ECONOMIC IMPACT OF

CHARLES STURT UNIVERSITY

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Western Research Institute
ABN 76 090 089 991
C/- Charles Sturt University
Research Station Drive
Bathurst NSW 2795
Telephone: (02) 6338 4435
Facsimile: (02) 6338 4699
Email: tmurphy@csu.edu.au

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EXECUTIVE SUMMARY

This report estimates the economic impact of Charles Sturt University (CSU) expenditure and non local and international student expenditure on the regions surrounding its four main campuses to be $264 million in gross regional product, $164 million in household income and over 3,100 full-time equivalent jobs (FTE) when flow on effects are taken into account. Of this, $223 million in gross regional product, $144 million in household income and 2,500 FTE is the result of CSU expenditure and $42 million in gross regional product, $20 million in household income and 600 FTE is from international and non-local student expenditure.

To put these results into perspective, CSU and international and non-local students attending the university generate the equivalent of 9 percent of Wagga Wagga's employment in the Murrumbidgee statistical division; the equivalent of 12 percent of Bathurst's employment in the Central West statistical division; and the equivalent of 3 percent of Albury's employment in the Murray and Ovens-Murray statistical divisions.

The findings in this report are based on input-output modelling, applied in a conservative manner. Specifically, a base case was deducted from CSU expenditure on the assumption that in the absence of the university the land, labour and capital would be used for another, albeit less productive purpose. Also, local student expenditure has not been included on the assumption that such students would remain in the region in the absence of CSU. In addition, impacts were measured using marginal coefficients which generate smaller impacts than the standard average coefficients.

This research does not take account of the research, educational, social and cultural benefits CSU brings to its regional communities. However, despite this limited focus and very conservative assumptions, this study demonstrates that CSU makes an important economic contribution to its surrounding regional economies.

1 INTRODUCTION

1.1 Background

Universities make a significant contribution to their region in terms of gross regional product, income and employment. The importance of this contribution is enhanced when the university is located in a regional area. The Centre for International Economics, in their 1997 report *Assessing the Economic Contribution of Regional Universities*[1], identified four ways in which a university contributes to its region:

1. Universities earn income, spend that income and attract students that spend;
2. Universities conduct research on regional issues and/or commercial applications;
3. Universities educate the labour force and help attract industries; and
4. Universities can contribute to the social and cultural life of the region.

Charles Sturt University (CSU) commissioned the Western Research Institute (WRI) to explore the first type of contribution. Specifically, the study estimates the economic impact of the operating income and expenditure of CSU and the expenditure of non-local and international students on the regions of the university's main campuses.

1.2 Charles Sturt University

Charles Sturt University has four main campuses. These are located at Wagga Wagga, Bathurst, Albury and Dubbo. In 2003, CSU expenditure (including wages and salaries) was estimated to be around $208 million across the four campuses. At this time, the university employed over 1,400 staff and had over 8,200 internal students enrolled at its main campuses, almost 63% of whom were coming from a region outside that in which the campus is located.

[1] Centre for International Economics (1997). *Assessing the economic contribution of regional universities*. Canberra and Sydney.

2 METHODOLOGY

Input-output analysis was used in this study to determine the economic impact of Charles Sturt University and the expenditure of its students. 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. The input-output tables constructed for the regions surrounding the main campuses of CSU are for the 2002/03 financial year and so estimate the impact of CSU in that year. All tables were constructed using *Input-Output Analysis for Practitioners* version 8.0.0[2] software.

Input-output tables were constructed for the Central West, Murray/Ovens-Murray, Murrumbidgee and North Western statistical divisions. These regions are shown in the diagram below.

[2] Input-Output Analysis for Practitioners ©2003 Centre for Economic Policy Modelling, University of Queensland. Programmed by Guy West.

2.1 Constructing the Tables

The input-output tables for this project were extracted from the Australian Bureau of Statistics (ABS) 1998-99 national input-output table using the Generation of Regional Input-Output Tables (GRIT) technique. The GRIT technique derives regional input-output tables from the National input-output table using location quotients and superior data (in this case, information regarding the CSU operations) at various stages in the construction of the tables. The GRIT procedure was developed by Associate Professor Guy West and Professor Rod Jensen of the University of Queensland and is the most widely used method of constructing regional input-output tables in Australia. The GRIT method is also widely used in America and Europe.

2.1.1 Data Collection

- *CSU Operations*

The national input-output table includes only one sector for all education and does not include a separate sector for university education. Charles Sturt University provided the WRI with detailed information about the university's expenditure, location of expenditure, employment and revenues. This information was used to construct higher education sector rows and columns in the respective input-output tables. This higher education sector was inserted into each table and then subtracted from the education sector.

