Form 40 (version 2)
UCPR 35.1

AFFIDAVIT OF DR RICHARD DENNISS 11 JULY 2012

COURT DETAILS	
Court	Land and Environment Court of New South Wales
Division	Class 1
Registry	Sydney
Case number	10224 of 2012
TITLE OF PROCEEDINGS	
Applicant	**Bulga Milbrodale Progress Association Inc**
First Respondent	**Minister for Planning and Infrastructure**
Second Respondent	**Warkworth Mining Limited ACN 001385842**
FILING DETAILS	
Filed for	**Bulga Milbrodale Progress Association Inc, applicant**
Legal representative	Kirsty Ruddock, EDO NSW
Legal representative reference	1116690
Contact name and telephone	Kirsty Ruddock, Julia Green (02) 9262 6989

[redacted]

AFFIDAVIT

Name	Dr Richard Denniss
Address	LPO Box 5096, University of Canberra Bruce ACT 2617
Occupation	Executive Director, Australia Institute
Date	11 July 2012

I affirm:

1 I am the executive director of the Australia Institute. I am an Adjunct Associate Professor at the Crawford School of Economics and Government at the Australian National University.

2 I have been asked by the Applicant to prepare an expert report that addresses the following issues:

a) *Describe the economic models used by the Hunter Valley Research Foundation. Provide your opinion on the appropriateness of these models for the Project. Use detailed examples where appropriate.*

b) *If, in your opinion, there are more appropriate methods to calculate the economic benefits of the Project, describe them. Discuss any implications this would have for the results of the Cost Benefit Analysis (CBA). Use detailed examples where appropriate.*

c) *Explain the term 'multiplier effect' in economic theory. Describe where the Hunter Valley Research Foundation has used the multiplier effect in economic modelling. Provide your opinion on the appropriateness of the use of the multiplier effect. Use detailed examples where appropriate.*

d) *In your opinion, are there any benefits or costs that have been included in the CBA that present a larger or smaller cost or benefit than you think is appropriate? Use detailed examples where appropriate. Include, where relevant, reference to:*

i) *state or federal subsidies;*

ii) *state or federal taxes or royalties; and/or*

iii) *managing company or joint venture partnership structures.*

[redacted]

e) *In conjunction with the other economic experts briefed for this matter, generate a revised CBA for the Project that:*

   i) *provides an indicative figure (with reasoning) for any costs or benefits that in your opinion should be included; and*

   ii) *satisfies the Director-General's Requirements to assess whether the Project would result in a net benefit for the NSW community.*

3 In response to that request, I have prepared the report which is annexed to this affidavit and marked 'A'.

4 The views expressed in that report are my own and correctly state my opinion in relation to the matters set out in the report. I believe no further qualifications are required as to the opinions set out in the report other than those expressed in the report.

5 Details of my qualifications as an expert on the subject matter of the report are provided in Attachment 1 to the report.

6 I have been provided with a copy of Division 2 of Part 31 of the *Uniform Civil Procedure Rules 2005* and the *Expert Witness Code of Conduct* in Schedule 7 of the *Uniform Civil Procedure Rules 2005*. I have read the expert witness code of conduct and agree to be bound by it. I believe that my report complies with the code.

7 I believe that the information set out in this affidavit is true and correct to my own knowledge.

[redacted]

AFFIRMED at Bruc[redacted]

Signature of deponent _____

Name of witness Joanne Maples

Address of witness [redacted]

Capacity of witness [#Justice of the peace ~~#Solicitor #Barrister #Commissioner for affidavits #Notary public~~] (ACT 1783)

And as a witness, I certify the following matters concerning the person who made this affidavit (the **deponent**):

1 #I saw the face of the deponent. [OR, delete whichever option is inapplicable]

~~#I did not see the face of the deponent because the deponent was wearing a face covering, but I am satisfied that the deponent had a special justification for not removing the covering.[1]~~

2 ~~#I have known the deponent for at least 12 months~~. [OR, delete whichever option is inapplicable]

#I have confirmed the deponent's identity using the following identification document:

Driver licence (ACT)

Identification document relied on (may be original or certified copy)[2]

Signature of witness [redacted]

Note: The deponent and witness must sign each page of the affidavit. See UCPR 35.7B.

[1] The only "special justification" for not removing a face covering is a legitimate medical reason (at April 2012).]

[2] "Identification documents" include current driver licence, proof of age card, Medicare card, credit card, Centrelink pension card, Veterans Affairs entitlement card, student identity card, citizenship certificate, birth certificate, passport or see Oaths Regulation 2011 or JP Ruling 003 - Confirming identity for NSW statutory declarations and affidavits, footnote 3.]

Annexure "A"

Report of Dr Richard Denniss

Executive Director, The Australia Institute

Adjunct Associate Professor, ANU

11 July 2012

THIS AND THE FOLLOWING 24 PAGES IS THE ANNEXURE MARKED " A " REFERRED TO IN THE AFFIDAVIT OF Richard Denniss SWORN THIS 11th DAY OF July 20 12 BEFORE ME: [redacted] JUSTICE OF THE PEACE/~~SOLICITOR~~ (ACT 1783)

Bulga Milbrodale Progress Association v Minister for Planning and Infrastructure

Land and Environment Court Proceedings 10224 of 2012

Briefing

1. By letter of 1 May 2012, I was briefed by EDO NSW to provide an expert report. A copy of my letter of instruction is attached to my report as Attachment 2. I have been asked to address the following matters in my report:

   We request that you address the following issues in your expert report:

   1. *Describe the economic models used by the Hunter Valley Research Foundation. Provide your opinion on the appropriateness of these models for the Project. Use detailed examples where appropriate.*

   2. *If, in your opinion, there are more appropriate methods to calculate the economic benefits of the Project, describe them. Discuss any implications this would have for the results of the Cost Benefit Analysis (**CBA**). Use detailed examples where appropriate.*

   3. *Explain the term 'multiplier effect' in economic theory. Describe where the Hunter Valley Research Foundation has used the multiplier effect in economic modelling. Provide your opinion on the appropriateness of the use of the multiplier effect. Use detailed examples where appropriate.*

   4. *In your opinion, are there any benefits or costs that have been included in the CBA that present a larger or smaller cost or benefit than you think is appropriate? Use detailed examples where appropriate. Include, where relevant, reference to:*
      a) *state or federal subsidies;*
      b) *state or federal taxes or royalties; and/or*
      c) *managing company or joint venture partnership structures.*

5. *In conjunction with the other economic experts briefed for this matter, generate a revised CBA for the Project that:*
   a) *provides an indicative figure (with reasoning) for any costs or benefits that in your opinion should be included; and*
   b) *satisfies the Director-General's Requirements to assess whether the Project would result in a net benefit for the NSW community.*

Qualifications

2. I am the executive director of the Australia Institute. I am an Adjunct Associate Professor at the Crawford School of Economics and Government at the Australian National University. My curriculum vitae is provided as Attachment 1.

