

Deloitte Access Economics

Economic impact of
the rotation of 1,100
US Marines and
associated
equipment in
northern Australia

Report for the
Department of
Defence

10 April 2013

Deloitte Access Economics Pty Ltd
ACN: 149 633 116

Level 1, 9 Sydney Ave
Barton ACT 2600
PO Box 6334
Kingston ACT 2604

Tel: +61 2 6175 2000
Fax: +61 2 6175 2001
www.deloitte.com.au

Garbis Avakian
Department of Defence
US Force Posture Review Implementation Team
R8-3-38/PO Box 7901
Canberra ACT 2610
AUSTRALIA

10 April 2013

Dear Garbis,

Economic impact of the rotation of up to 1,100 US Marines and associated equipment in northern Australia

We are pleased to provide you with this final report on the economic impact of the potential rotation of up to 1,100 United States (US) Marines and associated equipment in northern Australia in 2014.

Yours sincerely,

A handwritten signature in black ink, consisting of several overlapping loops and a trailing line, representing the name Lynne Pezzullo.

Lynne Pezzullo
Director
Deloitte Access Economics Pty Ltd

Contents

Executive summary	i
1 Potential rotation in 2014	1
2 Northern Territory economy	4
3 Methodology	6
3.1 Model.....	6
3.2 Data sources.....	7
4 Economic impact of a rotation.....	13
4.1 Northern Territory and Australian economy.....	13
4.2 Northern Territory industry.....	14
4.3 Government revenue.....	15
4.4 Impact on Defence expenditure	16
4.5 Impact on other Commonwealth and Defence programs.....	17
Appendix A : The DAE-RGEM model	18
Appendix B : Components of expenditure estimates	22
Appendix C : References.....	24
Limitation of our work.....	25

Charts

Chart 2.1 : Economic structure of the Northern Territory, 2011-12.....	5
Chart 4.2 : Northern Territory impacts by industry sector, \$ million.....	15

Tables

Table 4.1 : Economy wide impacts of potential US Marine rotation	13
Table 4.2 : Northern Territory impacts by industry sector	14

Figures

Figure 3.1 : Measuring direct economic activity.....	7
--	---

Liability limited by a scheme approved under Professional Standards Legislation.

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/au/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms.

Figure A.1 : Key components of DAE-RGEM.....18

Glossary of acronyms

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ADF	Australian Defence Force
CDE	constant differences of elasticities
CRESH	constant ratios of elasticities substitution
CES	constant elasticity of substitution
DAE-RGEM	Deloitte Access Economics – Regional General Equilibrium Model
GDP	gross domestic product
GSP	gross state product
NT	Northern Territory
RAAF	Royal Australian Air Force
SOFA	Status of Forces Agreement
USMC	United States Marine Corps

Executive summary

The potential rotation into northern Australia of 1,100 United States (US) Marines and associated equipment (vehicles, artillery, weapons and communications) is expected to result in \$5.6 million in additional gross state product (GSP) for the Northern Territory (NT) in 2014 (0.3% of GSP or \$5,091 per Marine).

- Australian GDP is expected to increase by a lower amount – \$5.4 million¹ (0.0% of GDP or \$4,909 per Marine).
- These estimates have been based on conservative assumptions of \$7.7 million in total expenditure (\$7,000 per Marine) - \$4.5 million by the US Marine Corps and \$3.2 million in individual Marines' combined personal expenditure.

According to a random and representative phone poll of 500 Territorians, over 88% believe that economic benefits will occur in their region from the presence of US Marines. Stakeholders extensively consulted across government and industry – using interviews, focus groups, public forums and public submissions – believed that there were benefits and identified opportunities that could occur in the Northern Territory because of the rotations. The Australian Government has not yet made decisions on the detail for potential future arrangements. This generates significant uncertainties for stakeholders wanting to position for possible economic opportunities or mitigate potential issues; and makes it more difficult for stakeholders to estimate economic impacts with confidence.

As requested by the Commonwealth Treasury, the methodology adopted in this report uses the Deloitte Access Economics Regional General Equilibrium Model (DAE–RGEM). General equilibrium analysis takes into account potential changes to the structure of the economy due to the additional expenditure.

- This differs from the input-output analysis used in the previous economic impact assessment of rotations of 200-250 US Marines in 2012 and 2013, which predicted a larger economic impact per Marine with a \$3.3 million in value added to the NT economy (\$7,333 per Marine) and \$7.4 million in value added to the whole Australian economy (\$16,444 per Marine).

The economic impact needs to be considered in the context of the broader changes in the NT economy, which is significantly strengthening (with 4.4% growth projected in 2013-14) due to construction and investment activity – albeit with a decrease in government spending (government and defence remains the largest NT industry). While the economy is growing and faces capacity constraints, the potential rotation of US Marines is not expected to significantly add to this.

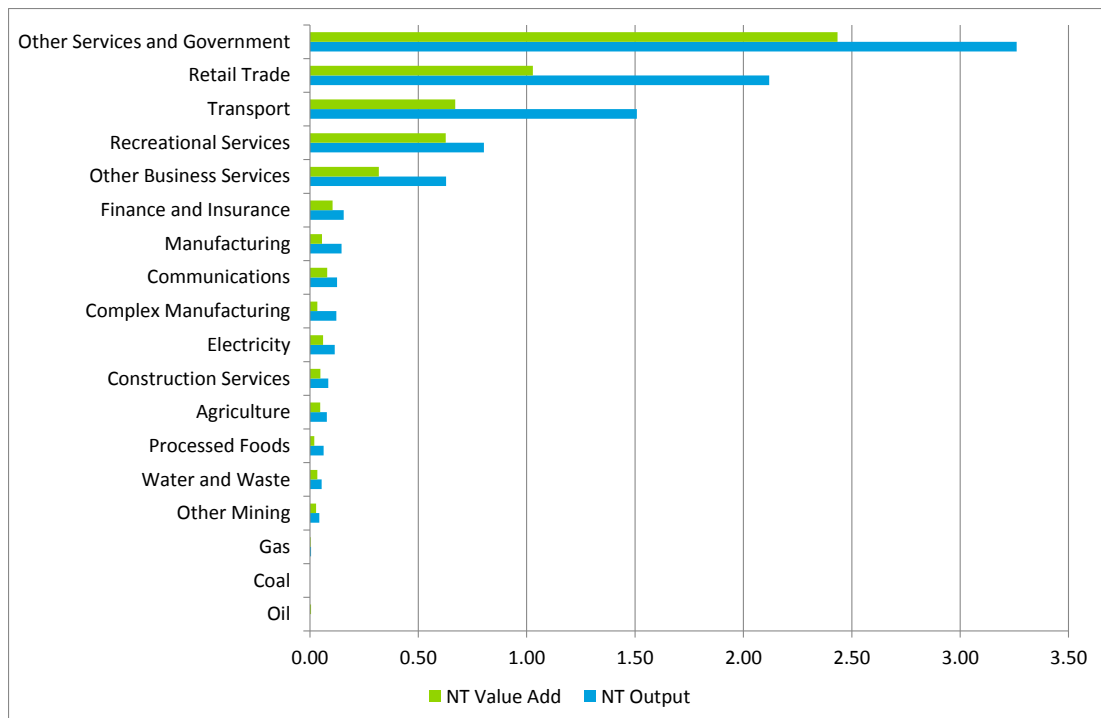
Flow on effects from the direct expenditure of \$7.7 million by the rotation will occur to other industries (\$1.6 million).