- *Student Expenditure*

Some information regarding student expenditure was gathered from the Division of Student Services CSU. This information included estimates of expenditure on accommodation, food, gas, electricity, stationery, printing and text books. Expenditure on other items was based on the lowest income quintile spending habits of the ABS *Household Expenditure Survey* (Cat. 6535.0).

The Office of Planning and Audit CSU provided the WRI with the number of local, non-local and international students enrolled in 2003 at each campus. In this report, it is conservatively assumed that only expenditure by non-local and international students provides a net impact to the respective regional economies. Non-local students are defined as those enrolled at a campus outside the region in which they had previously lived.

The following assumptions were made regarding student expenditure:

- All international students were assumed to be living on-campus, with the remainder of on-campus accommodation assumed to be occupied by non-local students..
- Expenditure by international and non-local students was calculated conservatively on a 32 week year, taking account of 14 weeks teaching and two weeks for exams per semester.
- Student expenditure for on-campus accommodation and tuition fees were not included in the final demand impacts to avoid double-counting as these amounts were included in CSU revenue.
- Transport expenditure by on-campus students was also excluded as it was assumed that the close proximity to town and provision of free transport by the university would offset this type of expenditure.
- Utilities expenditure was only included for off-campus students.
- A 15% margin on student retail and off-campus student transport expenditure was used to estimate the impact of this type of economic stimulus.

2.2 Impact Analysis

2.2.1 Industry Significance

Input-output tables are frequently used to provide estimates of the significance of a particular industry or organisation in terms of its contribution to the economy. This is done by examining the effects of the organisation shutting down and ceasing all economic activities. This method provides an estimate of the level of economic activity that can be attributed to that particular organisation, in this case CSU.

The NSW Department of State and Regional Development and NSW Treasury usually assume that if an industry were to leave a region, another is likely to take its place. That is, the land, labour and capital would be used for some other purpose resulting in a net loss to the region of less than the full impact of the lost industry. To take this into account, a common approach is to deduct a base case of between 25% and 80% of the total industry impact, which provides a net industry significance or impact. In this study, the WRI applied a base case of 25% to CSU income and expenses. This simply assumes that if the University was not present in each of the four regions around 25% of the impact would be generated by some form of alternative investment. That is, only 75% of CSU expenditure and income was included in the model.

2.2.2 Final Demand Impacts

The impact of non-local and international student expenditure was estimated as a final demand impact. Specifically, their expenditure was allocated to the relevant sectors to give the estimated impacts of this expenditure including both initial and flow-on effects.

2.2.3 Total Impacts

The economic impact of CSU on each of the regional economies can be estimated by adding the industry significance of CSU for that region to the final demand impacts non-local and international student expenditures for that region[3].

[3] It should be noted that the impact of CSU wages and salaries are included in the flow-on effects of university expenditure and hence do not need to be estimated separately as with student expenditure.

The impact of CSU in each region was estimated in terms of:

- **Value added** which is equal to gross output minus intermediate inputs. Value added is equivalent to the contribution to gross regional product (the local equivalent of gross domestic product).

- **Household Income** which measures the benefit received by regional households from economic activity. It typically refers to compensation of employees but can also include income in return for productive activity such as, the gross mixed income of unincorporated enterprises, gross operating surplus on dwellings owned by persons, and property income receivable and transfers receivable such as social assistance benefits and non-life insurance claims.

- **Employment** which refers to full-time equivalent (FTE) employment and is a measure of the total level of staff resources used. The FTE of a full-time staff member is equal to 1.0. The FTE of a part-time worker will be a fraction of this depending on the relative number of hours worked.

2.2.4 Use of Marginal Coefficients

The WRI also applied marginal coefficients[4] to the CSU tables to provide a more accurate representation of the flow-on effects of university related stimuli than would be possible using a linear model. Use of marginal coefficients largely overcomes the overestimation of impacts that can result from using the linear approach. A more detailed description of the marginal coefficients approach can be found in appendix 1.

[4] West, G. & Gamage, A. (1997). Differential Multipliers for Tourism in Victoria. *Tourism Economics, 3 (1),* 57-68.

3 ECONOMIC IMPACT OF CHARLES STURT UNIVERSITY

The input-output tables constructed for CSU were used to estimate the economic benefits generated by the University by determining the *economic significance* of university operations and expenditure by non-local and international students. The economic benefits generated by CSU are specified in terms of employment, value added (or gross regional product - GRP) and household income.