1) Appropriateness of economic models used

3. The Hunter Valley Research Foundation (HVRF) have used their own Input-Output model of the Hunter Valley economy to determine the 'flow on' effects of the Warkworth mine extension in their economic assessment of the Project. In the words of the HVRF:

> *"An Input-Output (I-O) model provides a descriptive snapshot of a particular economy at a point in time. Assessments using I-O models estimate the 'economic impact' of a change in economic activity caused by either an increase or decline in spending associated with a specific industry. The results of the analysis are shown in terms of the value of the goods and services which are generated (which will be more than the initial increase or decline in spending) and the number of jobs which are created.*
>
> *I-O modelling assumes that each industry in an economy is related to every other industry. The relationship is strong between some industries (e.g. coal and transport are closely related) and weak between others (e.g. coal and communications tends to have a weaker relationship). The strength of the relationship between all industries is represented by multipliers.*
>
> *The multiplier represents the aggregate impact of a change in expenditure. That is, the impacts that are additional to the 'initial' impact are captured by the value of the multiplier. These additional impacts are referred to as 'flow-on' impacts.*
>
> *The I-O model used in this report is one developed for the Hunter Region economy by the Hunter Valley Research Foundation (HVRF). The data used in the creation of the model was compiled from a survey of over 300 organisations in the Hunter Region in 2001. The Hunter Region is as defined by the Australian Bureau of Statistics (ABS) in 2001. Note, the ABS has since redefined the Hunter Region with the amalgamation of*

several Upper Hunter Local Government Areas (LGA) while some sections of these LGAs were transferred to adjoining regions."

4. While the use of such input-output analysis is commonplace in Australia, the frequency of its use is not an indication of its accuracy. The HVRF model, like all input-output models, is necessarily constrained both by the accuracy of the data used to describe the linkages between the sectors of the regional economy and by the assumptions on which the model is based. This latter is a fundamental constraint. Both of these constraints are discussed below.

Limitations of the data on which the HVRF model is built

5. In the case of the HVRF model, the data they are using is from 2001 which precedes the current mining boom in Australia. Indeed, it precedes the widespread use of mobile telephones and the internet, and in turn means that the data is based on production processes and relationships between industries that are likely to be out of date. There is little doubt that the linkages used in the HVRF model are significantly different to the linkages that actually exist today.

6. The HVRF model cannot, in my opinion, provide an accurate depiction of the Hunter Valley economy in 2012 as both the structure of the Hunter Valley economy will have changed significantly over that period and the production processes used to produce a given quantity of output will have changed significantly over that time. In turn, its usefulness as an accurate predictor of the impact of expanded coal output in 20 years is severely limited.

7. Consider the following example. In 2001 the estimated linkage between the level of coal output in the Hunter Valley and employment in the transport industry was based on the technology and work practices that prevailed at that time. In turn, in my opinion, this linkage reflected the *average* relationship between all mining operations and all transport operations in the Hunter Valley at that time. However, since that time there has been significant technological change and new capital investment in both the coal mining industry and the transport industry. In turn it is virtually inevitable that new investments in the mining industry will rely on a higher degree of automation, and in turn lower employment/output ratios, than the average employment/output ratio that prevailed in 2001.

8. The trend towards declining employment/output ratios in mining does not just result from economy wide changes in technology and increases in labour productivity. Rather, the mining boom, and the associated shortages of skilled labour and rising labour costs,

places specific pressure on the mining industry to invest in labour saving technology (see Fisher 2012 p. 20)[3].

9. While I do not claim to have any specific expertise in the design and operation of coal mines in NSW, it is clear from sources such as Fisher 2012 (eg Table 3.1 p. 24) that there has been significant technological change in the mining industry and that, as a result of that change, the employment/output ratio is likely to have declined compared to the ratio used by the HVRF based on 2001 data.

10. This raises three problems for the use of the HVRF model.

- It is highly likely that both the mining industry and the transport industry now use less workers per tonne of coal mined and moved. It is my opinion that, based on both the economy wide trend and the impact of high wages and skilled labour shortages in the mining industry, that the use of the average employment/output ratios that prevailed in 2001 will result in an exaggerated estimate of the employment created by mining activity in 2012.

- It is inconceivable that the absolute amount of employment in coal mining and transport, and the relative level of employment between coal mining and transport, will remain stable at the 2001 levels until 2030, especially as massive investment in new coal transport infrastructure that has both been built since 2001 and is planned to be built before 2030. For example, the builders of the new coal export terminal north of Newcastle that was completed in 2010 state that "Located on the Hunter River to the north of Newcastle, the new terminal has increased the productivity of the Hunter Valley coal chain." [4] and "Thiess has delivered a first class facility to reduce gridlocks, help boost shipments and export capacity and meet the future requirements of one of Australia's busiest deep-water ports. The terminal was ready for operation in early 2010. It was designed to help increase GDP by $1.5 billion a year, boost exports by $2 billion and generate up to 5000 jobs across NSW"[5] As such projects were not built in 2001 the data used in the HVRF report cannot accurately reflect either the relative size of the coal transport sector in the Hunter Valley economy or the current employment/output ratio of that industry.

- New mines, even new mines built in 2001, would not employ the 'average' level of technology and in turn would not have the average capital/labour ratio when they are completed. On the contrary, new developments typically use the latest technologies and, in turn, typically have higher capital/labour ratios than existing operations. That is, in 2001 if there were 20 mines in operation in the Hunter Valley

[3] Autonomous and Remote Operation Technologies in the Mining Industry, Brian Fischer and Sabine Schnittger, (2012) http://www.baeconomics.com.au/wp-content/uploads/2010/01/Mining-innovation-5Feb12.pdf

[4] http://www.thiess.com/capabilities/projects/newcastle-coal-export-terminal

[5] http://www.thiess.com/capabilities/projects/newcastle-coal-export-terminal

the employment/output ratio for the industry would reflect the average of those mines. However, new developments do not rely on the 'average' level of technology used by the existing industry, rather, they typically use the latest technologies and, in turn, typically have lower employment/output ratios. As discussed above, this is particularly so in an environment of skills shortage and rising wages.

11. In my opinion it is, therefore, almost inevitable that the HVRF model incorrectly portrays the linkages between the mining industry and the transport industry and, in turn, it is almost inevitable that such errors will overstate the employment effect in the transport industry within the Hunter Valley. If the estimates provided by the HVRF are to be relied upon the proponents should provide evidence to support the assumption that the mining and transport, industries have not reduced their employment/output ratio since 2001.

12. Finally, it is important to note that these errors do not just apply to the transport industry, they apply to all of the linkages between all of the industries in the HVRF model as technological change and organisational redesign means that all industries have increased their labour productivity in the past decade and, in turn, lowered their employment/output ratio. Put simply, unless the HVRF argues that labour productivity has fallen in absolute terms since the 2001 data was collected, the level of employment per million of industry output must have fallen from that identified in the HVRF model.

