

Prepared for the  
New Zealand International Education Marketing Network

Funded by

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# **Economic Impact Analysis Of Foreign Fee-Paying Students**

(Full Report)

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**Infometrics Consulting**  
October 2000

**Education International Marketing Network**  
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# Economic Impact Analysis of Foreign Fee-Paying Students

## Executive Summary

### Methodology

1. The economic impact of foreign fee-paying students has three main components:
  - expenditure on tuition fees,
  - expenditure on living costs,
  - the flow-on effects of both areas of expenditure on the wider economy.
2. Building on previous estimates of tuition fees by the Education New Zealand Trust and the Ministry of Foreign Affairs and Trade, this study estimates expenditure on living costs and ascertains the flow-on effects on the rest of the economy. No new primary data sources have been developed; the analysis involved the comparison and reconciliation of a number of existing data sources.
3. The methodology used for this study is commonly accepted for economic impact analysis. It was reviewed by Trade New Zealand, Education New Zealand Trust, Tourism New Zealand, Statistics New Zealand, Ministry of Education, Ministry of Foreign Affairs and Trade and Treasury prior to undertaking the study.

### Economic Impacts

1. Tertiary students are estimated to spend an average of \$11,600 on living costs. For secondary students the figure is marginally higher at \$11,800, whilst English language students and those attending other private training establishments are estimated to spend an average \$5000. The latter have a much shorter length of stay.
2. The main categories of living cost expenditure are food and drink, and accommodation, which together account for over 50% of the total. Other major expenses are transportation, books, appliances, communications and financial services such as insurance.
3. Expenditure on tuition costs by all students combined is estimated at \$181m. Expenditure on living costs by all students combined is estimated to be worth \$255m, thereby giving a total expenditure of \$436m, and enhancing the direct tuition spend by approximately 140%. Thus the ratio of total spending to tuition costs is 2.4.

	Fees	Living Expenses	Ratio	Multiplier Effect	Total
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	82.9	86.9	1.05	44.9	214.7
Secondary	43.4	73.3	1.69	25.0	141.7
English Language & PTE	55.1	94.1	1.71	39.6	188.8
Total	181.4	254.3	1.40	109.5	545.2

4. The flow-on economic impact of expenditure by foreign fee-paying students covers the additional contributions to output and employment generated by student expenditure on all goods and services, including tuition costs. Flow-on effects are estimated to more than double the direct expenditure, generating a total gross spending effect of \$984m.

5. Subtracting the value of sales between industries yields the overall contribution of international education to the country's Gross Domestic Product. This is estimated at \$545m, corresponding to about 0.5% of total GDP. In comparison the Fishing industry accounts for 0.3%, Oil and Gas Exploration for 0.7% and Horticulture 0.9%.
6. Employment directly attributable to foreign student expenditure is about 4,500 full time equivalent positions. The economic flow-on effects raise this to over 10,000.
7. Excluded from the analysis is foreign exchange earned from visits by the families of overseas students and foreign exchange earned directly by New Zealand tertiary institutions providing educational services in other countries. This exclusion is because of a lack of data.

## Economic impact by region

The economic impacts for eight regions are summarised in the following table.

Region	Fees (\$m)	Living Expenses (\$m)	Ratio	Multiplier Effect (\$m)	Total Value- Added (\$m)*
Auckland	68.3	108.8	1.59	20.6	197.8
Canterbury	36.6	48.1	1.31	6.7	91.4
Otago	19.1	25.9	1.36	0.7	45.7
Wellington	16.8	21.0	1.25	1.1	38.9
Manawatu-Wanganui	15.2	18.1	1.19	-1.3	32.0
Waikato	12.9	18.3	1.42	-1.5	29.7
Hawke's Bay	2.5	4.3	1.72	-0.3	6.5
Bay of Plenty	2.1	4.3	2.05	-0.2	6.2
Total	173.5	248.8	1.43	25.9	448.2
National Total	181.4	254.3	1.40	98.5	534.2

Of the eight regions surveyed, the four which earn most from foreign fee-paying students are Auckland, which contributed \$197.8m to national GDP; Canterbury, \$91.4 million; Otago, \$45.7 million; and Wellington \$38.9 million.

Auckland students paid \$68.3 million in fees and \$108.8 million in living expenses. For every \$1 spent on fees another \$1.59 was spent in the community on general living expenses.

The national totals are larger than the sum of the regional figures for three reasons:

- Some regions such as Northland and Tasman are excluded, although they account for only about 5% of international students.
- Value-added at the regional level excludes GST. From a regional perspective GST revenue does not accrue to the region. Some may implicitly be returned via the provision of health, education, superannuation payments and so on, but it is beyond the resources of this project to determine whether each region is a net contributor to, or recipient of government spending in relation to GST revenue..

- Inter-regional trade is excluded. We can estimate the economic benefit that each region generates for itself from international students, but we cannot reliably estimate the effect of each region on every other region.

The multiplier effect combines the flow-on effects on gross output and the subsequent adjustment for the ratio of value-added to gross output. The flow-on spending generated in a given regional economy will always be positive, but the conversion from gross output (analogous to gross sales or turnover) into value-added will always be negative. Value-added corresponds to Gross Domestic Product, being sales less purchases from other industries in the region, and less goods and services imported from other regions. Essentially therefore, it comprises the income earned by labour and capital.

Hence the net multiplier effect may be positive or negative, although in general larger and more diversified regions will tend to have a positive multiplier effect as they tend to be more economically self-sufficient. However, whilst the net multiplier effect may be negative, the right hand column in the table is always positive. That is, every region obtains a positive contribution to its value-added or GDP from foreign fee-paying students.

# 1. Estimation of Living Cost Expenditure

Expenditure by students on living costs is estimated purely on the basis of currently available data. No new primary data sources have been developed. Our approach is to appraise whatever estimates currently exist by comparing them against each other and by comparing them with complementary information. The data sources used are given below, with the estimates of student expenditure summarised in Table 1 at the end of this section.

- *Student Income and Expenditure Survey*, undertaken by CM Research for the New Zealand University Students Association and the Aotearoa Polytechnic Students Union in 1998.
- *The Economic Impact of International Students in Dunedin*; a survey undertaken by Yiquan Lee for the Advanced Business Programme at Otago University in 1999.
- *Overseas Student Statistics 1998*, Australian Education International, 1999.
- International Visitors Survey undertaken for the New Zealand Tourism Board by CM Research.
- Ministry of Foreign Affairs' estimates of the appropriate value of Overseas Development Assistance scholarships.
- Household Economic Survey: specific analysis commissioned from Statistics New Zealand.

## 1.1 Estimates Derived from the NZUSA/APSU and Lee Surveys

The NZUSA/APSU study itemised university and polytechnic student expenditure into weekly and annual expenditure. Weighting the former by an estimated 39 weeks (to exclude holiday time) yields annual expenditure per full time tertiary student of \$11,550. (See Appendix A).

As the sample allows the identification of 97 foreign students it is possible to derive an expenditure figure for this group, although the sample size implies a wide error margin. Given a mean length of stay of 40.9 weeks,<sup>1</sup> implies annual expenditure of \$11,266.<sup>2</sup> CM Research note that for the full sample of 2242 the 95% confidence interval is 2.1%. Thus for a sample of 97, the analogous interval is approximately 10.1% or  $\pm$ \$1140.

Using Lee's data yields estimated expenditure of \$11,064 (excluding the purchase of financial assets - see Appendix B), although this applies only to foreign students studying in Dunedin.

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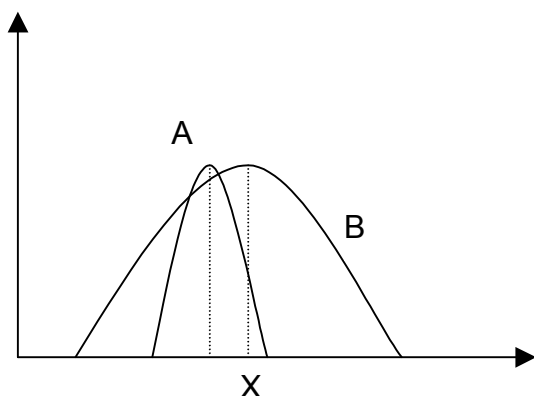
<sup>1</sup> This is calculated by using Lee's data on length of stay by foreign nationality, reweighted by the nationality mix over the whole of New Zealand, as given in *New Zealand Exports of Education Services*, Ministry of Foreign Affairs and Trade, May 2000, Table A4.

<sup>2</sup> We are grateful to CM Research for providing us with the summarised expenditure data for the 97 foreign students in the sample. Responsibility for subsequent calculation and inference is solely ours.