Table 3.1.1 below summarises the economic impact of CSU expenditure (including flow-on effects) in each of its four main regions and as a total. University expenditure accounts for around $223 million in value added (GRP) and $144 million in wages and salaries. CSU expenditure also contributes around 2,500 FTE jobs to the local economy.

Table 3.1.1: Economic Impact of Charles Sturt University Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	115.72	74.05	1,335
Central West	74.87	49.33	860
Murray/Ovens Murray	28.38	18.39	300
North Western	3.63	1.95	40
Total	**222.60**	**143.72**	**2,535**

Table 3.1.2 below summarises the economic impact of non-local student expenditure (including flow-on effects). Expenditure of non-local CSU students accounts for over $40 million in GRP and almost $20 million in household income per year. This type of student expenditure also contributes around 590 FTE jobs across the four regions.

Table 3.1.2: Economic Impact of Non-local Student Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	14.93	7.22	218
Central West	19.00	9.60	281
Murray/Ovens Murray	5.77	2.77	80
North Western	0.58	0.28	8
Total	**40.28**	**19.87**	**587**

Table 3.1.3 below summarises the economic impact of international student expenditure (including flow-on effects) in each of Charles Sturt University's four main regions. The expenditure of international students attending CSU generates $1.4 million in value added, almost $1 million in household income and over 20 FTE jobs across the four CSU regions.

Table 3.1.3: Economic Impact of International Student Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	0.97	0.47	15
Central West	0.36	0.19	6
Murray/Ovens Murray	0.09	0.05	1
North Western	0.00	0.00	0
Total	**1.42**	**0.71**	**22**

The total impact of CSU in each of the regions is shown below in Table 3.1.4. The table shows the economic impact of CSU, non-local student and international student expenditure (including flow-on effects). In total the university generates almost $264 million in GRP, $164 million in household income and over 3,000 FTE jobs.

Table 3.1.4: Total Economic Impact of Charles Sturt University

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	131.62	81.75	1,568
Central West	94.24	59.12	1,147
Murray/Ovens Murray	34.24	21.20	381
North Western	4.21	2.23	48
Total	**264.31**	**164.30**	**3,144**

Table 3.1.5 shows the relative total contribution of Charles Sturt University to the economy of each Statistical Division in which the campuses are located. For example CSU contributes 2.4% of value added or gross regional product; 3.1% of household income and 2.2% of employment in the Murrumbidgee Statistical Division.

Table 3.1.5: Relative Total Contribution of CSU to each Statistical Division Economy

Region	Value Added (%)	Household Income (%)	FTE Employment (%)
Murrumbidgee	2.4	3.1	2.2
Central West	1.6	2.1	1.4
Murray/Ovens Murray	0.4	0.6	0.4
North Western	0.1	0.1	0.1
Total	**1.1**	**1.5**	**1.1**

The economies of these four statistical divisions are large. To put the total contribution of CSU into perspective, employment generated by the university in the Murrumbidgee Statistical Division is equivalent to 9% of Wagga Wagga's employment; in the Central West Statistical Division it is equivalent to 12% of Bathurst's employment; and in the Murray and Ovens Murray Statistical Divisions it is equivalent to 3% of Albury's employment.

4 CONCLUSION

This report found that expenditure by CSU and its non-local and international students contributes $264 million in gross regional product, $164 million in household income and over 3,100 full-time equivalent jobs in the regions surrounding the CSU campuses at Wagga Wagga, Bathurst, Albury and Dubbo when flow on effects are taken into account. Of this, $223 million in gross regional product is the result of CSU expenditure and $42 million is from international and non-local student expenditure.

These estimates are very conservative in that a base case was deducted from the impact of CSU's operational expenditure; local student expenditure was excluded from the impact of student expenditures; and marginal coefficients were used to estimate flow-on effects eliminating the overestimation of flow-on effects that usually occurs in the standard linear model. Moreover this study takes no account of the educational, research, social and cultural benefits CSU campuses bring to their regions.

This research demonstrates the important contribution of CSU to the economic well being of its regional economies.

APPENDIX 1: ECONOMIC IMPACT ANALYSIS

This appendix discusses the basics of economic impact analysis, including an overview of what input-output tables are, how the tables are constructed and the assumptions of the model. The appendix also describes the input-output table used in this study.

A.1 Input-Output Tables

Input-output tables are part of the Australian national accounts. An input-output model provides a detailed picture of the structure of an economy at a particular point in time. It includes all the transactions that occur during a specific period, usually one year.