13. In addition to the problems associated with the age of the data and the significant technological and structural change that has occurred in the Hunter Valley since 2001 there are a range of other problems with the use of input-output models for a project such as the Warkworth mine.

14. In the words of the Australian Bureau of Statistics (ABS), input-output tables need to be used with caution as they are built on the assumptions that:

> *"Relationships between output and input are assumed to be fixed and, in turn, do not allow for technological change or changes in the ratio of capital and labour used to produce a given value of output.*
>
> *All of the output of an industry is assumed to be identical with no differences in quality of features.*
>
> *There are no economies of scale.*[6]*"*

Fundamental limitations of Input Output models

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[6] McLennan, W. ABS, *Information Paper Australian National Accounts Introduction to Input-Output Multipliers*, Cat. No.: 5246.0, Pp.4, at <http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/FFD0BAE851EDCB8BCA2570C9007ECE04/$File/52460%20-%20Information%20Paper%20-%20Introduction%20to%20Input%20Output%20Multipliers.pdf>.

15. While the assumptions identified by the ABS above clearly require substantial caveats to be placed around any conclusions concerning the results of input-output modelling, in my opinion the biggest problem with the use of such models in relation to projects such as the Warkworth extension is the inherent assumption within the model that there is a large pool of highly skilled mining, construction and manufacturing workers who are unemployed and would be able to take up job opportunities for skilled labour created by the development. The HVRF are explicit about relying on this assumption when they state:

    "the analysis assumes that unemployed resources are available within the Hunter Region to meet any increase in demand" (HVRF p. 11)

16. While it is common to hear concerns raised about the 'skills shortage' or even the 'skills crisis' associated with the rapid expansion of the mining industry in Australia, it is less common to hear the suggestion made by the proponents of this scheme that there is a surplus of skilled workers.

17. Both the HVRF model and the Benefit Cost Analysis by Gillespie Economics (see Gillespie Economics p. 11 paragraph 1) make the assumption that there are 951 unemployed miners located within the Hunter Valley. In my opinion this assumption is wrong.

18. Ironically, and notwithstanding their assumptions made in the ES, HVRF researchers appear to have expressed concern about skills shortages in the Hunter Valley region in the past, for example:

    "particularly as skills shortages threaten some industry sectors" (2012[7])

    "Overall the economy is fairly healthy; the unemployment rate is still below the state averages, but the key issue that needs to be addressed is an acute skills shortage for trades persons...Employers are crying out for skilled people such as boilermakers, and no-one is answering the call, " HVRF senior research officer Renee Hawkins said.[8]

19. In a recent examination of the prospects for automation in the mining industry Fischer (2012) also reports the existence of a global 'skills shortage' in the mining industry.[9]

20. The proponent has made, in this case, the unjustified, assumption that there is a surplus of under-employed skilled labour within the Hunter Valley able to take up job opportunities created by the Warkworth extension. That is because, while in some industries it could be argued that the unemployed and new entrants to the labour market can take up new opportunities, the mining industry itself has stated that the highly skilled nature of mining means that unskilled workers are unsuited to the mining industry. This is well documented.

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[7] http://hccinnovationfestival.com.au/regional-innovation-showcase/62-innovation-is-the-current-economic-buzz-word.html

[8] http://www.muswellbrookchronicle.com.au/news/local/news/general/200-jobs-lost-last-year/390413.aspx

[9] http://www.baeconomics.com.au/wp-content/uploads/2010/01/Mining-innovation-5Feb12.pdf

21. Indeed, in a newspaper article entitled 'Mining can't bail out all the jobless, industry warns' Mr Chris Fraser from the Minerals Council of Australia is reported as saying as follows:

> *The mining industry has warned it cannot soak up the tens of thousands of workers being shed by manufacturing, saying it wants workers with specific skills, such as tradesmen.*
>
> *In a reality check for redundant workers looking for a new start from the mining boom, the Minerals Council of Australia said there were only small pockets of entry-level jobs available.*
>
> *"There is no shortage of people wanting to drive trucks and earn $150,000 a year. People think they are going to walk into those jobs. Well, they don't," said the council's director of education and training, Chris Fraser.*
>
> *Mr Fraser said it was a mistake to equate skills shortages with people shortages. "The mining industry has got a skill shortage issue - a chronic shortage of mining professionals and tradesmen," he said.*
>
> *The warning reflects the anecdotal evidence from manufacturing workers recently made redundant. At BlueScope Steel in Hastings, which shed about 250 jobs in August, it appears only a handful of workers are finding a new life in the mines.*
>
> *The state secretary of the Australian Workers Union, Cesar Melhem, said fewer than 10 redundant workers were expected to end up with mining jobs.*
>
> *Mr Melhem said the civil construction jobs in the mining sector were different from the skills of manufacturing workers. "They've got a pool to pick from," he said.*
>
> *Buffeted by the high Australian dollar, BlueScope cut about 1000 jobs nationally, with most going from its Port Kembla operation in New South Wales. In the wake of the announcement, BHP Billiton - which spun off BlueScope in 2002 - offered the prospect of coalmining jobs to the career steel makers.*
>
> *A BHP Billiton spokeswoman said almost 60 BlueScope workers had accepted jobs, and another 60 had been offered roles or were in the final stages of being hired. About 20 were working at the company's Illawarra Coal operation.*
>
> *Labor senator and former metal workers' union head Doug Cameron said Treasury officials made the "purely theoretical" argument that manufacturing had to make way for the mining boom.*
>
> *"You've got various parts of the economy that are just not creating the jobs," he said.*

"You can't expect a 55-year-old boilermaker who's worked all his life at BlueScope Steel in Wollongong to just suddenly pack up.

"They just can't up and head over to Karratha or up to the north of Queensland."

Despite its importance to the Australian economy, the mining sector is a relatively small employer compared with manufacturing.

The Minerals Council's Mr Fraser said mining's 220,000 workers comprised 2 per cent of the workforce, compared with manufacturing's 10 per cent.

Since the global financial crisis, Australian Bureau of Statistics figures show the mining sector has created almost 80,000 jobs, while manufacturing has lost 126,000[10].

22. All of the assertions made by the HVRF and Gillespie Economics about the 'jobs created', both by the Warkworth mine and in the broader economy, are based on the explicit assumption that there is an existing pool of highly skilled unemployed people who, in the absence of the development, would remain unemployed.

23. It is my opinion that such an assumption is nonsensical. Indeed, if such a large pool of skilled labour was available then the mining industry would be lowering rather than increasing the pay of their mining workforce and, indeed, they would not need to resort to attempts to import foreign workers to address the 'skills shortage' The use of the assumption of a large pool of unemployed skilled workers results in significant exaggeration of the social and economic benefits of the proposal.

