

The RQ1 results from the modelling four scenarios from the Gorgon project will be detailed in the presentation at ATTA 2017.

2.5 Conclusion

The question was asked about economic outcomes if Australia's fiscal regime for petroleum for integrated natural gas-to-liquids projects were modified to generate higher government revenue. The Gorgon project was selected as the case study. Its modelling indicates flaws in the fiscal system, such as zero PRRT collections to 2030. The overall performance of the PRRT is not operating as intended in terms of revenue collections. The recommendations for change follow below.

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Recommendation 1: More sensitivity PRRT modelling for offshore gas projects in Commonwealth waters is required to determine the effect of differing uplift rates on deductible expenditure.

Recommendation 2: Transferability of exploration expenditure was negotiated for oil back in 1990, and is not working as intended today for gas. Gas projects only provide utility rates of return, not 'super profits' as found in oil. Transferability of exploration expenses should be modelled for a fairer outcome from community resources.

Recommendation 3: Modelling of a reverse order of deductions for the PRRT should be undertaken. For example, high uplift deductions should be deducted first.

Recommendation 4: The focus of PRRT modelling should be on natural gas projects in Commonwealth waters that are not subject to a royalty regime. Case study modelling shows flaws in the PRRT regime for gas, which suggests minimal resource tax will be paid on these projects in the near future. This is a serious matter for the federal government revenues.

Recommendation 5: The Gas Transfer Price method is flawed, as shown by case study modelling. There are alternatives, such as the use of the 'mid-stream breakeven price' method, or the 'Net Back' method alone, either of which would derive a fairer price. Advance Pricing Arrangements should be made transparent to the public, much like the Australian Tax Office 'sanitised' private rulings or interpretive decisions.

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Recommendation 6: Royalties should be re-introduced for integrated natural gas-to-liquids projects in Commonwealth waters. This change would result in earlier and assured revenue from resources. Any PRRT collected would credit royalties. The fiscal system would then be equal to onshore coal seam gas projects and the North West Shelf project.

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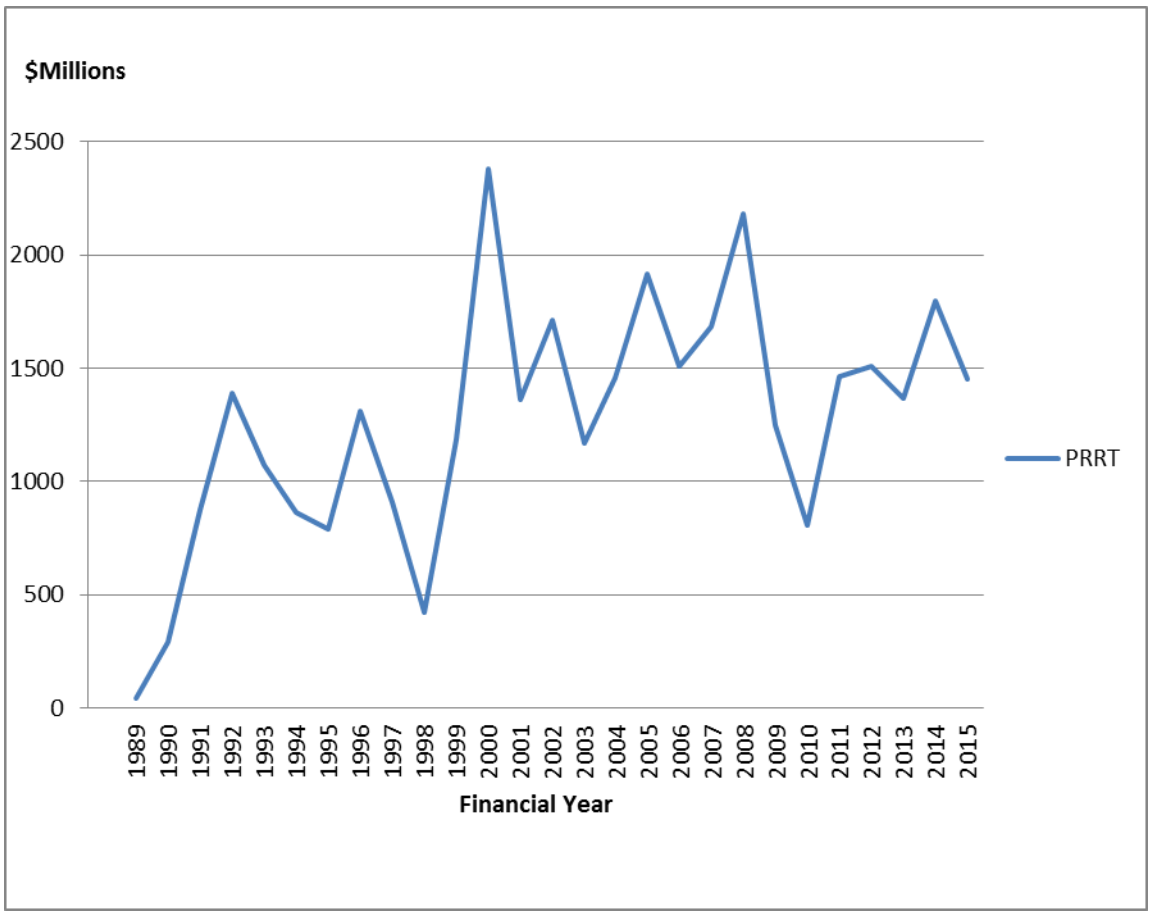
Appendix 1

