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CSG economic modelling

On the alleged benefits of the Santos coal seam gas project in North West NSW

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Summary

Santos is planning to mine the coal seam gas reserves of North West New South Wales and, as elsewhere with coal seam gas projects, has encountered substantial local opposition. Action groups such as 'Save Liverpool Plains' and 'Lock The Gate Alliance' have initiated lobbying and protest action. However, Santos has recently released a report entitled 'The economic impacts of developing coal seam gas operations in North West NSW' undertaken by the Allen Consulting Group (the Allen Report). The Allen Report was commissioned and released by Santos and in an accompanying press release Santos says that the report examines what is likely to happen:

> *"…if the company's proposed coal seam gas (CSG) investments proceed as scheduled."*[1]

Santos' Vice President Eastern Australia, James Baulderstone, took the Allen Report to say that*:*

> *"Allowing the natural gas industry to develop in NSW will deliver once-in-a-generation economic opportunities for the state, especially in regional areas."*[2]

However, despite the claim that the development of CSG will create a 'once in a generation' economic opportunity Santos' own economic modelling shows that, on the contrary, the benefits to the local economy of the planned development will be quite small and that the major beneficiaries will be the owners of Santos who predominantly reside outside of the development area.

The Santos modelling contains a number of findings that should be of interest to both opponents and proponents of the mine alike, including:

- only 30 new gas jobs are expected to be created in the operational phase of the development
- 570 new public sector jobs will be created
- despite the very small number of new mining jobs the modellers find that economic output in NSW will grow by $821 million.

Due to the fact that the Allen Report does not provide a clear outline of the critical assumptions that they made readers are at a disadvantage in trying to understand how such a small increase in direct employment could create nearly $1 billion in additional economic activity. Similarly, the reader is left to wonder how an investment in coal seam gas creates 570 new public sector jobs as the report's authors provide no discussion of this intriguing conclusion.

While the reported findings in the Allen Report raise as many questions as they answer, those interested in the relative costs and benefits of the development should be even more concerned with the results that the report does not present. For example:

1) the modelling results appear to suggest that gas exports from the development will 'crowd out' $646 million in other exports by driving the value of the Australian dollar higher.

[1] Santos (2011a). 'Santos NSW CSG investment promises substantial benefits for state', *Media Release*, 20 December.

[2] Santos (2011a).

2) the loss of $646 million in exports from other sectors is likely to cause then loss of 5,770 jobs in the non-mining industries.
3) the report provides no broad context for the scale of the development, for example, it does not discuss the estimated 30 new gas jobs in relation to the 66,000 people in the labour force of the North Central Plains and Hunter Region.
4) whereas proponents of other large developments, such as the China First coal mine in Queensland, concede that their mine will lead to the loss of thousands of jobs in manufacturing the Allen Report provides no clear discussion of the net macroeconomic consequences of the development.
5) despite claiming to consider the 'economic impacts' of CSG development the Allen Report includes just three paragraphs on the impact of the proposed development on the region's water resources. Water is a vital economic resource for the region but no analysis of the environmental risks is attempted.
6) the Santos report does not provide evidence to support the assertion that treated water will be safe for crop and livestock use or for release into local water ways.

It is hard to escape the conclusion that the Allen Report, being based on a series of systematically generous assumptions and largely ignoring the biggest costs and risks of the project, provides a flawed basis on which to evaluate the net costs and benefits of the Santos development.

Indeed, given the inclusion of results such as the boost in public sector jobs of 570 and the exclusion of any analysis of the impact on the exchange rate and jobs in other sectors it would seem that the Allen Report conceals more than it reveals about the likely impact of CSG development in NSW.

Introduction

Santos is planning to mine the coal seam gas reserves of North West NSW and, as elsewhere with coal seam gas projects, has encountered substantial local opposition. Action groups such as 'Save Liverpool Plains' and 'Lock The Gate Alliance' have initiated lobbying and protest action. However, Santos has recently released a report entitled 'The economic impacts of developing coal seam gas operations in North West NSW' undertaken by the Allen Consulting Group (the Allen Report). The Allen Report was commissioned and released by Santos and in an accompanying press release Santos says that the report examines what is likely to happen:

> *"…if the company's proposed coal seam gas (CSG) investments proceed as scheduled."*[3]

Santos' Vice President Eastern Australia, James Baulderstone, took the Allen Report to say that*:*