The rows of an input-output table show the disposal of the output of an industry to itself and to other industries as well as final demand categories (i.e. exports and household consumption); and

The columns show the origin of inputs into production, whether they are intermediate inputs (i.e. intra- and inter-industry purchases) or primary inputs (i.e. labour and capital).

One of the main attractions of input-output models is their relative ease of use and the level of detail obtained concerning the structure of the economy. The Australian Bureau of Statistics (ABS) notes the usefulness of input-output tables:

"Input-output tables provide detailed information about the supply and disposition of commodities in the Australian economy and about the structure of, and inter-relationships between, Australian industries. Detailed data on supply and use of commodities, inter-industry flows and a range of derived data, such as input-output multipliers, are provided for economic planning and analysis, and construction of models for forecasting purposes." (ABS *Introduction to Input-Output Multipliers*, Cat. 5246.0)

The main use of input-output tables is economic impact analysis, where the tables are used to estimate the benefits generated by new initiatives on each and every sector of an economy. For example, if there is a change in the purchasing or sales pattern of any industry, the flow – on, or multiplier effects on upstream industries can be calculated. An input-output table is also very useful for estimating the direct and indirect contribution of final demand, as with the retail and food services expenditure of consumers.

A.2 Methodology of Table Construction

Base Table Construction

The base tables were constructed from the national input-output table provided by the Australian Bureau of Statistics in the publication: *Australian National Accounts: Input-Output Tables* cat. no. 5209.0.55.001[5]. The national table was adjusted to suit each of the four regions using location quotients derived from detailed ABS employment data for 2001 and an estimation of final demands based on the 2001 ratio of employment to population in each of the areas. These adjustments provide base tables for the 2000-01 financial year. At this point the tables include 106 sectors, these were aggregated to form 27 sectors including the major industry sectors.

Table Inflation

Base tables were inflated from 2001 to 2003 using ABS data for 2003. The ABS publication *State Accounts 2002-03* was used to determine the relative increase in the intermediate quadrant, final demands and primary inputs, which were then inflated to approximately equal the ABS figures for 2003. Employment data for 2003 provided by the ABS[6] was used to determine the level of inflation in employment, this adjustment was then also applied to the tables. The application of 2003 inflators to the tables resulted in balanced, workable tables for the 2002-03 financial year.

Insertion of the Higher Education Sector

The ABS national input-output table does not include the higher education industry group therefore a new sector was inserted to allow analysis of the contribution of Charles Sturt University to each of the regions. The new sector was modelled on the Education sector of the table, its relative size was determined from the ratio of employment in higher education to Education from detailed ABS employment data for 2001. The higher education sector was then subtracted from the Education sector to rebalance the table. The resulting column was inflated using the same method as described in section 2.2.

[6] Employment data sourced from ABS cat. no. 6291.0.55.001 Labour Force, Australia, Detailed: Table 05. Employed persons by State and Industry.

A3 The GRIT Technique

The input-output tables for this project were extracted from the Australian Bureau of Statistics (ABS) 1998-99 national input-output table using the Generation of Regional Input-Output Tables (GRIT) technique. The GRIT technique is basically a hybrid method of deriving regional input-output tables from the National input-output table while at the same time allowing for the insertion of superior data (i.e. information regarding the CSU operations) at various stages in the construction of the tables.

The GRIT procedure was developed by Associate Professor Guy West and Professor Rod Jensen of the University of Queensland and is the most widely used method of constructing input-output tables in Australia. The GRIT method is also widely used in America and Europe. The system is “variable interference” in that the analyst is able to determine the extent to which they interfere with the mechanical processes by introducing primary or other superior data. The GRIT system is designed to produce regional tables that are: consistent in accounting terms with each other and with the national table; capable of calculations to a reasonable degree of holistic accuracy; and capable of being updated with minimum effort as new data becomes available.

The national input-output table constructed by the ABS does not provide a satisfactory representation of the higher education sector. To account for this deficiency, information from the following sources was used to modify the tables:

- Employment figures were provided by the ABS from the 2001 Census of Population and Housing. The employment figures were classified according to the Australian and New Zealand Standard Industry Classification.
- A range of figures were sourced from the ABS State Accounts (Cat. 5220.0) and Australian System of National Accounts (Cat. 5204.0) for 2002-03, including household final consumption, government final consumption, private gross fixed capital formation, public corporations gross fixed capital formation, general government gross fixed capital formation, exports of goods and imports of goods.
- Estimates of CSU expenditure, revenues and employment provided by CSU.
- Estimates of the number of local, non-local and international students provided by CSU.

