



**Estimates of the Economic Impact of
Palmerston North Tertiary Education Institutions**

**for
Vision Manawatu**

Prepared by Infometrics Ltd

August 2007



1. PALMERSTON NORTH TERTIARY EDUCATION INSTITUTIONS

Palmerston North is served by three major tertiary education institutions: Massey University, the Universal College of Learning, and Te Wānanga O Aotearoa. In 2006 there were 16,876 effective full time students (EFTS) enrolled at these institutions. In addition there are seven private training enterprises (PTEs)¹ operating in the Manawatu that trained a further 2,082 EFTS in 2006. These PTEs will also make an important contribution to the Palmerston North economy but have not been included in the present study.

Each of Palmerston North's three main tertiary education institutions is part of a larger operation operating in many other parts of New Zealand. For two, Massey University and the Universal College of Learning, Palmerston North was the starting point of their activities and remains their national headquarters. Palmerston North still remains where the majority of activity is centred for these two institutions with between 50 and 60% of students enrolled at Palmerston North campuses and around 70% of staff working in Palmerston North. As we note below, the headquarter nature of Palmerston North operations for Massey University and the Universal College of Learning means that much of their national operations are administered out of Palmerston North, hence the higher proportion of staff than students in Palmerston North. One implication of this is that revenue attributable to Palmerston North operations for these two institutions is considerably lower than their expenditure. Normally one would calculate the economic impact based on revenue streams accruing to activities in the area, but in this circumstance it seems more sensible to base our calculations around expenditure levels. Although much of the revenue relating to administrative activities is earned outside Palmerston North, the administrative staff work, live and spend predominantly in the Palmerston North economy.

The Palmerston North activities of Te Wānanga O Aotearoa are a much smaller proportion of their national activities (less than 10%) than for the other two institutions. However Te Wānanga O Aotearoa has been a source of tertiary education growth in Palmerston North. They had over 2,000 students studying in Palmerston North in 2006, despite only beginning activities in the area in 2000. A key feature of the operations of Te Wānanga O Aotearoa is their focus on New Zealand students and their lack of any full-fee-paying students – all their students qualify for a fee subsidy from the Tertiary Education Commission.

¹ ETC Learning Centre, International Pacific College NZ, Kyrewood Equestrian Centre, Manawatu Education Academy (PN) Ltd, Mara Marketing Ltd, NZ Inst of Electrolysis & Beauty Therapy, and Palmerston North School of Design.



Table 1: Student and staff numbers in 2006

	Massey University	Universal College of Learning	Te Wānanga o Aotearoa ¹
<i>Palmerston North operations</i>			
Student numbers (EFTS)			
TEC funded	10,915	2,144	2,033
International	1,045	191	0
Other	414	134	0
Total	12,374	2,469	2,033
Staff numbers (FTE)			
Academic	771	154	57
Other	1,480	191	15
Total	2,251	345	72
<i>National operations</i>			
Student numbers (EFTS)			
TEC funded	16,412	4,160	27,011
International	3,412	267	0
Other	651	289	0
Total	20,475	4,716	27,011
Staff numbers (FTE)			
Academic	1,260	258	647
Other	1,897	259	704
Total	3,157	517	1,351

Source: Tertiary Education Commission and individual institutions

1. National data for Te Wānanga o Aotearoa relate to 2005



2. ECONOMIC IMPACT

After declining by 3% in 2005, the contribution of the tertiary education sector to Palmerston North's value added is estimated to have expanded by 1% in 2006. We estimate that the tertiary education sector contributed \$491m (including GST) to Palmerston North's value added in 2006. The contribution to value added in 2006 was 31% above the \$376m contribution estimate for the sector five years earlier in 2001.

