

Report on the Economic Impact of the Universities in the Regional Universities Network



Introduction

The Regional Universities Network (RUN) is a network of six universities with headquarters in regional cities or towns in Australia. RUN was established in October 2011 with each member University playing a vital role in the development of their regional economies and communities¹. The foundation members include:

- Central Queensland University;
- Southern Cross University;
- University of Ballarat;
- University of New England;
- University of Southern Queensland; and
- University of the Sunshine Coast.

In October 2012, RUN commissioned a study to estimate the economic contribution of each University to its local region. The results of the study are summarised in seven individual reports, one for each of the member universities and one for RUN overall.

This report outlines the methodology and key assumptions used to undertake the study.

Methodology

The economic impact assessment in this study was undertaken using input output analysis. Input output analysis provides a detailed picture of the structure of a regional economy at a point in time and can be used to estimate the contribution or impact of a particular sector of the economy including flow-on or multiplier effects. RedeConsult uses the latest version of IO9, the input output modelling software developed by Professor Guy West.

There are essentially three key steps in the analysis of the economic impact, namely:

- Developing the input output models at the national, State and Local Government Area (LGA) levels;
- Identifying the magnitude of the primary impacts derived from direct income and expenditure from the university campuses, capital expenditure and expenditure by students and visitors attending graduation ceremonies; and
- Modelling the flow-on or multiplier effects on the relevant economies to measure the total economic impact.

Constructing the input output tables

The methodology adopted to construct the regional input output tables used in the economic impact assessment of the campuses of the six member universities of RUN incorporated a number of steps. These steps are outlined below.

Updating the Australian input output table

The latest national input output table (2008-09) published by the Australian Bureau of Statistics (ABS) (ABS Cat. No. 5209.0.55.001) was utilised as the base table. The steps involved in updating that table to reflect the calendar year of 2011 included:

¹ www.run.edu.au Accessed 15th November 2012

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- Data from the 2011 Census relating to employment by industry sector were analysed, in conjunction with data from the Labour Force Survey (ABS Cat. No. 6291.0.55.003), to determine the number of full time equivalent employees by industry sector in 2011. In converting to full time equivalent jobs, the ABS convention of assuming 1 part time employee is equivalent to 0.5 full time employee was adopted. The above data were used to calculate output by industry sector, in 2008-09 dollar values.
- The table was then inflated by the Consumer Price Index (ABS Cat. No. 6401.0) to convert the table to 2011 values.
- Data from the Australian System of National Accounts (ABS Cat. No. 5204.0) for 2010-11 and 2011-12 were averaged and information on Compensation of Employees and Gross Operating Surplus by industry sector was used to adjust the previously derived results in the relevant rows in the input output table. Similarly, data from the same publications relating to final demand were used to adjust the relevant columns in the input output table.
- The table was balanced and checked for accuracy against data from the Australian System of National Accounts including comparisons of the derived Gross Domestic Product and its components and Gross Industry Value Added.
- Data from the Australian National Accounts: State Accounts (ABS Cat. No. 5220.0) for 2010-11 and 2011-12 were averaged and information on Compensation of Employees, Gross Operating Surplus and the various final demand sectors extracted.
- The above data were incorporated into the Generation of Regional Input Output Tables (GRIT) file incorporated in the IOg software used in this analysis. The GRIT technique, developed by Professors West and Jensen of the University of Queensland, uses allocation methods and location quotients as well as superior data. It is the most widely used method of constructing input output tables in Australia. It is also commonly employed in Europe and America.
- The resultant tables were balanced using the RAS methodology. The RAS technique is a bi-proportional iterative adjustment method designed to modify a base input output matrix to fit new row and column totals. The rows and columns are adjusted proportionally to the new row and column totals in turn, and the cycle repeated until the actual row and column totals converge to the specified values. This may require some adjustment to the tolerances of individual sectors to enable the table to converge.
- The balanced tables were then checked for accuracy against data from the Australian National Accounts: State Accounts including comparisons of the derived Gross State Product and its components and Gross Industry Value Added.