> *"Allowing the natural gas industry to develop in NSW will deliver once-in-a-generation economic opportunities for the state, especially in regional areas."*[4]

However, a close reading of the Allen Report leaves the reader with some serious doubts that there will in fact be net benefits associated with the project. For example, as shown below, the Allen Report confusingly claims figures of both 30 and 200 new gas related jobs in NSW during the operational phase. The figure of 30 gas jobs seems to be from the modelling output (see Figure 1) as a direct result of the CSG project and the figure of 200 comes from claims about direct employment. That said, the Allen Report also finds that these 30 to 200 new jobs will create an increase in NSW economic output of $821 million per year. The lack of detail in the report means that we are at a loss to understand how these mining jobs could create $821 million in local output. Similarly, we cannot easily explain how the new gas development is supposed to create a reported 570 new jobs in the NSW public service. A key conclusion of this paper is that the Report's authors should release all of the assumptions on which their modelling was based as well as a full set of modelling results.

Economic models of the sort used in the Allen Report are designed in such a way that an economic benefit in one part of the economy is associated with losses elsewhere. Whether there is a net economic benefit overall will reflect the assumed relationships between other sectors built into the model. However, the Allen Report tends to focus on the positive results and either fails to find, or fails to report, the inevitable negative impacts on other parts of the economy. Based on the Santos project modelling it would appear that an increase in gas exports is associated with a loss of $646 million in exports elsewhere in the economy with an associated loss of 5,770 jobs during the operational phase of the gas project.

Method

The Allen Report modelling uses the Monash Multi-Regional Forecasting model.[5] This approach begins with an initial set of projected data outlining how the economy is likely to behave in the absence of the proposed development. This is called the baseline scenario and gives projections for employment, income and similar economic variables. Then the change, in this case a large CSG project is modelled and new forecasts are compared with

[3] Santos (2011a).

[4] Santos (2011a).

[5] The MMRF is a dynamic Computable General Equilibrium (CGE) model of Australia's six State and two Territory economies. For more information see <http://www.monash.edu.au/policy/mmrf.htm>.

the baseline to identify changes. As the Allen Report notes, this type of modelling is used by well-respected organisations such as the Commonwealth Treasury.

The Allen Report likes to present its work as following in the tradition of researchers and economic modellers, including the Commonwealth Treasury, especially Treasury's report on the then proposed Carbon Pollution Reduction Scheme.[6] It is worth briefly comparing the Allen Report with the report prepared by Treasury on the Carbon Pollution Reduction Scheme. In the latter there is a serious attempt to set out and justify all of the assumptions used in the modelling. The way Treasury enters input assumptions into the model is carefully explained as is the impact of the assumptions on the results. Also the model results are summarised in the Treasury report so that the text can be verified and indeed, readers can make up their own minds and come to different conclusions if they wish. By contrast a reader of the Allen Report is left wondering what analysis they have actually undertaken. This seems especially important since a report financed by sectional interests might be expected to go to greater lengths to be transparent by setting out all its assumptions, its workings and fully explaining its results.

The economic models used in this type of exercise are undertaken in a 'general equilibrium framework' so called because they attempt to track *all* the changes likely to occur throughout the whole economy. For example, a large mining investment in North West NSW may potentially have impacts on the value of motor vehicles produced in South Australia. In principle the model should be able to follow through that and similar consequences.[7]

Anyone attempting to examine the current Allen Report is at a substantial disadvantage since few of the critical assumptions about the inputs into the model or outputs of the model are explicitly provided by the authors.

Preliminary observations

The first thing to note about the Allen Report is that it is very opaque. There is no clear discussion of what the initial assumptions were. For example, the intended gas production is given in petajoules, a measure of the energy content of the gas, but there are no assumptions given for the price of gas provided to the reader. Yet the modellers must have determined such a price in forecasting exports and Gross Domestic Product (GDP). Investment spending during the construction phase must have been put into the model but nothing is revealed in the paper about the assumed size of that investment. While the press release highlights the magnitude of the project the apparent absence of any impact on the Consumer Price Index or the Balance of Payments suggests otherwise.

There is no clear discussion of the macroeconomic consequences. For example, we are not told how the exchange rate or inflation rate are expected to change in response to the gas project.

There are also significant ambiguities in the discussion. For example, employment impacts by industry in the operations phase are given in Figure 3.2 of the Allen Report which provides the estimate of the additional jobs created in NSW in various industries. However, gas employment appears to increase by 30 people but we are told on page 17 there are an additional 200 direct jobs in the Santos project in the operational phase. Is Table 3.2 to be interpreted as just the indirect employment effects? The reader should not really be responsible for answering such questions.