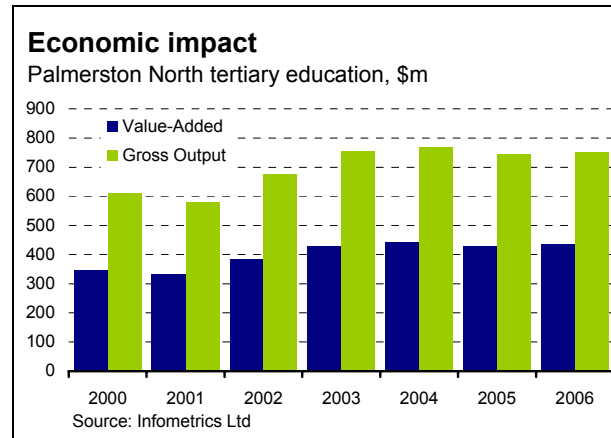


Figure 1

In 2006, the three main tertiary education institutions in Palmerston North² earned \$254m (excluding GST) in revenue from: student fees (\$66m), TEC funding (\$127m) and other revenue sources such as research (\$61m). The expenses of these tertiary education institutions are typically considerably more than their revenue. In 2006, \$307m was spent on: staff (\$159m), depreciation (\$30m), and other expenses (\$117m) by the three tertiary education institutions in Palmerston North.

This higher spend reflects that Palmerston North is the base of operations in other parts of the country for both Massey University and Universal College of Learning. This means that much of their national administrative functions and costs are undertaken in Palmerston North. Nationally both of these institutions are normally profitable operations (although both ran small losses in 2006, at \$1.52m and 0.137m respectively), much of the revenue associated with administrative activities in Palmerston North is earned outside Palmerston North. To ensure a more complete coverage of the impact of tertiary education on the Palmerston North economy, our calculations of economic impact are based on expenditure rather than revenue.

The 16,876 effective full time students (EFTS) are estimated to have spent on average \$10,400 each during their time in Palmerston North in 2006.³ Excluding imports and GST this implies a total spend by tertiary

² Massey University, the Universal College of Learning, and Te Wānanga O Aotearoa

³ The average spend is lowered by the estimated 3,240 extramural students studying at Massey University, who are assumed on average to spend just two



students of \$152m in 2006. The downstream impact of spending in Palmerston North that results from tertiary education institutions (living expenses of students and staff, production expenses of the institutions, and the spending of recipients of this money) is estimated to have induced \$750m of financial transactions (or Gross Output) in 2006.

However, there is potential for considerable double counting when adding up each of these transactions: recipients of any direct spending will need to cover their expenses. Thus the net gain in income is considerably lower than the gross increase in revenue or spending. There is also considerable scope for money to leak out of the local economy. For example, a large proportion of the money spent on a new car will go towards the overseas manufacture and delivery of the car to New Zealand. Netting out these intermediate costs and payments to people outside the city provides a truer measure of the tertiary education sector's contribution to Palmerston North's economy. Thus compared to a gross output estimate of \$750m, the tertiary education sector is estimated to have contributed \$491m (including GST) to the city's value added in 2006.

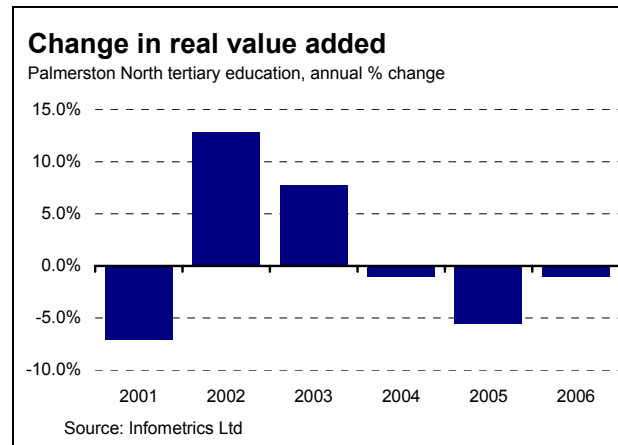


Figure 2

These estimates of economic contribution are not adjusted for changes in prices over time. Thus, to the extent that prices generally increase over time, these estimates tend to overstate the growth in contribution to economic activity. In particular, accounting for inflation implies that the contribution of the tertiary education sector has been declining in recent years, by 1.1% in 2004, 5.5% in 2005 and 1.0% in 2006.