Creating the relevant State input output tables

The national input output table derived for the calendar year of 2011 was used to generate input output tables for the same year for New South Wales, Queensland and Victoria. The steps involved in developing these State tables included:

- Data from the 2011 Census regarding employment by industry sector by place of employment were analysed, in conjunction with data from the Labour Force Survey, for the relevant State to estimate the number of full time equivalent employees by industry sector working in each State in 2011. This was used to apportion output by industry sector.
- Data from the 2011 Census regarding employment by industry sector by place of employment were analysed, in conjunction with Census data relating to full time and part time employment by industry

Creating the regional input output tables

The input output tables developed for 2011 for New South Wales, Queensland and Victoria were used to create the relevant regional tables for the Local Government Areas (LGAs) to be examined. This incorporated the following steps:

- Data from the 2011 Census regarding employment by industry sector by place of employment were analysed, in conjunction with Census data relating to full time and part time employment by industry

sector, to estimate the number of full time equivalent employees by industry sector working in each LGA in 2011. This was used to estimate output by industry sector.

- Data from the 2011 Census relating to weekly income by industry sector were extracted and compared with the average weekly income by industry sector for the parent State. The resultant ratio was used to adjust State level Compensation of Employees by full time equivalent by industry sector to a regional level.
- Average weekly income per capita for persons residing in each LGA was calculated from data from the 2011 Census and compared with the State average. The resultant ratio was used to adjust State level Household Final Consumption Expenditure and Ownership of Dwellings per capita to a regional level.
- The above data were incorporated into the GRIT file, along with data for the relevant university campus as outlined below, and the resultant tables balanced using the RAS methodology. The RAS technique incorporated in IO9 permits maintaining the integrity of the superior data provided by the universities whilst balancing the tables bi-proportionally. The balanced tables were checked for reasonableness by comparing Gross Regional Product per capita and per full time equivalent employee with the State average.

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Ongoing income and expenditure

Each University provided data on income and expenditure by type and location of expenditure for each campus examined for the calendar year of 2011. By necessity, some of this data in relation to location of expenditure is a “best estimate”. There are difficulties in accurately allocating the location of expenditure, particularly when invoices are often paid to a head office location but the goods and services are supplied locally. As the bulk of the final remittance will eventually make its way back to the

local economy from which the goods and services were supplied, “best estimates” of the amount spent locally were adopted. It is noted that the universities have a commitment to purchase locally as far as possible.

Income and expenditure data were allocated to one of the following geographical locations:

- the LGA in question;
- the balance of the relevant State;
- each of the other two States on the eastern seaboard;
- elsewhere in Australia; and
- overseas.

In preparing the economic impact assessment, the total income and expenditure for each university by campus was aggregated for the relevant State. For example, the data on income and expenditure for each of the four campuses of CQ University being assessed were aggregated to generate an estimate of total income and expenditure in Queensland. Expenditure data was then converted to basic prices² to maintain consistency with the original tables derived from the national input output table. The various margins tables available in the ABS publication for the 2008-09 national input output table were used to calculate the basic prices.

A separate row and column was inserted in the relevant State table to reflect the operations of the particular university. The data derived for income, expenditure, wages and salaries, gross operating surplus and full time equivalent employment were inserted and then subtracted from the total for the Education & Training sector to maintain the integrity of the table and avoid double-counting. The resultant balanced tables were then used to generate tables at the LGA level using the GRIT technique.

Data relating to income at each campus for the relevant LGA was assessed, with income derived from

² The basic price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable, and plus any subsidy receivable, on that unit as a consequence of its production or sale. It excludes any transport charges invoiced separately by the producer.