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[6] Commonwealth of Australia (2008). *Australia's low pollution future: The economics of climate change*.

[7] For more discussion of economic modelling in Australia see Denniss, R (2012). *The use and abuse of economic modelling in Australia*. Technical Brief No.12, The Australia Institute, February.

There is no figure or explanation given for the estimated initial economic stimulus due to the increased revenue for Santos. The Allen Report suggests that North West NSW CSG production will be around 210 petajoules of gas by 2024. At present prices of around $7 a gigajoule that implies production worth around $1,470 million per annum.[8] Recent government estimates suggest that gas prices will remain relatively stable to 2034-35.[9] The first input into the modelling of the on-going impact of the North West CSG project would have been an increase in production from the Santos project worth almost $1.5 billion before second round impacts come into play. It seems very curious that calculations for the magnitude of this crucial shock to the model[10] are barely discussed in the report. Likewise, annual construction figures and similar expenses are simply not reported.

Another preliminary observation that needs to be made is that the title of the Allen Report suggests a comprehensive account of the economic impacts of the CGS operations. Yet there is no hint of any costs, take for example the squeezing out of any farmers associated with the project. In contrast the consultants that modelled the China First coal mine in Queensland explicitly mentioned the 3000 total jobs that were expected to be lost elsewhere if the mine went ahead.[11] In the Allen report there is no estimate of possible job losses anywhere in the economy.

One cannot make an omelette without scrambling the eggs. Upon reading the discussion in the Allen Report it appears as though the Santos CSG project is going take place in an economic vacuum. The Allen Report simply fails to report how it took account of the direct impacts on other sectors such as agriculture, manufacturing, tourism and transport. The report, commissioned by Santos, also ignores the impact of their development on the environment and water access and quality from such a large scale investment in sensitive areas of the North West region of NSW. There is no attempt to discuss these costs, which would need to be considered in any full discussion of the economic impacts. Nor is there any attempt to quantify the risks to the region's environment or the risks to industries that could suffer due to the degradation of land and water resources.

Claimed Benefits of the CSG development

The Allen Report suggests project employment of around 1800 people in 2015 during the construction phase and 200 on an ongoing basis. The latest Australian Bureau of Statistics (ABS) figures for average weekly total earnings in the mining industry are $2163.80 and in construction, $1276.00. Annualising those figures suggests an annual wages bill peaking at about $120 million in 2015 and settling down to $23 million per year during the local mining/operating phase.

These are not big numbers. The North Central Plains alone has a labour force of 16,000 people with another 50,000 in the nearby Hunter region.[12] The annual wages bill in those two regions is in the order of $800 million and $2,500 million respectively. The impact of the project will not be trivial but neither should it be exaggerated.

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[8] One petajoule is equal to a million gigajoules.

[9] Syed, A and Penny, K (2011). *Australian energy projections to 2034-35*, Bureau of Resources and Energy Economics, December, <http://bree.gov.au/documents/publications/energy/Australian-Energy-Projections-report.pdf>

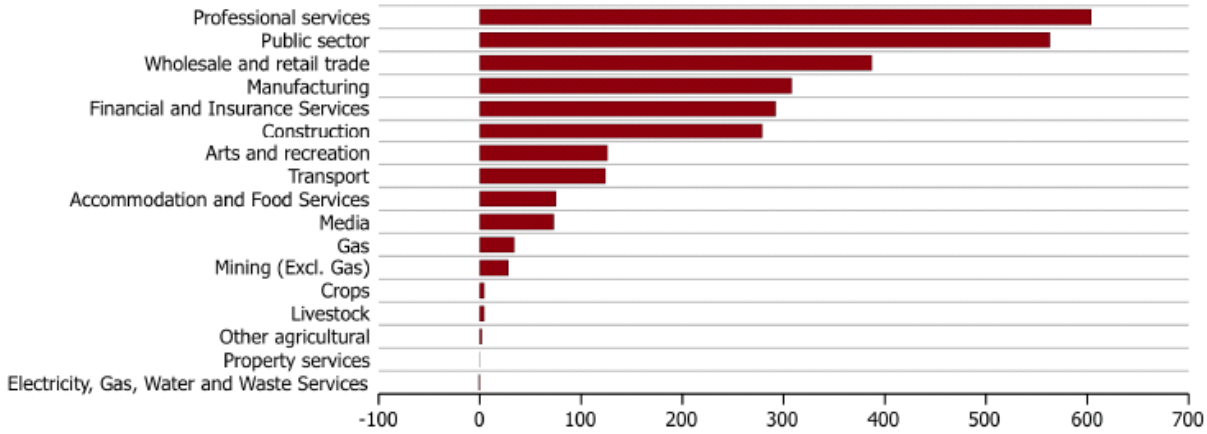
[10] Economic modelers refer to 'shocks' when they make changes to the model in order to explore the consequences.