Despite these declines, the tertiary education sector remains a very important component of the Palmerston North economy. The presence of the three tertiary education institutions directly and indirectly contributed 16.4% of the economic activity in the city in 2006 (see Figure 3). To provide a point of comparison, a similar study to the present one found that tertiary education provided a 4.0% contribution to the Wellington Region's economy in 2005.

weeks of the year in Palmerston North, as distinct from the 36 plus weeks of other students.

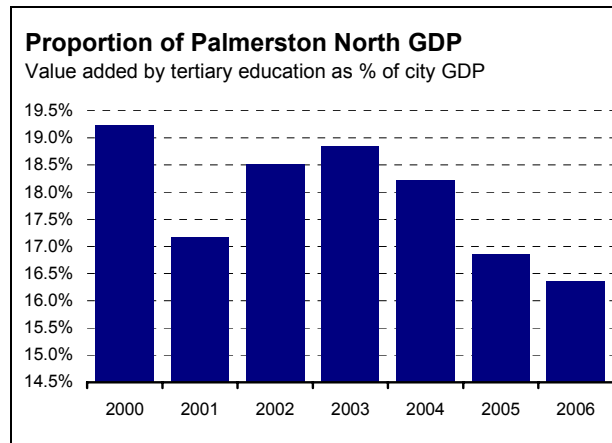


Figure 3



Table 2: Economic impact calculations, tertiary education in Palmerston North

		2000	2001	2002	2003	2004	2005	2006
Number of Students	No. (EFTS)	19,058	16,622	19,355	21,752	20,033	18,061	16,876
Number of Staff	No. (FTEs)	2,241	1,854	2,141	2,456	2,468	2,432	2,669
<u>Estimates of direct contribution (excl GST)</u>								
Institution revenue	\$m	193	206	240	263	264	247	254
Institution expense	\$m	225	227	259	282	301	299	307
Living Costs (excl. imports)	\$m	158	133	162	188	174	159	152
Total spending	\$m	383	360	421	470	475	457	459
Value-Added / gross output	\$/	0.59	0.60	0.60	0.59	0.60	0.61	0.61
Value-Added	\$m	226	216	251	279	286	277	280
<u>Multipliers - Type I</u>								
Gross Output		1.25	1.25	1.25	1.25	1.25	1.26	1.26
Value-Added		1.21	1.21	1.22	1.22	1.22	1.22	1.22
<u>Multipliers - Type II</u>								
Gross Output		1.60	1.61	1.61	1.60	1.62	1.63	1.63
Value-Added		1.53	1.54	1.54	1.54	1.54	1.55	1.55
<u>Activity by Type I Multipliers</u>								
Gross Output	\$m	477	450	526	587	596	575	578
Value-Added	\$m	273	261	305	340	350	339	343
<u>Activity by Type II Multipliers</u>								
Gross Output	\$m	611	580	676	754	769	743	750
Value-Added	\$m	345	331	385	428	441	428	434
GST	\$m	48	45	53	59	59	57	57
Value-Added + GST	\$m	393	376	438	487	500	486	491



3. INSTITUTION REVENUE AND EXPENSES

Revenue earned by Palmerston North education institutions increased by 3% from \$247m in 2005 to \$254m in 2006. This growth in revenue came about principally from increases in non-student revenue activities, such as research, at Massey University and Universal College of Learning.

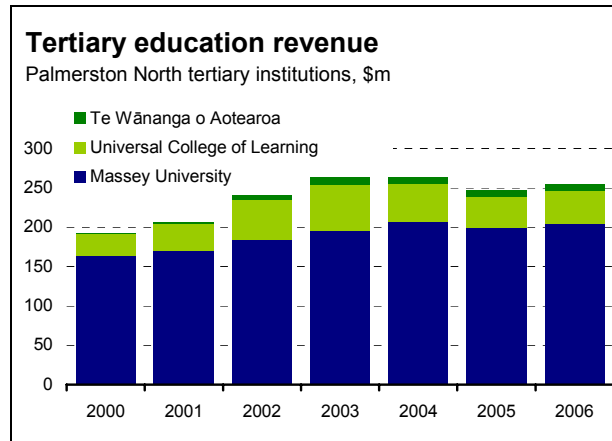


Figure 4

Expenditure increases were proportional to the revenue growth, increasing by 3% from \$299m in 2005 to \$307m in 2006. The largest contribution to this increase appeared to come from increases in non-academic staff at Massey University.