24. In reality, the rapid expansion of the mining industry is resulting in fights between mining companies, and the manufacturing industry, for a small pool of skilled workers. This demand results in high wages being offered to those who work in the mining industry. The main victim of this fight is the broader manufacturing industry that cannot compete with the high wages being offered by the mining industry.

25. As the following discussion of alternative modelling techniques shows, it is widely accepted in the Commonwealth Treasury, and even in economic modelling commissioned by the mining industry itself, that the expansion of the mining industry comes at the expense of employment and output in other industries, primarily manufacturing, tourism and education, all of which have traditionally been substantial employers in the Hunter Valley. That is, in the absence of a pool of unemployed skilled workers the expansion of the Warkworth mine is likely to result in a reduction in employment in other industries rather than simply boosting employment in the region by the amount of employment associated with the development.

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[10] http://www.theage.com.au/opinion/political-news/mining-cant-bail-out-all-the-jobless-industry-warns-20120308-1un51.html#ixzz1wUxkzETA

2) In my opinion are there more appropriate models to consider such benefits?

3) Explain the term multiplier effect in economic theory – describe where HVRF have used the multiplier

26. Input output tables can be a useful tool for estimating the strength of the linkages between industries and shed light on the relative employment intensity of a wide range of different economic activities. They provide a relatively quick and inexpensive means to estimate the likely impact of relatively small changes in a specific industry on demand for labour or raw materials when those resources are available in abundance

27. Input output tables can be used to calculate simple 'multipliers' which provide for a quick answer to questions such as 'how many jobs would be created in industry X if there was an increase of $1million in industry Y?'

28. In the words of the HVRF (page 10-11):

> *Calculation of the flow-on effects specified above is made by the application of a set of factors called multipliers which are generated by the I-O model. A multiplier is essentially a measurement of the magnitude of response to an economic stimulus.*
>
> *In the I-O literature multiplier impacts are sometimes defined differently and/or a particular multiplier effect may be referred to by different names. The HVRF has adopted the following conventions to describe and quantify multiplier impacts, which formalise the preceding explanation of flow-on effects.*
>
> *Production induced multiplier impacts (the 'production multiplier')*
>
> *These are the increase in the production of goods and services and employment which occurs in response to the expenditures needed to operate the mine. This multiplier takes into account the effect of purchases by a firm from the sector in which it is classified in the I-O model, as well as the effects in all other sectors of the model, arising from transactions between sectors as successive waves of increases in production occur.*
>
> *Consumption-induced multiplier impacts (the 'consumption multiplier')*
>
> *The output and employment effects arising from the increase in household incomes (wages, salaries, dividends and profits) in all sectors of the economy as a result of the value of expenditures needed to operate the mine. The main influence captured here is the stimulation to the retail and service sectors when householders purchase consumer goods and services with their increased incomes. This effect is sometimes referred to as the 'pay-packet' effect.*
>
> *Total flow-on impacts*
>
> *The joint effect of the production-induced and consumption-induced impacts.*
>
> *Total impacts*

The sum of the initial impacts and the production and consumption-induced flow-on impacts. That is, the sum of the cause and effect components.

29. The relative simplicity of applying input output multipliers should not, however, be confused with the ease of interpreting the results. Consider the following paradox:

    Every industry in Australia creates demand for raw materials in other industries and, in turn, could argue that they are "responsible" for creating "indirect" jobs in addition to those employed in their industry alone.

    Every industry in Australia could commission economic consultants to estimate the "total" number of direct and "indirect" jobs created by that industry.

    According to the ABS input-output tables, across the entire Australian economy on average there are 4.9 jobs created directly for every million dollars spent (compared to 1.4 for mining). For every million dollars spent there are 9.2 direct and indirect jobs created in total giving a multiplier of 1.87. Therefore, if there were 10 million people in the Australian workforce and each industry sought to estimate their direct and indirect contribution to employment then collectively their claims would add up to18.7 million workers.

30. It is relatively easy to resolve this paradox. The purpose of the multipliers is to highlight the interactions between industries as money flows around the economy. Some of the output of the energy industry is used to create steel and some of the output of the steel industry is used by the energy industry.

31. The input-output data on employment tells us about the relative employment in each industry.

32. The input-output data on output tells us about the output of each industry.

33. The input-output data from the input output tables tells us about the linkages between each industry.

34. But when individual industries start using the input output multipliers to claim credit for employment and output in other industries they are guilty of "double counting" . That is, when the mining industry tries to take credit for the size of the construction industry, there is no offsetting "reduction" in the measured size of the construction industry.

35. Historically this attempt at double counting, an attempt typically designed to increase the apparent size and significance of an industry, has been relatively inconspicuous due to the simple fact that the technique was only used by small industries that needed to find a way to make themselves seem more economically significant than they were. That is, industries such as manufacturing or retail with large levels of employment have had

no need to use multipliers to suggest they are large employers while small employers such as agriculture and mining typically have.

36. In recent years, however, the rapid growth of the mining industry combined with their determination to continue to rely on the multiplier effect to exaggerate their size, has highlighted the potentially absurd results that can be derived from input output modelling.

37. Put simply, the published National Accounts[11] seeks to remove the "double counting" of production associated with the fact that the output of the construction industry is not included in the output of the mining industry. The whole point of using multipliers, however, is to put this double counting back into the public perception of the size of the economy

38. In the words of the ABS:

> *"(multipliers) tend to overstate the potential impact of final demand stimulus. The overstatement is potentially more serious when large changes in demand and production are considered."*

And:

> *"The implicit assumption is that those taken into employment were previously unemployed and were previously consuming nothing. In reality, however, not all 'new' employment would be drawn from the ranks of the unemployed; and to the extent that it was, those previously unemployed would presumably have consumed out of income support measures and personal savings. Employment, output and income responses are therefore overstated by the multipliers for these additional reasons."*[12]

39. Put simply, the HVRF have used the assumption of a large pool of unemployed skilled workers to justify the conclusion that an expansion in the size of the Warkworth mine will lead to an expansion in the size of Hunter Valley Workforce.

40. However, when no such pool of unemployed skilled workers exists the expansion of employment in one industry will lead to a reduction in employment in other industries. In turn, the use of the HVRF's assumption of a large pool of unemployed skilled labour results in an overstatement of the benefits to the local community of the Warkworth expansion

Limitations of input output analysis in labour constrained industries

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[11] For example, 5206.0 - Australian National Accounts: National Income, Expenditure and Product, Mar 2012

[12] McLennan, W. ABS, *Information Paper Australian National Accounts Introduction to Input-Output Multipliers*, Cat. No.: 5246.0, Pp.4, at <http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/FFD0BAE851EDCB8BCA2570C9007ECE04/$File/52460%20-%20Information%20Paper%20-%20Introduction%20to%20Input%20Output%20Multipliers.pdf>

41. If a modeller was to use input-output tables to determine the impact of a doubling of the size of mining output they would find that employment would double, regardless of the ability of the economy to provide twice as many suitably qualified employees at the wage rate that prevailed when the input output tables were constructed.