Petroleum Resource Rent Tax: Receipts for Financial Years 1989 to 2015



Source: Australian Government annual budget papers.

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Primary Sources

National Archives of Australia, Canberra: Commonwealth Record Series A1690/62 Coal and Minerals files; A1690/63 Petroleum files; and A1690/64 Energy files.

- *Selected files from NAA Series # A1690/63 Petroleum files*

Dates	**NAA Item number**	**Item Description**
10/1/84 to 19/9/84	84/0051	Petroleum offshore: review of legislation. Constitutional Settlement between Commonwealth and State coastal waters
26/1/84 to 5/4/84	84/210	RRT Model Specifications
12/1/84 to 13/2/84	84/384	RRT Tax Co-ordination
13/2/84 to 10/9/84	84/390	Resource based taxes overseas
14/3/84	84/696	Petroleum offshore: proposals for competitive bidding system
23/3/84 to 7/9/84	84/774	Excise duty on new oil
26/3/84 to 12/4/84	84/793	RRT Industry submissions
26/3/84 to 10/4/84	84/794	RRT Co-ordination
30/3/84 to 20/6/84	84/834	AMES Standing Committee on offshore Petroleum legislation. Technical directions
March to May 1984	84/973	Bass Strait royalty meetings
16/4/84 to 9/5/85	84/1005	Papers on RRT Co-ordination
5/7/84	84/1795	WA onshore petroleum royalty arrangements, Barrow Island

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June to August 1984	84/1730	Bass Strait royalty meetings
9/5/84	84/1201	Papers on RRT Co-ordination
9/5/84	84/1202	Papers on RRT Co-ordination
23/5/84 to 12/6/84	84/1347	Papers on RRT Co-ordination
30/5/84 to 16/7/84	84/1416	Petroleum offshore legislation amendments of Petroleum (Submerged Lands) Act 1967
12/6/84 to 6/7/84	84/1545	Papers on RRT Co-ordination
24/8/84	84/2345	Petroleum offshore royalty payments: Bass Strait
7/9/84 to 11/10/84	84/2501	Petroleum offshore legislation amendments of Petroleum (Submerged Lands) Act 1967
21/9/84	84/2629	Weeks override royalty on Bass Strait petroleum production
11/10/84 to 13/11/84	84/2796	Petroleum offshore legislation amendments of Petroleum (Submerged Lands) Act 1967
13/1/84 to 3/1/85	84/3125	Petroleum (Submerged Lands) Act 1967: abolition of royalties TR

Legislation

Excise Tariff Act 1921 (Cth)

Petroleum (Submerged Lands) Royalty Act 1967 (Cth)

Petroleum Revenue Act 1985 (Cth)

Petroleum Resource Rent Tax Assessment Act 1987 (Cth) as amended

Petroleum Resource Rent Tax Assessment Regulations 2005 (Cth)

Petroleum Resource Rent Tax Assessment Regulation 2015 (Cth)

Petroleum Resource Rent Tax (Miscellaneous Provisions) Act 1987 (Cth)

Petroleum Excise (Prices) Act 1987 (Cth)

Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Cth)

Minerals Resource Rent Tax Repeal and Other Measures Act 2014 (Cth)

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Craig Emerson, private papers. [Detailed in Kraal (2016) forthcoming]

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