[11] Denniss, R (2011). *An analysis of the economic impacts of the China First mine*, Submission, The Australia Institute, December.

[12] Figures from DEEWR Labour force region data at <http://www.deewr.gov.au/lmip/default.aspx?LMIP/LFR>

In Chapter 3 of the Allen Report the broader economic gains for NSW are discussed. This chapter is very obscure. Figure 3.2 (reproduced below in Figure 1) includes the employment impacts by industry showing around 600 new jobs in professional services, around 570 in the public sector, a bit under 400 in wholesale and retail trade and so on. However, gas employment increases by around 30 and mining employment goes up by about 25 jobs.[13]

Figure 1: Claimed NSW employment impacts from Santos coal seam mining, number of workers by industry.



Source: Allen Consulting Group (2011). Figure 3.2.

Figure 1 raises more questions than it answers. For example, it would be interesting to know why the modelling shows only 30 new gas mining jobs in NSW but suggests there will be around 570 NSW public servants employed as a result of the Santos project.

The mechanisms though which 570 new public sector jobs will be created are not explained. While one might understand increased employment in many sectors of the economy associated with a mining-related boost to spending, it is not clear how that could also translate into a decision to increase the number of public servants. The Allen Report provides no explanation.

Throughout the report there is mention of the creation of 200 jobs.

> *"The development would … create 200 direct permanent full time positions on the project."*[14]

Furthermore:

> *"Santos estimates that the company will require a workforce of …more than 200 positions during operations."*[15]

However, these statements are contradicted further on when those 200 jobs are described in a manner that suggests they may not be all direct Santos jobs:

> *"It is estimated that the region will benefit from the creation of around 200 full time additional positions. This increase takes into account both those positions created as*

[13] It is possible some error arises when trying to read numbers from the graphs.

[14] Allen Consulting Group (2011)., p. iv

[15] Allen Consulting Group (2011)., p. 13

> *a direct result of the CSG project and indirectly through increased economic activity."*[16]

As already pointed out above, the claimed employment impacts, from the Allen Report repeated in Figure 1 only makes sense if this is interpreted mainly the indirect or second round effects only. Otherwise it would be difficult to understand why the 200 direct or indirect jobs are not reported. The description of Figure 1 in the Allen Report states that employment will rise due to:

> *"…second round income effect where increased output is sold in the market, especially as exports, leading to a flow on impact to households and capital owners throughout the economy. This in turn is spent by firms and households increasing expenditure on some goods and services, raising output, investment and employment in some sectors and regions."*[17]

It is this second round effect that appears to generate a claimed $821 million increase in NSW output during the operational phase. Second round effects are not the direct result of the coal seam gas project but an attempt to estimate what will happen when the gas income is re-spent in the rest of the economy.

It appears that the modellers have presented results only for the operational phase rather than the construction phase. As mentioned above, it looks very much like the Allen Report is modelling what happens *after* the gas sales receipts are received and then it is assumed that income in turn is spent on local goods and services. However, the relative magnitudes of the modelling results seem out of order. The income received by Santos will go towards paying wages, paying for other inputs and the residual will be profit. If there are to be second round effects then it is these channels through which they must take place. We can examine each in turn.

As pointed out already, the wages bill for Santos can be expected to increase by around $23 million in the operational phase and it can be expected that some of those wages will be re-spent in the local economy. Given these are high income miners we note that taxes will also be higher and so new spending is unlikely to be more than around $15 million, assuming there are no offsetting local job losses. It would be challenging to generate an $821 million impact from such a small increase in wages.