42. The rigidity of input output tables and their inability to conform to the most basic of economic assumptions about the role of price in the economy means that input-output modelling should only be used to evaluate relative small changes in small parts of the economy and for parts of the economy that can quickly train the workers they need.

43. For example, imagine if a small biscuit factory were to increase their biscuit production by 10 per cent. . Such an expansion would be unlikely to have a significant impact on either the world price of flour or the local price of labour. For this reason, the use of input output tables, based as they are on the existing price relativities, would likely yield meaningful insight into the likely increase in employment and demand for flour and other ingredients.

44. Alternatively, if the mining industry were to double in size in a short period of time, then the construction boom associated with such an expansion would likely have a major impact on the price of metal fabrication, concrete, excavation machinery and skilled labour. In turn, it would be virtually meaningless to rely on the relative factor shares that existed before the boom to estimate the likely impact of such a boom.

45. Further, the doubling in size of such an industry is likely to create price pressures and labour market constraints for other industries, pressures which are ignored when input output tables are used to evaluate the impact of the expansion.

46. Finally, a major boom in one industry is likely to lead to significant shifts in the structure of the economy which in turn will create a wide range of macroeconomic pressures, including upward pressure on the exchange rate, wages rates, inflation and interest rates. Again, none of these effects will be captured in estimates of "job creation" derived from input output tables.

47. In the words of Dr David Gruen, head of Macroeconomics at the Commonwealth Treasury:

> *"In a well-functioning economy like ours, with unemployment close to its lowest sustainable rate, it is not the case that individual industries are creating jobs, they are simply re-distributing them."* [13]

48. Similarly, the economic consultants commissioned by the proponents of the China First Mine in Queensland estimated that if the China First mine were to proceed more than 3,000 jobs would be lost in other sectors as high wages and a higher exchange rate lead to other firms

[13] Transcript of evidence to senate economics committee 16 Feb 2012, p. 17

shutting down. Manufacturing jobs were estimated to decline by 2,215 in Queensland alone. The modellers commissioned China First Mine go on to state:

> *"of note, the manufacturing sector is estimated to record a considerable decline in overall industry output during operation...it is anticipated the manufacturing sector will be one of the hardest hit sectors in terms of the reallocation and draw of labour to the China First Project given the relatively similar skills sets employed...further, the export of $4.6 billion of coal will likely place some upward pressure on Australia's exchange rate, which may impact on the global competitiveness of manufacturing goods produced in Australia."* [14]

49. Similarly, the proponents of Arrow Energy gas development state that:

> *"The Arrow LNG Plant is expected to contribute to maintaining the strength of the Australian dollar, which may adversely impact the profitability and long term prospects of some sectors that are exposed to international competition. Key industries expected to be impacted by the exchange rate include manufacturing, some agricultural commodities and tourism-related sectors."*[15]

50. There is a clear disparity between the HVRF modelling, which suggests that the expansion of the mining industry creates only benefits for other industries, and the modelling done for the China First and Arrow Energy developments, which concede that the expansion of one industry has significant adverse impacts for other industries. This disparity is explained entirely by the choice of model used.

51. The proponents of the China First Mine and the Arrow Energy development used 'Computable General Equilibrium' models rather than input output models and, in turn, their model shows the impact of a new development on the wages paid in the mining industry, the wages paid in other industries, and, in turn, allows for the impact of an expansion in one part of the economy to be more accurately traced through to its likely impacts in other parts of the economy.

52. Of crucial concern to the case at hand is that, unlike the input-output modelling conducted by the HVRF, CGE models do not assume that there is an invisible pool of highly skilled workers who would remain unemployed in the absence of the Warkworth expansion project going ahead. In turn, such models do not assume, unlike the HVRF model, that all of the wages spent by this 'ghost workforce' will result in an increase in retail or other spending. CGE models assume that new projects simply reallocate the workforce between jobs rather than 'create' them in the way assumed in the HVRF model.

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[14] Waratah Coal (2010) *Waratah Coal – China First Environmental Impact Statement:* Appendix 24 - *Economic Impact – Final Report*, p24

[15] Arrow Energy (2012) *Arrow LNG Plant Environmental Impact Statement, Appendix 21: Economic Impact Statement* p55

53. In my opinion, it is inappropriate to use an input-output model to estimate the amount of 'jobs created' by the Warkworth mine expansion for a number of reasons:

    a) The HVRF model assumes an available pool of highly skilled mining, manufacturing and construction workers that would otherwise be unemployed

    b) The HVRF model assumes that as a result of this 'employment creation' there is a knock-on increase in retail and other spending. HVRF p. 15 states that "the increase in the number of pay packets in the local economy will stimulate consumer demand and this will, in turn, generate further economic benefits. The value of this effect is represented by the 'consumption' induced flow-on". To the extent that those people who gain employment in the Warkworth development would have been employed elsewhere their pay packet from Warkworth cannot be seen as an additional pay packet in the Hunter Region but simply a transfer of a paypacket from one employer to another.

    c) The HVRF model ignores the adverse impact of the expansion on other sectors of the economy, for example, manufacturing, through higher wages.

54. In summary, the use of a CGE model would be superior to the use of input output modelling in analysing a development such as the Warkworth expansion as it does not rely on the fanciful assumption of a large pool of unemployed skilled miners. The use of a CGE model would have generated fundamentally different, and smaller, benefits to the broader community.

4) Are there any costs or benefits included that are inappropriate

55. As discussed above the economic benefits of the direct creation benefits are exaggerated by the assumption that, without the Warkworth mine proceeding, a large pool of highly skilled workers would be otherwise employed.

56. As discussed above the use of old capital/labour ratios based on 2001 data likely exaggerates the potential impact on employment in other industries.

57. As discussed above the 'indirect' job creation associated with the 'increase in the number of pay packets in the economy' are exaggerated by the assumption that Warkworth will employ a pool of highly skilled 'ghost workers' rather than simply poach them from other existing or potential developments. To the extent that those employed at Warkworth were previously employed elsewhere in the local economy there are no additional 'pay packets' I the local economy. The 'social benefits' of employment creation in the Gillespie Economics cost benefit analysis are, therefore likely to significantly exaggerate the size (if any) of the social benefits of the project.

58. The Gillespie Economics BCA includes the total sale price of coal as a 'benefit' without discussing the degree of foreign ownership of the Warkworth mine and, in turn, without discussing who will receive the benefit of the sale of coal currently owned by Australian citizens.

59. That is, the implication in the Gillespie Economics BCA is that the entire sale price of coal from the Warkworth mine is in some way a benefit to the Hunter Valley economy. This is not the case for a number of reasons.

    a) To the extent that the mine is not owned locally the profit from the sale of the coal will not make any contribution to the local economy

    b) To the extent that employment in the mine 'crowds out' employment in other regional employers there are no additional 'pay packets' in the local economy

    c) While a profitable mine will pay some tax these revenues will not accrue to the local community.

    d) to the extent that mining activity crowds out manufacturing and other industries it is important to calculate the 'net tax' that flows from such a development, i.e. the tax paid by the new development less the tax no longer paid by the firms that cease trading as a result of that expansion.