- Chart i shows that the increased demand due to the potential rotation manifests as direct value added in government/other services (\$2.43 million), retail trade (\$1.03 million), transport (\$0.67 million) and recreational services (\$0.63 million). The

¹ The Australian impact is less than the NT impact due to the general equilibrium effects reducing GDP by \$0.2 million in states outside the NT – i.e. some resources shift from other jurisdictions into the NT.

business services sector in the Territory enjoys a slight increase in output of approximately \$0.32 million, with only relatively small impacts in other industries of \$0.52 million.

Chart i: Northern Territory impacts by industry sector, \$ million



Source: Deloitte Access Economics estimates.

- The estimated impact on Australian tax revenues is an increase of \$1.09 million, other things being equal. The estimated impact on state tax revenue in the NT is an increase of \$199,930, other things being equal. There was no indication that revenue to local government will change as a result of the potential rotation.
- The impact on Defence expenditure was estimated as zero in net terms - we have assumed for the purpose of this assessment that no capital expenditure is required to support the 2014 rotation, and that any additional expenses for the rotation will be covered by cost sharing arrangements. In general terms, the USMC pays for costs it incurs. Defence tends to absorb some costs in the provision of support to the USMC (for example administrative overheads). Should rotations of 1,100 Marines be enduring or grow in size into the future, additional expenditure would be required to provide longer-term working and living accommodation solutions, and this would need to be negotiated with the USA.
- There was no indication that any Australian Government programs would be impacted by the potential rotation of 1,100 US Marines.

Deloitte Access Economics

1 Potential rotation in 2014

On 16 November 2011, Prime Minister Gillard and US President Obama announced two new force posture initiatives intended to significantly enhance defence cooperation between Australia and the United States (US). The first initiative is the rotation of US Marines to Darwin and northern Australia, for around six months at a time, to conduct exercises and training on a rotational basis with the Australian Defence Force (ADF). The intent over coming years is to establish a rotational presence of up to a 2,500-person Marine Air Ground Task Force.

The initiative commenced with an initial rotation of around 200 US Marines in Darwin, which began in April 2012 and concluded in late September 2012. Another rotation of 200-250 US Marines is to occur during the 2013 dry season.

The Australian Government has not yet made any decisions about the detailed arrangements for larger US Marine Corps rotations. The Minister for Defence has directed that an assessment be undertaken of the impacts of rotational deployments of up to 1,100 US Marines to northern Australia from 2014. This will help inform the Australian Government's consideration of the size, nature and timing of the next increment in possible future rotations.

The potential rotation would occur for six months during the 2014 dry season. It is possible that training and regional engagement with the rotational force would occur outside of Australia with regional partners during this time, as occurred in the 2012 rotation. We have assumed that the rotation of US Marines in Northern Australia would occur in the Northern Territory specifically and, given data considerations, this region was thus adopted for the analysis. The rotational force characteristics outlined below comprised the scenario discussed in public forums and consultations with stakeholders and on which the assessments are modelled.

Personnel

- Any such rotational deployment comprising approximately 1,100 Marines would rotate into northern Australia in the dry season.
- Such a rotational US Marines force could include:
 - a Ground Combat Element, including infantry, artillery and armour functions;
 - a Logistics Element, responsible for transport, equipment support, communications and support functions; and
 - an Aviation detachment to provides logistic support and airlift to ground forces.
- Such a rotational force would be accommodated at local Defence facilities, such as Robertson Barracks.
 - This could require the construction of additional accommodation and the use of temporary accommodation (demountable or prefabricated or a combination of both).

- A small number of personnel in command and control, liaison, maintenance and support roles could be posted to Australia for a period longer than six months.
- US personnel could be provided “liberty” leave on weekends, and at other times at the discretion of commanding officers.
 - US Marines Corps’ standard “liberty” policy restricts drinking of alcohol to personnel aged 20 and above, and includes a midnight curfew for most Marine Corps personnel.

Equipment

- The Marine Corps rotation could bring a range of equipment into northern Australia, potentially including:
 - vehicles and vehicle support equipment, including all-terrain vehicles, light armoured vehicles, and heavy trucks; and
 - weapons such as small arms, mortars, and towed cannons.
- Some aircraft and aviation support equipment could also be deployed to Australia to provide support for training and exercising.
 - Aircraft could potentially include: rotary wing and/or tilt-rotor aircraft (such as transport helicopters like the CH-53 or the MV-22 Osprey); tankers or transport aircraft (such as the KC-130 Hercules); and fighter jets (such as the F/A-18/AV-8B).
- The US Marine Corps could leave some equipment in Australia from one rotation to the next, to alleviate quarantine and biosecurity concerns.
- Equipment deployed to Australia could be stored on Defence premises, in commercial premises, or a combination of both.
- Maintenance and support for US equipment could be provided by the US Marine Corps, by industry, or a combination of both.

Training and exercising

- The rotational force would conduct training in ADF training areas and ranges in the Northern Territory.
- The strictest environmental standards will be observed during these activities.
 - Environmental risk reduction is inherent to all stages of the planning, management, and conduct of military activities, including any activities associated with this enhanced Australia-US practical defence cooperation.
- The US Marines will comply with Australia’s policy and existing practice regarding cluster munitions, depleted uranium, and nuclear weapons.
- The rotational force could also spend time working with other countries in the region.

Decision Making Processes

- All of these matters are subject to advised Australian Government decisions.

Legal Arrangements

- US Defense Force personnel in Australia are governed by a Status of Forces Agreement that makes US personnel in Australia subject to both Australian law and US military law.
- The Status of Forces Agreement grants Australia exclusive jurisdiction for alleged offences against Australian laws but not US law; and exclusive jurisdiction to US military authorities for alleged offences against US law but not Australian law.
- Where an offence is punishable by the laws of both Australia and the US, the Status of Forces Agreement and the Defence (Visiting Forces) Act 1963 provide a mechanism for determining which country has the primary right to exercise jurisdiction.

Assumptions for the purposes of this assessment

There remains no definitive course of action beyond the rotation of up to 250 US Marines in 2013. However, if the 2014 rotation was to occur it is assumed that the longer term intent remains for a rotational presence of up to a 2,500-person Marine Air Ground Task Force.² For the purposes of this assessment, we have assumed that a rotation of 1,100 US Marines in 2014 would be accommodated at Robertson Barracks, that any rotary wing or tilt-rotor aircraft accompanying the rotation would operate from RAAF Base Darwin, and that any fighter aircraft accompanying the rotation would operate from RAAF Base Tindal. We have assumed that no additional infrastructure is required to support a rotation of 1,100 Marines in 2014, and have assumed that garrison and logistics support will generally be provided through extant Defence services and contracts.

