



The Economic Impact of International Education in New Zealand 2015/16

for Education New Zealand

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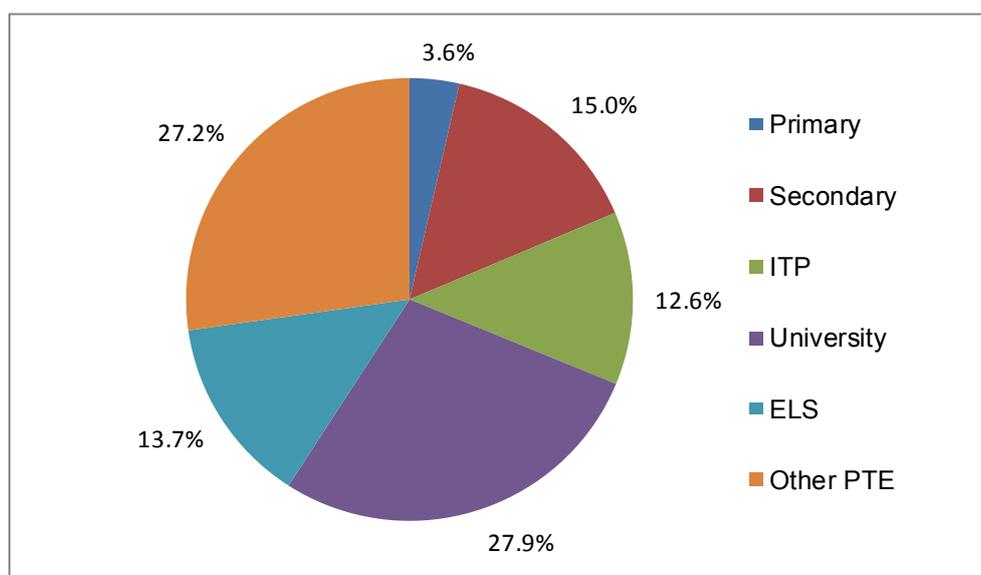
1. Executive Summary

Education New Zealand commissioned Infometrics and National Research Bureau (NRB) to estimate the current size of the onshore international education industry – comprising expenditure by international students in New Zealand during 2015/16.

International education comprises both onshore and offshore activity. This report looks only at the onshore side – foreign students studying in New Zealand. A recent report looked at the offshore activity, estimating its revenue (foreign exchange earnings) at \$171m, its direct value added or contribution to Gross Domestic Product (GDP) at \$118m and its total (direct plus indirect plus induced) contribution to GDP at \$242m.¹

In this report we estimate comparable figures for the onshore activity of the industry at \$3.8 billion of foreign exchange earnings, direct contribution of GDP of \$1.9 billion and total (direct plus indirect plus induced) contribution to GDP of \$4.0 billion. The Other PTE sector is now almost the same size as the university sector. It has seen growth in the total number of students since 2012 of almost 50%.

Figure 1.1: Composition of the \$4.0 billion Total Contribution to GDP



In 2012/13 the total contribution to GDP was much lower at \$2.5 billion. Driving the increase has been a 25% increase in the total number of students and large rises across the sector in expenditure on living costs, particularly by primary school students where expenditure includes that of guardians. Expenditure by this group was probably understated in previous assessments, but a much larger sample size for this group has greatly enhanced the robustness of the estimates.

Another factor that could have caused the lift in expenditure is students remaining in New Zealand after their course has finished, perhaps moving on to more study after a gap or seeking to work in New Zealand. To the extent that the latter is true it may not

¹ Covec and Infometrics (2015): *Development and Implement of a New Valuation Methodology for NZ's Services Education Export*. Report to Education New Zealand

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be entirely valid to attribute all the expenditure of such students to the international education industry.

Total employment (direct plus indirect plus induced) attributable to the industry is estimated at over 32,000 filled jobs, compared with 28,000 in 2012/13, an implied rate of increase of 14% which is much lower than the increase in the contribution to GDP (value added) and also lower than the increase in the number of students. This contrast suggests that another reason for the large increase in value added is price inflation, as volume changes would be more likely to drive changes in employment. The most significant component of price inflation would likely be the steep escalation in property prices (and hence accommodation costs) in the last few years, particularly in Auckland which has two thirds of international students.

While Auckland has by far the most students, the highest average spend is by students in Waikato (Hamilton). Otago (Dunedin) students have the highest mean tuition fee, reflecting the relatively high proportion of university students, but living costs there are below average.

Twenty-six percent of students came from China in 2015 and they produced 35% of total value added, although the students with the highest average spend come from the Middle East and Korea.

2. Methodology

Overview

The size of the international education industry is estimated using data from three main sources:

1. Ministry of Education data on the number of international students and their tuition fees.
2. A primarily web-based survey of expenditure by students on living costs.
3. Economic multipliers from Butcher Partners.

Official data on the number of students is used to weight the results of the survey of spending on living costs in order to obtain estimates of total spending. The primary weighting is by type of educational institution, with second-level weighting by source country/region and New Zealand region of study.

Combining total spending on living costs with total spending on tuition fees yields an estimate of the total amount of onshore spending by international students. Again this total spending can be disaggregated by institution of study and so on. Subtracting income earned from working in New Zealand provides a truer picture of the industry's foreign exchange earnings.

After adjusting for the import content of spending and the purchase of second hand goods (motor vehicles), it is possible to obtain an estimate of the contribution of the international education industry to New Zealand's Gross Domestic product (GDP), also known as value added.

Survey of Student Living Costs

The survey seeks to obtain estimates of expenditure by students on living costs covering a maximum period of 12 months, or their time in New Zealand where that is less than 12 months. Durations of stay may exceed durations of study.

As noted above the survey is primarily web-based, with about 5% of returns being paper-based. Invitations to participate in the survey were sent to all usable email addresses in a sample of 18,564 students provided to us by Immigration New Zealand.² We received 8007 responses, which were weighted by the student numbers in Tables 3.1 and 3.3. As the survey is over 20 pages long it is not included in this version of the report. It is available on request.