60. The production of coal delivers benefits to the following agents:

    a) The users of the coal

    b) Those who profit from the sale of the goal

    c) Those who earn an income from the production of the coal that they would not otherwise earn from producing another good or service.

    d) Taxpayers through the receipt of royalties and taxes on profit

61. It is not clear from the Gillespie Economics analysis why it has been assumed that the total value of coal sold is treated as a benefit to the local, state, or even national community. That is, to the extent that the benefits of using the coal accrue to those outside of Australia and that the benefits of the profits accrue to those outside of Australia it is my opinion that it is inappropriate to include both of those flows in the stock of community benefits to be considered in the project evaluation.

62. The Gillespie Economics BCA also appears to pay no attention to the indirect economic costs associated with the Warkworth development, for example, the adverse impact of the expansion of the Warkworth mine on profitability, and even viability, of manufacturing and other enterprises likely to be impacted by a reduction in the availability of skilled workers, higher wages or both.

63. Similarly, the reduction in payroll tax, company tax, and even royalty payments by other enterprises as a result have not been included in the Gillespie Economics BCA. As discussed above, the proponents of other mining developments have conceded that the expansion of their projects will come at a significant cost to employment and profits in other industries.

64. Finally, neither the Gillespie Economics report nor the HVRF report makes mention of the cost to taxpayers associated with the federal and state and government subsidies to the mining industry. It has been estimated that the annual cost of federal government subsidies to the mining industry cost more than $4 billion per annum. State and local governments typically incur significant infrastructure and road maintenance costs with new mine developments, none of which appear to be discussed by the proponents of the Warkworth mine.

65. While mines are required to pay royalties in exchange for the valuable natural resources they extract it has recently been revealed that the accurate collection of royalties in NSW cannot be assured. Indeed:

> *"DII cannot assure the people of NSW that all royalties owed are being paid in full. This is because it does not have sufficiently robust systems and processes to identify what is owed and to make sure it is paid. What needs to be paid is complex to calculate and guidance on this is inadequate. Auditing and monitoring processes for royalties are not strong enough. Penalties do not apply to underpayments, even if persistent, as long as some payment is made on time."*[16]

5) Generating a BCA

66. Given the information provided by the proponent of the Warkworth mine it is not appropriate to attempt to determine the net benefit of this proposal. The estimates of the likely employment and other economic benefits of the proposal are based on the flawed assumption of a large pool of unemployed skilled labour and it would require significant time and expense to conduct a more realistic assessment of those impacts using well specified CGE modelling.

Overall conclusions

67. The HVRF have used the wrong kind of model to assess the likely community benefits of the Warkworth mine expansion. Indeed, the explicit assumption in their model that a large pool of unemployed skilled mining workers exists is the main determinant of their conclusion that the Warkworth mine will generate significant new employment and other local economic benefits.

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[16]NSW Department of Industry and Investment (201) Coal mining royalties : http://www.audit.nsw.gov.au/ArticleDocuments/142/208_Coal_Mining_Royalties.pdf.aspx?Embed=Y

68. The use of more realistic assumptions, in particular the assumption that there is a shortage of skilled mining workers, would result in fundamentally different conclusion. In particular, if a CGE model was used, that is a model that assumes that no large pool of unemployed skilled labour exists, then the direct and indirect benefits of the mine expansion would be significantly lower. This is primarily due to the fact that a CGE model would allow for the fact that the expansion of the mining industry would come at the expense of other industries as skilled labour is drawn away from existing employers (resulting in a reduction in their output) and redeployed in the mining industry.

69. Finally, the Gillespie economics report conflates the total sale price of coal produced at Warkworth with the local economic benefit. As most of the profit and taxes associated with the project will not accrue to residents of the Hunter Valley, or even NSW, such an assumption overstates the community benefits. Similarly, to the extent that most of the people employed at Warkworth would have been employed elsewhere in the absence of the Warkworth expansion the employment benefits to the community are similarly exaggerated.

Attachment 1
Dr. Richard Denniss – C.V.

Education

2004	**PhD in Economics** University of Sydney Thesis topic: Measuring Fiscal Stance in Australia
1992	**Bachelor of Commerce (Honours)** University of Newcastle

Employment

July 2008 – Present	**Executive Director** The Australia Institute, Canberra
June 2008 – Present	**Adjunct Associate Professor** Crawford School of Economics and Government Australian National University, Canberra
Jan 2008 – June 2008	**Associate Professor** Crawford School of Economics and Government Australian National University, Canberra
Aug 2005 – November 2007	**Strategy Adviser** Senator Bob Brown Leader of The Australian Greens, Canberra
Mar 2004 - Aug 2005	**Deputy Director**
Aug 2003 - Mar 2004	**Acting Executive Director**
Nov 2002 - Aug 2003	**Senior Research Fellow** The Australia Institute, Canberra
Dec 2001 - Nov 2002	**Chief of Staff**
May 2001 - Dec 2001	**Senior Policy Adviser** Senator Stott Despoja Leader of the Australian Democrats, Canberra
Apr 2000 - May 2001	**Research Fellow** The Australia Institute, Canberra

Feb 1995 - Apr 2000 **Lecturer, Level A**
Department of Economics
University of Newcastle, NSW

Books

2008: *Introduction to Australian Public Policy,* Cambridge University Press, Manuscript submitted in July 2008. (with Sarah Maddison)]

2005 Clive Hamilton and Richard Denniss, *Affluenza*, Allen and Unwin, Sydney.

Refereed Journal Articles

2007 Richard Denniss, 'Crisis of cash or crisis of confidence – the costs of ageing in Australia', *Journal of Australian Political Economy*, forthcoming.

2007 Hugh Saddler, Mark Diesendorf and Richard Denniss, 'Clean energy scenarios for Australia', *Energy Policy*, Vol. 35, No. 2, pp. 1245-1256.

2007 Martin O'Brien, Abbas Valadkhani, Peter Waring and Richard Denniss, 'The Australian labour market in 2006', *Journal of Industrial Relations*, Vol. 49, No. 3, pp. 311-326.

2006 Martin O'Brien, Richard Denniss and John Burgess, 'The Australian labour market in 2005', *Journal of Industrial Relations*, Vol. 48, No. 3, pp. 305-318.

2005 Richard Denniss, 'Young people's attitudes to workplace bargaining', *Journal of Australian Political Economy*, No. 56, pp. 145-155.

2005 Sarah Maddison and Richard Denniss, 'Democratic constraint and embrace: implications for progressive non-government advocacy organisations in Australia', *Australian Journal of Political Science*, Vol. 40, No. 3, pp. 373-389.