The second channel for new spending comes from the incomes generated by the suppliers to Santos. In oil and gas extraction throughout Australia intermediate products used in the industry are approximately four times the value of the wages bill.[18] So there might be suppliers providing around $100 million in goods and services and earning an after tax income of perhaps $65 million which again might generate new spending. However, a reduction in economic stimulation can be also be expected due to the crowding out of similar supply.[19] The result once again is that there will be some multiplier effect but only of a relatively small value.

If the first two channels, wages and input suppliers which can be estimated to be considerably less than $100 million, are too weak to generate large multiplier effects then a

[16] Allen Consulting Group (2011),, p. 17

[17] Allen Consulting Group (2011)., p. 14.

[18] ABS (2010). *Australian National Accounts: Input-output tables – Electronic publication, final release 2006-07 tables*, Cat no 5209.0.55.001, 23 December. The actual value is 4.15.

[19] 'Crowding out' is the expression economists use to describe the process through which an increase in spending in one area may cause a contraction in activity in another area. For example, new spending in construction may draw labour out of manufacturing activities.

lot of weight must have been put on the increased profits received by Santos. Of course, profits received by Santos will only be re-spent if they are first paid out in dividends. In 2010 Santos made an after-tax profit of $498 million and paid out $316 million in dividends.[20] This is a reasonable payout, but we need to ask if, and where, it will be re-spent in turn. On 28 February 2011 the top shareholder in Santos was HSBC Custody Nominees (Australia) Limited and similar investment companies accounted for the rest of the top 20 shareholders. Collectively those nominee companies and similar investment companies accounted for 58 per cent of the ownership of Santos. Such companies tend to be acting as agents for superannuation funds and are unlikely to spend any money they receive on goods and services that might kick start a multiplier response. Note too that any foreign ownership of Santos would inhibit an Australian multiplier effect. Also for historic reasons many of the individual shareholders are likely to be biased towards South Australians.

Without further knowledge about the ownership structure of Santos it is difficult to believe that its shareholders will make significant new expenditures in NSW. Further, to the extent that the owners of Santos undertake new spending we should also net against that the reduction in spending on the part of the owners of businesses elsewhere who suffer losses due to the high value of the Australian dollar and other consequential changes in the economy (see below).[21]

In summary it appears the multiplier impacts have been exaggerated. It is implausible that the three streams would be strong enough to ultimately produce the reported $821 million multiplier effect, especially in NSW alone. It appears as if the Allen Report assumes the bulk of all the gas receipts would be received as an income increase in the hands of local people which would in turn trigger the multiplier mechanism in the model. However, for the reasons discussed above such an approach would be inconsistent with the publicly available facts. In this regard it should be noted that once up and running mining projects generate very little in the way of benefits to the local region and often impart net negative impacts. That is one of the reasons why people use the term 'resource curse' to refer to the net impacts of large mining activity.[22] While the construction phase of mining creates significant numbers of jobs that is rarely true of the operational phase. While it is possible that increased export volumes, combined with record resource prices, can deliver broad benefits, such an outcome depends more on the tax/distribution policies than the number of new mines.

Australia wide macroeconomic effects

The Allen Report suggests that 50 per cent of the gas output will be exported thereby generating additional export receipts. 50 per cent seems a very arbitrary figure and the Allen Report virtually admits as much when it says that:

> "…bec*ause of this uncertainty* [due to *the coverage of the carbon tax], it has been assumed that 50 per cent of gas production will be consumed domestically."*[23]

[20] Santos (2011b). *Annual Report.*

[21] There is forth logical possibility that should be mentioned for completeness. Santos could itself spend the increase in its profit. The Allen Report gives no reason to suspect that Santos has further investments it wants to undertake if it had higher retained profits. Also Santos is flush with funds already. An inspection of the Santos balance sheet shows it has plenty of cash and its Chief Financial Officer, Andrew Seaton stated that the *'strong balance sheet and liquidity position place us [Santos] in a position of strength'*.(See Santos (2010) *Annual Report*, p. 9.) If Santos wanted to undertake more purchases it would already have done so.

[22] This is documented at length in Richardson, D and Denniss, R (2011) *Mining the truth: the rhetoric and reality of the commodity boom,* Institute Paper 7, The Australia Institute, September.