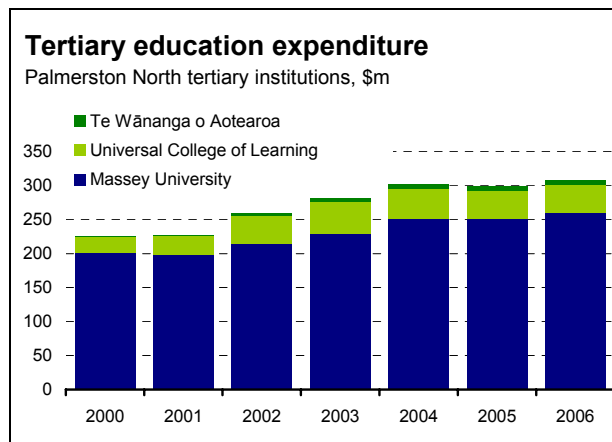


Figure 5



4. STUDENT NUMBERS

Student numbers are a key factor underpinning the economic contribution of the tertiary education sector. Effective full time student (EFTS) numbers at Palmerston North's tertiary education institutions increased from 16,620 in 2001 to 21,750 in 2003. This expansion of enrolments was broad based across the three institutions, however the expansion of enrolments in Palmerston North at Te Wānanga O Aotearoa has been quite spectacular, increasing from nothing prior to 2000 to over 2,000 in 2006. There has been a steady decline in enrolment numbers in Palmerston North's tertiary education institutions since 2003. By 2006 EFTS were back under 17,000, at 16,876.

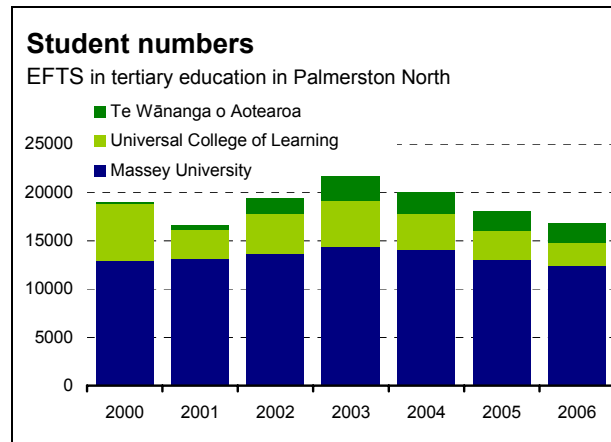


Figure 6

International students

International student numbers have also been declining in recent years from a peak of almost 2,000 EFTS in 2004 to 1,236 in 2006. International tertiary students are predominantly a Massey University phenomenon in Palmerston North, with 1,045 of the 1,236 foreign EFTS in Palmerston North attending Massey University (see Figure 7).

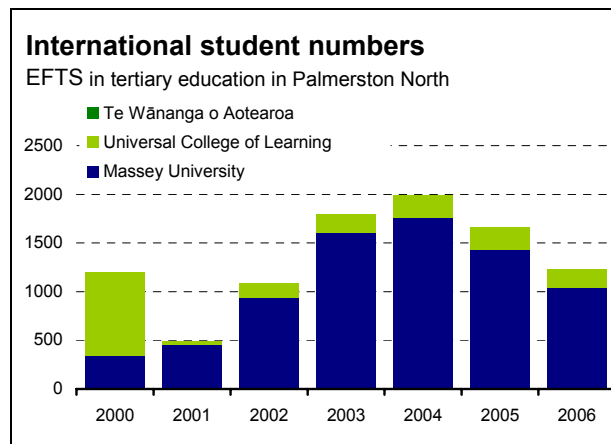


Figure 7



TEC funding

The majority of Palmerston North students receive funding assistance from the Tertiary Education Commission (TEC). All Te Wānanga O Aotearoa and just under 90% of Massey University and Universal College of Learning students receive TEC funding. As a result more than 90% of Te Wānanga O Aotearoa revenue, and around 50% of Massey University and Universal College of Learning revenue, comes from government student fee grants.