2005 Richard Denniss, 'Private health insurance in regional Australia', *Medical Journal of Australia*, Vol. 182, No. 6, pp. 290-293.

2005 Bruce Chapman and Richard Denniss, 'Using financial incentives and income contingent penalties to detect and punish collusion and insider trading', *Australia and New Zealand Journal of Criminology*, Vol. 38, No. 1, pp. 122-140.

2005 Richard Denniss, 'From Working Nation to thriving nation: the role of Working Nation in shaping the labour market of 2004 and beyond', *Journal of Economic and Social Policy*, Vol. 9, No. 2, pp. 111-123.

2004 Clive Hamilton, Budhima Lokuge and Richard Denniss, 'Barrier to trade or barrier to profit? Why Australia's pharmaceutical benefits scheme worries U.S. drug companies', *Yale Journal of Health Policy, Law, and Ethics*, Volume 4, No. 2, pp. 373-385.

2004 Clive Hamilton and Richard Denniss, 'The costs of Claytons health insurance products', *Journal of Economic and Social Policy*, Vol. 8, No. 2, Winter, pp. 54-63.

2004 Richard Denniss, 'Paid annual leave in Australia: An analysis of actual and desired entitlement', *Labour and Industry*, Vol. 15, No. 1 August, pp. 1-16.

2004 Richard Denniss and Clive Hamilton, 'The slow road from rhetoric to reform: An analysis of road pricing policy in Australia', *Economic Papers*, Vol. 23, No. 1, March, pp. 88-99.

2003 Stephen Rix and Richard Denniss, 'GM crops in Australia: A critique of the economic modelling.', *Journal of Australian Political Economy*, No. 52, pp. 5-21.

2003 Richard Denniss, 'Flexible measures for a flexible labour market', *Australian Bulletin of Labour*, Vol. 29 No. 2, pp. 113-125.

2001 Clive Hamilton and Richard Denniss, 'Generating emissions? The impact of microeconomic reform on the electricity industry' *Economic Papers*, Vol. 20, No. 3, pp. 15-28.

2001 Richard Denniss and Martin Watts, 'Regional labour markets: naturally less efficient?', *Employment and Labour Relations Review*, Vol. 12, Supplement, pp. 166-182.

1999 Richard Denniss, 'Managing the transition from public to private sector delivery of services', *Journal for Institutional Innovation, Development and Transition,* Vol. 3, No. 1, pp 1-16.

1999 Richard Denniss and P. Toner, 'On the wrong track? An analysis of the suitability of contracting out in the NSW rail industry', *Economic Analysis and Policy*, Vol. 29, pp. 117-131.

Book Chapters

2007 'The role of leisure time in achieving sustainability' in *Steering Sustainability* (Anitra Nelson ed.) Ashgate Publishing, Melbourne (forthcoming).

2007 The Commodified environment: How the economy feeds obesity' in *The seven deadly sins of obesity: how the modern world is making us fat,* Jane Dixon and Dorothy Broom (eds.), UNSW Press.

2006 Criminal Reparations: Using Financial Incentives and Income-Contingent Fines for White Collar Crimes, in *Government Managing Risk: Income Contingent Loans for Social and Economic Progress*, Bruce Chapman (ed.) pp. 248-276.

2006 'The role of market based instruments in addressing environmental problems', in *The Australian Economy: A students Guide to Current Economic Conditions*, Warringal Publishing, 2006.

2006 'Policy Research and Organisational Demands', in *Beyond the Policy Cycle* (Hal Colebatch ed.), Allen and Unwin.

2005 'The transition to a post growth society' in J. Goldie, B. Douglas and B. Furnass (eds.) *In search of sustainability*, CSIRO Publishing, Melbourne (with Clive Hamilton).

2003 'Taxes and Charges for Environmental protection' in G.A.Grown (Ed.) *Environmental Awareness and Obligations: An Australian Management Perspective*, Thompson CPD, Kew, Australia.

2003 Policy Priorities and Processes: a Research Institute Perspective, in *Facing the Future: Engaging Stakeholders and Citizens in Developing Public Policy*, Meredith Edwards and Richard Curtain (eds), National Institute for Governance, Canberra.

2000 'Impact of Microeconomic Reform on Greenhouse Gas Emissions from the Electricity Sector' in Productivity Commission *Microeconomic Reform and the Environment*, pp. 79-97, Ausinfo, Canberra. (with C. Hamilton)

2000 'Governments and Market Failure' in P. Kneist and J. Burgess (eds.) *Introduction to Micro Economics*, pp 173-202. Macmillan Publishers Australia, South Yarra. (with Burgess, J. and Kneist, P.)

2000 'Markets and the Environment' in P. Kneist and J. Burgess (eds.) *Introduction to Micro Economics*, pp 257-251. Macmillan Publishers Australia, South Yarra. (with Kneist, P.)

1999 'The Budget Balance and The Stance of Fiscal Policy' in S. B. Dahiya (ed.) *The Current State of Economic Science* Vol. 4 pp. 1799-1816, (with John Burgess)

Monographs

2007 *Economists and Environmentalists: Together at last?*, The Australia Collaboration, Melbourne.

2005 *Wasteful Consumption in Australia*, The Australia Institute, Discussion Paper no. 77. (with Clive Hamilton and David Baker)

2004 *A Clean Energy Future for Australia*, WWF, Australia, 162 pages. (with Hugh Saddler and Mark Diesendorf)

2004 *Property Rights and the Environment: Should farmers have a right to compensation?*, The Australia Institute, Discussion paper no. 74. 62 pages. (with Andrew Macintosh)

2004 *Silencing Dissent: Non-government organisations and Australian democracy*, Discussion Paper no. 65, The Australia Institute, Canberra. (with Sarah Maddison and Clive Hamilton). 63 pages.

2004 *The accountability of private schools to public values*, Discussion Paper no. 71, The Australia Institute, Canberra. (with Deb Wilkinson and Andrew Macintosh). 90 pages.

2003 *Annual Leave in Australia: An analysis of entitlements, usage and preferences*, Discussion Paper No. 56, The Australia Institute, Canberra.

2003 *Trading in Our Health System? The impact of the Australia-US Free Trade Agreement on the Pharmaceutical Benefits Scheme*, Discussion Paper No. 55, The Australia Institute, Canberra, (with K. Lokuge). 43 pages

2003 *A critique of the claimed economic benefits of GM food crops in Australia*, Network of Concerned Farmers. (with Stephen Rix)

2002 *Taxes and Charges for Environmental Protection*, Discussion Paper No. 46, The Australia Institute, Canberra. (with Clive Hamilton and Hal Turton)

2001 *Measuring Employment in the 21st Century: New measures of Underemployment and Overwork*, Discussion Paper Number 36, The Australia Institute, Canberra.