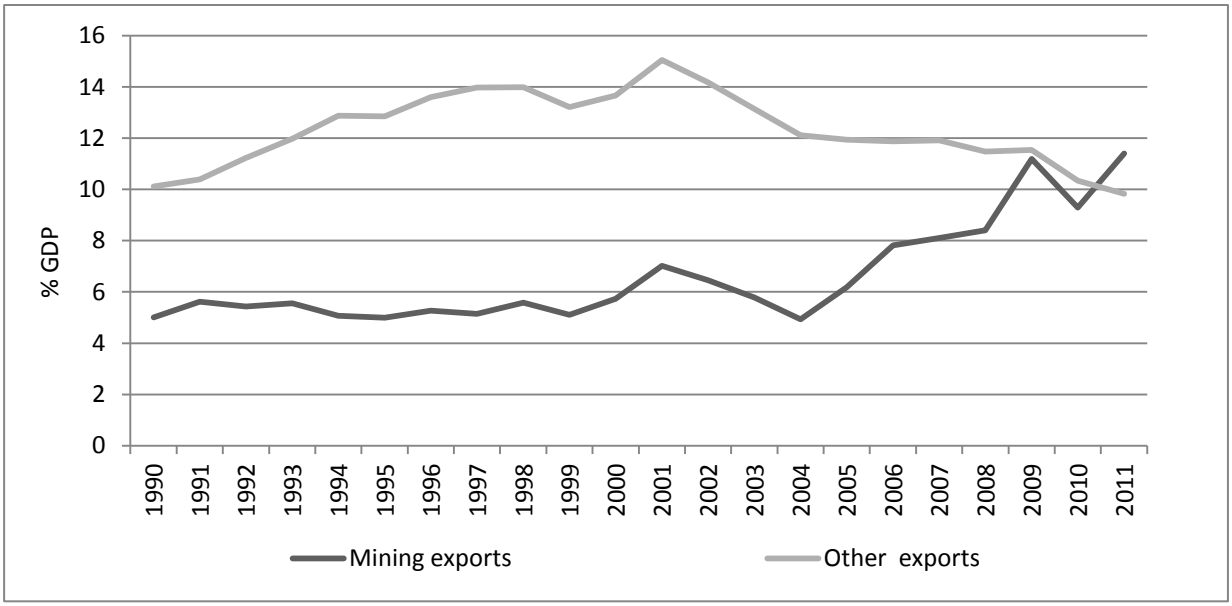
[23] Allen Consulting Group (2011)., p. 12.

The extent to which the project creates additional exports is important for the macroeconomic implications. With a floating exchange rate the value of currency coming into Australia must equal the amount flowing out. Hence anything that has the effect of increasing export income will set up reactions that result in compensating changes elsewhere in the economy. One of the main responses to increased exports is an increase in the exchange rate which has the effect of both inhibiting other exports from Australia as well as increasing imports into Australia. As might be expected, Figure 4.1 from the Allen Report shows an equal increase in net exports and net imports.[24]

Just as increased exports can set up multiplier effects so too can increased imports but the effects will be negative. Imports are paid for by Australians but the payments go overseas rather than staying in Australia—these payments are a 'leakage' out of the flow of spending in Australia which reduces the demand for the products of Australian industry. Against the jobs created by the gas industry and the multiplier effects we have to deduct the impacts on the import competing industries of Australians switching their expenditure towards imports.

In addition to the increase in imports a higher exchange rate can deter other Australian exports from manufacturing, tourism, agriculture and even marginal mining ventures. Car manufacturers Toyota and Holden have recently announced job cuts blaming the high value of the Australian dollar[25] as have service companies such as Qantas.[26] The relationship between mining exports and other exports is clearly shown in the following graph.

Table 1: Mining and non-mining exports as share of GDP



Source: ABS (2011) Balance of payments and international investment position, Australia, Sep 2011,Cat no 6302.0, 6 December, ABS (2011) Labour force, Australia, Nov 2011, Cat no 6202.0.

This effect, the crowding out of exporting and import competing industry, should show up in the modelling and indeed it does. We can find out how much other exports fall in their model by noting that 50 per cent of Santos's sales, which is the assumed export share, should be worth $735 million based on a unit price of $7 a gigajoule. Now on Allen's figures net exports increase by 0.03 per cent which, using 2010-11 figures gives just $89 million as the increase

[24] Allen Consulting Group (2011)., p. 19.