There were two versions of the survey; one for students who are required to be with a carer or guardian, and one for all other students. With regard to the former it is deliberately intended to capture the spending of the carer as well as that on behalf of the

² The full sample provided had 19,782 names, but 1218 of them had unusable contact details.

student. As the carer would not be in New Zealand, but for the student, their combined spending is attributed to international education.³

As might be expected with a predominantly self-completion web-based survey, a number of nonsensical responses occur. With thousands of replies and dozens of questions it is impractical to check every answer to every question, and if one could it is not always possible to distinguish a legitimate outlier, such as spending \$250,000 on a vehicle, from an error such as an inadvertent extra zero. Thus for each question we calculate the mean and standard deviation from the raw data, and then limit all cell values for that question to be no higher than the mean plus five standard deviations. This assumption can be changed. A lower value would reduce more outliers, but of course would increase the risk of incorrectly limiting a legitimate answer.

A brief discussion of the advantages and disadvantages of web surveys versus traditional random sampling is given in Appendix A.

³ There is a possibility of double counting in tourism statistics if carers do not select 'education' on their arrival/departure cards as their main purpose of visit.

3. International Students in New Zealand

The following two sections relate to students classified as “full fee-paying” by the Ministry of Education. A section on other types of international students follows later.

Full Fee-Paying Students

Data on the number of full fee-paying students (which excludes PhD students) by type of provider for 2015 was supplied by the Ministry of Education. To maintain comparability with earlier research, six types of provider – also referred to as sub-industries of the Education industry – are identified:

1. Primary school, including intermediate schools
2. Secondary school
3. Institutes of technology, polytechnics, and wananga
4. Universities
5. English language schools
6. Other private tertiary establishments

Table 3.1 shows the distribution of full fee-paying students by education sub-industry and source country or region. In total there were about 116,000 full fee-paying students in 2015 – depending on how they counted. This is a strong 26% increase on 2012 of 91,700.

The other Private Training Establishments (PTE) sector had the most students – about 42,000 or 36% of the total.

As in past years China (including Hong Kong) still has the largest market share with 27.0% of students. India is next with 25% followed (a long way behind) by Japan with 8%. The largest individual ‘cell’ by far is the 20,695 Indian students at Other Private Training Establishments (PTEs).

A similar story applies to revenue from tuition fees – Table 3.2. Total revenue was \$1030m of which 36% is paid by Chinese students and 21% by Indian students. The total value of tuition fees paid by Chinese students at university exceeds the total value of tuition fees paid by Indian students at Other PTEs.

With regard to New Zealand region of study (Table 3.3) Auckland totally dominates the industry, with at least 66% of total students. We say ‘at least’ because some tertiary students have secondary campuses in Auckland, but those students were not separately identified in the data supplied by the Ministry of Education. Auckland’s share of fee revenue is at least 65%.

The largest individual cell in terms of both student numbers and tuition fee revenue is PTE students in Auckland – Table 3.4.

Table 3.1: Full Fee-Paying Student Numbers by Sector and Source

	Primary	Secondary	ITP	University	ELS	Other PTE	Total
Brazil	10	370	50	210	1,670	645	2,955
Chile	10	210	45	20	385	180	850
China	755	5,225	4,370	9,660	3,090	8,450	31,550
Colombia	0	60	20	30	715	285	1,110
Germany	25	1,805	140	140	845	75	3,030
India	25	55	6,695	1,040	65	20,695	28,575
Indonesia	5	120	110	245	60	225	765
Japan	190	2,445	230	390	5,015	1,135	9,405
Korea	1,110	1,280	275	580	2,280	1,780	7,305
Malaysia	15	75	110	1,110	25	180	1,515
Pacific Island	10	300	410	415	15	840	1,990
Pakistan	0	0	20	30	0	25	75
Philippines	10	20	845	50	15	2,640	3,580
Saudi Arabia	90	40	400	645	1,180	385	2,740
Thailand	95	1,270	100	235	1,000	545	3,245
USA	25	75	85	1,690	5	140	2,020
Vietnam	15	240	200	610	125	490	1,680
Other Europe	60	1,235	330	600	3,110	480	5,815
Other Latin & South America	5	65	20	55	210	130	485
Other Middle East	0	20	25	290	75	80	490
Other North America	5	95	35	105	85	135	460
Other South-East Asia	50	260	370	735	725	810	2,950
Rest of the World	<u>15</u>	<u>135</u>	<u>740</u>	<u>385</u>	<u>310</u>	<u>1,700</u>	<u>3,285</u>
Total	2,525	15,400	15,625	19,270	21,005	42,050	115,875

Excludes PhD, Exchange and FRPG students

Table 3.2: Fee Income by Sector and Source (\$m)

	Primary	Secondary	ITP	University	ELS	Other PTE	Total
Brazil	0.1	2.7	0.6	3.9	4.0	5.1	16.3
Chile	0.0	1.5	0.5	0.4	1.2	1.0	4.5
China	3.7	53.7	49.9	186.3	9.4	68.7	371.6
Colombia	0.0	0.5	0.2	0.6	1.7	2.2	5.2
Germany	0.1	11.9	1.4	2.7	2.4	0.7	19.2
India	0.1	0.5	70.2	20.1	0.1	128.9	219.9
Indonesia	0.0	1.0	1.1	4.8	0.3	2.3	9.6
Japan	0.8	17.2	2.5	7.3	12.8	8.5	49.1
Korea	5.4	11.7	2.9	12.3	5.5	12.8	50.5
Malaysia	0.1	0.7	1.2	22.0	0.1	1.7	25.8
Pacific Island	0.1	2.7	4.1	7.4	0.0	5.5	19.9
Pakistan	0.0	0.0	0.2	0.6	0.0	0.2	1.0
Philippines	0.1	0.2	7.4	1.0	0.0	17.2	25.8
Saudi Arabia	0.5	0.4	4.9	11.6	3.0	3.1	23.5
Thailand	0.5	10.5	1.0	4.6	2.5	3.8	22.8
USA	0.2	0.6	0.8	33.6	0.0	2.2	37.4
Vietnam	0.1	2.4	2.1	10.7	0.3	4.1	19.7
Other Europe	0.2	8.2	2.6	12.0	7.9	4.5	35.4
Other Latin & South America	0.0	0.5	0.2	0.9	0.6	0.8	3.0
Other Middle East	0.0	0.2	0.3	5.7	0.2	0.5	7.0
Other North America	0.0	0.9	0.3	2.1	0.3	1.2	4.8
Other South-East Asia	0.3	2.4	4.0	13.9	1.9	6.5	28.9
Rest of the World	0.1	1.4	7.7	7.3	0.7	11.5	28.6
Not elsewhere defined	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.4</u>	<u>0.4</u>
Total	12.4	131.7	166.0	371.8	54.9	293.2	1,030.0