- Student expenditure, estimated from the ABS Household Expenditure Survey (Cat. 6535.0) and some information provided by CSU.

The final step in the construction of the input-output tables was to balance the table using the RAS technique.[7] The RAS technique is a bi-proportional iterative adjustment method that modifies the base input-output matrix to fit the new sector. The rows and columns of the new sector was simply 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. After the tables were balanced, their consistency was checked to identify any large discrepancies or obvious anomalies.

A.4 Assumptions of the Input-Output Model

The use of an input-output table in economic impact analysis requires a number of explicit assumptions. The specific assumptions are as follows:

- The inputs purchased by each sector are a function of the output of that sector. The input function is generally assumed linear and homogeneous of degree one, which implies constant returns to scale and no substitution between inputs. The technology is also assumed constant.

- Each commodity (or group of commodities) is supplied by a single industry or sector of production. This implies that there is only one method used to produce each commodity and that each sector has only a single primary output. In other words, there are no joint products.

- The total effect of several types of production is the sum of the separate effects. This rules out external economies and diseconomies and is known simply as the additivity assumption.

- The system is in equilibrium at given prices.

- In the static input-output model, there are no capacity constraints so that the supply of each good is perfectly elastic. Each industry can supply whatever quantity is demanded of it and there are no capital restrictions.

In terms of applied input – output analysis, the focus of these assumptions comes down primarily to the linearity property. The assumption of a linear relationship between the input

coefficients and output unrealistically implies that supply is infinitely elastic. This limitation generally leads to an overestimation of the multiplier effects generated by any initial change in expenditure. The overestimation of impacts can occur in the short run, when a firm has excess capacity and in the long run if a firm is experiencing increasing returns to scale. In both cases an increase in output can occur that is less than proportional to the necessary increase in inputs, and the linear coefficients assumption is violated.

Transfer and expenditure switching is the second major problem that arises when using input-output tables, as economic impacts tend to be overstated. The Bureau of Industry Economics (1984: page 3) argues that expenditure transfers occur when expenditure on a particular good or service is transferred from one location to another.[8] Expenditure switching, on the other hand, is when expenditure is switched from one good or service to another. When such transfers of expenditure occur within the region under investigation then the economic impact can be overstated to the extent of that transfer.

Caution is advisable in the use of the estimates of the flow-on effects due to the issue of expenditure switching. Given expenditure transfers do occur between substitute products and the fact that a large number of students are non-local and may shop out of the region being examined, it is debatable whether or not it is appropriate to attribute the economic benefits of student expenditure to Charles Sturt University. Thus, while the economic benefits of student expenditure have been estimated in this study, the decision whether or not to use these estimates depends on the problem at hand.

A.5 The Marginal Coefficients Model

As discussed above one of the main limitations of input-output tables is the assumption of linear coefficients. To address this problem this study uses the marginal coefficients model. The marginal income coefficients model attempts to overcome the limitations of traditional input-output analysis by removing the assumption of linear coefficients for the household sector. As is well documented in the literature, the household sector is the dominant component of multiplier effects in an input-output table, so using marginal income coefficients for the household sector only provides a more accurate estimate of the multiplier effects and provides results closer to those of a computable general equilibrium (CGE) model. Following West and Gamage (1997) the linear coefficients assumption between other intermediate sectors of the input-output table has been maintained, but the relationships between the primary factors are non-linear.

[7] The RAS technique is explained in Appendix A of the ABS *Input-Output Tables 1996-97* publication (Cat. 5209.0).

The marginal coefficients model therefore provides a non-linear relationship between household income and household consumption. This is done by using a generalised least squares regression to estimate a logarithmic equation for household income elasticities. This marginal coefficients model then replaces the average income coefficients of households with marginal coefficients estimated from time series data at the sectoral level. Information for the state of Queensland was used for estimating the marginal coefficients used in this study, as specific data for New South Wales is not available. In other words, the Queensland estimates were used as a proxy for each of the regions in this study. This should still result in a more accurate estimate of the economic impact of the pork industry than would be possible with traditional input-output analysis.

It should be noted that the marginal coefficients model effectively discounts the initial effect of an impacting agent (i.e. increased export demand) according to the household income elasticity of the relevant sector. This also causes a reduction in the flow-on effects of the impacting agent and the total economic impact of that agent. Therefore, the estimated multipliers for the marginal coefficients model would typically be higher than those for a traditional input-output model, even though the total economic impact in value terms (and jobs) is lower in the marginal coefficients model. Extreme care is therefore required when using multipliers derived from a marginal coefficients model, as it is less valid to separate its results into initial and flow-on effects.