Some differences in expenditure are to be expected given the differences in survey format and actual differences in the costs of goods and services in Dunedin relative to those over the whole country. For example data from the Ministry of Housing reveals that market rentals in Dunedin are 20% lower than the national average.<sup>3</sup>

Assuming a similar variance in expenditure as in the NZUSA/APSU study implies a 95% confidence interval of around 3.7% or  $\pm\$410$ . Thus, statistically the surveys are not inconsistent, and in fact the 95% confidence interval is contained entirely within the 95% confidence interval of the NZUSA/APSU based estimate. The problem then is which estimate is likely to be better - the one calculated from the larger sample, but narrower focus (Dunedin only) of the Lee survey, or the one calculated from the smaller sample (in relation to foreign students), but nation-wide focus of the NZUSA/APSU survey?

Pictorially the problem may be represented as follows. Distribution A is more tightly centred around its mean, but is probably not centred on the true mean (X) - it is biased. Distribution B on the other hand, ought to be centred on the true mean, but any estimate drawn from it is subject to a wide error margin. It is possible that the estimate from distribution A (the Lee sample) is a better approximation of the true mean than an estimate drawn from distribution B (the NZUSA/APSU sub-sample).



Some additional evidence which might help in reconciling the two estimates is to note that for a sub-sample of Dunedin students, taken from the NZUSA/APSU survey, mean expenditure is  $\$10,355$ .<sup>4</sup> The sample size is 170 so the 95% confidence interval is about 7.6% or  $\pm\$790$ . Statistically this implies a significant difference between the expenditure of Dunedin students and that of students nation-wide. The ratio is about 90%. Whether the same ratio of expenditure also applies to foreign students is not known. The crucial point is that we cannot be certain that the Lee sample is biased. Domestic students who live in Dunedin may well spend less than those who live elsewhere, but this does not imply that the same is also true of foreign students. Taken at face value the difference between the NZUSA/APSU and Lee based estimates is only about 2% and, as noted above, well within the 95% confidence intervals.

If foreign students tend to come from the higher socio-economic groups (apart perhaps from ODA students) and receive assistance from foreign governments, one might expect their spending patterns to exhibit less variation over New Zealand campuses than the spending patterns of domestic students. However, there should probably be some allowance for the

<sup>3</sup> Ministry of Housing, Tenancy Bond Centre data for 1998.

<sup>4</sup> Again the summary data has been provided by CM Research at our request.

lower living costs in Dunedin. We will assume therefore that the Lee based estimate is biased downwards by 5%. If the true bias was 10%, the same as for all students, the implied per capita expenditure of foreign students nation-wide would be about \$12,300 which is right at the upper end of the 95% confidence interval for the NZUSA/APSU based estimate.<sup>5</sup> Thus this estimate seems likely to be too high.

Given an estimate of the bias it is then possible to calculate a weighted average of the variances in such a way that the weights lead to the most efficient estimator - in a statistical sense. It is easily shown that the weight on the NZUSA/APSU based estimate should be 11.64% and that the weight on the adjusted Lee based estimate should be 88.36%.<sup>6</sup> This yields a mean expenditure of \$11,602 and a 95% confidence interval of 3.6% or  $\pm$ \$400. This central estimate may still be biased, but the surrounding confidence interval has a high probability of containing the true value.

## 1.2 Other Information

To our knowledge there are no other sources of data which provide direct estimates of expenditure by foreign students in New Zealand. However, there is other information which can be used to support (or undermine) the above estimates.

Looking firstly at the Australian data, the similarity is quite striking. Over all tertiary students mean annual expenditure in 1998 was NZ\$11,499, converted from Australian dollars using a purchasing power parity exchange rate. Whilst one would be reluctant to simply assume that Australian data applies to New Zealand, the fact that the figure is close to the New Zealand estimate of \$11,602 derived above does reinforce the plausibility of a spending figure in this vicinity.

The estimates of expenditure by secondary school students show a larger difference between the two countries than those for tertiary students. However, the ratio of the adjusted tertiary estimate based on Lee to the original tertiary estimate based on Lee (i.e. 11602/11064), when applied to the Lee based estimate for secondary students (11265) yields an adjusted estimate for secondary students of \$11,800. This is within about 5% of the Australian estimate. It is interesting too that the Australian figures support the Lee result that secondary students spend more than tertiary students; a result which might not have been expected.

Only for English language students is there a big difference between the expenditure estimates. The estimate based on Lee's data is low in relation to expenditure for other types of students simply because of the much lower average length of stay (about 3 months) for English language students. In contrast, the Australian data shows a level of expenditure for this group which is much more on a par with that of other students.

Another estimate of expenditure by foreign students may be derived from data collected by the New Zealand Tourism Board from the International Visitors Survey. Whilst not explicitly identifying foreign fee paying students it does pick up visitors whose main reason for coming to New Zealand is either education or study. Visitors who have been in the country for more than one year are excluded. Using data on length of stay it is possible to filter out all those who stay less than 61 days, which probably does not leave too many visitors who are anything but foreign students.<sup>7</sup> By fitting a double logarithmic regression to expenditure per day

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<sup>5</sup>  $11064 \times (11550/10355) = 12341$ .

<sup>6</sup> These weights are the result of minimising the combined variance of the two estimates.

<sup>7</sup> The assistance of NZTB in this regard is acknowledged and appreciated.

against length of stay, it is possible to derive an estimate of spending by visitors who stay an average of 286 days (the mean for tertiary students) and 88 days (the mean for ESL students).

Whilst the error margins attached to these estimates are fairly wide, the results at \$10,380 and \$6,300 are broadly compatible with the other estimates. That the IVS based figure for tertiary students is lower than the other estimates is quite plausible given memory recall problems for spending over many months and the low numbers at the tail of the length-of-stay distribution. The 88 day group may include some people who are not fulltime students; people on combined holiday/education visits for example.

The Ministry of Foreign Affairs and Trade have recently recalculated the value of international scholarships to be paid under Overseas Development Assistance programme. These values have been determined on the basis of what it would cost for a student to live in New Zealand. Most of the information is drawn from the Household Economic Survey, although other sources are also used. The end result is mixture of actual spending by New Zealand households and imputed spending allowances (such as for public transport). It appears that various sorts of discretionary expenditure such as the purchase of motor vehicles and meals in restaurants are not taken into account. Of course for the purpose of determining assistance this may be fine, but it does not necessarily correspond to what a foreign student would actually spend if they received no such support from the New Zealand government. The ODA figure for a single student is estimated at \$10218 for a 40.9 week period.<sup>8</sup> As expected this is lower than estimated actual expenditure by foreign students, but again reasonably consistent given the differences in definition. Also, the value of the ODA scholarships are increased if the student has a spouse or dependent children. This would raise weighted average expenditure per student.

Interestingly, the Ministry estimates that living costs for foreign students in Dunedin are 91.5% of the national average, providing some support for the 90% ratio derived from the NZUSA/APSU survey. It also supports the decision made above to compress the difference for actual expenditure (as opposed to imputed living costs) by foreign students.

Statistics New Zealand have estimated the expenditure of English language students via a survey of providers. Non-tuition expenditure of these students is estimated at \$3297, although apart from the costs of accommodation, the figure appears to be derived largely by assumption. If we take the average of this value and the IVS based estimate the result is \$4799, extremely close to the estimate based on Lee's survey of \$4787.

Finally, it is useful to explore the reliability of the NZUSA/APSU survey as it underpins much of the analysis in Section 1.1. Whilst we cannot do this directly for the sub-sample of foreign students we can at least compare the results for the full sample with expenditure data from the Household Economic Survey. At our request Statistics New Zealand have provided estimates of weekly expenditure (excluding tuition costs) for full time students; defined as being at least 15 years of age, and enrolled in full time study at a university, polytechnic, occupational training college or technical correspondence institute. In order to increase the sample size the results of the 1996, 1997 and 1998 surveys are combined.

The following types of household were identified:

1. one person student household,
2. couple only student household (one or both students),
3. non-family student household,

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<sup>8</sup> A full annual grant would average \$12,400.

4. non-family student with other household,
5. other households with one student,
6. other households with more than one student.

The results as produced by SNZ are presented in Appendix C. Across all of the above household types, mean expenditure per person over a 39 week period was \$10,365. However, this includes household types such as families where only one member of the family is a full time student. In such cases dividing total household expenditure by the number of people in the household is unlikely to produce a good estimate of mean expenditure per student. Confining the calculation to just the first three household types, where the majority of household members are students, yields a mean expenditure per person of \$11,046. For types (1) and (3), where all household members are students, the average is \$11,397. These figures are very comparable to the \$11,550 estimated in the NZUSA/APSU survey. And the direction of the difference is consistent with the timing differences - the NZUSA/APSU survey being centred around the middle of 1998 and the HES being centred around late 1996.

Thus the HES data supports the results from the NZUSA/APSU survey, thereby supplying some additional credence to the latter's estimates of expenditure by foreign students. That is, whilst the NZUSA/APSU estimate of foreign student expenditure may suffer from sample size problems, it is probably not a biased estimate of the true value.<sup>9</sup>

### 1.3 Summary

Data from various sources displays a reasonably consistent picture. Combining the information from the preferred surveys; those by the NZUSA/APSU and Lee, yields \$11,602 as an estimate of the mean expenditure of foreign tertiary students. The ratio of this value to that estimated directly from Lee's data of \$11,064 is 1.0486. Assuming that this ratio also applies to expenditure by foreign secondary and English language students, leads to the estimates of expenditure shown in the table below, rounded to the nearest \$100. Details are provided in Appendix B.