Excludes PhD, Exchange and FRPG students

Table 3.3: Full Fee-Paying Student Numbers by Sector and Region of Study

	Primary	Secondary	ITP	University	ELS	Other PTE	Total
Auckland	1,725	8,300	6,530	10,580	14,755	34,375	76,265
Waikato	150	890	1,230	1,805	750	440	5,265
Wellington	65	1,155	1,330	2,155	1,210	405	6,320
Canterbury	130	1,535	1,345	1,775	1,560	3,135	9,480
Otago	35	665	380	1,765	1,120	770	4,735
Other North Island	340	2,090	2,870	1,010	1,230	2,685	10,225
Other South Island	75	785	1,880	10	380	30	3,160
Not elsewhere defined	<u>0</u>	<u>0</u>	<u>45</u>	<u>700</u>	<u>15</u>	<u>175</u>	<u>935</u>
Total*	2,520	15,420	15,610	19,800	21,020	42,015	116,385

Excludes PhD, Exchange and FRPG students

*Totals may differ from those in Table 3.1 due to rounding and students being counted in more than one location.

Table 3.4: Fee Income by Sector and Region

	Primary	Secondary	ITP	University	ELS	Other PTE	Total
Auckland	8.1	83.0	75.9	224.6	41.3	233.6	666.5
Waikato	0.7	6.8	13.9	28.0	1.5	3.5	54.4
Wellington	0.2	7.7	17.4	30.2	3.1	2.9	61.5
Canterbury	0.8	11.8	13.7	32.1	3.5	26.5	88.4
Otago	0.2	5.2	3.6	36.1	2.4	5.1	52.6
Other North Island	2.2	12.5	24.6	17.4	2.3	19.7	78.7
Other South Island	0.2	4.6	16.4	0.1	0.8	0.5	22.7
Not elsewhere defined	<u>0.0</u>	<u>0.0</u>	<u>0.5</u>	<u>3.3</u>	<u>0.0</u>	<u>1.4</u>	5.2
Total	12.4	131.7	166.0	371.8	54.9	293.2	1030.0

Excludes PhD, Exchange and FRPG students

International PhD Students

International PhD students in New Zealand pay the same fees as domestic students. They are not categorised as “full fee-paying students” in Ministry of Education data and hence are not counted in Tables 3.1-3.4. From an industry perspective, however, they are nonetheless international students studying in New Zealand. For 2015 the Ministry recorded 4088 such students – see Table 3.5.

Because data on the tuition fees that PhD students pay is not collected by the Ministry, we have estimated the mean PhD fee at about \$7000.⁴ The estimate should be seen as approximate, as fees vary by subject, by university, and by the ratio of coursework to thesis. Living cost expenditure for international PhD students is assumed to be equal to the average across all international university students.

Other International Students

Table 3.5 shows other types of foreign students who receive some form of assistance.

Table 3.5: Other Foreign Students in 2015

Subsector	Assistance Type	Students
Universities	NZAID student	480
	International Fee-Paying Student (including people on Work Visa)	20,120
	Student on a recognised exchange scheme	1,322
	Foreign research based post-graduate	475
	Visiting military personnel, diplomatic staff or family, persons associated with Antarctic programme	0
	International On-Shore PhD student	4,088
Polytechnics	NZAID student	95
	International Fee-Paying Student (including people on Work Visa)	17,240
	Student on a recognised exchange scheme	212
	Foreign research based post-graduate	36
Wananga	International Fee-Paying Student (including people on Work Visa)	5
Private Training Establishments	NZAID student	5
	International Fee-Paying Student (including people on Work Visa)	17,675
School	Student on a recognised exchange scheme	8
	Student on a recognised exchange scheme	967

Source: Ministry of Education.

Fees may be paid by New Zealand residents or entities, such as through the Ministry of Foreign Affairs and Trade (eg NZ Aid students). In other cases there are exchanges of students between New Zealand and foreign institutions with no associated fees at all, and NZ Aid students doing on-the-job training have their living costs paid by New Zealand. Children whose parents are in New Zealand on Work Visas and the children of military personnel are not counted within any definition of international education.

⁴ <http://www.universitiesnz.ac.nz/files/Fees%20for%20Domestic%20Students%202016.pdf>

To avoid possible over-estimation of the size of the industry we account only for the living cost expenditure of Exchange students and Foreign Research Post-Graduate (FRPG) students, on the assumption these costs are not financed by New Zealand institutions, and thus would contribute to foreign exchange earnings.

The estimates of living cost expenditure are based on the sample results for all students, weighted by sector, country of origin or New Zealand region of study. That is, the survey does not specifically identify Exchange or FRPG students.

Note that the exclusion of tuition costs for this group has the effect of lowering the average tuition fee implied by Tables 3.1–3.4.

Economic Impact of International Students

Total expenditure including tuition fees, for all international students as defined above, classified by education sector is summarised in Table 3.6. An example of how to read the table for university students is given after the table.

Key results from Table 3.6 are:

1. Total foreign exchange earnings, encompassing tuition and living costs, but excluding expenditure that is financed by income earned from working in New Zealand, is estimated to be \$3.8 billion.
2. The direct value added or contribution to GDP is \$1.9 billion.
3. The total (direct plus indirect plus induced) contribution to GDP is estimated at \$4.0 billion. This figure is calculated by starting with foreign exchange earnings; subtracting expenditure on indirect taxes (GST and excise duty), imports and used vehicles; re-allocating trade margins; applying economic multipliers to measure the flow-on effects of the net spending; and finally adding back the indirect taxes. Appendix B provides more information on economic multipliers.
4. Expenditure by international students in New Zealand directly generated around 15,000 filled jobs. Adding on indirect and induced employment raises the total to over 32,000 filled jobs.
5. Primary students have by far the highest mean living costs as their expenditure includes that of their carer or guardian.
6. University students face the highest mean tuition fee.
7. However the in terms of foreign exchange earnings the PTE sector has a narrow lead over the university sector.

A note of caution here though: In cases where students report studying in more than one sector, they are allocated to the sector mentioned first in the survey. It is fair to assume that a share of the living costs of short course students (such as those at ELS or PTE institutions) occurs either after they move onto to other types of study or after they have finished studying, but remain in New Zealand. Classifying students who attend more than one type of institution is always somewhat arbitrary as they were not asked about the length of time spent at each, let alone to apportion their expenditure.