To address this issue the multipliers in this report are calculated on the basis of the total economic impact estimated using the marginal coefficients model divided by the initial impact that would have applied to a traditional input-output model. This procedure allows the estimation of multipliers using the marginal coefficients model that are comparable to those of a traditional input-output model. Multipliers estimated using this method should be lower than traditional multipliers. However, these multipliers give a more accurate estimate of the economic impact of a change in final demand.

[8] Bureau of Industry Economics (1984). *Tourist Expenditure in Australia*. Research Report 16, AGPS.

A.6 The Input-Output Tables

The input-output tables used in this study contain 28 sectors, primarily based on the Australian and New Zealand Standard Industry Classification (ANZSIC 1993 Edition), as shown in Table A. A specific sector was included in the input-output table representing the higher education sector.

Table A Sector classification

APL Industry Sector	ANZSIC Classification
Agriculture	Division A
Coal, oil & gas mining	Sub-Divisions 11 and 12
Other mining	Division B (ex. Sub-Divisions 11 and 12)
Food & beverages manufacturing	Sub-Division 21
Textiles, clothing & footwear manufacturing	Sub-Division 22
Wood and paper manufacturing	Sub-Division 23
Printing and publishing	Sub-Division 24
Chemical	Sub-Division 25
Machinery and equipment manufacturing	Sub-Division 28
Metal product manufacturing	Sub-Division 27
Non-metallic mineral product manufacturing	Sub-Division 26
Other manufacturing	Sub-Division 29
Utilities (i.e. electricity, gas and water supply)	Division D
Construction	Division E
Wholesale Trade	Division F
Retail and repairs	Division G
Accommodation, cafes and restaurants	Division H
Transport & storage	Division I
Communication services	Division J
Finance & insurance services	Division K
Ownership of dwellings	Based on National Input-Output Table
Business services (including property services)	Division L
Government administration and defence	Division M
Education services	Division N
Higher education	Class 8431
Health and community services	Division O
Recreational and cultural services	Division P
Personal and other services	Division Q

APPENDIX 2: IMPACT OF LOCAL STUDENT EXPENDITURE

Local students are defined as those enrolled at a university campus in the same region in which they live. All local students were assumed to live off campus, 50% of whom were assumed to live with their parents and so no utilities or accommodation costs were attributed to these students.

Table A.2.1 below summarises the economic impact of local student expenditure (including flow-on effects) in each of Charles Sturt University's four main regions. In total, this type of student expenditure generates almost $23 million in GRP, $11 million in household income and around 350 jobs.

Table A.2.1: Economic Impact of Local Student Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	10.09	4.92	152
Central West	5.76	2.95	90
Murray/Ovens Murray	4.62	2.27	72
North Western	2.22	1.08	33
Total	**22.69**	**11.22**	**347**

Table A.2.6 below shows the multipliers for local student expenditure in each of the four CSU regions.

Table A.2.6: Multipliers for Local Student Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	2.04	1.75	1.60
Central West	2.01	1.74	1.58
Murray/Ovens Murray	1.75	1.56	1.41
North Western	1.96	1.71	1.57

APPENDIX 3: MULTIPLIERS

The relationship between the direct and indirect contribution of Charles Sturt University can be expressed as a multiplier. A multiplier indicates the relative magnitude of the flow-on effects of CSU compared to the direct effect of the university (i.e. a multiplier of 1.5 indicates that for every $1 of direct impact there will be $0.50 in flow-on effects).

Tables 4.1, 4.2 and 4.3 show the *Type IIA* multipliers for CSU expenditure and non-local and international student expenditure. *Type IIA* multipliers are calculated as the ratio of the total economic impact of CSU (i.e. direct plus indirect effects) divided by the direct effects of the university. For example, the employment multiplier for the Murrumbidgee region indicates that for every person employed at CSU a total of 2.44 persons are employed by all industries in the Murrumbidgee economy. Note that these multipliers include the original increase of one person employed by the university.

Table A.3.1: Multipliers for CSU Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	2.16	1.54	2.44
Central West	2.07	1.53	2.42
Murray/Ovens Murray	1.67	1.35	1.89
North Western	2.50	2.00	3.64

Table A.3.2: Multipliers for Non-local Student Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	2.04	1.76	1.63
Central West	2.02	1.76	1.63
Murray/Ovens Murray	1.75	1.59	1.49
North Western	1.96	1.73	1.61

Table A.3.3: Multipliers for International Student Expenditure

Region	Value Added ($m)	Household Income ($m)	Employment (FTE)
Murrumbidgee	1.94	1.68	1.55
Central West	1.90	1.65	1.52
Murray/Ovens Murray	1.67	1.51	1.38

Note: there were no international students enrolled at the Dubbo campus in this year.