² "Australia-United States Force Posture Initiatives", Prime Minister of Australia, <http://www.pm.gov.au/press-office/australia-united-states-force-posture-initiatives>

2 Northern Territory economy

While the potential rotation of US Marines will bring increased expenditure into the Northern Territory economy it will be unlikely to create any significant ongoing change in the economy. As the Northern Territory is currently undergoing significant changes, with increased investment but decreased government spending, it is important to understand the larger drivers around any potential rotation and potential expenditure by the Marines.

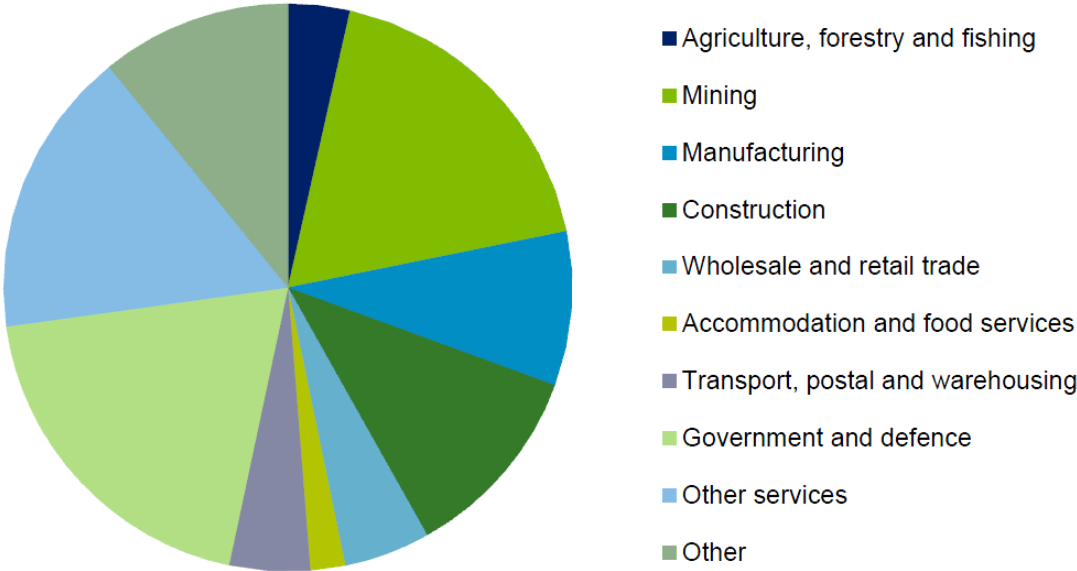
The Northern Territory economy strengthened significantly (4.4%) in 2011-12, compared to 1.2% growth in 2010-11. This was in part due to larger construction projects commencing later in the Northern Territory than occurred in Queensland and Western Australia. The INPEX Ichthys LNG Project caused commercial construction to quadruple, and while this demand is largely serviced by imports from other states and nations into the Northern Territory, the Territory's international trade surplus will decrease and the Territory will continue to experience solid growth (DAE, 2012).

Tourism, however, is unlikely to show similar strength, although softening in this sector has not had strong flow on effects to the rest of the NT economy as demand picks up elsewhere. Hotel occupancy rates remain strong, with capacity constraints during the dry season due to increased demand from other industries (notably mining). As house prices become increasingly unaffordable due to strong demand, even unskilled labour will become more difficult to obtain to service particular industries. For the broader NT economy, there remains supply-side capacity constraints such as a skilled labour force shortages, investment attraction and product development limitations.

Despite these bottlenecks, the Northern Territory's economic outlook, as noted by the Northern Territory Government 2012-13 Mini Budget, is positive with expected growth of 3.9% in 2012-13 and 4.4% in 2013-14 (Northern Territory Government, 2012). Construction activity continues to intensify, including residential construction, leading to record levels of private investment in 2012-13 and 2013-14. Public sector expenditure, however, is expected to be the primary detractor to economic growth. Expected growth in employment (3% in 2013-14) and population (2.2% in 2013-14) is associated with cost of living pressures and inflation is forecast to increase 4.3% in 2013-14.

The 2011-12 composition of the Northern Territory economy is shown in Chart 2.1, with the largest industries being government and defence, mining, and other services. Manufacturing and construction are also significant industries in the NT.

Chart 2.1: Economic structure of the Northern Territory, 2011-12



Source: Australian Bureau of Statistics (ABS, 2012)

Ultimately the Territory is likely to gain market share within Australia’s economy and population in the coming years. However, due to the economy remaining small and dependent on key projects, it will continue to be volatile.

3 Methodology

As a decision about the size and nature of the potential US Marine rotation is still pending, all assumptions underlying the modelling of potential economic benefits from the potential rotation were set conservatively so as to be most justifiable.

3.1 Model

The model used to estimate the economic impact, at the request of the Commonwealth Treasury, was the Deloitte Access Economics – Regional General Equilibrium Model (DAE-RGEM), a large scale, dynamic, multi-region, multi-commodity computable general equilibrium model of the world economy. The model allows policy analysis in a single, robust, integrated economic framework. This model projects changes in macroeconomic aggregates such as gross domestic product (GDP), employment, export volumes, investment and private consumption. At the sectoral level, detailed results such as output, exports, imports and employment are also produced. This ensures that all effects are captured, including:

- crowding out effects arising from the demand for labour and materials;
- economy wide employment and income effects due to new jobs being created; and
- flow-on effects to other sectors (including tourism) from increased spending in the region.

The model is based on a set of key underlying relationships between the various components of the model, each of which represents a different group of agents in the economy, where these relationships are solved simultaneously. In effect DAE-RGEM mimics the real world by adjusting responses through the economy based on the type and size of any new expenditure. For example, any increased demand for labour may displace other potential investment opportunities elsewhere if demand represents a better use of labour than alternatives. This is the key difference between the estimates derived in this economic impact assessment compared to the previous economic impact assessment (Noetic, 2012). In effect, the previous report assumed that the economy was not capacity constrained and there would be no ‘crowding out’ from the presence of US Marines. Further information for DAE-RGEM can be found at Appendix A.