For private training establishments (excluding English language schools) there seem to be no expenditure estimates currently available. Given the nature of the services provided by these institutions it is considered that their students are more like students of English language schools than tertiary students. It is therefore assumed that the mean expenditure of PTE students is the same as that of English language students. In any case, however, the low number of students in this category means that the figure for expenditure per person will not significantly affect estimated total expenditure.

#### **Foreign Student Expenditure on Goods and Services (excluding Tuition)**

Type of Student	\$/person	Number*	Total \$m
Secondary	11,800	5699	67.3
Tertiary	11,600	6879	79.8
English language schools	5,000	15718	79.0
Private training establishments	5,000	755	3.8
		29051	229.9

\* from MFAT *op cit* and Ministry of Education. ODA students excluded

<sup>9</sup> In statistical terminology the estimate is 'consistent', meaning that as the sample size is increased one would expect the estimated value to converge to the true value.

Overall, foreign students are estimated to spend \$230m on goods and services - excluding tuition costs - whilst living in New Zealand. This estimate ostensibly relates to 1999, but should be considered as being representative of the period 1998-2000 as the underlying calculations are based on data gathered from throughout this period. It is believed that the errors caused by non-matching time frames (such as caused by price inflation) are small in comparison to the other problems discussed above.

The best way to improve the accuracy of these estimates is to undertake a carefully constructed nation-wide survey of foreign students. It is up to EIMN to decide on the worth of doing so. In our opinion the answer depends on the use of the data. If the figures were to be used to enhance official national accounts (GDP, current account balance etc) a specific survey would seem worthwhile. However, if the main use of the information is for various parties ranging from individual educational institutions to the Government, to gain a good appreciation of the value of international education services to the economy, and to formulate strategies to encourage them, then the above numbers would seem sufficiently reliable.

In the following sections we look at the wider economic impact of foreign students. To the \$230m estimated above is added expenditure on tuition costs, NZIS fees, and so on, in order to determine the total value of expenditure associated with foreign education services. This provides a base for an examination of the flow-on effects on other industries in the economy.

**Table 1.1**  
**Comparison of Estimates of Student Expenditure on Goods and Services**

Subject	Student Category	\$/person	Year	Sample Size	Source
NZ university and polytechnic students	all full time tertiary	11,550	1998	2242	CM Research for NZUSA/APSU
	Dunedin tertiary	10,355		170	
	foreign tertiary	11,266		97	
Foreign students in Dunedin	tertiary	11,064	1999	} 737	Lee (1999)
	school	11,265			
	English language	4,787			
Foreign students in Australia	university	10,948	1998	unknown	Australian Education International (converted at a PPP exchange rate of 0.89)
	vocational	12,582			
	univ + vocat.	11,499			
	schools	12,468			
	English language	11,016			
Education/study visitors	286 days stay	10,380	1999/00	156	Extrapolated and interpolated from IVS data on \$/day x length of stay
	88 days stay	6,300			
ODA allowances	full time students	10,218	1998-2000		MFAT
English language providers	English language	3,297	1999	census	SNZ Census of English Language Providers, MFAT <i>op cit</i> , see footnote 1.
All households with full time students aged 15 or over	hh with students	10,365	1996-98	612	Household Economic Survey, SNZ
	majority student hh	11,046		81	
	all student hh	11,397		45	

## 2. Economic Impact Analysis

### 2.1 Introduction

The economic contribution of an industry does not mean that the economy is better off by the full amount of the measured contribution. This would only be true if all of the resources involved in supplying the needs of that industry would otherwise lie idle. This is unlikely, but we have no idea of what the most plausible counterfactual would be.

However, measurement of the economic contribution of foreign students differs in one important respect from measurement of the economic contribution of say a casino. In the latter there is distinct shift in the spending of local consumers - towards the casino and away from other (discretionary) goods and services. Thus there is definite 'trade diversion' effect which generates demand at the casino. With foreign students the demand comes from offshore (like an export) so there is no 'trade diversion' effect emanating from the demand side.<sup>10</sup> Hence we do not allow for such an effect in the multiplier analysis. Nevertheless, as stated above, this is not to imply that the relevant resources would be idle if there were no foreign students.

### 2.2 The Multiplier Concept

Each dollar spent on the output of one industry leads to output increases in other industries. For example for a university to deliver education services to a foreign student it requires inputs of books, energy, communication services and so on. Part of the tuition fee is used to cover the cost of these items. Another part covers the cost of the buildings and equipment (spread over their useful lives) and there is a large portion for staff wages and salaries. The supplying industries such as energy require inputs themselves, pay wages and salaries and so on.

The effect on these supplying industries is known as the upstream or indirect production effect and is commonly measured by a number called a multiplier which is defined as the ratio of the direct plus indirect effect, to the direct effect.

The effect brought about by the initial payment of wages and salaries is generally known as the downstream or induced consumption effect, as wages and salaries are used to purchase household consumption goods. Their production and sale requires inputs from other industries and so on as before. Again the effect may be measured by a multiplier. The total multiplier is defined as the direct, plus indirect production, plus induced consumption effects, divided by the direct effect.

However, multipliers need to be cautiously interpreted and carefully applied. When applied to gross output they lead to double counting. For example the value of food and drink supplied at a restaurant is counted as part of the gross output of both the Food and Beverage industry and the Restaurant industry. If one's aim is to measure overall business activity this double counting may be useful, but from the perspective of economic contribution it is value-added which is of interest.

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<sup>10</sup> There is the vexing issue of whether foreign fee-paying students earn income generated in New Zealand during their stay; income which is used to finance their expenditure in Anew Zealand. If such income is significant it needs to be subtracted from student expenditure to derive a figure which consistent with the definition of exports. This issue is discussed further in Appendix D.

## 2.3 Link to National Accounts

At this point one needs to be mindful of the definition of value-added and of the income-expenditure identity in the national accounts. If a foreign student spends \$100 in New Zealand, that \$100 is part of exports which is a component of final demand - the expenditure side of Gross Domestic Product (GDP). In this sense it represents 100% value-added, as value-added is synonymous with contribution to GDP. On the income side, however, only the part which is not spent on inputs from other industries is counted as direct value added. The rest is progressively spent and re-spent upstream and, apart from the cost of imports, is eventually entirely exhausted on inputs of labour and capital; that is value-added.<sup>11</sup> Thus the multiplier for the indirect upstream effects is just the process whereby the expenditure and income sides of the national accounts remain in balance. No additional value-added is created from this effect. All that we gain is knowledge about how the initial expenditure shock ripples through the various supplying industries.

The more powerful effect is that of the induced consumption multiplier. The initial wage and salary payments and the subsequent wage and salary payments lead to an increase in private consumption; another component of final demand. This generates flow-on effects in an analogous manner to the original increase in exports and therefore does generate an additional gain in GDP. This gain may be legitimately attributed to the increase in exports, provided that resources have not been diverted from other productive uses. If they have, it is necessary to deduct the direct, indirect and induced effects of those resources in their alternative uses.

## 2.4 Determination of Multipliers

Multipliers for the indirect production effect are easily calculated from standard input-output tables produced by Statistics New Zealand. Thus for a given increment to final demand (exports, consumption etc), we can determine the direct and indirect pattern of production needed to support that increment to final demand.

Consumption induced multipliers are more complicated to determine as they require some assumptions about the links between the Production Account and the Income & Outlay Account in the national accounts. In particular a link between private consumption (mostly household spending) and income from wages and profits needs to be established. Typically this is accomplished by treating inputs of labour as an intermediate input and then treating private consumption as the industry which produces labour. Enhancements to this approach include allowing for the distribution of operating surplus to households and for the leakage of household savings. This is the essence of the approach used by Butcher Partners (whose results we use below) to calculate the indirect production and induced consumption multipliers.

Other enhancements are possible:

- allowing for income leakages via taxes and for consumption injections via income from welfare benefits;
- including the effect of government consumption, much of which, such as health, is actually consumed by individuals and paid for out of taxes;

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<sup>11</sup> In fact value added also includes some forms of indirect taxation.

- including the effect of new investment which may be needed to expand output and may be financed out of operating surplus;
- acknowledging that exports may need to rise to finance the requirement for additional imports.

Accounting for all of these effects requires the use of a multi-industry general equilibrium model. Such a model incorporates all of the inter-dependencies in the economy, such as flows of goods from one industry to another, plus the passing on of higher wage costs in one industry into prices and thence the costs of other industries. It also ameliorates most of the other implicit assumptions that are commonly overlooked in the application of multipliers derived from static input-output tables, notably:

- it does not assume that all factors of production are in excess supply,
- it allows for price changes (such as if a factor is in limited supply) which may lead producers to change inputs thereby altering their production structure,
- it does not force average relationships to hold at the margin,
- it automatically calculates net multiplier effects by reducing the gross effects to the extent that they pull resources out of other productive uses (that is trade diversion).