Living costs

Estimates of student living costs are based on the 2004 Student Income and Expenditure Survey (NZUSA, December 2004), see Method section below. Based on these numbers, we estimate that the average full time New Zealand student spent \$12,400 in Palmerston North during the 2006 academic year. Foreign students are estimated to have spent slightly more, \$14,200, primarily from an assumption that they spend longer in the city over the year (40 weeks compared with 36 weeks). Balanced against this is the estimated 3,240 extramural students at Massey University, who are assumed to have spent two weeks on average in Palmerston North in 2006. As a consequence, Massey University's extramural students are expected to have spent around \$900 in Palmerston North during 2006.

Multiplying up these estimates by the number of students under each category each year, and accounting for price changes for different spending items using sub-components of the CPI, generates the living cost estimates presented in Table 2. The average living costs represent the weighted average of spending by the different types of students. As a result the extramural students bring down the average spend in the city compared with full-time residential students.



Table 3: Student living costs in Palmerston North

		2000	2001	2002	2003	2004	2005	2006
Number of Students	No. (EFTS)	19,058	16,622	19,355	21,752	20,033	18,061	16,876
Average living cost	\$/student	9,600	9,200	9,600	10,000	10,000	10,100	10,400
Imports	\$/student	575	555	564	567	551	560	574
GST	\$/student	718	693	721	743	742	751	773
Net	\$/student	8,305	7,999	8,352	8,658	8,688	8,790	9,013
Living cost	\$m	183	153	186	218	200	182	176
Imports	\$m	11	9	11	12	11	10	10
GST	\$m	14	12	14	16	15	14	13
Net	\$m	158	133	162	188	174	159	152



5. STAFF NUMBERS

Staff numbers at tertiary education institutions in Palmerston North increased from 2,430 in 2005 to 2,669 in 2006. The main contribution to this increase in staff numbers was due to a 250 increase in non-academic staff numbers at Massey University's Palmerston North campuses. Prior to this, staff numbers in Palmerston North's tertiary education institutions had been stable at just under 2,500 for three consecutive years (see Figure 8).

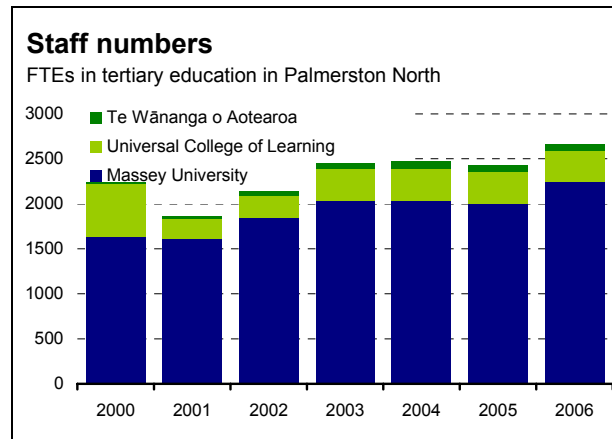


Figure 8

In contrast to total staff numbers, we estimate that academic staff numbers in Palmerston North tertiary education institutions have declined by around 50 full time equivalents since 2004. As a result, despite falling enrolment numbers (or perhaps because of them) Palmerston North's tertiary education institutions have striven for and achieved continued improvements in teaching efficiency. The number of effective full time students per full time equivalent staff members has declined from 21 in 2003 to 17 in 2006. As a point of comparison, the national trend has been for a decline in this ratio from 19 to 17 over the same period.