APPENDIX 4: DISTRIBUTION OF VALUE ADDED BY INDUSTRY

Table A.4.1: Total Value Added by Industry

Industry	Initial ($m)	Flow-on ($m)	Total ($m)
Agriculture	0.00	4.09	4.09
Mining			
Coal & Oil Mining	0.00	0.46	0.46
Other Mining	0.00	0.05	0.05
Manufacturing			
Food	0.00	4.55	4.55
Textiles	0.00	0.29	0.29
Wood	0.00	0.57	0.57
Printing	0.00	0.70	0.70
Chemicals	0.00	0.58	0.58
Non-Metals	0.00	0.58	0.58
Metals	0.00	0.61	0.61
Machinery	0.00	1.59	1.59
Other Manufacturing	0.00	0.75	0.75
Utilities	1.82	6.73	8.55
Construction	0.00	4.26	4.26
Wholesale	0.00	8.22	8.22
Retail	1.86	13.43	15.29
Hospitality	5.32	5.83	11.15
Transport	0.06	3.78	3.84
Communication	1.54	4.29	5.83
Finance	0.00	6.96	6.96
Dwellings	0.00	29.14	29.14
Business	6.09	11.98	18.07
Government	0.00	1.22	1.22
Education	0.00	2.72	2.72
Higher Education	108.19	0.04	108.23
Health	2.20	4.49	6.69
Recreation	1.67	3.64	5.31
Personal	0.53	13.49	14.02
Total	**129.27**	**135.04**	**264.31**

Table A.4.2: Value Added by Industry at the Wagga Wagga Campus

Industry	Initial ($m)	Flow-on ($m)	Total ($m)
Agriculture	0.00	2.85	2.85
Mining			
Coal & Oil Mining	0.00	0.02	0.02
Other Mining	0.00	0.02	0.02
Manufacturing			
Food	0.00	2.78	2.78
Textiles	0.00	0.16	0.16
Wood	0.00	0.33	0.33
Printing	0.00	0.33	0.33
Chemicals	0.00	0.29	0.29
Non-Metals	0.00	0.28	0.28
Metals	0.00	0.29	0.29
Machinery	0.00	0.69	0.69
Other Manufacturing	0.00	0.39	0.39
Utilities	0.58	3.39	3.98
Construction	0.00	2.29	2.29
Wholesale	0.00	4.56	4.56
Retail	0.75	7.33	8.08
Hospitality	2.08	2.99	5.08
Transport	0.02	1.99	2.01
Communication	0.65	2.11	2.76
Finance	0.00	3.45	3.45
Dwellings	0.00	15.04	15.04
Business	1.99	5.87	7.86
Government	0.00	0.58	0.58
Education	0.00	1.34	1.34
Higher Education	53.49	0.02	53.52
Health	0.87	2.18	3.05
Recreation	0.67	1.79	2.46
Personal	0.21	6.93	7.14
Total	**61.33**	**70.30**	**131.62**

Table A.4.3: Value Added by Industry at the Bathurst Campus

Industry	Initial ($m)	Flow-on ($m)	Total ($m)
Agriculture	0.00	0.83	0.83
Mining			
Coal & Oil Mining	0.00	0.41	0.41
Other Mining	0.00	0.02	0.02
Manufacturing			
Food	0.00	1.44	1.44
Textiles	0.00	0.09	0.09
Wood	0.00	0.19	0.19
Printing	0.00	0.23	0.23
Chemicals	0.00	0.19	0.19
Non-Metals	0.00	0.24	0.24
Metals	0.00	0.24	0.24
Machinery	0.00	0.66	0.66
Other Manufacturing	0.00	0.26	0.26
Utilities	0.86	2.69	3.55
Construction	0.00	1.37	1.37
Wholesale	0.00	2.60	2.60
Retail	0.83	4.63	5.46
Hospitality	2.47	2.17	4.65
Transport	0.03	1.22	1.25
Communication	0.66	1.58	2.24
Finance	0.00	2.55	2.55
Dwellings	0.00	10.85	10.85
Business	2.77	4.62	7.40
Government	0.00	0.44	0.44
Education	0.00	1.04	1.04
Higher Education	36.23	0.02	36.24
Health	0.98	1.79	2.77
Recreation	0.76	1.30	2.05
Personal	0.24	4.73	4.97
Total	**45.83**	**48.40**	**94.24**