All of these effects have the potential to undermine the result of multiplier analysis - the wider the attempted coverage of indirect and induced effects, the greater is the potential for miscalculation and error. Rather like a stone thrown into a pond; the more the ripples spread out the more likely they are to encounter some form of obstacle - ripples from another stone, a cross current, the embankment.

### 3. Multipliers for Foreign Education Services

It is common for multipliers which cover the indirect production effects to be labelled as Type I multipliers whilst those which also include the induced consumption effects to be labelled Type II multipliers. Each type of multiplier is usually calculated for three different measures of economic activity:

- gross output
- value added
- employment

Multipliers have been derived for foreign education services by weighting individual industry multipliers by the composition of expenditure by foreign students. Essentially this corresponds to deriving a synthetic industry - Foreign Education Services - one which is not actually defined in the national accounts, but which represents an amalgamation of a collection of different industries such as education, restaurants, accommodation etc. The multipliers so derived are shown in Appendix E.

Table 3.1 below compares the important Type II value-added multiplier for Foreign Education Services (FES) with that for some other industries.

**Table 3.1**  
**Multipliers for Selected Industries**

	Type II VA multiplier	VA/GO ratio	VA/GO * Type II
Foreign Education Services	2.10	0.59	1.25
Forestry (logging)	2.23	0.48	1.07
Wood Processing	3.19	0.35	1.12
Paper Production	2.68	0.39	1.04
Machinery & Equipment	2.84	0.33	0.94
Air Transport	2.68	0.37	0.99
Communications	1.82	0.65	1.18
Health	1.91	0.70	1.34

The table shows that the multiplier for FES ranks around the middle of those listed. In general the value of the multiplier falls the more removed the industry is from processing raw materials. Most of the value of output of processing industries is accounted for by the cost of the raw material input, which is also captured in the value of the output of the raw material supplier. In other cases a high multiplier is not so much due to a high numerator, but rather to a low denominator (total direct, indirect and induced value-added divided by direct value-added). This typically occurs where a high degree of sub-contracting is involved.

In both cases there is a relatively low amount of value being added directly. This is reflected in the value-added to gross output (VA/GO) ratio. It is low in industries such as Wood Processing and high in industries such as Communications.

The combined effect of these two factors is shown in the right hand column of the table. For FES the value of 1.25 means that for every dollar of foreign exchange earnings from the education of foreign students (a weighted average of tuition and living costs), New Zealand's gross domestic product will rise by \$1.25.

For the industries shown, only the Health industry has a larger effect on GDP, suggesting that there is less expenditure leakage offshore in Health than in FES. Contrast this with Air Transport where a dollar of foreign exchange earnings raises GDP by ninety-nine cents. For this industry its high import content - fuel and crew accommodation - negates the domestic flow-on effects.

In general service industries have higher local content than manufacturing industries and thus greater net additional effects on GDP. Of course this ignores any effects which are not captured by multipliers such as the establishment of certain technical skills in critical mass, and the supply of locally manufactured goods to service sectors, which might otherwise import their requirements.

## 4. Economic Effect of Foreign Student Expenditure

Using the multipliers discussed above and the estimates of expenditure derived in Section 1, plus MFAT estimates of expenditure on air travel and fees to the New Zealand Immigration Service, produces a picture of the economic flow-on effects of spending by foreign students. This is shown in Table 4.1. The details are given in Appendix E.

**Table 4.1**  
**Summary of Economic Flow-On Effects of Foreign Student Expenditure**

	Gross Output (\$m)	Employment (FTE)	Value-Added (\$m)
Direct	436	4555	259
Direct + Indirect	685	8047	398
Direct + Indirect + Induced	984	10352	545

### 4.1 Output

The direct foreign exchange earnings (or at least expenditure) attributable to foreign students total \$435.7m, corresponding to tuition fees of \$181.4m and expenditure on other goods and services of \$254.3m.<sup>12</sup> This generates a further \$249m of indirect turnover (gross output) by industries which supply inputs to the FES industries; for example inputs of energy to educational institutions. Another \$299m (984-685) of induced turnover is generated by the spending of wages and salaries earned by people employed in FES and those employed in the industries which supply FES. Note that the induced effect also subsumes all of the next and subsequent waves of indirect and induced effects which arise out of the first wave of induced effects.

Although the gross output multiplier for FES more than doubles the initial effect, this does not equate to the effect on GDP. Stripping out the double counting leaves a total contribution to GDP of \$545m. As noted above this is an extra \$0.25 for every \$1.00 earned directly.

A word of caution is in order at this point. The multiplier of 1.25 applies to the nation as a whole. For any individual region the multiplier will be less; in approximate proportion to the size of the region. In general the smaller a region the less self-sufficient it will be and thus the greater its need for imported goods and services. Thus the 1.25 should not be applied to regional estimates of student expenditure to deduce the impact on regional GDP.

The estimated direct, plus indirect, plus induced value-added effect of \$545m represents about 0.5% of total GDP. By way of comparison the Fishing and Hunting industry accounts for 0.3%, the Oil & Gas Exploration industry for 0.7% and the Horticulture industry for 0.9%. And yet the international education industry does not have the profile of these industries. It would be an interesting exercise to ascertain which of these industries has experienced the most rapid growth over the last decade - and which has the most potential for future growth.

<sup>12</sup> \$229.9m as derived in Section 1, plus \$20m of international fares (MFAT) plus \$4.4m in NZIS fees (MFAT).

## 4.2 Employment

Employment directly attributable to foreign student expenditure is about 4,555 full time equivalent positions. Multiplier effects raise this to around 10,350. Of the direct effect, MFAT (*op cit*) estimate that about 45% is accounted for by the education industry. Thus one could claim that for every job generated directly in the education industry (through having foreign fee paying students in New Zealand) another four FTE jobs are generated elsewhere - approximately 1.2 jobs in industries which directly supply goods and services such as food and transport to students, another 1.7 jobs in industries which supply those industries and the education industry, and another 1.1 in the industries which benefit from the increased consumer spending power associated with all of the other new employment.

One difficulty with the employment data is that the employment-output ratios in the education industry tend not to be calculated in the same way as for most other industries. Usually the number of FTE positions is divided by the value of sales. However, because consumers of public education services do not directly pay the full cost of these services, the value of sales is approximated by the total cost of inputs. Thus to the extent that public education services do not earn a (notional) return on capital, the calculated labour-output ratio will be over-estimated. Whether this matters for determining the employment attributable to foreign education services depends on two questions:

1. Do the tuition fees which are charged to foreign students reflect full economic costs?
2. Are those fees based on marginal costs or average costs?

The above calculations implicitly assume that a foreign student is not being asked to pay for more *per unit of service delivered* than the Government provides for a domestic student, and that the fee is based on average costs. The Italicised words are important. A higher fee may be charged without affecting the validity of the calculations if a foreign student actually costs more to teach, such as if language barriers require additional tuition for foreign students who undertake university degree courses.

The relevant legislation (Education Act 1989 and subsequent amendments) seems to imply that tuition fees for foreign students should be based on marginal costs, but it is not clear whether short run or long run marginal costs should be used. For example it would appear that if there is a spare seat in a lecture theatre which was constructed to service domestic students, a capital charge is not required. We suspect that the fees charged by the various institutions reflect a mixture of average and marginal costs. Given that the institutions are not losing money on the enrolment of foreign students we surmise that in aggregate, tuition fees do at least cover long run marginal cost, including any additional costs associated with foreign students *per se*. This would mean that any error in the above employment estimates would be such as to inflate the figures, although this is unlikely to be significant.

A more important source of error is in the estimates of expenditure by foreign students on general living costs. As discussed in Section 1 the central estimate for tertiary students (which affects the estimates for all the other student categories) has a surrounding confidence interval. In the next section we explore the sensitivity of the above results to differences in estimates of expenditure on living costs.

## 5. Sensitivity Analysis

The central estimates for student expenditure on goods and services, together with the upper and lower bounds of the 95% confidence intervals are summarised in the table below. For secondary, English language and other PTE students the ratio of tertiary student expenditure in the high and low scenarios to that in the central scenario, has been applied to the central estimates for those other groups of students. Note that the higher and lower expenditure figures assume the same composition of expenditure - the central estimate is merely scaled up or down. The per capita figures are rounded to the nearest \$100.