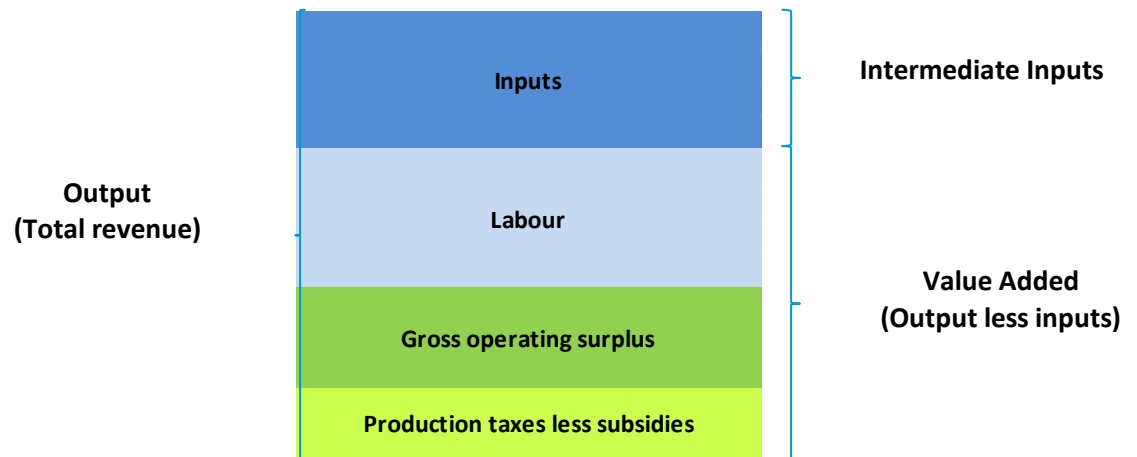
While there is the possibility that rotations might continue and potentially become larger (2,500 personnel), consistent with the announced intent, at present this is not the case, with no confirmation beyond the 250 personnel in 2013 which makes it more difficult for some stakeholders to formulate how they would react. As such the modelling assumes that any change in the economy will be a short term adjustment - that is, businesses will only make decisions based on what would occur in 2014 rather than on what might occur beyond that timeframe, such as any future rotational presence in the long term.

On this basis, all data inputs were collated by type of expenditure expected and matched to the corresponding areas in DAE-RGEM.

Figure 3.1 depicts how economic activity is measured. (Gross) output is a measure of sales of money changing hands, which is greater than value added (output minus intermediate

inputs). Value added comprises labour, gross operating surplus and net production taxes (i.e. taxes minus subsidies). For Australia, value added is equivalent to gross domestic product (GDP), while for the NT, value added is equivalent to gross state product (GSP).

Figure 3.1: Measuring direct economic activity



Previous economic impact estimates

The previous economic impact study of a rotation presence of up to 250 US Marines in 2012 and then in 2013 (Noetic 2012) estimated that, for the Northern Territory, there would be an additional direct expenditure of \$3.96 million in present value terms (\$8,800 per Marine), with value added of approximately \$3.3 million (\$7,333 per Marine). The total value added of the expenditure in Australia was estimated at \$7.4 million (\$16,444 per Marine). The industries identified that were most likely to be affected were those which support basic living, the recreational economy and Defence activity i.e. transportation, retail trade, food and beverage services, and sport and recreation providers.

3.2 Data sources

3.2.1 Expenditure estimates

There are two main sources of potential expenditure from the US Marines. First there is reimbursement from the United States Marine Corps (USMC) for goods and services consumed during the course of active duty. Second, there is expenditure from US Marines during the course of their visit. The dot-points summarise the quantum and type of potential expenditure (\$7.7 million in total), with the data sources explained after the dot-points.

- **USMC expenditure: expected reimbursement is \$4.5 million**, including:
 - transportation arrangements; including vehicle hire and fuel;
 - use of training facilities and barracks;
 - food and rations;
 - miscellaneous costs; and
 - Australian Quarantine and Inspection Service charges.
- **US Marines personal: expected spend is \$3.2 million**, including:

- tourism;
- alcohol consumption;
- food and beverage consumption;
- shopping;
- gambling; and
- regular consumables.

USMC expenditure is estimated from actual costs incurred by the 2012 US Marine rotation provided by the Department of Defence. Expenditure was segmented by component and scaled by the expected size and distribution of the 1,100 US Marines, although we note that the pricing of these costs is subject to change. Estimates include the observed direct reimbursements to the Australian Government and industry that would occur, but do not include potential expenditure by USMC:

- that is dependent on circumstances and may be unlikely to occur (e.g. use of Australian health services during the course of active duty that would require further reimbursement);
- revenue items that are too reliant on future outcomes/negotiations have been estimated at either their lowest level of expenditure (e.g. Australian Quarantine and Inspection Service cost recovery arrangements) or are excluded if there are no plausible estimates at the current time (e.g. potential maintenance contracts); and
- additional demand from other US forces due to presence of US Marines that is not directly linked to their rotation may occur (e.g. additional ship visits to support training), however, as there are no estimates or expectations these have not been included.

It is therefore likely that there will be additional expenditure into the Australian economy over and above these conservative estimates.

US Marine personal expenditure is estimated from wage data provided by the USMC combined with the expected size of expenditure in the local economy using the latest estimates from the US Department of the Navy (2010).³ The expected type of spend is based off two estimates; a basic consumption bundle derived from Household Expenditure Survey (ABS, 2011) for the Northern Territory and a leisure bundle derived from a previous Australian study on expenditure habits by US Forces in Australia (Stehlik et al, 2004). Further details of inputs that make up the components can be found at Appendix B.

3.2.2 Consultations

Consultations were held with relevant stakeholders as summarised below – including interviews, workshops, a public submissions process (6 responses received) and two public forums. In addition, a random, statistical representative telephone poll of 500 respondents (from over 11,000 contacted) conducted by the Social Research Centre in January-February 2013 gauged people's expectations of whether the presence of US Marines would benefit the local economy, and an internet survey (with 50 valid responses) had a section for

³ The 1,100 US Marines are considered enlisted personnel and are expected to spend 12% of their wages during the rotation. This is similar to but more conservative estimate than the previous report and takes into account the impacts of US Marines' wages and allowances being paid as a lump sum.

organisations to provide viewpoints and information on the local economy and the impact from any potential rotations.

The consultation process was considered important to triangulate and validate the findings from the quantitative analysis from a qualitative perspective.

Consultations that investigated potential economic effects occurred with the following stakeholders.

Northern Territory Government⁴

- The Hon Peter Chandler, MLA Northern Territory, Minister for Business, Minister for Trade, Minister for Economic Development

Local government⁵

- The Mayor of Darwin
- The Mayor of Palmerston
- The Litchfield Council
- Representatives from the Victoria Daly Shire Council

Australian Government Departments⁶

- The Treasury
- Department of Families, Housing, Community Services and Indigenous Affairs
- Department of Education, Employment and Workplace Relations
- Department of the Prime Minister and Cabinet
- Department of Finance and Deregulation
- Department of Foreign Affairs and Trade
- Attorney-General's Department
- Department of Agriculture, Fisheries and Forestry
- Australian Customs and Border Protection Service
- Department of Regional Australia, Local Government, Arts and Sport.

Northern Territory Government Departments⁷

- Department of the Chief Minister
- Department of Treasury and Finance
- Department of Business
- Tourism NT
- Department of Health

⁴ Met face to face.

⁵ All met individually.

⁶ Most agencies were met face to face, but also included phone interactions.