Table A.4.4: Value Added by Industry at the Albury Campus

Industry	Initial ($m)	Flow-on ($m)	Total ($m)
Agriculture	0.00	0.36	0.36
Mining			
Coal & Oil Mining	0.00	0.02	0.02
Other Mining	0.00	0.01	0.01
Manufacturing			
Food	0.00	0.29	0.29
Textiles	0.00	0.04	0.04
Wood	0.00	0.04	0.04
Printing	0.00	0.12	0.12
Chemicals	0.00	0.09	0.09
Non-Metals	0.00	0.04	0.04
Metals	0.00	0.06	0.06
Machinery	0.00	0.22	0.22
Other Manufacturing	0.00	0.07	0.07
Utilities	0.34	0.54	0.89
Construction	0.00	0.51	0.51
Wholesale	0.00	0.89	0.89
Retail	0.25	1.26	1.50
Hospitality	0.68	0.54	1.23
Transport	0.01	0.41	0.42
Communication	0.21	0.50	0.71
Finance	0.00	0.85	0.85
Dwellings	0.00	2.83	2.83
Business	1.24	1.27	2.52
Government	0.00	0.17	0.17
Education	0.00	0.29	0.29
Higher Education	17.01	0.00	17.02
Health	0.31	0.45	0.77
Recreation	0.22	0.47	0.69
Personal	0.07	1.52	1.59
Total	**20.36**	**13.88**	**34.24**

Table A.4.5: Value Added by Industry at the Dubbo Campus

Industry	Initial ($m)	Flow-on ($m)	Total ($m)
Agriculture	0.00	0.05	0.05
Mining			
Coal & Oil Mining	0.00	0.02	0.02
Other Mining	0.00	0.00	0.00
Manufacturing			
Food	0.00	0.05	0.05
Textiles	0.00	0.01	0.01
Wood	0.00	0.01	0.01
Printing	0.00	0.02	0.02
Chemicals	0.00	0.01	0.01
Non-Metals	0.00	0.01	0.01
Metals	0.00	0.01	0.01
Machinery	0.00	0.02	0.02
Other Manufacturing	0.00	0.02	0.02
Utilities	0.03	0.10	0.13
Construction	0.00	0.09	0.09
Wholesale	0.00	0.16	0.16
Retail	0.03	0.22	0.24
Hospitality	0.08	0.12	0.20
Transport	0.00	0.16	0.16
Communication	0.02	0.10	0.12
Finance	0.00	0.10	0.10
Dwellings	0.00	0.42	0.42
Business	0.08	0.22	0.31
Government	0.00	0.02	0.02
Education	0.00	0.05	0.05
Higher Education	1.45	0.00	1.45
Health	0.03	0.07	0.10
Recreation	0.02	0.08	0.11
Personal	0.01	0.32	0.33
Total	**1.75**	**2.46**	**4.21**

THE WESTERN RESEARCH INSTITUTE

The WRI is a non-profit economic, business and social research organisation located on the Bathurst campus of Charles Sturt University. The WRI holds a wealth of knowledge on employment, business development and investment issues affecting regional Australia. It has worked with Commonwealth, State and Local Governments and industry groups on numerous investment and development programs in regional areas. The WRI has strong credentials in business and commercial market consulting and applied economic modelling including input-output analysis, shift-share, agribusiness and regional socio-economic surveys and analysis.

The Research Team

Tom Murphy - Chief Executive Officer *BEc. (Hons I) MSc. (Econ) Lancaster*

Tom Murphy holds the degrees of Bachelor of Economics from the University of New England and Master of Science (Economics) from the University of Lancaster. He is currently Chief Executive Officer of the WRI. Mr Murphy has previously held academic positions as senior lecturer in Economics and Director of the Regional Economics Research Unit in the Faculty of Commerce, Charles Sturt University, Bathurst and positions at the University of New England and Macquarie University. He has also held the positions of Economic Analyst with the Office of National Assessments in Canberra, with responsibility for the ASEAN economies and Senior Consultant with KPMG Peat Marwick Management Consultants.

Luciana Mazzotti - Senior Research Officer BBus (Marketing) CSU

Luciana has a background in marketing and adds a new dimension to the WRI team. With her strong analytical capabilities and economic modelling skills, Luciana manages a range of WRI projects. Her excellent written communication skills are demonstrated by the clear and simple language that characterises WRI research reports. Luciana has experience in the retail, hospitality and advertising industries and brings a diverse range of skills to the WRI.