Table 3.6: Summary of Economic Impacts

		Primary	Secondary	ITP	University	ELS	PTE	Total
Gross Activity								
No. students*	No	2526	16366	15873	25155	21005	42058	122983
Mean living costs	\$	55871	28131	23809	27015	25126	22755	
Mean tuition fees	\$	4891	8046	10459	15917	2614	6972	
	\$	60763	36178	34269	42932	27740	29727	
Mean NZ earnings	\$	1972	1251	4278	2452	1389	4847	
Total forex earnings	\$m	149	572	476	1018	554	1046	3814
Value-Added Analysis								
Total net spending^	\$m	120	487	402	875	461	884	3228
Labour / Output	No/\$m	4.30	5.45	4.85	5.27	3.68	4.44	4.30
Value Add /Output	\$/ \$	0.57	0.61	0.61	0.63	0.57	0.60	0.57
Employment	No.	514	2651	1950	4608	1696	3921	15340
Value Added	\$m	68	295	243	551	264	527	1949
<u>Multipliers - Type I</u>								
Gross Output		1.71	1.64	1.65	1.61	1.72	1.67	
Employment		1.67	1.50	1.56	1.50	1.78	1.62	
Value Added		1.56	1.48	1.49	1.44	1.56	1.51	
<u>Multipliers - Type II</u>								
Gross Output		2.20	2.21	2.23	2.21	2.17	2.21	
Employment		2.18	1.97	2.08	2.02	2.34	2.16	
Value Added		2.00	1.97	1.98	1.94	1.97	1.98	
<u>Activity by Type I multipliers</u>								
Gross Output	\$m	205	799	665	1409	792	1478	5349
Employment	No.	858	3976	3033	6920	3020	6335	24142
Value Added	\$m	107	437	362	793	412	794	2904
<u>Activity by Type II multipliers</u>								
Gross Output	\$m	263	1076	895	1937	1002	1952	7126
Employment	No.	1120	5218	4065	9296	3966	8468	32133
Value Added	\$m	137	580	482	1068	521	1042	3830
Indirect tax	\$m	8	27	29	59	31	60	214
Value Added plus Tax	\$m	145	607	511	1127	552	1102	4044
Survey sample size		241	1469	1002	2449	1093	949	7203

Source: Survey results. Multipliers calculated from data supplied by Butcher Partners. Sector is according to what is first reported.

*Includes PhD, Exchange and FRPG students.

^Net of indirect taxes, used vehicles, and imports.

Example (University Students):

1. There were 25,155 university students in 2015 (19,270 from Table 3.1 plus 4088 PhD students, 1322 Exchange, and 475 FRPG students (Table 3.5).
2. University students have mean living costs of \$27,015 and mean tuition fees of \$15917 (including those who pay nothing), giving an average total spend of \$42,932.
3. Mean earnings by university students were \$2452.
4. Netting out earnings in New Zealand implies total foreign exchange earnings of \$1018m.
5. To calculate the economic flow-on effects we subtract indirect taxes (GST and excise duty), expenditure on imported goods and expenditure on second hand goods (motor vehicles). Net spending by all university students is \$875m.
6. This expenditure generates direct employment of 4608 filled jobs and value-added (contribution to GDP) of \$551m.
7. The Type I multipliers, which capture the indirect or upstream effects of spending by students, raise total spending to \$1409m, employment to 6920 filled jobs, and value added to \$793m. An example of the type of additional employment generated by the Type I multiplier is a job in a printing company producing stationery for universities.
8. The Type II multipliers capture the induced or downstream effects of spending by students. Total spending increases to \$1937m, employment to 9296 filled jobs, and value added to \$1068m. An example of the type of additional employment generated by the Type II multiplier is a job in retailing that is supported by the spending of university staff, whose salary is in part paid by university students.
9. To obtain an estimate for the total contribution to New Zealand's GDP of international university students we add the indirect taxes back to the Type II value-added, to obtain \$1127m.

Industry Comparison

Table 3.7 shows a number of industries that are comparable to the onshore international education industry, in terms of their direct contribution to GDP. It is very similar in size to Beverage & Tobacco Manufacturing and to Information Media.

Table 3.7: Contribution to GDP of Selected Industries

Industry	\$m
International education (from Table 3.6)	1949
Meat and meat product manufacturing	1767
Beverage and tobacco manufacturing	1924
Fabricated metal products	1885
Rail, water, air and other transport	1888
Information media	1925
Insurance & superannuation funds	2441