⁷ Occurred through a workshop

- Department of the Attorney General and Justice
- Northern Territory Police, Fire and Emergency Services

Private industry and other stakeholders⁸

- NT Chamber of Commerce
- Australian Industry and Defence Network NT
- Australian Hotels Association NT
- Palmerston Regional Business Association
- Industry Capability Network NT
- Regional Development Australia NT
- Motor Trades Association NT

3.2.3 Consultation findings

3.2.3.1 Surveys

The internet survey did not provide enough information from which to draw statistically valid conclusions, but was considered important from a mixed methods perspective in order to elicit views from those wishing to express them on the issues raised in the random, representative phone poll. As such, the phone poll was the statistically robust component, and the survey was fielded for inclusivity (to capture views that were potentially not widespread but strongly held).

According to the phone poll, 88.6% of respondents believed the presence of the US Marines would benefit the local economy, while 1.6% believed there would be an increase in the cost of housing and living from the rotation.

3.2.3.2 Stakeholders

Northern Territory Government

The Northern Territory Government is supportive of the rotations. Economic benefits were expected to occur. The greatest opportunity expected for local businesses is through maintenance contracts; however there remain concerns about the extent of potential opportunities available to private industry when Defence maintenance contracts are carried out on Defence premises.

Local government

Economic benefits were hoped for from all councils, with the councils expressing a desire to see more benefits resulting in their regions.

Australian Government departments

The only identified additional revenue would occur from cost recovery arrangements for the necessary biosecurity processes. Both the Australian Department of Agriculture,

⁸ Occurred through a workshop.

Fisheries and Forestry and the Northern Territory representatives who conducted quarantine checks noted that there should be the capacity to process 1,100 US Marines without border delays if there was a somewhat staggered intake. However it is currently difficult to estimate what exact supporting arrangements will be required due to the complexities and potential methods used (such as Tiger Teams used to pre-inspect equipment coming to Australia for Exercise Talisman Sabre).

Northern Territory Government departments

Northern Territory Government departments noted that there are a number of corollary effects occurring throughout the economy in the short to medium term (e.g. construction and Australian defence activities, as identified in Section 2) such that no individual impact can be taken in isolation. There is strong demand for additional skilled workers over the next five years. Direct maintenance contracts were considered the biggest potential benefit. There are potential synergies for industry with the use of equipment by the USMC similar to the ADF. Noting the sustainability of the sector in the Northern Territory is growing, the combined demand from ADF in the Northern Territory with potential future rotations of 2,500 US Marines could create a critical mass to build a strong local industry to support maintenance of military equipment. The NT Government noted the potential for the Defence Support Hub industry park to store USMC equipment prepositioned in Australia. This would enable Defence prime contractors and small and medium sized enterprises to cluster and align capability in support of Defence requirements, with these increased capabilities potentially attracting further equipment storage and maintenance opportunities.

Any overflow of US Marines from ADF bases into the Northern Territory off-base housing market could adversely affect the cost of housing and land due to the supply constrained market. There is neither intent nor any expectation that a rotation of 1,100 Marines in 2014 would cause any overflow of US Marines from Defence facilities into the broader NT housing market. As such, no adverse affect on the cost of housing and land due to the supply constrained market is expected. While there is no direct capacity issue (since accommodation is on-base), there may be capacity constraints in the transport sector (e.g. trucks coming into Darwin full and leaving empty, or taxis at peak periods), although some of these could be managed through forward planning (e.g. hired buses or trucks at peak periods).

If the rotation of 1,100 US Marines continued into future years beyond 2014 (or if there was an increase), construction of additional accommodation may be required. It is possible that current construction projects would be completing or easing off around 2016, so future potential deployments beyond 2014 may help ensure that growth in demand for (and construction of) accommodation would be more stable than might otherwise occur.

There was no concern that there would be any issues or capacity constraints in providing the support or in providing general police duties from the presence of US Marines. Similarly there is a contract for the provision of particular health services between the provider of services to the USMC and Royal Darwin Hospital, but it is not expected to cause additional constraints in the Northern Territory.

Private industry and other stakeholders

Private industry and other stakeholders noted that due to the uncertain nature of the potential rotations it was difficult to adjust or position for potential work that may result. It is therefore difficult for industry to create the capacity required to support future activity until the nature and details of the rotation are made available. Concerns were expressed that when contracts for the maintenance of Defence equipment are carried out on Defence facilities, this limits the ability for non-Defence equipment to be maintained by those contractors in those same facilities. There was hope expressed in consultations by private industry stakeholders that direct contracts with industry in the Northern Territory could occur, rather than just extension of existing current ADF contracts, thereby potentially increasing opportunities for local industry.

Industry noted that since Robertson Barracks is not at capacity due to current ADF deployments overseas, the full economic effects or issues (e.g. building additional accommodation) are yet to be realised. Opportunities relating to the potential enhancement of regional training areas were also identified. Due to Darwin being a receiving port, there is significant capacity within the road transport sector to meet any potential USMC requirements. Concern was raised about the quality of road infrastructure and what impact this may have on constraining economic benefits. It was also noted that while industry has been successful in targeting foreign workers to meet the skills shortage, it is also difficult for businesses to keep employees due to cost of living issues.

3.2.4 Capacity constraints

During all consultations with stakeholders, capacity constraints were considered that may require additional outlays or potential reimbursements from USMC, or that may require modification to the assumptions used in the DAE-RGEM. All stakeholders, apart from the Northern Territory Department of Health, were of the view that additional capacity constraints would not arise from the rotation of an additional 1,100 US Marines. The Department of Health indicated that the current ambulance service is already operating at capacity and additional support may be sought to help address any increase in the use of services. This is not an isolated issue and has been raised with other organisations; for example, INPEX with a more sizeable workforce of around 3,000 people is also considering how it may assist in transporting injured personnel to the Royal Darwin Hospital (INPEX, 2012). It is not currently evident how this potential capacity issue will be resolved.

4 Economic impact of a rotation

4.1 Northern Territory and Australian economy

The expected combined expenditure of the 1,100 US Marines during the rotation into the Australian economy would be \$7.7 million, based on the sum of the inputs in the previous chapter (section 3.2.1).

This impact is expected to contribute an additional \$5.6 million to the Northern Territory Gross State Product (GSP) in 2011-12 dollars (Table 4.1), or \$5,091 per Marine. This impact is marginal (0.03%) compared to the 2011-12 Northern Territory GSP of \$18.1 billion (Northern Territory Government, 2013). The total direct value added is \$4.76 million and the total indirect value added is \$0.84 million.

The increase in aggregate demand in these sectors flows through to a small employment increase in the Territory of approximately 34 full time equivalent workers, with the increased demand in the labour market driving a small increase in the economy wide average wage rate of approximately 0.02%.

The results at the Australian level closely follow those at the Northern Territory level, with no additional employment at the Australian level and a total contribution to Australian Gross Domestic Product (GDP) of \$5.4 million. The difference between the Northern Territory (GSP) and Australia (GDP) is due to the interaction between the Northern Territory and other States and Territories for the selected goods and services. The additional demand will cause a redistribution of activity to the Northern Territory and, due to the expensive and porous nature of the economy there, the resulting increase in Australian GDP will be \$0.2 million lower than the increase in Northern Territory GSP. For example, trucks and truck drivers may be diverted from, say, Queensland or WA to NT during the rotation.