**Table 5.1**  
**Foreign Student Expenditure - High and Low Estimates**

Type of Student	\$/person		
	Central	High	Low
Secondary	11,800	12,200	11,400
Tertiary	11,600	12,000	11,200
English language schools	5,000	5,200	4,800
Private training establishments	5,000	5,200	4,800
	Total Revenue (\$m)		
	Central	High	Low
Secondary	67.2	69.5	65.0
Tertiary	79.8	82.5	77.0
English language schools	78.6	81.7	75.4
Private training establishments	3.8	3.9	3.6
	229.4	237.7	221.1

Applying the multipliers to the above scenarios leads to the results in Table 5.2. In terms of the total effect on Gross Domestic Product the effect of  $\pm$ \$400 on secondary and tertiary student expenditure, and  $\pm$ \$200 on English language and other PTE student expenditure is only about \$10m, less than 2%. On employment the effect is about 200 FTE positions.

**Table 5.2**  
**Summary of Economic Flow-On Effects of Foreign Student Expenditure**

	Gross Output (\$m)	Employment (FTE)	Value-Added (\$m)
<b>Central</b>			
Direct	436	4555	259
Direct + Indirect	685	8047	398
Direct + Indirect + Induced	984	10352	545
<b>High</b>			
Direct	444	4637	264
Direct + Indirect	697	8192	405
Direct + Indirect + Induced	1001	10539	555
<b>Low</b>			
Direct	427	4463	254
Direct + Indirect	671	7884	390
Direct + Indirect + Induced	964	10143	534

Most of the differences are minor, but it needs to be recalled that only the estimates of expenditure on living costs are being altered in these scenarios. Tuition costs are held constant. Another source of error which we have not looked at is the composition of expenditure. Even if total expenditure per student is known with certainty, changes in its composition could affect the value of the multipliers and thus the estimated flow-on effects. Although some estimates of this effect are possible with the data used here, it is not recommended. Data from a specifically targeted survey would be much better for this purpose.

The other limitations of multipliers discussed in Section 2.4 should also not be forgotten. For example the average effect versus the marginal effect which has already been mentioned with respect to tuition costs, applies to every link in the chain of production which the multipliers encompass.

Overall then, none of the numbers should be interpreted as being accurate to the extent stated. The direct foreign exchange earnings from the supply of education services to foreign students are probably in the range \$420m to \$450m and the associated effect (direct plus indirect plus induced) on Gross Domestic Product is probably in the range \$530m to \$560m. Direct employment is around 4,500 full time equivalent jobs, with indirect and induced flow-on effects raising this figure to over 10,000.

Two other sensitivity tests which would seem worthwhile include:

1. endeavouring to make some allowance for New Zealand generated income earned by foreign students during their stay here, (although any employment secured by these students may - depending on the circumstances - constitute an additional indirect economic effect over and above those estimated in Section 4, even though any income so obtained detracts from their net foreign exchange spending);
2. incorporating the effect of tourism associated with international education, in particular visits by friends and relatives of students who may come for graduation ceremonies or to help students to set up at the start of the academic year. Lee (*op cit*) tentatively estimates this effect in Dunedin to be worth an additional 5% or so of what students spend.

## 6. Regional Economic Impact of International Education

The national economic impacts maybe disaggregated by region, although the results are not as robust. There are a number of reasons for this:

1. inconsistent data on students by region,
2. lack of data on expenditure by region,
3. uncertainty over allocation of international travel and NZIS fees.

Firstly, the regional distribution of tertiary and secondary student numbers is based on enrolments as at 31 July 1999. For secondary students the regional allocation involved classifying over 280 schools. As shown in Table 6.1, in neither case is the implied total number exactly the same as the national totals used in the previous chapters. Thus the regional numbers have been uniformly scaled so that they sum to the required totals. For ESL the regional disaggregation adds exactly to the total as the same source of data was used.<sup>13</sup> The small number of other PTE students (755) have been allocated by region on a *pro-rata* basis.

**Table 6.1**  
**International Student Numbers by Region**

	Tertiary	Secondary	ESL+PTE
Auckland	2195	2438	6962
Canterbury	1204	1027	4073
Otago	1001	425	1085
Wellington	753	503	1113
Manawatu/Wanganui.	759	342	968
Waikato	541	319	1132
Hawke's Bay	82	144	115
Bay of Plenty	39	171	109
Other	305	330	916
Total	6879	5699	16473
Total prior to scaling	6549	4577	15718

The 'Other' group in the table could theoretically be more finely allocated. The reason for not doing so relates to the second point noted above; expenditure data. Apart from the survey by Lee there is no data on the expenditure of foreign students by region. Thus we have assumed that the regional differences in the spending of domestic and foreign students combined also apply just to foreign students - separately for each category of student. For example if Wellington students spend 10% more on food than the average across the whole country, then the same 10% difference is assumed to apply to international students, although the levels of expenditure may be different.

This assumption means that we still need to know the composition of spending by region for domestic and foreign students combined. For this we use the NZUSA/APSU survey, although this is limited to the regions identified in Table 6.1.<sup>14</sup> Hence the reason for not separately identifying regions such as Southland, even though they are known to have international students.

<sup>13</sup> Statistics New Zealand survey *op cit*. We acknowledge their assistance in compiling the regional disaggregation.

<sup>14</sup> Again we appreciate NZUSA/APSU permission to use the survey and the time put in by CM Research to tabulate the required data.

A complication which arose during this process is that the tabulation of the NZUSA/APSU results used different procedures for sample re-weighting and for the treatment of outlying observations than used for the national analysis presented in Section 1. This means that the regional figures presented below are not perfectly consistent with the national figures.

Two items of expenditure were not previously disaggregated by student category, namely international travel and NZIS fees. The former is split *pro-rata* with foreign student numbers on the assumption that each student makes only one return trip from and back to their home country, whilst the latter is also split *pro-rata* but only for tertiary and secondary students.

The results for the eight regions listed above are summarised in Table 6.2. The first two columns show the spending on tuition and living costs. A finer breakdown is not presented as this is likely to convey a spurious degree of accuracy.

The third column shows the ratio of expenditure on living costs to that on tuition fees. For example a ratio of 1.20 means that each \$1.00 of spending on tuition fees generates \$1.20 of expenditure on living costs.

The multiplier effect combines the flow-on effects on gross output as generated by the Type II multiplier and the subsequent adjustment for the ratio of value-added to gross output, as explained in Section 3. The flow-on spending generated elsewhere in the regional economy will always be positive, but the conversion from gross output (or gross sales) into value-added will always be negative. As noted in Section 3, value-added corresponds to Gross Domestic Product, being sales less purchases from other industries in the region, and less goods and services imported from other regions. Essentially therefore, it comprises the income earned by labour and capital.

Hence the net multiplier effect may be positive or negative, although in general larger and more diversified regions will tend to have a positive multiplier effect as they tend to be more economically self-sufficient. The last column is the estimated value-added or increase in GDP attributable to foreign fee-paying students.

**Table 6.2**  
**Summary of Regional Economic Effects of International Students**

Region	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)*
Auckland	68.3	108.8	1.59	20.6	197.8
Canterbury	36.6	48.1	1.31	6.7	91.4
Otago	19.1	25.9	1.36	0.7	45.7
Wellington	16.8	21.0	1.25	1.1	38.9
Manawatu-Wanganui	15.2	18.1	1.19	-1.3	32.0
Waikato	12.9	18.3	1.42	-1.5	29.7
Hawke's Bay	2.5	4.3	1.72	-0.3	6.5
Bay of Plenty	2.1	4.3	2.05	-0.2	6.2
Total	173.5	248.8	1.43	25.9	448.2
National Total	181.4	254.3	1.40	98.5	534.2
Ratio	95.6%	97.8%		26.3%	83.9%

\* excluding GST

Note that the value-added figures exclude GST. This marks a departure from the nation-wide analysis where the figures are GST inclusive, because from a regional perspective GST revenue does not accrue to the region. Some may implicitly be returned via the provision of health, education, superannuation payments and so on, but it is beyond the resources of this project to determine whether each region is a net contributor to, or recipient of government spending in relation to GST revenue.

Total fees come to \$173.5m which is 95.6% of the nation-wide total estimated by MFAT - and which we have used in previous sections. The deficit of 4.3% is accounted for by students in the other regions for whom we have no expenditure data. For living expenses the deficit is somewhat less at 2.2%. There is no reason why the two deficits should be exactly the same as expenditure on living costs varies by region and so does the mix of students. Nevertheless, one would expect a similar proportionate deficit. The 2.2% therefore seems reasonable. Whilst it may indicate that foreign students who live in the larger regions spend more than those in the omitted smaller regions such as Tasman and Gisborne, the inconsistency mentioned above with respect to re-weighting and outliers may also be affecting this result. Overall, however, the 97.8% seems plausible.

A larger deficit is evident in the value-added column. This is attributable to the deduction of GST from the expenditure data (where relevant) and to the omission of inter-regional flow-on effects. For example the estimate for Wellington includes all of the Type I and Type II multiplier effects which occur with the Wellington region. Similarly for Hawke's Bay. But leakages from the Wellington region in the form of expenditure on goods and services which come from Hawke's bay, such as wine, are not picked up in the estimate for Hawke's Bay. Similarly for all other such inter-regional trade flows. This omission is because we do not know the nature of the inter-regional flows; how much of the expenditure by Wellington students on wine is on wine from Hawke's Bay, or on wine from Otago, or on wine from an omitted region such as Marlborough.