2000 *Tracking Well-being in Australia: The Genuine Progress Indicator 2000*, Discussion Paper Number 35, The Australia Institute, Canberra. (with Clive Hamilton)

2000 *Taxing Concern? The performance of the Green Power Scheme in Australia*, Australia Institute Discussion Paper No. 31, the Australia institute, Canberra.

1999 *How Low Can We Go? An Analysis of the pressure on Coal prices and Employment*. Report for the CFMEU. ESC Working Paper no. 139. (with Peter Waring)

1998 *Paying to Protect the environment: Any Volunteers*? Public Sector Research Centre Paper no. 50. UNSW, Sydney.

1998 *On the Wrong Track: The Impact of Contracting Out by Rail Services Australia on Regional Economies and the Labour Market*. Employment Studies Working Paper No. 38 (with P. Toner)

1998 *Redressing the Earnings Gap*. Employment Studies Centre Working Paper No. 37. (with J. Burgess, R. Green and G. Strachan)

1997 *Supplementary Labour: What is it and Where will it Lead?* Employment Studies Centre Working Paper No. 34.

1997 *The construction Industry and Enterprise Bargaining, Part 1: Industry Structure, Bargaining Characteristics and the Spread of Bargaining*. Employment Studies Centre Working Paper No. 32. (with J. Burgess, R. Green and B. Mills)

1997 *The construction Industry and Enterprise Bargaining, Part 2: The prospects for a two-tier Labour Market Emerging and intensifying Under Enterprise*

Bargaining, Employment Studies Centre Working Paper No. 33. (with J. Burgess, R. Green and B. Mills)

1995 *The Economic Impacts of An Increase In Construction Industry Wages*. Employment Studies Centre Research Paper, October 1995

1995 *The State of Australian Government 1994-95*. Evatt Foundation, Sydney.

1994 *The State of Australian Government, 1993-94*. Evatt Foundation, Sydney.

Other Papers

2006 'Unemployment is in the eye of the beholder: an analysis of the definition of unemployment in Australia', published by the office of Senator Rachel Siewert.

2005 'The Attitudes of Young People to the Environment', The Australia Institute.

2005 'Who benefits from private health insurance in Australia?', The Australia Institute.

2005 'Demographic Trends in Private Health Insurance Membership', The Australia Institute.

2004 'Public Attitudes to Discrimination in Private Schools', The Australia Institute. (with D. Wilkinson, A. Macintosh)

2004 'Tax Deductibility of Donations to School Building Funds', The Australia Institute. (with D. Wilkinson)

2004 'Overconsumption of pet food in Australia', The Australia Institute.

2004 'Buying an education: Where are the returns highest?', The Australia Institute.

2003 'A backdoor to higher medicine prices? Intellectual property and the Australia-US Free Trade Agreement', The Australia Institute. (with B. Lokuge, T. Faunce)

2003 'Using rewards to catch white collar criminals', The Australia Institute. (with Bruce Chapman)

2003 'Health Spending in the Bush: an analysis of the geographic distribution of the private health insurance rebate' The Australia Institute.

2003 'The double dividend: an analysis of the job creation potential of purchasing additional holiday leave', The Australia Institute.

2003 'Funding sport fairly: an income-contingent loans scheme for elite sports training, The Australia Institute.

2002 'Tax Flight? An analysis of the 'duty free' system in Australia', The Australia Institute.

2002 'Health Insurance Tax Rort', The Australia Institute. (with Clive Hamilton)

Articles in non-refereed journals and magazines

2006	The cost of a comfortable retirement', *Dissent* no.21, Spring 2006, pp.36-39.
2005	'Who benefits from PHI', *New Doctor*, November 2005 – pp. 23-25
2004	'Middle Class Welfare: Is too much ever enough?' *Seeing Red*, Issue 1, March 2004, pp.17-21.
2003	Snake Oil And The Pharmaceutical Benefits Scheme, *Arena* Issue 66 August - September 2003.
2001	'Gross Domestic Product versus the Genuine Progress Indicator', *Dissent*, Winter 2001, pp. 35-37
1997	'Dividends of Pain', *Arena*, No. 27, March 1997. (with W. F. Mitchell)

Consultancies

2003	A Critique of the modelling of the economic impact of GM crops in Australia, for The Twynham Agriculture Group. (with Stephen Rix)
2003	'Valuation of household production for a married housewife', conducted for Mclellands Lawyers, Sydney. (with Clive Hamilton and Michael Bittman)
2003	'An economic analysis of the potential cost to Australian exporters of allowing genetically modified food crops to be grown in Australia.' Conducted for GreenPeace. (with Stephen Rix)
2000	Submission to the House of Representatives Joint Standing Committee on Treaties' Inquiry into the Kyoto Protocol, prepared for Australian Gas Light Company. (with Clive Hamilton)
2000	An analysis of taxes and charges impacting on the environment, prepared for the NSW EPA. (with Clive Hamilton and Hal Turton)
1999	An Analysis of the impact of Job Shedding in the Coal Industry on the Hunter Labour Market. Prepared for the CFMEU on behalf of the ESC. (with P. Waring)
1998	Impact of the Construction of an International Airport at Stockton, Newcastle. Prepared for ABI Group on behalf of the ESC.
1997	High Skill or Low Wages in the Australian Clothing Industry for the AIRC award simplification review. (with N. Croce)
1998	On the Wrong Track - The Impact of Contracting Out by Rail Services Australia on Regional Economies and the Labour Market for the Public Transport Union. (with P. Toner)
1998	Employment and Budgetary Impact of Reform of Entertainment Taxation Policy in Australia, Report for the Restaurant & Catering Industry Association.
1998	Redressing the Earnings Gap, Submission for the Labor Council of NSW to Pay Equity Inquiry. (with J Burgess, R Green and G Strachan)
1998	Back on track : managing rail maintenance in the New South Wales rail network / prepared on behalf of the Public Transport Union by the Productive Edge Consulting Group. (with Phil Toner).
1997	Pay and Performance in the NSW TAB, Report for Clayton Utz & TAB Agents Association.

1997	Hunter Region: Towards a Sustainable Future, Report for Hunter Economic Development Corporation and the NSW Parliamentary Inquiry on Business and Employment opportunities in the Hunter Region. (with R Green and P O'Neill)
1997	Textiles and Fashion: Australia's Cutting Edge Industries, Report for TCFUA and Industry Commission. (with R Green and P O'Neill)
1997	Submission by the TCFUA to the Industry Commission Inquiry into the Textiles, Clothing and Footwear Industries. (with Roy Green)
1996	Written submission to the National Wage Case for the CFMEU, Construction and General Division. (with Roy Green, John Burgess and Bob Mills)
1996	An analysis of Supplementary Labour, prepared for AMWU.
1995	The Contribution of Government Charges to the CPI in Australia, prepared for the Prices Surveillance Authority. (with Bill Mitchell)
1993	Survey and Appraisal of the literature dealing with the philosophy and economic effects of government dividend charging policies on Government Trading Enterprises', prepared for the MSB Hunter Ports Authority.