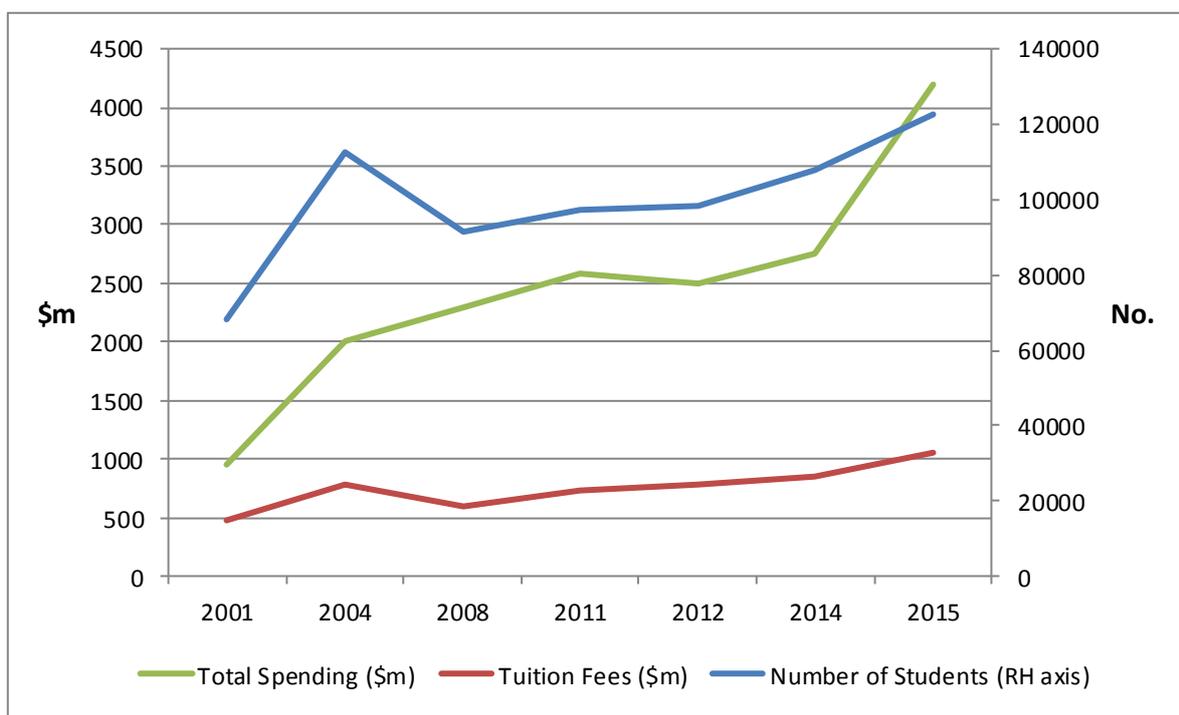
Source: Infometrics regional model

Historical Comparison

Figure 3.1 shows the trend in total (full fee-paying and other) student numbers and tuition fee income (including PhD students). After a period of negative growth between 2004 and 2008, and low growth until about 2012, student numbers and fee revenue have reached new highs, putting the industry back on a solid growth path.

However, the steep growth in total student spending over the last two years outstripped the growth in spending on tuition fees and the growth in student numbers. This is partly a compositional effect; more school students who tend to stay for a full year, and other students either proceeding to further study or obtaining work permits. Price inflation, particularly for accommodation costs, would also be a contributing factor.

Figure 3.1: Historical Comparison, Number of students & Spending



4. Disaggregated Look at Expenditure

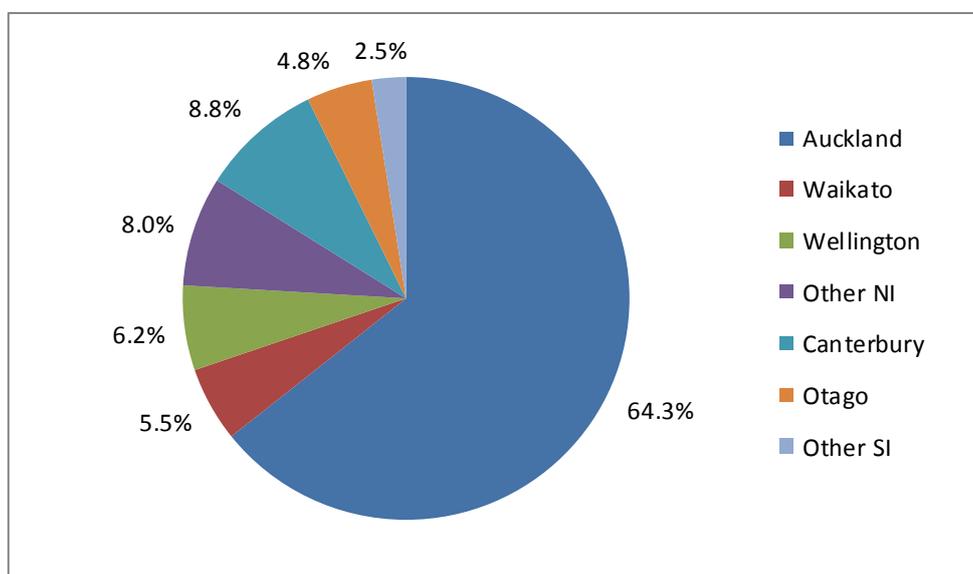
Expenditure by New Zealand Region of Study

Table 4.1 and Figure 4.1 present the economic impacts of international students by their main New Zealand region/city of study. Students who did not report a region of study are allocated to Other North Island.

Total foreign exchange earnings are estimated to be about \$3.6 billion, which is lower than the value in Table 3.6 of \$3.8 billion. The difference arises because in our survey we do not have cell sizes large enough to simultaneously classify students by education sector, country of origin and New Zealand region of study. Thus inconsistencies arise when weighted cell counts are combined in different ways.

As in previous years we choose to use estimates based on sector by country of origin in preference to estimates based on sector by New Zealand region of study, as spending variability across countries is greater than across (broad) New Zealand regions – net of inter-sector variation. This practice happens to produce a lower estimate of total spending when spending is analysed by New Zealand region of study, but there is no theoretical reason why the difference should be in this direction. In any case the difference is only about 5% which is well within survey error margins.

Figure 4.1: Foreign Exchange Earnings by New Zealand Region of Study



Theoretically the sum of the regional GDP effects in Table 4.1 should be less than the total GDP effect presented in Table 3.6, which it is – \$3.3 billion compare to \$4.0 billion respectively. Of this \$700m difference, \$200m is the initial discrepancy referred to above while the remaining \$500m arises because any activity that leaks out of a given region to other regions in New Zealand is not picked up by the multipliers for that region. For example if a student in Wellington purchases wine that is made in Otago, that spending represents leakage from Wellington, but it is not captured in the estimates for the economic effects of international education in Otago – which relate only to students who study in Otago. A lack of data on inter-regional trade flows prevents us from tracking such leakage between regions.

Table 4.1: Economic Impacts by New Zealand Region of Study 2015/16*

		Auckland	Waikato	Wellington	Other N.I.^	Canterbury	Otago	Other S.I.	Total
Number of students*	No	78860	5821	7378	11883	10662	5646	3242	123492
Mean living costs	\$	24861	27279	24366	21559	25205	23035	23264	
Mean tuition fees	\$	<u>8592</u>	<u>9684</u>	<u>8813</u>	<u>7431</u>	<u>8825</u>	<u>10018</u>	<u>6993</u>	
	\$	33453	36963	33179	28989	34029	33053	30258	
Mean earnings	\$	3710	2750	2560	4428	3842	2285	2439	
Total forex earnings	\$m	2346	199	226	292	322	174	90	3648
Total net spending	\$m	1991	167	194	226	270	150	76	3075
Employment	No.	8730	855	956	1224	1388	775	398	14326
Value Added	\$m	1202	99	118	137	163	92	45	1855
<u>Activity by Type I multipliers</u>									
Gross Output	\$m	2887	235	271	327	392	208	103	4422
Employment	No.	12909	1159	1282	1716	1959	1066	542	20634
Value Added	\$m	1621	128	153	181	218	117	57	2476
<u>Activity by Type II multipliers</u>									
Gross Output	\$m	3636	281	331	406	491	253	123	5521
Employment	No.	16246	1391	1551	2134	2430	1307	653	25712
Value Added	\$m	2036	154	186	224	273	142	68	3081
Indirect tax	\$m	131	12	12	15	19	9	5	203
Value Added + tax	\$m	2167	165	198	238	291	151	73	3284
Survey sample size	No	4203	361	497	858	607	219	457	7202

* Totals differ from those in Table 3.6 due to possible double counting of students in multiple regions and sample size variability.