For any given region its value-added figure represents the gain to that region attributable only to the international students which it attracts itself. Any benefits it gains from other regions attracting foreign students are not included. Therefore it is impossible for the sum the individual regional estimates of value-added to add to the national figure of \$534m, even if no regions were omitted and even if GST was not excluded.

The full force of these omissions can be seen in the 'multiplier effect' column, where the sum of the regional effects is only about 26% of the national multiplier effects. Given that the omission of the smaller regions accounts for only about 3% and that the omission of GST is probably responsible for about 6%, it is clear that around two-thirds of the national multiplier effect is missed because of the omission of inter-regional trade flows.

Nevertheless the overall effect of this is not that large because the netting out of inter-industry sales (the conversion from gross output to value-added) means that the net contribution of the multiplier effect to value-added is small relative to the gross expenditure on tuition fees and living costs. As may be seen in Table 6.2, the final deficit in overall value-added is only about 16%.

Table 6.3 shows the regional employment effects.

The initial employment shows the employment which is generated directly by student expenditure. Total employment is 4051 which is 11.1% below the total of 4555 derived from the national data. About 3% of this is deficit attributable to the omitted regions, as discussed above. The rest is primarily attributable to the deduction of GST, although there will also be some effect from the different composition of spending across the regions.

**Table 6.3**  
**Regional Employment Effects of International Education**

	Initial Effect	Total Effect
Auckland	1667.4	3579.2
Canterbury	829.1	1685.2
Otago	436.7	829.4
Wellington	372.2	707.9
Manawatu-Wanganui	331.8	609.0
Waikato	296.7	526.9
Hawke's Bay	61.1	104.7
Bay of Plenty	55.8	102.4
Total	4050.8	8144.7
National Total	4554.7	10143.0
Ratio	88.9%	80.3%

As with the value-added results, the deficit is increased when the multiplier effects are taken into account. Again this is due to the omission of inter-regional trade. The interpretation to be placed on this is that the eight regions directly and indirectly generate employment for themselves of about 8145 full time equivalent jobs. Another 2000 full time equivalent jobs are generated by inter-regional trade, with each region benefiting from the presence of international students in other regions (including the omitted regions).

Additional data on the regional economic effects is presented in Tables 6.4 to 6.11. Of the eight regions surveyed, the four which earn most from foreign fee-paying students are Auckland, which contributed \$197.8m to national GDP; Canterbury, \$91.4 million; Otago, \$45.7 million; and Wellington \$38.9 million. The Auckland region has the largest economic impact from international students primarily because it has the greatest number of students - see Table 6.1. And its more diversified economy also means that it retains proportionally more of the expenditure by students within its regional boundaries. Its net multiplier effects are always positive, in contrast to those in the smaller regions such as Bay of Plenty.

**Table 6.4**  
**Auckland Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	26.5	31.7	1.20	6.6	64.8
Secondary	18.6	36.3	1.95	6.0	60.9
ESL & PTE	23.3	40.8	1.75	7.9	72.0
Total	68.3	108.8	1.59	20.6	197.8

**Table 6.5**  
**Waikato Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	6.5	7.4	1.14	-0.6	13.3
Secondary	2.4	4.6	1.92	-0.5	6.5
ESL & PTE	4.0	6.3	1.58	-0.5	9.8
Total	12.9	18.3	1.42	-1.5	29.7

**Table 6.6**  
**Bay of Plenty Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	0.5	0.6	1.20	0.0	1.1
Secondary	1.3	2.9	2.23	-0.2	4.0
ESL & PTE	0.4	0.7	1.75	0.0	1.1
Total	2.1	4.3	2.05	-0.2	6.2

**Table 6.7**  
**Hawke's Bay Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	1.0	1.3	1.30	-0.1	2.2
Secondary	1.1	2.3	2.09	-0.2	3.2
ESL & PTE	0.4	0.7	1.75	0.0	1.1
Total	2.5	4.3	1.72	-0.3	6.5

**Table 6.8**  
**Manawatu-Wanganui Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	9.2	9.1	0.98	-0.7	17.6
Secondary	2.6	4.3	1.65	-0.3	6.6
ESL & PTE	3.4	4.7	1.38	-0.3	7.8
Total	15.2	18.1	1.19	-1.3	32.0

**Table 6.9**  
**Wellington Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	9.1	9.1	1.00	0.5	18.7
Secondary	3.8	6.4	1.68	0.3	10.5
ESL & PTE	3.9	5.5	1.41	0.3	9.7
Total	16.8	21.0	1.25	1.1	38.9

**Table 6.10**  
**Canterbury Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	14.5	14.8	1.02	2.3	31.6
Secondary	7.8	13.1	1.68	1.7	22.6
ESL & PTE	14.3	20.2	1.41	2.8	37.3
Total	36.6	48.1	1.31	6.7	91.4

**Table 6.11**  
**Otago Regional Economic Effects**

	Fees	Living Expenses	Ratio	Multiplier Effect	Total Value-Added
	(\$m)	(\$m)		(\$m)	(\$m)
Tertiary	12.1	13.7	1.13	0.5	26.4
Secondary	3.2	6.1	1.91	0.1	9.4
ESL & PTE	3.8	6.0	1.58	0.2	10.0
Total	19.1	25.9	1.36	0.7	45.7

## Appendix A: NZUSA/APSU Survey

<b>Expenditure of Full Time Students</b> (CM Research for NZUSA/APSU)												
					<b>Dunedin</b>				<b>Overseas</b>			
	%	Mean (\$)	Median (\$)	Overall Mean (\$)	%	Mean (\$)	Median (\$)	Overall Mean (\$)	%	Mean (\$)	Median (\$)	Overall Mean (\$)
Food	89	64	40	57	87.1	53.8	44.9	47	85.6	59.4	50.2	51
Local transport	81	24	20	19	57.6	28.7	19.9	17	66.0	19.2	19.8	13
Entertainment	74	27	20	20	86.5	22.9	19.8	20	71.1	20.1	10.5	14
Accommodation	76	111	80	84	81.8	91.6	69.9	75	89.7	121.9	87.1	109
Utilities	69	38	20	26	69.4	48.2	25.1	33	63.9	48.1	39.9	31
Personal items	66	12	9	8	74.7	15.1	9.9	11	78.4	15.0	9.9	12
Insurance, repairs	41	22	15	9	24.1	23.6	15.0	6	16.5	17.4	15.0	3
Childcare	10	35	25	4	5.3	44.0	20.2	2	5.2	10.0	10.0	1
Miscellaneous	35	44	20	15	40.6	21.5	15.0	9	25.9	17.4	9.9	5
				243				220				238
Estimated duration				39.0				39.0		(LoS from MFAT)		40.9
				9469				8565				9720
<u>Annual Expenditure</u>												
Text books etc	88	455	350	400	88.8	387.8	299.8	344	85.6	389.9	299.4	334
Clothes	78	366	298	285	85.9	327.1	247.9	281	78.4	300.6	202.2	236
Travel (not local)	56	401	203	225	69.4	392.2	298.1	272	61.9	519.3	349.8	321
Music, books	54	179	100	97	63.5	219.9	150.2	140	64.9	162.8	150.5	106
Health	57	235	150	134	59.4	224.6	140.6	133	42.3	190.3	150.0	80
Appliances	23	1182	602	272	24.1	1466.4	1000.2	353	28.9	336.9	298.8	97
Consumer items over \$50	25	456	280	114	22.4	419.6	281.1	94	17.5	184.9	201.9	32
Vehicles	14	2377	1501	333	7.6	1064.5	1000.1	81	16.5	972.3	999.7	160
Other major expenses	24	921	422	221	17.6	522.3	485.5	92	29.9	598.0	598.9	179
				2081				1791				1546.0
Total per annum				11550				10355				11266

<b>Expenditure Allocation to Industry</b>	
	\$/yr per capita
Education	
Food and Drink	2080
Clothing	236
Wood Products	89
Printing & Publishing	600
Chemicals	420
Equipment etc	600
Other Manufacturing	32
Energy	419
W&R Trade	
Restaurants	292
Transport - land	259
Transport - air	321
Communications	419
Finance	570
Real Estate	4474
Community Services	372
Health	<u>80</u>
	11266

<b>Weighted Length of Stay for all NZ</b>			
(MFAT report, Table A4)			
<b>Source</b>	<b>No</b>	<b>LoS</b>	
Asia	4964	9.7	48320
Pacific	486	10.0	4860
North America	283	4.4	1245
Cent/South America	40	10.0	400
Europe	397	8.0	3176
Africa	50	10.0	500
Middle East	12	10.0	120
Other	<u>112</u>	<u>10.0</u>	<u>1120</u>
Total	6344	<b>9.42</b>	59741