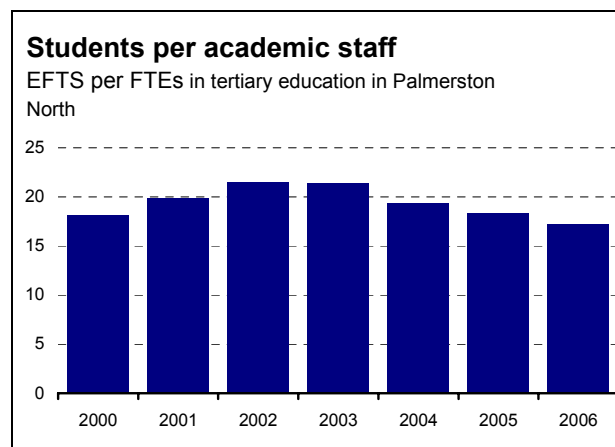


Figure 9



6. METHOD

Data sources

Data on student numbers, staff numbers, revenue and expenditure in Palmerston North Tertiary Education Institutions is sourced from a variety of sources including:

- the Statements of Financial Performance for Tertiary Education Institutions produced by the Tertiary Advisory Monitoring Unit of the Tertiary Education Commission (<http://www.tec.govt.nz/templates/standard.aspx?id=1216>),
- tertiary education statistics from the Education counts website (<http://educationcounts.edcentre.govt.nz/statistics/tertiary/index.html>)
- information provided directly from the individual tertiary education institutions (including their websites): Massey University (<http://www.massey.ac.nz/>), the Universal College of Learning (<http://www.ucol.ac.nz/main.asp>) and Te Wānanga O Aotearoa (<http://www.twoa.ac.nz/>)

Information on student spending patterns was sourced from the 2004 Student Income and Expenditure Survey (NZUSA, December 2004, <http://www.nzusa.org.nz/index.php?page=livingallowances>). Base multiplier estimates, from which education specific multipliers for Palmerston North are calculated, are sourced from Butcher Partners.

Key assumptions

Economic impact analysis often relies on a number of judgements and assumptions. The key assumptions made in the current analysis include:

- The NZUSA 2004 student income and expenditure survey updated their 2001 survey. Calculations in this report assume that there was a smooth annual transition in spending patterns between 2001 and 2004, and that spending patterns did not change before or after this period. While these assumptions are unrealistic, we have no additional information to provide a materially better estimate and, in practice, the evidence we do have suggests that changes in student spending patterns appear to be quite minor, especially in comparison to the impact of changing student numbers.
- To calculate the annual spend of students in Palmerston North, we assume that international students spend on average 40 weeks in the city, New Zealand students 36 weeks and extramural students assumed to spend just 2 weeks a year in the city.
- Not all data was necessarily available for just Palmerston North, as all three of the institutions have operations in other centres. In these situations estimates for Palmerston North were made based on national data and relativities between Palmerston North and national figures in other years.

**Table 4****Estimated average weekly living expenses by region in 2004**

Expenses (\$)	Auckland	Hamilton	Palmerston North	Wellington	Christchurch	Dunedin
Accommodation	149	112	85	112	106	99
Local transport	38	25	25	34	33	19
Food	70	59	59	69	57	50
Entertainment	42	28	22	38	32	32
General bills	46	48	25	51	26	24
Living expenses	54	39	36	39	33	28
Personal items	17	16	17	22	13	14
Miscellaneous	70	22	16	38	25	20
Childcare costs	74	45	45	67	37	62

*Source: TNS Income and Expenditure Survey, 2004***Table 5****Annual living expenses for full-time students**

Expenses (\$)	Average
Text books and course costs (not fees)	521
Clothes	457
Travel outside town	694
Music (CDs, etc), books	185
Medical/dental/optical	350
Computer/stereo/appliances	1,020
Purchase of consumer items over \$50 (not cars/bikes)	694
Purchase of cars/bikes	3,095
Other major expenses	802

Source: TNS Income and Expenditure Survey, 2004

Calculations

The study follows the standard approach of using multiplier estimates to calculate the induced impact of the sector on economic activity in the whole of the study area (Palmerston North). Multipliers are estimated from inter-industry studies and account for the flow of money between industries and between sectors (households, business, government) in the production process. Effectively these estimates are a shorthand way of accounting for the fact that the spending by one person is the revenue of another and that producers need to reimburse their workers and the providers of goods and services used in the production process.