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areas outside the LGA treated as an export. Similarly, expenditure data within the LGA was converted to basic prices, with expenditure made outside the LGA treated as an import. All staff, expressed as full time equivalents, and their associated wages and salaries were initially applied to the LGA in which the campus is located, irrespective of their place of residence. In preparing the data for the GRIT process, the income, expenditure, employment and Compensation of Employees data was subtracted from the overall data derived for the Education & Training sector in the LGA to avoid double counting.

Subsequently, an adjustment was made for the flow-on impacts for employees living outside the LGA. Whilst the initial impact was allocated to the LGA in order to assess the overall contribution to Gross Regional Product, a proportion of the flow-on impact was deducted to reflect expenditure by these employees in the LGA in which they reside, particularly in relation to expenditure on accommodation.

Utilising the GRIT technique from a State table already incorporating the particular university sector is more accurate than simply deriving the regional table, inserting the relevant campus sector and subtracting it from the overall Education & Training sector. At the small area level, that approach can result in negative values in the intermediate quadrant of the input output table which then have to be adjusted.

The impact analysis for each campus at the LGA level was modelled by shutting down the campus sector to determine the impact on output, gross regional product, household income and full time equivalent employment. Marginal, rather than average, income and expenditure relationships for the household sector were incorporated in the analysis.

Conventional input output models are subject to valid criticisms regarding linearity assumptions as a result of the adoption of average coefficients. Economic impact analysis using multipliers assumes that households consume goods and services in exact proportions to their initial budget shares. However, the household budget share of some goods might

increase as household income increases, whilst others remain unchanged. This equally applies to industrial consumption of intermediate inputs and factors of production.

As has been well documented, the household sector is the dominant component of multiplier effects in an input output model, as consumer driven consumption and income tends to dominate local economic activity. Capturing marginal, rather than average, income and expenditure relationships for the household sector can provide a more realistic representation of the economic system and remove the strict linearity assumption.

The analysis undertaken in this project incorporates empirically derived marginal, rather than average, coefficients providing a more realistic representation of the economy and removing the strict linearity assumption. The results are therefore more conservative and reasonable than those derived from conventional input output modelling.

Capital expenditure

As with ongoing expenditure, capital expenditure by location of expenditure is based on a "best estimate". For example, with capital expenditure on construction, the majority of expenditure is likely to be made locally, even if the main contractor is not a locally based business. Whilst payment to the main contractor may be made outside the local area, much of this is likely to flow back to the relevant LGA through the purchase of materials and payments to sub-contractors.

The universities provided data regarding capital expenditure made in 2011 by type of expenditure and location. The economic impact of this expenditure was assessed as a final demand impact, again incorporating marginal income coefficients.

Student expenditure

The base data used in assessing the impact of student expenditure is the 2009-10 Household Expenditure Survey (ABS Cat. No. 6530.0). That publication presents estimates of average weekly household expenditure by broad groups, presented as

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expenditure for each quintile of household income. The broad expenditure categories used in the Household Expenditure Survey are summarised below.

- Current housing costs (selected dwelling)
- Domestic fuel and power
- Food and non-alcoholic beverages
- Alcoholic beverages
- Tobacco products
- Clothing and footwear
- Household furnishings and equipment
- Household services and operation
- Medical care and health expenses
- Transport
- Recreation
- Personal care
- Miscellaneous goods and services

The data are presented at the State level and not at a regional level. As it is to be expected that the pattern of expenditure at the small area level will differ from the State average, depending upon relative household income levels, a number of adjustments to the data were made. In assessing the likely impact of student expenditure on the relevant local economy, the following steps were undertaken:

- Data from the 2009-10 Household Expenditure Survey were extracted for New South Wales, Queensland and Victoria. Average household size, extracted from the same publication, was used to convert average household expenditure to average per capita expenditure.
- Data from the Consumer Price Index, Australia (ABS Cat. No. 6401.0) were used to inflate the Household Expenditure Survey data by group to 2011 values. Indices for the relevant capital city were used as a proxy for inflation in each LGA.
- Data from the 2011 Census regarding personal income levels by State were analysed to assess average personal weekly income for New South Wales, Queensland and Victoria.
- Data from the 2011 Census regarding personal income levels by LGA were extracted for each of the LGAs examined in this report. Average personal weekly income was calculated for each LGA and expressed as a percentage of the average personal weekly income for the relevant State. For the combined LGAs of Tweed and Gold Coast, each was calculated separately as a percentage of either New South Wales or Queensland.
- Average weekly expenditure per capita for the lowest gross household income quintile by State, expressed in 2011 values, was adjusted for each LGA using the proportion of average personal weekly income compared with the relevant State. As an example, it was estimated that the average personal weekly income for the LGA of Armidale was 85.4 per cent of that for New South Wales. Accordingly, average per capita weekly expenditure by group for the lowest gross household income quintile was adjusted to reflect 85.4 per cent of the New South Wales data when calculating student expenditure in Armidale LGA. For the combined LGAs of Tweed and Gold Coast, average weekly expenditure was calculated separately for each LGA and an average of the two adopted for the combined LGAs.
- The impact of student expenditure was calculated using the number of weeks spent on campus and applied as a final demand to the relevant sectors in the input output table, incorporating marginal income coefficients.
- It has been assumed that all expenditure is made in the LGA in which the campus is located. In practice, it is likely that some expenditure is made outside the LGA, particularly in relation to retail spending. Capital cities generally attract a proportion of regional retail expenditure and the significant increase in internet purchases, both domestically and overseas, could have a major impact on local retail expenditure. A 15 per cent margin was used for expenditure on retail goods to allow for the fact that there is considerable potential for the flow-on from this type of spending to be felt outside the immediate region

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as well as expenditure leakage through internet purchases and spending in capital cities. However, in assessing the impact for RUN as a whole on Australia and the Eastern Seaboard, expenditure on retail goods was captured in its entirety.

- Expenditure on accommodation, utilities, household furnishing and household operations were excluded for students living in university owned premises to avoid double counting. This is already included in university income. Similarly, adjustments to expenditure on food and beverage were made for those campuses offering a meal package component.
- Additional expenditure on health insurance was only applied to students who lived overseas on enrolment, as it is compulsory for overseas students to take out private health insurance for the duration of their stay in Australia.

Clearly expenditure by non-local students, defined as those who had a home address on enrolment outside the relevant LGA, has a positive impact on the local economy. What is less obvious is the impact of expenditure by local students i.e. those that had a home address on enrolment in the relevant LGA. It is likely that, in the absence of the university campus, a proportion of these students would have enrolled at another university or campus outside the LGA and therefore their expenditure would be lost. It can, therefore, be argued that the presence of the university campus has prevented expenditure being lost from the respective LGA.

On the other hand, without the university campus being present, a proportion of local students might still have remained in the LGA but taken up employment or commenced other forms of tertiary education. Under these circumstances the university cannot be credited with retaining expenditure in the LGA.

Students studying part time are, on average, considerably older than those studying full time. As such, they may be more likely to be established locally with jobs and family commitments. It has therefore been conservatively assumed that all local

internal students at each campus, who are studying part time, would not have left the region to study internally elsewhere if the university campus was not present and their expenditure is therefore not a net benefit to the region.

Analysis of the age of full time students by place of residence compared with the relevant state average is shown in the table below.

Average age of students attending university on a full time basis, 2011

	Average age (years)	Average age - % difference from State average
Southern Cross University		
Lismore	26.9	13.0%
Coffs Harbour	25.7	8.0%
Tweed / Gold Coast combined	24.3	1.6%
University of New England		
Armidale	23.8	-0.1%
University of Ballarat		
Ballarat	23.8	0.3%
Horsham	27.3	15.0%
CQ University		
Bundaberg	28.4	18.1%
Gladstone	25.8	7.3%
Mackay	24.6	2.2%
Rockhampton	25.3	5.0%
University of Southern Queensland		
Fraser Coast	29.0	20.5%
Ipswich	24.0	-0.2%
Toowoomba	25.6	6.6%
University of the Sunshine Coast		
Sunshine Coast	25.9	7.6%