## Appendix B: Lee Survey and Reconciliation

Student Expenditure									Total/Mean	
	Malaysia	USA	Other Asian	European	Other Tert.	Tertiary	ESL	Schools	Implied	Given
Number	550	238	221	102	109	1220	254	263	1737	1737
Estimated length of stay (months)	9.6	4.4	9.8	8.0	10.0	8.52	2.90	8.70	7.7	
<u>Weekly (\$)</u>										
accom	79	84	115	91	110	90	159	146	109	105
food	44	51	46	57	41	47	49	27	44	43
local transport	4	10	11	5	6	7	15	11	9	8
entertainment	12	33	17	22	19	18	20	14	18	17
other entertainment	9	14	13	10	10	11	8	9	10	10
personal items	13	12	15	12	16	13	13	10	13	13
misc	<u>16</u>	<u>14</u>	<u>17</u>	<u>13</u>	<u>37</u>	<u>17</u>	<u>15</u>	<u>15</u>	<u>17</u>	<u>17</u>
	177	218	234	210	239	204	279	232	219	213
<u>Monthly (\$)</u>										
clothing & footwear	47	48	47	68	71	51	38	52	49	51
electricity	69	25	26	17	33	45	7	12	34	38
telephone	49	32	58	29	70	48	57	49	49	49
appliances rental	4	4	5	7	10	5	5	5	5	5
insurance	12	6	24	26	3	13	7	13	12	13
repairs	4	4	4	4	2	4	4	3	4	3
music	19	18	23	26	28	21	18	22	21	22
health	15	7	29	9	24	16	5	15	14	15
misc	<u>23</u>	<u>20</u>	<u>36</u>	<u>11</u>	<u>19</u>	<u>23</u>	<u>11</u>	<u>24</u>	<u>22</u>	<u>24</u>
	242	164	252	197	260	226	152	195	211	220
<u>Annual (\$)</u>										
appliances	208	283	852	277	349	358	515	432	392	396
vehicles	118	6	814	959	23	284	183	47	233	271
financial assets	15	0	75	0	452	61	59	258	90	104
other	159	0	566	209	14	193	88	216	181	259
textbooks	407	292	360	307	539	379	45	104	289	314
additional lease	<u>537</u>	<u>0</u>	<u>345</u>	<u>400</u>	<u>451</u>	<u>378</u>	<u>0</u>	<u>0</u>	<u>266</u>	<u>266</u>
	1444	581	3012	2152	1828	1653	890	1057	1451	1610
<u>Aggregation using length of stay</u>										
Weekly	7383	4168	9964	7300	10385	7541	3516	8770	7352	
Monthly	2323	722	2470	1576	2600	1930	441	1697	1629	
Annual	<u>1444</u>	<u>581</u>	<u>3012</u>	<u>2152</u>	<u>1828</u>	<u>1653</u>	<u>890</u>	<u>1057</u>	<u>1451</u>	
Sum	11150	5470	15446	11028	14813	11125	4846	11523	10432	
less Financial Assets	11135	5470	15371	11028	14361	11064	4787	11265	10342	

**Expenditure Allocation to Industry,  
Calibration and Reallocation of Trade Margins**

	Data from NZUSA (App A)	Tertiary \$/person	ESL \$/person	Schools \$/person	Adjusted as per Section 3			Reallocate Trade Margins			
					Scaling factor:			margin	Tertiary \$/person	ESL \$/person	Schools \$/person
					na	1.0000	0.9540				
Food and Drink	2080	1858	651	1134	2143	751	1247	1.91	1122	393	653
Clothing	236	436	110	452	243	61	241	1.74	139	35	138
Wood Products	89	96	44	108	92	42	98	1.93	48	22	51
Printing & Publishing	600	633	126	326	618	123	303	1.32	468	93	230
Chemicals	420	389	165	438	432	184	465	1.16	374	159	402
Equipment etc	600	1129	847	889	618	463	464	1.65	374	281	281
Other Manufacturing	32	50	8	52	33	5	33	1.78	19	3	19
Energy	419	384	20	104	432	23	112		432	23	112
W&R Trade									1634	643	1077
Restaurants	292	476	160	378	301	101	228		301	101	228
Transport - land	259	124	95	208	267	203	427		267	203	427
Transport - air	321	146	52	160	331	118	346		331	118	346
Communications	419	405	165	426	432	176	433		432	176	433
Finance	570	479	129	440	587	159	515		587	159	515
Real Estate	4474	3722	2003	5519	4608	2480	6519		4608	2480	6519
Community Services	372	598	197	500	383	127	306		383	127	306
Health	80	139	15	131	83	9	74		83	9	74
	11266	11064	4787	11265	11602	5024	11811		11602	5024	11811
						5020	11822				
Lee adjusted for bias (see Section 1.1)		11646									
Final weighted estimate		<b>11602</b>									

The Lee figures for Secondary and ESL students are adjusted industry by industry using the ratio of the final weighted expenditure figure for Tertiary students of \$11,602 and the NZUSA/APSU expenditure composition, to the Lee-based estimate of \$11,064 and its associated expenditure composition. Because the expenditure composition differs between the three types of students there is no guarantee that the total over all industries (for each student type) will sum to the independently adjusted total. In fact for Secondary students the totals do match, but for ESL students a scaling factor of 0.954 was required.

<b>Expenditure per Capita Converted to Total Expenditure</b>				
	Tertiary	ESL	Schools	PTEs
Student Numbers (MFAT)	6879	15718	5699	755
	\$m	\$m	\$m	\$m
Food and Drink	7.7	6.2	3.7	0.3
Clothing	1.0	0.6	0.8	0.0
Wood Products	0.3	0.3	0.3	0.0
Printing & Publishing	3.2	1.5	1.3	0.1
Chemicals	2.6	2.5	2.3	0.1
Equipment etc	2.6	4.4	1.6	0.2
Other Manufacturing	0.1	0.0	0.1	0.0
Energy	3.0	0.4	0.6	0.0
W&R Trade	11.2	10.1	6.1	0.5
Restaurants	2.1	1.6	1.3	0.1
Transport - land	1.8	3.2	2.4	0.2
Transport - air	2.3	1.8	2.0	0.1
Communications	3.0	2.8	2.5	0.1
Finance	4.0	2.5	2.9	0.1
Real Estate	31.7	39.0	37.1	1.9
Community Services	2.6	2.0	1.7	0.1
Health	0.6	0.1	0.4	0.0
	79.8	79.0	67.3	3.8

<b>Sensitivity Analysis Based on 95% Confidence Interval</b>					
95% CI	Tertiary	ESL	Schools	PTE	Total
400 High	12002	5193	12221	5193	
-400 Low	11202	4847	11406	4847	
Rounded High	12000	5200	12200	5200	
Low	11200	4800	11400	4800	
Number of students	6879.0	15718.0	5699.0	755.0	
Central	79.8	79.0	67.3	3.8	229.9
High	82.5	81.7	69.5	3.9	237.7
Low	77.0	75.4	65.0	3.6	221.1

**Appendix C: Student Expenditure Excluding Tuition Fees from Household Economic Survey  
(1996-1998 Combined)**

	one person student household	couple only student household (one or both students)	non-family student household	non-family student with other household	other households with one students	other households with more than one students	households without students	Total all households
Estimated number of households	2,946	4,305	2,790	9,929	46,924	9,923	1,085,732	1,162,549
Average number of people in household	1.00	2.00	3.64	3.22	3.87	4.35	2.66	2.73
Average number of students in the household	1.00	1.18	3.64	1.57	1.00	2.18	0.00	0.09
Average weekly expenditure (less formal education fees)	492.4	519.9	852.5	867.2	1034.4	1066.8	640.3	661.5
Number of persons in the household								
European	2,272	7,160	5,576	24,504	121,450	24,502	2,290,328	2,475,793
New Zealand Maori	-	722	699	3,266	20,094	5,824	339,383	370,413
Pacific Island	-	-	-	-	11,067	4,074	127,350	142,691
Asian	-	-	2,925	3,178	20,095	7,294	81,124	115,148
All Ethnic groups (including other ethnic groups)	2,946	8,610	10,146	31,967	181,508	43,191	2,892,305	3,170,673

Source: Commissioned analysis from Statistics New Zealand

Notes

1. Definition of student: persons age 15 years and over, who are enrolled in full-time study at a university, polytechnic, occupational training college or at a technical correspondence institute.
2. Any cell in the table which has been contributed to by less than five households (or people) in the sample has been suppressed.

## Appendix D: Income of Foreign Students

This appendix explores whether it is possible to determine the net foreign exchange contribution of fee-paying students - that is their gross contribution minus income earned in New Zealand. Lee (*op cit*, p45) reports that 14% of students obtain some income from salary and wages, although it is not clear whether this is all generated in New Zealand. No data is given on the amount of such earnings.

The Census is a good source of income data, but unfortunately does not identify our target group. We have therefore sought a proxy group by identifying people with the following characteristics:

- aged 15 years or more,
- born overseas,
- attending or studying for a full time course,
- been in New Zealand for 3 years or less,
- is either the occupier of a flat or house, a flatmate of the occupier, a boarder in a private dwelling, or a guest in a non-private dwelling (such as a student hostel).