Table 4.1: Economy wide impacts of potential US Marine rotation

		Northern Territory	Australia
GSP/GDP	\$A2011-12 million	5.6	5.4
	% deviation	0.03	0.00
Employment	full time equivalent	34	34
	% deviation	0.03	0.00
Wage rate	% deviation	0.02	0.00
Investment	% deviation	0.00	0.00

Source: Deloitte Access Economics estimates.

4.2 Northern Territory industry

The impact on the Northern Territory industry is strongly concentrated in trade, transport, and other services and government (Chart 4.2). Flow on effects from the direct expenditure of \$7.7 million (section 3.2.1) by the rotation will occur to other industries (\$1.6 million) resulting in a total gross output of \$9.3 million throughout the Northern Territory. The key result, however, is the value added that is provided to the Northern Territory of \$5.6 million. Table 4.2 shows that the increased demand due to the potential rotation manifests as direct value added in government/other services (\$2.43 million), retail trade (\$1.03 million), transport (\$0.67 million) and recreational services (\$0.63 million). The business services sector in the Territory enjoys a slight increase in output of approximately \$0.32 million, with only relatively small impacts in other industries of \$0.52 million.

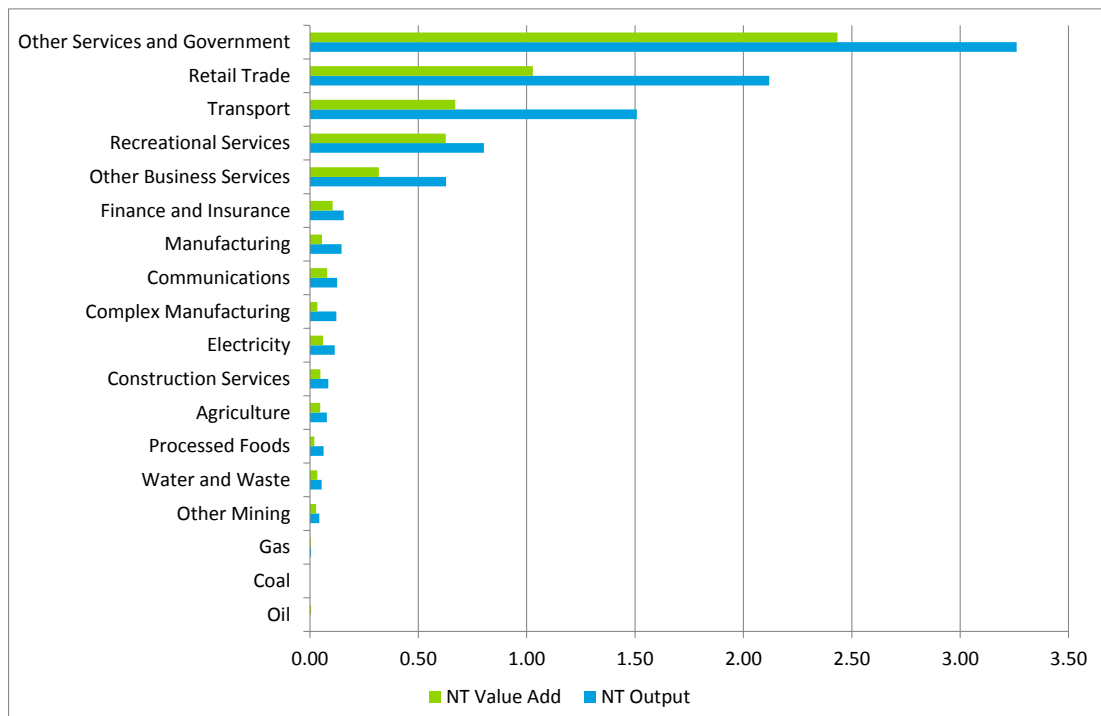
Table 4.2: Northern Territory impacts by industry sector

Sector	Gross output (\$ million)	Value added (\$ million)
Other services and government	3.26	2.43
Retail trade	2.12	1.03
Transport	1.51	0.67
Recreational services	0.80	0.63
Other business services	0.63	0.32
Finance and Insurance	0.16	0.10
Manufacturing	0.15	0.06
Communications	0.13	0.08
Complex manufacturing	0.12	0.03
Electricity	0.11	0.06
Construction services	0.08	0.05
Agriculture	0.08	0.05
Processed foods	0.06	0.02
Water and waste	0.05	0.03
Other mining	0.04	0.03
Gas	0.00	0.00
Oil	0.00	0.00
Coal	0.00	0.00
Total	9.3	5.6

Source: Deloitte Access Economics estimates.

The benefit estimated here is reliant on no increase in the capital stock to support the rotation. In effect it is a steady state scenario of what would occur for any regular rotation of 1,100 US Marines in Northern Australia. If the rotation was to occur on more than one occasion or was to be larger, a proportionally greater economic benefit could occur for both Australia and the Northern Territory as it is likely that capital stock would need to increase (noting existing stock may be used as construction activities decrease), or that a greater supporting presence is required for a potential 2,500 US Marine rotation.

Chart 4.2: Northern Territory impacts by industry sector, \$ million



Source: Deloitte Access Economics estimates.

4.3 Government revenue

Consultations with the Australian and Northern Territory governments indicated that no additional duties or sources of revenue would be sought from the USMC. This would be in keeping with the SOFA with the US.⁹ The governments would continue to receive indirect taxation revenue from USMC contracts to industry and US Marine Corps and spending by individual Marines in the Northern Territory.

4.3.1 Australian Government revenue

DAE-RGEM results have been applied together with the latest government financial statements to ascertain the flow on effects from the expected expenditure on Government revenue. The total Australian tax impact was estimated in this manner as \$1.09 million.

4.3.2 Northern Territory Government revenue

DAE-RGEM results have been applied to the latest government financial statements to ascertain the flow on effects from the expected direct expenditure. The total state tax impact was estimated as \$199,930, assuming that:

- the deployment and subsequent revenue increase does not flow through to horizontal fiscal equalisation considerations by the Commonwealth Grants Commission; and
- there is no increase in government expenditure to collect the additional revenue.

⁹ <http://www.austlii.edu.au/au/other/dfat/treaties/1963/10.html>

Hence the impact on Northern Territory revenue once adjusting for these considerations may be somewhat less.

4.3.3 Local government revenue

The majority of direct expenditure from US Marines will occur in Darwin and Palmerston Councils. However, there is no current indication that revenue to local government will adjust from the potential rotation.

Litchfield Council noted that the increased presence of US Marine vehicles could cause increased degradation of road infrastructure, as their roads service various Defence training areas. It is expected that the main impact on the road infrastructure will continue to be the use of roads by the mining and transportation industries, however.

4.4 Impact on Defence expenditure

Capital expenditure

The Department of Defence advises that any requirement for capital works or adjustments to current expenditure to facilitate a potential 1,100 US Marines rotation in 2014 are not yet known. However, there are potential impacts that may occur in future rotations. Details of cost would be dependent on negotiations between the Australian and United States Governments.