^ Includes students in unknown regions.

Foreign exchange earnings in the Auckland region total \$2.2 billion, around 64% of the total. The total effect on the region's GDP is around \$2.2 billion and total employment generated by international education in the region is over 16,000 jobs. No other region is close to Auckland in either student numbers or foreign exchange earnings. However, two regions (Waikato and Canterbury) have higher mean expenditure per student.

Table 4.2 shows the relative contribution of international education spending to total GDP in each region. Unsurprisingly Auckland is the region that is most reliant on the industry, with international education accounting for 2.7% of its GDP. Otago follows with 1.6%. It is worth re-iterating that the industry's contribution in a region relates only to the spending of students in that region. That is, leakage from one region to another, such as a Waikato student buying furniture made in Auckland, is not picked up in these figures. As implied by the bottom of Table 4.2, on a national basis such leakage amounts to 0.3% of GDP – the difference between the sum of the identifiable regional effects at 1.5% and the true national total effect of 1.8%.

**Table 4.2: International Education Share of Regional GDP
(direct + indirect +induced)**

Region	GDP (2015) \$m	International Education \$m	International Education share
Auckland	80,562	2167	2.7%
Waikato	19,507	165	0.8%
Wellington	29,397	198	0.7%
Other North Island*	40,377	238	0.6%
Canterbury	27,443	291	1.1%
Otago	9,253	151	1.6%
Other South Island	12,989	73	0.6%
Total above	219,529	3284	1.5%
Total NZ	219,529	4044	1.8%

Source: Infometrics regional model

* including unknown region of study

Expenditure by Source Country/Region

The economic effects of international students by source country or region are shown in Table 4.3 and Figure 4.2. Total foreign exchange earnings amounted to \$3.79 billion which is very close to the \$3.81 billion in Table 3.6.

Unsurprisingly China is the largest market, generating \$1.3 billion of foreign exchange earnings and \$1.4 billion in total (direct plus indirect plus induced) value added. Chinese students constitute about 26% of the total number of international students and 35% of total foreign exchange earnings.

The top four countries (China, India, Korea and Japan) account for two-thirds of total (direct plus indirect plus induced) value added.

On a per capita basis Saudi Arabian and Other Middle East students are the biggest spenders, due to their concentration in university courses. Excluding tuition fees, the highest per capita spending is by Korean students.

Table 4.3: Economic Impacts by Source Country/Region 2015/16

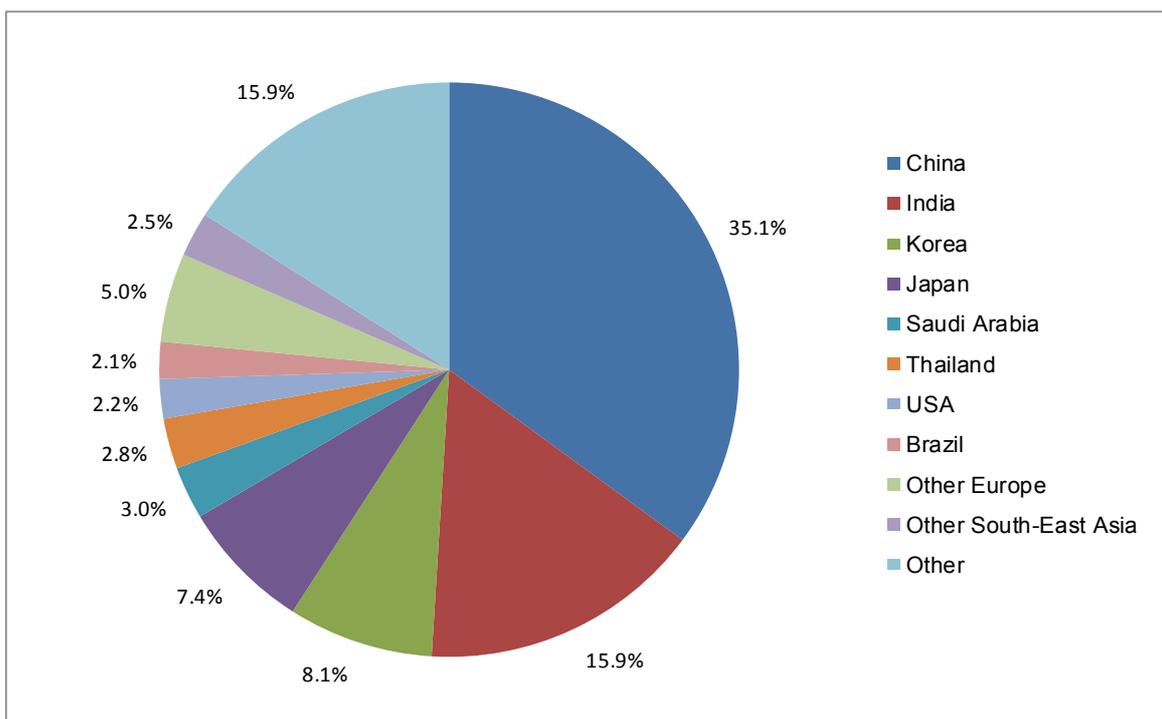
		Brazil	China	Germany	India	Indonesia	Japan	Korea
Number of students	No	3014	32482	3506	28967	918	9598	7378
Mean living costs	\$	23362	31462	17145	19312	25351	25330	36646
Mean tuition fees	\$	5503	11574	5779	7676	11429	5139	6877
	\$	28865	43036	22924	26988	36779	30469	43523
Mean earnings	\$	2624	2068	638	6231	2554	1309	1831
Total forex earnings	\$m	79	1331	78	601	31	280	308
Total net spending	\$m	67	1109	67	519	27	239	257
Employment	No.	286	5641	317	2576	137	934	1064
Value-Added	\$m	40	670	40	317	17	144	151
<u>Activity by Type I multipliers</u>								
Gross Output	\$m	113	1828	109	858	44	399	434
Employment	No.	474	8699	503	3932	209	1590	1783
Value Added	\$m	60	996	60	469	25	216	231
<u>Activity by Type II multipliers</u>								
Gross Output	\$m	147	2457	146	1158	60	513	560
Employment	No.	628	11524	667	5280	279	2103	2351
Value Added	\$m	78	1323	79	625	33	275	296
Indirect tax	\$m	4	77	4	33	2	14	17
Value Added + tax	\$m	82	1400	83	659	34	288	313
Survey sample size	No	106	2359	336	1957	56	263	307