The extent that an activity will stimulate further activity within the city will differ from activity to activity depending on the input structure of production processes and the spending patterns of people and institutions that receive income as a result of the transactions. Multipliers are therefore estimated for each source of activity. For example an activity that uses a higher proportion of labour will tend to induce a higher amount of subsequent spending as employees spend their wages. Alternatively an activity which uses a high proportion of imported inputs will have a lower flow-on impact onto local economic activity.



Multipliers also differ depending on the factor of interest. Typically there will be different multipliers to estimate the impact on value added (contribution to GDP) and for gross output (the value of financial transactions). Many economic impact studies mistakenly focus on gross output impacts, which have little economic significance, but tend to be higher figures and so potentially appeal to the uninformed (or the less scrupulous). The problem with gross output measures is that it does not net out the costs of production for each transaction. It therefore can count the value of a product service several times and so provide an inflated measure of actual activity.

For example, part of the price of a sandwich covers the cost of the bread and the sandwich ingredients, which have to be subtracted from the price if one wants to calculate the value added by the sandwich maker. If we add up all the financial transactions that took place in the production of the sandwich we would come up with a figure well in excess of the price paid by the person who actually buys and eats the sandwich. However, the purchase of the sandwich has produced more economic activity than implied by just the final transaction: it has also contributed to the income of farmers, bakers, packagers, transportation providers and so on. Also, by generating income for these other groups, the economic activity of interest will also induce further activity resulting from spending by these other groups.

Thus what we are trying to do when measuring the economic impact of an activity is:

- Calculate the value of the upstream activities that are associated with producing inputs for the activity of interest;
- Calculate the induced stimulation to economic demand from the employment and spending consequences of all the activities associated with producing the product of interest;
- Remove multiple counts of the same activity (eg counting the value of the wheat in a sandwich just once means removing its implicit value in the flour supplied by the miller, in the bread supplied by the baker, and in the sandwich supplied at the lunch bar).

In practice, we use type I multipliers to calculate the first effect and type II multipliers to produce a combined calculation of the first two effects. To remove double counting we need to calculate the value added by the seller in the transaction of interest and then apply value added multipliers, rather than output multipliers, to this value. Thus the economic impact of an activity is calculated as:

$$EI = GO_i \cdot \frac{VA_i}{GO_i} \cdot mult_i^{VA,II}$$

To illustrate, using data presented in Table 2, the calculation of the economic impact of the Palmerston North's tertiary education sector in 2006 is based on a gross output estimate of \$459m, a value added to



gross out put ratio of 0.61 and a type II value added multiplier of 1.55. Thus⁴,

$$\text{Economic impact} = 459 \times 0.61 \times 1.55 = 434$$

The multipliers used in this study are based on Butcher Partners estimates of multipliers that apply for the Palmerston North in 2003/04. There are different multipliers for different activities, thus the actual multipliers used depend on the spread of activities being studied. In this study, accounting for student spending patterns complicates the analysis the most. Student spending patterns are derived using the NZUSA 2004 student income and expenditure survey. Student spend estimates required the following steps:

- Allocating spending based on NZUSA definitions into national accounting industries,
- Calculating and removing retail margins, GST and the import component to put student spending in a form consistent with the multiplier estimates,
- Rating up weekly spending patterns into annual figures,
- Weighting single item multipliers by relative spending to derive representative multipliers for total student spending.

Excel tables detailing all calculations and judgments are available on request.

⁴ Note repeating these calculations for other examples in Table 2 can produce slightly different results to those presented in Table 2. The reason for this difference is that the numbers presented in the Table have been rounded and this can lead to modest changes in the calculations compared with those in the spreadsheets that underpin the numbers in Table 2.