- If this rotation was to continue in the future there could be capacity constraints at Robertson Barracks if the ADF has additional spatial requirements into the future.
- Should the USMC preposition equipment in Australia during the wet season, it is likely that additional facilities would be required to store that equipment. Equipment is likely to be prepositioned due to quarantine benefits.

Ongoing expenditure

The Department of Defence has various arrangements with the US that govern cost sharing arrangements and reimbursement. The primary agreements are the 2010 *Acquisition and Cross Servicing Agreement*¹⁰ and the 2010 *Defence Cooperative Logistic Support Agreement*.¹¹ These agreement provide for cost recovery arrangements to be agreed from full cost through to at cost. In general terms, the USMC pays for costs it incurs. Defence tends to absorb some costs in the provision of support to the USMC (for example administrative overheads).

For the purposes of this analysis, the impact on Defence expenditure was estimated as zero in net terms – based on no expected capital expenditure for the potential 2014 rotation, and any additional expenses for the rotation covered by cost sharing arrangements.

¹⁰

http://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=/jst/12may2010/treaties/usa_acquisition_text.pdf

¹¹ <http://www.austlii.edu.au/au/other/dfat/treaties/1989/28.html>

4.5 Impact on other Commonwealth and Defence programs

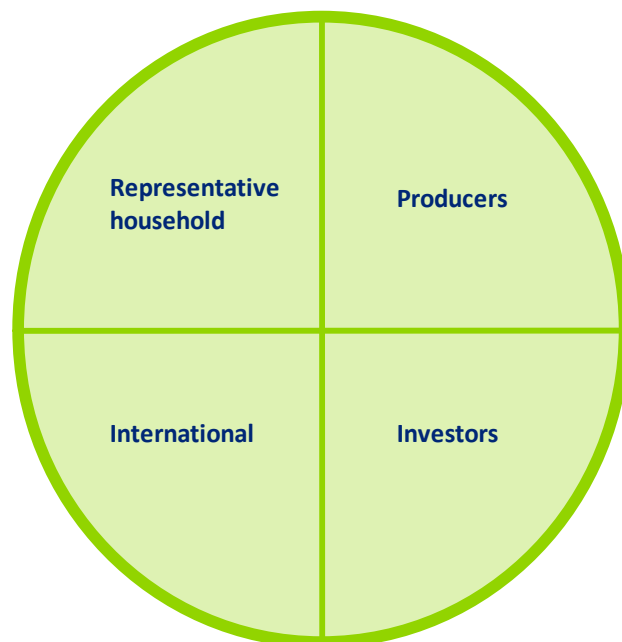
Impacts on other programs in addition to the impacts expected from the economic modelling outcomes were raised with all Australian Government stakeholders. There was no indication that any Australian Government programs would be impacted by the potential rotation of 1,100 US Marines (the ambulance issue raised by the Northern Territory Department of Health as per section 3.2.4 is a NT Government not a Commonwealth impact).

Appendix A: The DAE-RGEM model

The Deloitte Access Economics – Regional General Equilibrium Model (DAE-RGEM) is coded and solved using the GEMPACK software package (Harrison and Pearson, 1996). The model is based on a set of key underlying relationships between the various components of the model, each of which represents a different group of agents in the economy, where these relationships are solved simultaneously.

Figure A.1 shows the key components of the model for an individual region. The components include a representative household, producers, investors and an international component (i.e. linkages with the other regions in the model, including other Australian jurisdictions and foreign regions). Below is a description of each component of the model and key linkages between components. Some additional, somewhat technical, detail is also provided.

Figure A.1: Key components of DAE-RGEM



DAE-RGEM is based on a substantial body of accepted microeconomic theory. Key assumptions underpinning the model are outlined below.

- The model contains a ‘regional consumer’ that receives all income from factor payments (labour, capital, land and natural resources), taxes and net foreign income from borrowing (lending).
- Income is allocated across household consumption, government consumption and savings so as to maximise a Cobb-Douglas utility function.
- Household consumption for composite goods is determined by minimising expenditure via a CDE (constant differences of elasticities) expenditure function. For most regions, households can source consumption goods only from domestic and imported sources. In the Australian regions, households can also source goods from interstate. In all

cases, the choice of commodities by source is determined by a CRESH (constant ratios of elasticities substitution, homothetic) utility function.

- Government consumption for composite goods, and goods from different sources (domestic, imported and interstate), is determined by maximising utility via a Cobb-Douglas utility function.
- All savings generated in each region are used to purchase bonds whose price movements reflect movements in the price of creating capital.
- Producers supply goods by combining aggregate intermediate inputs and primary factors in fixed proportions (the Leontief assumption). Composite intermediate inputs are also combined in fixed proportions, whereas individual primary factors are combined using a constant elasticity of substitution (CES) production function.
- Producers are cost minimisers, and in doing so, choose between domestic, imported and interstate intermediate inputs via a CRESH production function.¹²
- The supply of labour is positively influenced by movements in the real wage rate governed by an elasticity of supply.
- Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. A global investor ranks countries as investment destinations based on two factors: global investment and rates of return in a given region compared with global rates of return. Once the aggregate investment has been determined for Australia, aggregate investment in each Australian sub-region is determined by an Australian investor based on: Australian investment and rates of return in a given sub-region compared with the national rate of return.
- Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these goods via a CRESH production function.
- Prices are determined via market-clearing conditions that require sectoral output (supply) to equal the amount sold (demand) to final users (households and Government), intermediate users (firms and investors), foreigners (international exports), and other Australian regions (interstate exports).
- For internationally-traded goods (imports and exports), the Armington assumption is applied whereby the same goods produced in different countries are treated as imperfect substitutes. But, in relative terms, imported goods from different regions are treated as closer substitutes than domestically-produced goods and imported composites. Goods traded interstate within the Australian regions are assumed to be closer substitutes again.
- The model accounts for greenhouse gas emissions from fossil fuel combustion. Taxes can be applied to emissions, which are converted to good-specific sales taxes that impact on demand. Emission quotas can be set by region and these can be traded, at a value equal to the carbon tax avoided, where a region's emissions fall below or exceed their quota.

¹². The model contains a more detailed treatment of the electricity sector that is based on the 'technology bundle' approach for general equilibrium modelling developed by ABARE (1996).

The representative household

Each region in the model has a so-called representative household that receives and spends all income. The representative household allocates income across three different expenditure areas: private household consumption, government consumption, and savings.

Going clockwise around Figure A.1, the representative household interacts with producers in two ways. First, in allocating expenditure across household and Government consumption, this sustains demand for production. Second, the representative household owns and receives all income from factor payments (labour, capital, land and natural resources) as well as net taxes. Factors of production are used by producers as inputs into production along with intermediate inputs. The level of production, as well as supply of factors, determines the amount of income generated in each region.

The representative household's relationship with investors is through the supply of investable funds – savings. The relationship between the representative household and the international sector is twofold. First, importers compete with domestic producers in consumption markets. Second, other regions in the model can lend (borrow) money from each other.