These characteristics do not guarantee that each such person is a foreign student. In particular the group is likely to contain recent immigrants. Nevertheless one might expect it to be a reasonable proxy. The 1996 Census (taken as at 31 March) counts 10,938 people with these characteristics, and there were an estimated 9828 foreign full-fee-paying secondary and tertiary students as at 1 July 1996.<sup>15</sup> This excludes ODA and exchange students. The data reveals that for the over 18 age group, mean annual gross income was about \$8,400.<sup>16</sup>

The proportion of students who obtain income from each source is shown below. Given the employment restrictions imposed on foreign fee-paying students as well as on their eligibility for government benefits, a New Zealand generated income of \$8,400 for the average foreign student is implausible. Thus the filtering characteristics used above to identify foreign students seem not to work very well.

Income Source	%	Income Source	%
Receiving		Receiving	
Wages, etc paid by employer.	28.6	Domestic Purposes Benefit	0.5
Self Employment	3.7	Sickness Benefit.	0.3
Interest, other investments.	13.5	Invalids Benefit	0.2
ACC Regular Payments.	0.2	Student Allowance.	29.4
National Super.	0.2	Other Govt. Benefits.	3.6
Other Super., Pensions.	0.2	Other Sources of Income.	19.7
Unemployment Benefit.	13.9		

Accordingly we reject this data as a reliable indicator of income earned by foreign students while in New Zealand. Unfortunately without other data we cannot determine how significant such income actually is. On the basis of discussions with people in the industry such earnings are probably insubstantial. Nevertheless the lack of data means that we cannot be sure that expenditure by foreign students corresponds 100% to foreign exchange earnings.

<sup>15</sup> MFAT *op cit*, p12.

<sup>16</sup> The information is also available for the 15-18 age group and by country of origin for the main source countries. The data was supplied by SNZ at our request. Their help is appreciated.

## Appendix E: Economic Impact of Foreign Student Expenditure

### Summary

#### Gross Trade Creation

Base Values	Central	High	Low
1 Gross Output (\$m)	435.7	443.6	426.9
2 Employment (FTE)	4554.7	4636.8	4462.7
3 Value Added (\$m)	259.2	263.9	254.0

#### Multipliers - Type IB

4 Gross Output	1.57
5 Employment	1.77
6 Value Added	1.53

#### Multipliers - Type II

7 Gross Output	2.26
8 Employment	2.27
9 Value Added	2.10

#### Total Activity by Type IB Multipliers

10 Gross Output (\$m)	684.6	696.9	670.8
11 Employment (FTE)	8046.5	8191.5	7884.0
12 Value Added (\$m)	397.9	405.0	389.8

#### Total Activity by Type II Multipliers

13 Gross Output (\$m)	983.7	1001.4	963.8
14 Employment (FTE)	10352.0	10538.6	10143.0
15 Value Added (\$m)	545.2	555.0	534.2

#### Expenditure by Foreign Students (\$m)\*

	Tertiary	Second.	ESL	PTEs	Total
Education (a)	82.9	43.4	45.3	9.8	181.4
Food and Drink	7.7	3.7	6.2	0.3	17.9
Clothing	1.0	0.8	0.6	0.0	2.3
Wood Products	0.3	0.3	0.3	0.0	1.0
Printing & Publishing	3.2	1.3	1.5	0.1	6.1
Chemicals	2.6	2.3	2.5	0.1	7.5
Equipment etc	2.6	1.6	4.4	0.2	8.8
Other Manufacturing	0.1	0.1	0.0	0.0	0.3
Energy	3.0	0.6	0.4	0.0	4.0
W&R Trade	11.2	6.1	10.1	0.5	28.0
Restaurants	2.1	1.3	1.6	0.1	5.0
Transport - land	1.8	2.4	3.2	0.2	7.6
Transport - air (b)	2.3	2.0	1.8	0.1	26.2
Communications	3.0	2.5	2.8	0.1	8.3
Finance	4.0	2.9	2.5	0.1	9.6
Real Estate & Accom	31.7	37.1	39.0	1.9	109.7
Community Services	2.6	1.7	2.0	0.1	6.5
Health	0.6	0.4	0.1	0.0	1.1
Govt Services (c)	0.0	0.0	0.0	0.0	4.4
<b>TOTAL</b>	<b>162.7</b>	<b>110.7</b>	<b>124.3</b>	<b>13.6</b>	<b>435.7</b>

#### Notes

- (a) From MFAT *op cit*
- (b) Includes international air fares at \$20m (MFAT *op cit*).
- (c) Includes NZ Immigration Services fees of \$150 per student (MFAT *op cit*).

\* Source: Appendix B

Industry Multipliers									
	Spending Composition	FTE / \$m Gross Output	Val-Add / Gross Output	Multipliers - Type I			Multipliers - Type II		
				Gross Output	Employ- ment	Value Added	Gross Output	Employ- ment	Value Added
Education	0.4164	16.93	0.67	1.39	1.09	1.21	2.41	1.33	1.87
Food and Drink	0.0411	2.93	0.23	2.33	5.49	3.76	2.90	7.15	5.08
Clothing	0.0053	12.99	0.31	1.98	1.69	2.23	2.59	2.07	3.22
Wood Products	0.0022	8.48	0.35	2.04	1.88	2.23	2.70	2.48	3.19
Printing & Publishing	0.0139	2.34	0.39	2.01	3.04	2.09	2.47	4.31	2.68
Chemicals	0.0172	2.86	0.30	1.70	2.66	2.06	2.06	3.69	2.65
Equipment etc	0.0202	6.09	0.33	1.81	1.92	2.05	2.33	2.57	2.84
Other Manufacturing	0.0007	11.16	0.40	1.78	1.50	1.86	2.40	1.91	2.65
Energy	0.0091	1.49	0.43	2.12	3.34	2.17	2.42	4.78	2.51
W&R Trade	0.0642	11.73	0.54	1.70	1.46	1.63	2.39	1.90	2.27
Restaurants	0.0116	13.08	0.43	2.03	1.51	1.94	2.64	1.83	2.65
Transport - land	0.0175	9.45	0.48	1.83	1.74	1.81	2.50	2.31	2.52
Transport - air	0.0601	2.66	0.37	1.79	3.43	2.01	2.28	4.73	2.68
Communications	0.0191	6.12	0.65	1.54	1.75	1.43	2.04	2.44	1.82
Finance	0.0220	5.26	0.56	1.73	1.98	1.69	2.31	2.74	2.21
Real Estate	0.2518	4.32	0.69	1.51	1.80	1.36	1.80	2.25	1.57
Community Services	0.0148	16.20	0.48	1.76	1.37	1.73	2.42	1.65	2.42
Health	0.0026	7.87	0.70	1.40	1.37	1.25	2.32	2.20	1.91
Govt Services	0.0101	15.63	0.47	1.72	1.35	1.73	2.46	1.68	2.52
	1.0000								

Source: Butcher Partners

**Derivation of Multipliers for 'Foreign Education Services'**

	FTE / \$m Gross Output	Val-Add / Gross Output	Multipliers - Type I			Multipliers - Type II		
			Gross Output	Employ- ment	Value Added	Gross Output	Employ- ment	Value Added
Education	7.05	0.28	0.58	0.45	0.50	1.00	0.55	0.78
Food and Drink	0.12	0.01	0.10	0.23	0.15	0.12	0.29	0.21
Clothing	0.07	0.00	0.01	0.01	0.01	0.01	0.01	0.02
Wood Products	0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Printing & Publishing	0.03	0.01	0.03	0.04	0.03	0.03	0.06	0.04
Chemicals	0.05	0.01	0.03	0.05	0.04	0.04	0.06	0.05
Equipment etc	0.12	0.01	0.04	0.04	0.04	0.05	0.05	0.06
Other Manufacturing	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.01	0.00	0.02	0.03	0.02	0.02	0.04	0.02
W&R Trade	0.75	0.03	0.11	0.09	0.10	0.15	0.12	0.15
Restaurants	0.15	0.00	0.02	0.02	0.02	0.03	0.02	0.03
Transport - land	0.17	0.01	0.03	0.03	0.03	0.04	0.04	0.04
Transport - air	0.16	0.02	0.11	0.21	0.12	0.14	0.28	0.16
Communications	0.12	0.01	0.03	0.03	0.03	0.04	0.05	0.03
Finance	0.12	0.01	0.04	0.04	0.04	0.05	0.06	0.05
Real Estate	1.09	0.17	0.38	0.45	0.34	0.45	0.57	0.40
Community Services	0.24	0.01	0.03	0.02	0.03	0.04	0.02	0.04
Health	0.02	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Govt Services	0.16	0.00	0.02	0.01	0.02	0.02	0.02	0.03
Final multipliers for Foreign Education Services	10.45	0.59	1.57	1.77	1.53	2.26	2.27	2.10