Source: ABS Census of Population and Housing, 2011

As indicated in the table, there is considerable variation in the average age of students studying full time. In estimating the proportion of local students studying full time who would have left the region to study full time elsewhere in the absence of the relevant university campus, age as a percentage of the relevant State average has been used as a proxy. This is again assumed to be a function of stage in the family life cycle and associated mobility to study. As an example, the average age of students studying full

time at the Fraser Coast campus of the University of Southern Queensland is 29.0 years, or 20.5 per cent higher than the Queensland average of 24.0 years. It has been assumed that 20.5 per cent of local students studying full time at the Fraser Coast campus would not have left the region if the campus did not exist and their expenditure is therefore not a net benefit to the region. Conversely, it has been assumed that all students studying full time at the Ipswich campus would have studied full time at another university campus if the Springfield campus did not exist.

In assessing the impact of student expenditure for RUN as a whole, only those students who had a home address on enrolment outside New South Wales, Queensland and Victoria have been included in the economic impact on the Eastern Seaboard. The impact of student expenditure for RUN as a whole on Australia only incorporates expenditure by students who had an overseas home address on enrolment.

Visitor expenditure

The Universities provided information regarding the number of students attending graduation ceremonies in 2011 and the number of guests in attendance. It was assumed that the origin of these guests was distributed in the same proportion as the distribution of student home addresses on enrolment. Based on travel distance to the university campus, an assessment was made regarding the likelihood of guests being local, having an overnight stay or making a day trip. Tourist expenditure data for daytrip and overnight visitors to the region, obtained from the Department of Resources, Energy and Tourism³, was then used to estimate the likely additional expenditure generated by guests attending graduation ceremonies.

The impact of visitor expenditure on the local economy was assessed as a final demand impact, incorporating marginal income coefficients.

Other impacts

The second part of the study examined additional economic benefits that result from the presence of a university in a region in terms of human capital. This has been assessed by identifying the contribution to the number of workers with tertiary qualifications in each region. The key data used in this analysis is outlined below:

Graduate destination

The Graduate Careers Survey, undertaken by the Graduate Careers Council, collects the employment location of a graduate approximately four months after graduation. Each University was asked to provide a data file containing information from the Graduate Careers Survey for five years between 2007 and 2011.

If the graduate indicated that they were employed on the Survey census date, then the location (postcode) of employment was recoded to LGAs using ABS Concordance Tables. The LGAs were then reclassified into:

- footprint - combination of the relevant LGAs for the University;
- regional - for the state in which the University is located;
- other regional - the remainder of regional Australia;
- capital city - the state in which the University is located;
- other metropolitan - the remainder of metropolitan Australia; and
- other- includes overseas.

Analysis is undertaken only for students that graduated with a Bachelor level qualification. This included those with level 01/Bachelor degree, 02/Bachelor degree (honours) or 05/Bachelor degree (graduate entry). It is assumed that these students are most likely commencing in the workforce or have retrained or gained additional skills in their career and would be enhancing the human capital in the region of employment.

³

<http://www.ret.gov.au/tourism/research/tra/publications/2012/Pages/2012.aspx> - accessed 13 November 2012

Analysis of Census data

The following data were extracted from the ABS Census:

- Level of Education by LGA and Age (5 Year Groups) 2006 and 2011 Census;
- Level of Education by LGA , Labour Force Status and Individual Income (gross weekly) from the 2011 Census; and
- Labour Force Status by Level of Education by LGA.

Data was extracted for each LGA and was combined for the Gold Coast-Tweed LGAs.

Glossary

The following glossary of terms and definitions used in this report is drawn primarily from the ABS Australian System of National Accounts.

Capital expenditure

Gross fixed capital expenditure is the purchases of durable investment goods such as dwellings, plant and equipment.