Producers

Apart from selling goods and services to households and government, producers sell products to each other (intermediate usage) and to investors. Intermediate usage is where one producer supplies inputs to another's production. For example, coal producers supply inputs to the electricity sector.

Capital is an input into production. Investors react to the conditions facing producers in a region to determine the amount of investment. Generally, increases in production are accompanied by increased investment. In addition, the production of machinery, construction of buildings and the like that forms the basis of a region's capital stock, is undertaken by producers. In other words, investment demand adds to household and government expenditure from the representative household, to determine the demand for goods and services in a region.

Producers interact with international markets in two main ways. First, they compete with producers in overseas regions for export markets, as well as in their own region. Second, they use inputs from overseas in their production.

- Sectoral output equals the amount demanded by consumers (households and Government) and intermediate users (firms and investors) as well as exports.
- Intermediate inputs are assumed to be combined in fixed proportions at the composite level, with the exception of the electricity sector that is able to substitute different technologies (brown coal, black coal, oil, gas, hydropower and other renewables) using the 'technology bundle' approach developed by ABARE (1996).
- To minimise costs, producers substitute between domestic and imported intermediate inputs as governed by the Armington assumption, as well as between primary factors of production (through a CES aggregator). Substitution between skilled and unskilled labour is also allowed (again via a CES function).
- The supply of labour is positively influenced by movements in the wage rate governed by an elasticity of supply is (assumed to be 0.2). This implies that changes influencing the demand for labour, positively or negatively, will impact both the level of employment and the wage rate. This is a typical labour market specification for a

dynamic model such as DAE-RGEM. There are other labour market 'settings' that can be used. First, the labour market could take on long-run characteristics with aggregate employment being fixed and any changes to labour demand being absorbed through movements in the wage rate. Second, the labour market could take on short-run characteristics with fixed wages and flexible employment levels.

Investors

Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. The global investor ranks countries as investment destinations based on two factors: current economic growth and rates of return in a given region compared with global rates of return.

International

Each of the components outlined above operate, simultaneously, in each region of the model. That is, for any simulation the model forecasts changes to trade and investment flows within and between regions subject to optimising behaviour by producers, consumers and investors. Of course, this implies some global conditions must be met such as global exports and global imports are the same and that global debt repayments equal global debt receipts each year

Appendix B: Components of expenditure estimates

USMC expenditure cost categories (based on 2012 rotation)

- Rental vehicles (incl fuel)
- Bus hire
- Ammo handling and transport
- Portaloos
- Quarantine & AQIS charges
- Voice services
- Allocated rations
- Accommodation on base
- Garrison messing
- Office materials
- Relocation of office materials
- Commercial voice service
- Gas
- Fuel

US Marine expenditure cost categories

Wages and allowances (personal communication, USMC)

- Base Pay
- Basic allowance housing
- Cost of living allowance
- Meals and incidentals
- Family separation – where relevant

Consumption bundle (ABS, 2011)

- Oral hygiene products
- Soap
- Talcum powders and deodorant
- Hair care products
- Fragrances
- Toiletries and cosmetics not elsewhere classified
- Hair services (male)
- Stationery equipment
- Postal charges

- Cigarettes
- Confectionery
- Cakes, biscuits, puddings and related products
- Fruit and vegetable juice
- Books, newspapers, magazines and other printed material
- Dry cleaning and laundering
- Fresh fruit and nuts
- Soft drinks and packaged waters

Leisure bundle (Stehlik et al, 2004)

- Alcohol
- Tobacco
- Food and beverages
- Shopping
- Transport
- General activities/entertainment
- Adult entertainment
- Gambling

The exact amounts of the component expenditure are not available for release in this report due to identifying the financial situation of a limited number of providers.

Appendix C: References

ABARE (Australian Bureau of Agricultural and Resource Economics) 1996, *MEGABARE: Interim Documentation*, Canberra.

ABS (Australian Bureau of Statistics) 2011, Household Expenditure Survey, Australia: Summary of Results 2009-10, Australia.

ABS (Australian Bureau of Statistics) 2012, Australian national Accounts: State Accounts, 2011-12, Australia.

DAE (Deloitte Access Economics) 2012, Business Outlook: The US – set to shine in 2013? December 2012, Australia.

Harrison WJ, Pearson KR 1996, Computing Solutions for Large General Equilibrium Models Using GEMPACK, *Computational Economics* Vol. 9, pp. 83-127

INPEX 2010, Ichthys Gas Field Development Project: draft environmental impact statement, INPEX Browse, Ltd, Perth.

Noetic Solutions Pty Ltd 2012, Economic Assessment: United States rotational presence Phase 1 (rotations of 200-250 Marines into the Northern Territory).

Northern Territory Government 2012, 2012-13 Mini Budget, Department of Treasury and Finance, Darwin.

Northern Territory Government 2013, Northern Territory key Business Statistics, March 2013, http://www.dob.nt.gov.au/business/economics/key-statistics/Documents/nt_key_stats_mar_2013.pdf accessed 28 February 2013.

Stehlik D, Jennings G, Dwyer L 2004, A Socio-economic Impact Study of Defence Force Activity in Central Queensland Australia, Central Queensland University: Rockhampton Australia.

US Department of the Navy 2010, Final Environmental Impact Statement: Guam and CNMI Military Relocation –Socioeconomic Impact Assessment Study: Joint Guam Program Office, Hawaii United States of America.

Limitation of our work

General use restriction

This report is prepared solely for the use of the Department of Defence. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose of economic impact assessment. You should not refer to or use our name or the advice for any other purpose.

Contact us

Deloitte Access Economics
ACN: 149 633 116

Level 1
9 Sydney Avenue
Barton ACT 2600
PO Box 6334
Kingston ACT 2604 Australia

Tel: +61 2 6175 2000
Fax: +61 2 6175 2001

www.deloitteaccesseconomics.com.au

Deloitte Access Economics is Australia's pre-eminent economics advisory practice and a member of Deloitte's global economics group. The Directors and staff of Access Economics joined Deloitte in early 2011.

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/au/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms.

About Deloitte

Deloitte provides audit, tax, consulting, and financial advisory services to public and private clients spanning multiple industries. With a globally connected network of member firms in more than 150 countries, Deloitte brings world-class capabilities and deep local expertise to help clients succeed wherever they operate. Deloitte's approximately 170,000 professionals are committed to becoming the standard of excellence.

About Deloitte Australia

In Australia, the member firm is the Australian partnership of Deloitte Touche Tohmatsu. As one of Australia's leading professional services firms, Deloitte Touche Tohmatsu and its affiliates provide audit, tax, consulting, and financial advisory services through approximately 5,400 people across the country. Focused on the creation of value and growth, and known as an employer of choice for innovative human resources programs, we are dedicated to helping our clients and our people excel. For more information, please visit our web site at www.deloitte.com.au.

Liability limited by a scheme approved under Professional Standards Legislation.

Member of Deloitte Touche Tohmatsu Limited

© 2013 Deloitte Access Economics Pty Ltd