Table 4.3: Economic Impacts by Source Country/Region 2015/16 (continued)

		Malaysia	Pacific Island	Philippines	Saudi Arabia	Thailand	USA	Vietnam
Number of students	No	1803	2057	3618	2807	3336	2749	1809
Mean living costs	\$	24327	19621	18505	35211	27403	17730	26078
Mean tuition fees	\$	<u>15298</u>	<u>9829</u>	<u>7190</u>	<u>8470</u>	<u>7010</u>	<u>14275</u>	<u>11331</u>
	\$	39625	29449	25695	43681	34412	32004	37409
Mean earnings	\$	1906	3237	3893	3641	2152	1437	2816
Total forex earnings	\$m	68	54	79	112	108	84	63
Total net spending	\$m	59	47	68	96	89	74	54
Employment	No.	326	244	329	412	403	450	265
Value-Added	\$m	38	29	41	57	52	48	33
<u>Activity by Type I multipliers</u>								
Gross Output	\$m	96	76	112	161	150	116	89
Employment	No.	481	369	511	674	654	639	409
Value Added	\$m	54	42	61	86	79	67	49
<u>Activity by Type II multipliers</u>								
Gross Output	\$m	132	104	150	210	197	165	119
Employment	No.	644	494	683	892	865	860	546
Value Added	\$m	73	57	81	112	104	92	65
Indirect tax	\$m	4	3	4	6	6	4	3
Value Added + tax	\$m	76	60	85	118	110	97	68
Survey sample size	No	170	202	425	60	230	129	187

Table 4.3: Economic Impacts by Source Country/Region 2015/16 (continued)

		Other Europe	Other Latin & South America	Other Middle East	Other North America	Other South- East Asia	Rest of the World	Total
Number of students	No	7410	2603	934	731	3097	4166	122983
Mean living costs	\$	22102	21133	30861	18763	23097	24644	
Mean tuition fees	\$	<u>5238</u>	<u>5115</u>	<u>10693</u>	<u>7717</u>	<u>9500</u>	<u>8311</u>	
	\$	27340	26248	41554	26480	32597	32955	
Mean earnings	\$	1807	2768	4149	2289	1879	4768	
Total forex earnings	\$m	189	61	35	18	95	117	3791
Total net spending	\$m	159	52	30	15	81	100	3209
Employment	No.	741	234	145	84	397	496	15480
Value-Added	\$m	93	30	19	9	50	60	1937
<u>Activity by Type I multipliers</u>								
Gross Output	\$m	266	88	50	25	134	166	5313
Employment	No.	1190	382	226	124	616	767	24233
Value Added	\$m	142	46	27	14	73	90	2886
<u>Activity by Type II multipliers</u>								
Gross Output	\$m	352	115	67	34	179	222	7086
Employment	No.	1575	505	301	166	821	1022	32207
Value Added	\$m	186	61	36	19	97	120	3810
Indirect tax	\$m	11	3	2	1	5	7	211
Value Added + tax	\$m	197	64	38	20	102	126	4021
Survey sample size	No	275	143	108	48	151	483	7995

Figure 4.2: Foreign Exchange Earnings by Largest Source Country/Region

Two-Way Tables

The above tables are all one-way classifications: spending by education sector/industry (that is type of institution), spending by New Zealand region of study and spending by source country or region. In past studies multi-dimensional tables were generally prohibited by sample size considerations. Here though there are some opportunities for cross-tabulations across a number of dimensions.

For example the sample is large enough to analyse spending in Auckland by education sector or by main source country/region, or indeed by these two dimensions simultaneously –at least to some extent. These are options for further research.

Expenditure by Category

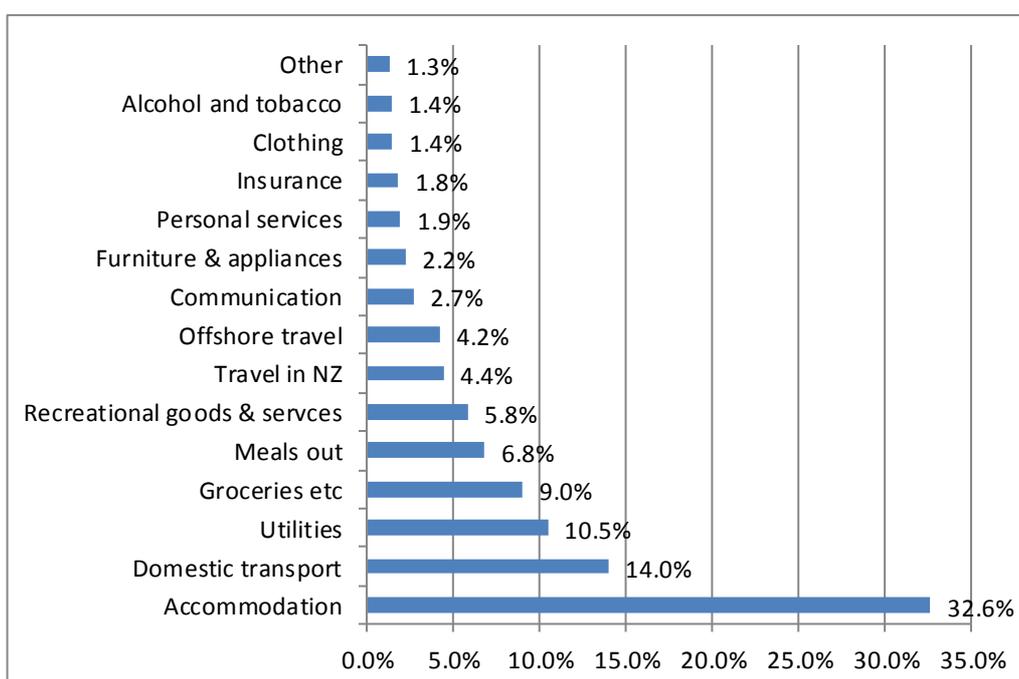
There are two reasons for asking students to report their expenditure at a reasonably fine commodity level. Most importantly, experience has shown that the sum of individually estimated components is more accurate (even if each is measured with substantial error) than simply asking for an estimate of total expenditure. Secondly, it provides us with at least some basis to calculate economic activity multipliers that capture the different spending patterns of different students. For example Auckland students probably spend more on accommodation than students in Waikato. However, these are generally second order effects.