[25] AFP (2012). 'Holden blames job losses on strong Australian dollar', *Yahoo!7 News*, 2 February, <http://au.news.yahoo.com/world/a/-/world/12791857/holden-blames-job-losses-on-strong-australian-dollar/>

[26] Crowe, D (2012). 'Qantas chief faces critics' *The Australian Financial Review*, 7 February.

in net exports. That means the difference, or $646 million in exports must have been lost elsewhere. Given the average labour intensity in Australian industry[27] we can estimate these lost exports would have caused a loss of some 5,300 jobs elsewhere. Taking into account the 200 jobs created in the gas project, the overall change in direct jobs associated with the additional Santos exports should have been a loss of around 5,770 jobs. Again, if the authors of the Allen Report had published all of their assumptions and results it would not have been necessary to attempt an interpolation of such crucial consequences of the Santos development.

The Allen Report should have found outcomes in the operations phase similar to those just discussed. The important thing is that there is no apparent symmetry between the impact of the Santos project and the impact of the reduced output elsewhere in the economy. Santos's project hardly uses any labour and the capital owners are unlikely to spend the majority of dividends they receive in the NSW economy. That contrasts dramatically with some of the other sectors, such as tourism and manufacturing that have been hit hard by the high exchange rate resulting from Australia's resource boom. Those sectors tend to be labour intensive so any decline is likely to impart ripple effects to the economy through job losses. So, as economic activity is transferred to Santos from the rest of the economy, the jobs created in Santos are likely to be less than the jobs lost elsewhere in the economy.

While the Allen Report modelling should have indicated a net unemployment increase, there is a mechanism in some macroeconomic general equilibrium models that would move unemployment back to some concept of the 'natural' or 'full employment' rate of unemployment.[28] That mechanism of course is a reduction in wages. According to Allen, in the model they chose:

> *"it is assumed that the deviation in the national real wage rate increases through time in proportion to the deviation in aggregate employment from its baseline-forecast level. The coefficient of adjustment is chosen so that the employment effects of a shock are largely eliminated after about ten years".*[29]

Translated into plain English this passage means any impact on jobs is expected to diminish over 10 years and wages will change so as to effect the adjustment. If that is the case and given that the model should show an initial reduction in employment then the answer the Allen Report should have obtained is a national reduction in employment lasting up to 10 years and, in addition to a permanent reduction in projected wages.

We noted earlier that the report assumes 50 per cent of the output is exported and the other 50 per cent is used locally. Given the arbitrary nature of the assumption differing scenarios should have been modelled and reported. The simple fact is that if 100 per cent of the output were to be represented in new exports then the modelling would show no difference in the positive benefits of the project but we should expect the negative effects should be roughly doubled. Hence the impact on the national economy would look a lot worse.

The question of what happens to net gas exports is especially important given that we might expect that whether or not Santos sells on the export market it is unlikely to affect world gas prices. In a competitive market the Australian price will be the world price and so whether Santos exports or not it is unlikely to affect the prices and quantities consumed in Australia.

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[27] Using GDP and average employment in 2010-11 there is one job per $123,000 in value added. ABS (2011) Australian system of national accounts, 2010-11, Cat no 5204.0, 28 October and ABS (2011) *Labour force, Australia, Nov 2011*, Cat no 6202.0.

[28] Some commentators suggest that rate is around 5 per cent at the moment.

[29] Allen Consulting Group (2011)., p. 32.

What that means is that all the additional Santos production will have the net effect of increasing Australia's net gas exports by the same amount.

For this reason the assumption of 50 per cent new exports in the modelling should be queried especially since that assumption would have had moderated the negative impacts on the Australian economy.

It is interesting to compare the Allen Report with another recent report on the proposed China First coal mine. That report explicitly set out its results, the good and the bad, and did make clear that the coal mine would have some adverse effects on the wider economy including:

- the loss of 3,000 jobs across Queensland and Australia, particularly in manufacturing, agriculture and tourism
- the loss of $1,249.4 million of manufacturing activity
- an increase in inflation
- increases in payrolls and rents for small and medium sized businesses
- reductions in housing affordability
- a worsening in the distribution of income.[30]

Environmental considerations

The Allen Report has just three small paragraphs in Section 2.4 on the most contentious aspect of the CGS project—the implications for water resources in the region. The Allen Report does not include consideration of environmental impacts other than to suggest that the project will be able to deliver five gigalitres of 'treated' water for local agriculture and other uses. That is the equivalent of 2000 Olympic swimming pools per annum. The Allen Report claims *'the CSG industry is turning a waste product into a water resource for the community.'* [31]

This is a highly contentious and unsubstantiated assertion. The Allen Report asserts without cited evidence that the treatment of deep aquifer water and its conversion into the equivalent of ground water that is suitable for crops and livestock is possible and feasible. Treated water is rarely like groundwater as it will still contain chemicals that reduce potability. The application of the five gigalitre figure raises a number of issues relating to the size of the environmental management task that confronts Santos in terms of the risk of contamination from the water extraction process.

