The Economic Impact of International Education in Southland 2015/16

for Education New Zealand

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1. Summary

Introduction

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.

Here we report on the results for the Southland region.

Results

International education students in Southland spend an average of $33,200 and foreign exchange earnings amounted to $46.3m in 2015/16.

The industries that directly supply goods and services to international students generate value added of $23.1m and 185 jobs. Incorporating indirect and induced effects raises employment to 268 jobs and value added to $31.2m. With indirect taxes the latter accounts for about 0.69% of Southland's Gross Domestic Product (GDP). The equivalent nation-wide proportion is 1.7%.

It should be noted that:

1. Estimates of tuition fees by region and sub-region may not be precise due to the difficulty of allocating fees paid by students studying at multi-campus providers or at multiple locations. The Ministry of Education advises that regional allocation of students and fees is approximate.

2. Regional impacts in Southland exclude spending by students based in other regions who may purchase goods and services in or from Southland.

3. The contribution to regional GDP does not mean that regional GDP would decline by this amount if the international education industry did not exist.

Summary of Economic Impacts

	Unit	Total
Gross Activity		
Number of students*	No	1470
Mean living costs	$	26,506
Mean tuition fees	$	6,683
Gross spending	$	33,189
Mean earnings	$	1700
Total forex earnings	$m	46.3
Value-Added Analysis		
Total net spending^	$m	39.2
Labour /Output	No/$m	4.74
Value Add / Output	$/$	0.59
Direct employment	No.	185.4
Direct value added	$m	23.1
Multipliers - Type I		
Gross Output		1.25
Employment		1.26
Value Added		1.20
Multipliers - Type II		
Gross Output		1.41
Employment		1.44
Value Added		1.35
Activity by Type I multipliers		
Gross Output	$m	49.0
Employment	No.	233.3
Value Added	$m	27.6
Activity by Type II multipliers		
Gross Output	$m	55.4
Employment	No.	267.9
Value Added	$m	31.2
Indirect tax	$m	2.5
Value Added plus Tax	$m	33.7
Regional GDP	$m	4857
International Education share		0.69%
Sample Size		104

Source: Survey results. Multipliers calculated from data supplied by Butcher Partners, weighted by expenditure patterns for 'Other South Island' to increase sample size.
*Includes fee-paying. PhD, Exchange and FRPG students.
^Net of indirect taxes, used vehicles, and imports.

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 – restricting the degree of geographical detail that can be reliably estimated.

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 the region's (or 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.[1] We received 8007 responses, which were weighted by the student numbers from the Ministry of Education. 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

[1] 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.[2]

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 even 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.

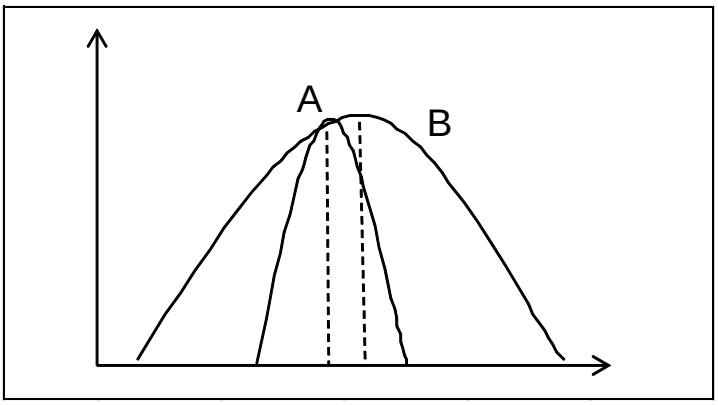
More information is provided in the full report: *The Economic Impact of International Education 2015/16*. Infometrics and National Research Bureau, report to Education New Zealand, October 2016.

[2] 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.

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 A1 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.[3] 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, 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

[3] In fact value added also includes some forms of indirect taxation.

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.

Appendix C: Glossary

Employment: number of jobs, with no distinction between full time and part time.

Foreign exchange earnings (forex): gross spending by all students, excluding income earned in New Zealand.

Gross spend/spending: total expenditure by students on tuition fees and living costs.

Indirect tax: primarily GST and excise tax.

Multipliers: multipliers capture the flow-on economic impacts from a given economic shock. See Appendix B for details.

Net spending: gross spending excluding indirect taxes, used vehicles, and imports. This is the basis for multiplier analysis.

Output /Gross Output: sales of goods and services.

Value added: The return to factors of production; labour (wages and salaries) and capital (depreciation and operating surplus), plus indirect taxes. This is equivalent to gross output less expenditure on intermediate inputs such as raw materials, energy, business services etc. Note that the application of multipliers requires goods and services to be valued in basic prices, which exclude indirect taxes.

Value added is also equivalent to gross domestic product (at a national or regional level) measured at factor prices, that is excluding indirect taxes paid by purchasers.