So, while the survey was not designed to provide an accurate and detailed profile of expenditure, we can nevertheless obtain a reasonably valid picture of relative expenditure over broad commodity groups. This is illustrated in Figure 4.3. Average living cost expenditure is approximately \$25,600.

Accommodation (which includes utilities and meals where this is included in rent or board) is by far the largest component of expenditure. That plus domestic transport (including the purchase of a vehicle which may not be used exclusively for domestic transport) account for almost half of expenditure. Utility and grocery costs are the next highest components.

Accommodation costs constitute about 33% of total expenditure on living costs, or about 25% of total costs inclusive of tuition fees. Thus a 20% rise in accommodation costs has about the same effect as a 5% rise in the New Zealand dollar exchange rate. To date it seems as though this has not dented the demand from international students for a New Zealand education, but it will be interesting to see how long this apparent price insensitivity persists.

Figure 4.3: Composition of Student Living Cost Expenditure



5. Follow-up research

Living Cost Survey

The living cost survey dataset presents a number of possibilities for further analysis:

1. Respondents were asked about the extent to which they used spending records to answer the questions. It would be interesting to see if there is any relationship between the use of records and total reported expenditure, thereby providing some insight into reporting error.
2. Students were asked about their intention to travel to their home country during the year. We have not extrapolated spending on travel to include intended travel as it may not occur, but this could be interesting.
3. Students were also asked about the number of people who visited from their home country. Whether or not those visitors would have come to New Zealand if the student was not here is impossible to say, but it would be possible to impute an average amount of spending to those visitors.

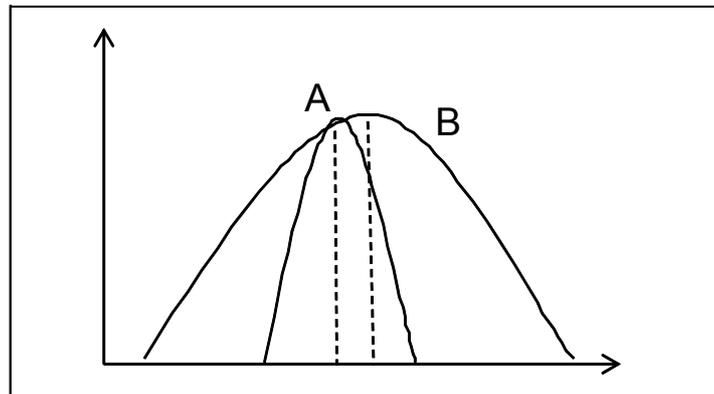
General Equilibrium Analysis

Given the size of the international education industry at around \$4 billion, it is easily large enough to be examined within a general equilibrium model. This would provide a more reliable analysis of the industry's economy-wide effects at the national level than standard multiplier analysis – as outlined in Appendix B.

Appendix A: Web Based Surveying

An advantage of inviting students to complete a web survey is that the number of responses is likely to be (and indeed was) much larger than what can be economically achieved by random interception of students at educational institutions. A disadvantage, however, is that one has no control over the randomness of replies. That is, are the spending patterns of those who choose to respond representative of all students, or are they biased in some way? Without direct comparison we can never be certain of the answer, but it may not matter that much. In Figure 3.2 the more concentrated distribution given by A represents a large non-random population that contains some bias. Distribution B in contrast has no bias, but a small sample size increase the probability of obtaining a biased estimate. Thus as long as the bias in A is not too large, a non-random sample may yield an estimate of spending that is closer to the true value than a proper random, but much smaller sample. In statistical parlance, the efficiency of estimate A is better than that of B.

Figure A1: Bias versus Variance



Appendix B: Economic Impact Analysis

The economic contribution of an industry does not mean that the economy is better off by the full amount of the measured contribution. That would only be true if all of the resources involved in supplying the needs of that industry would otherwise lie idle. This is unlikely.

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 an international 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 Type I multiplier which is defined as the ratio of the direct plus indirect effects, to the direct effect.

The supplying industries pay wages and salaries, which are used to purchase household consumption goods. This effect is generally known as the downstream or induced consumption effect. Again the effect may be measured by a multiplier. The total or Type II multiplier is defined as the direct, plus indirect production, plus induced consumption effects, all divided by the direct effect.

Multipliers are typically calculated for three different measures of economic activity:

- gross output
- value-added
- employment

Each of these is further disaggregated into Type I and Type II multipliers.

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 Manufacturing 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, or contribution to gross domestic product (GDP) which is of interest.

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 an international student spends \$100 in New Zealand, that \$100 is part of exports which is a component of final demand - the expenditure side of GDP. In this sense it represents 100% value-

added. 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 spending on imports, is eventually entirely exhausted on inputs of labour and capital; that is value-added.⁵ Thus the multiplier for the indirect upstream effects is just a representation of the process whereby the expenditure and income sides of the national accounts equilibrate. 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 and how much leaks offshore in the form of imports.

The more powerful effect is that of the induced consumption multiplier. The initial wage and salary payments and the subsequent rounds of 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. Again one cannot claim that the resources so used would be idle in the absence of education exports.

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 multipliers we use) to calculate the induced consumption multipliers.

Other enhancements are possible:

- allowing for consumption financed from social 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;
- 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 consumer imports.

Accounting for all of these effects requires the use of a multi-industry general equilibrium model. These types of models incorporate all of the main inter-dependencies in the economy, such as flows of goods from one industry to another,

⁵ In fact value-added also includes some forms of indirect taxation.

plus the passing on of higher wage costs in one industry into prices and thence the costs of other industries. They also ameliorate most of the other implicit assumptions that are commonly overlooked in the application of multipliers derived from static input-output tables, notably:

- not assuming that all factors of production are in excess supply,
- allowing for price changes (such as if a factor is in limited supply) which may lead producers to change inputs, thereby altering their production structure and hence the associated economic multipliers,
- not forcing average relationships to hold at the margin,
- automatically calculating 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.

Given the size of the international education industry a general equilibrium model analysis of the industry's wider economic impacts would seem worthwhile.