Compensation of employees (COE)

The total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the employee during the accounting period. It is further classified into two sub-components: wages and salaries; and employers' social contributions. Compensation of Employees is the basis of the Household Income multiplier.

Employment

Employment is measured as full-time equivalent (FTE) jobs.

Exports of goods and services

The value of goods exported and amounts receivable from non-residents for the provision of services by residents. Note that non-residents are defined as consumers, firms and governments from outside a given area. For example: the sale of education fees from Ballarat LGA to a purchaser in New South Wales is an export with respect to the Ballarat LGA input output table, but is not classified as an export in the Eastern Seaboard input output table.

Final consumption expenditure - general government

Government final consumption expenditure is current expenditure by general government bodies on services to the community such as defence, education, and public order and safety less any explicit charges for these services. If these are provided free of charge or at charges which cover only a small proportion of costs, the government is considered to be the consumer of its own output. This

output has no directly observable market value, and so it is valued in the national accounts at its cost of production. It also includes the value of the portion of market output purchased by the General Government sector on behalf of beneficiaries.

Final consumption expenditure – households

Net expenditure on goods and services by persons and expenditure of a current nature by private non-profit institutions serving households. This item excludes expenditures by unincorporated businesses and expenditures on assets by non-profit institutions (included in gross fixed capital formation). Also excluded is expenditure on maintenance of dwellings (treated as intermediate expenses of private enterprises), but personal expenditure on motor vehicles and other durable goods and the imputed rent of owner-occupied dwellings are included. The value of 'backyard' production (including food produced and consumed on farms) is included in household final consumption expenditure and the payment of wages and salaries in kind (e.g. food and lodging supplied free to employees) is counted in both household income and household final consumption expenditure.

Final demand

Final demand is the demand for goods and services not used up during the production process. Final demand is the sum of household and government consumption expenditure, capital formation, exports and changes in inventories.

Gross domestic product (GDP)

GDP is the total market value of goods and services produced in Australia within a given period after deducting the cost of goods and services used up in the process of production but before deducting allowances for the consumption of fixed capital. Thus gross domestic product, as here defined, is 'at market prices'. It is equivalent to gross national expenditure plus exports of goods and services less imports of goods and services.

Gross operating surplus

The operating surplus accruing to all enterprises, except unincorporated enterprises, from their operations in Australia. It is the excess of gross output over the sum of intermediate consumption, compensation of employees, and taxes less subsidies on production and imports. It is calculated before deduction of consumption of fixed capital, dividends, interest, royalties and land rent, and direct taxes payable, but after deducting the inventory valuation adjustment. Gross operating surplus is also calculated for general government and it equals general government's consumption of fixed capital.

Gross value added

The value of output at basic prices minus the value of intermediate consumption at purchasers' prices. The term is used to describe gross product by industry and by sector. Basic prices valuation of output removes the distortion caused by variations in the incidence of commodity taxes and subsidies across the output of individual industries.

Imports of goods and services

The value of goods imported and amounts payable to non-residents for the provision of services to residents. Note that non-residents are defined as consumers, firms and governments from outside a given area. For example: purchase of computing equipment from New South Wales is an import with respect to the Rockhampton LGA input output table, but is not classified as an import in the Eastern Seaboard input output table.

Intermediate inputs

An intermediate input is a good or service that is used in the production process.

Multiplier

A multiplier is a summary measure used for estimating the economic impact on an economy caused by a change in the demand for the output of a particular industry or group of industries. A multiplier indicates the relative magnitude of the flow-on effects. Multipliers should not be used to measure the

impact, rather they should be derived after the impact has been calculated. Multipliers have not been presented in this report to maintain confidentiality of information.

Output

This consists of those goods and services that are produced within an establishment that become available for use outside that establishment, plus any goods and services produced for own final use.

Primary Inputs

Primary inputs include compensation of employees, gross operating surplus and gross mixed income, taxes less subsidies on products, other taxes less subsidies on production and imports.



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