Water balance calculations of water co-produced with CSG in the Namoi catchment in the North West of NSW are unquantified. Current exploration activity in this region is unmetered at the well head. In addition, water flows into the desalination plant are not measured and are subject to evaporation in holding ponds. The net return of water after treatment may well be the five gigalitre estimate after it has evaporated in holding ponds, but the cost of water storage capacity and the cost of the disposal of salt and other elements as the operations move from exploration into production would likely be substantial. The scale and scope of water management raises the risk of environmental damage and the impacts on agricultural production in the region would be significant.

There were recent reports of spillages in a pilot production facility owned by Eastern Star Gas in the Pillage State Forest. Santos now owns Eastern Star Gas. The first incident

[30] For further discussion see Denniss, R (2011). *An analysis of the economic impacts of the China First mine*, Submission, The Australia Institute, December.

[31] Allen Consulting Group (2011)., p.13.

involved the spillage of 10,000 litres of polluted waste water in June 2011 and the second the leakage of 250 litres of an algaecide.[32] The impacts of a spill in the North West CGS area could dwarf that of the Pillage State Forest spill. Extracting water from the coal is essential in the production of CSG and the massive scale of the Santos project poses a serious environmental risk.

Estimates of the real impacts and costs associated with the de-watering of aquifers where gas is located need to address the production of salt and other dissolved solids from the saline water extraction and the treatment process. Using the five gigalitre figure from the Allen Report then an estimated 50,000 tonnes of salt will be generated. This is based on Santos' own figures of 10.2 tonnes of dissolved solids per megalitre used by Eastern Star Gas in their Review of Environmental Factors documentation for the New South Wales Government.[33]

These figures underscore the environmentally risky aspects of the CSG production process and the level of waste products that are generated and point to the significant potential for environmental damage to land along with contamination of groundwater aquifers used by the agriculture sector and rural communities. A balanced economic analysis should address the costs associated with salt production and disposal. If these are fully captured then the level of negative benefits generated from the project will be significantly higher as they will include significant reductions to agricultural sector capacity from the likely scale of environmental degradation. The rising controversy over CSG production is in part due to lax environmental impact assessments, as demonstrated by the Allen Report.

Conclusion

Santos claim that the Allen Report shows that the project will produce 'once-in-a-generation economic opportunities'.[34] By contrast, a serious reader can only wonder at what the modellers actually did. It is hard to overcome the suspicion that the report made a number of systematically generous assumptions with little consideration of likely adverse impacts. Such an approach results in an estimate of strong net benefits when the report should have perhaps found the opposite, given the large negative impacts on Australian employment and wages in the operational phase.

Some of the assumptions are very problematic, such as the assumption that the Santos project would generate domestic and export sales in the ratio of 50:50. But if Australians cannot absorb more gas Santos's output is likely to produce a 100 per cent increase in gas exports. The Allen Report fails to notify the reader that this would significantly increase the harm to other Australian industrial sectors, potentially negating any net benefits. The Allen Report also appears to be a very optimistic in its estimate of the multiplier effect flowing from the proceeds of the gas sales. When we consider exactly who would receive any proceeds of the gas sales it is difficult to find more than a fraction of the claimed $821 million increase in NSW output. Mining in the national economy is sure to crowd out labour intensive industry and so produce negative impacts elsewhere. This is the reason for the term 'resource curse'. The Allen Report leaves one wishing for more documentation to help explain why the results show only 30 new gas workers in NSW but 570 more public servants as a result of the coal seam gas project.

[32] Klan, A (2012). 'New spill at Santos CGS site', *The Australian*, 18 January.

[33] Eastern Star Gas (2006). Bohena Coal Seam Gas Project, Water Treatment and Disposal Project, Review of Environmental Factors, PEL 238, Gunnedah Basin, December 2006

[34] Santos (2011a).

Finally, there is a potentially massive risk to the environment and the industries that rely on it, especially agriculture. Extracting the coal seam gas and its associated saline water involves an important and difficult management problem. In addition to the gas, as shown above, the Santos project is likely to produce up to 50,000 tonnes of waste salt. None of risks associated with that or the costs of environmental damage are assessed in the Allen Report.

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