

Regional activity of universities

Data sources for assessing New Zealand universities
share of regional economic activity

NZIER report to Universities New Zealand - Te Pōkai Tara

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1. Summary

This report provides an estimate of the economic contribution of individual universities to their regions. The contribution is calculated by assessing the impact on the economy of the region if the services currently provided by the university were not available in that region and the students using those services went to other universities outside the region.

For this report we have considered three types economic of contribution:

- direct effects – comprising expenditure;
 - by universities on salaries and purchasing goods and services according to the audited 2015 annual accounts of each of eight universities
 - by domestic and international students on things like accommodation, entertainment, food, travel and other living expenses
- Indirect effects – first round of purchases by the industries that supply the goods and services purchased by universities and students
- Induced effects – these are the flow on effects of university related activity beyond direct and indirect effects.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. They can be estimated using multipliers that try to reflect the ripple effects of university expenditure on the economy, but this approach makes so many assumptions that the estimates should be seen as indicative only. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

Though indirect and induced effects are estimated in this report they should be seen as indicative only. See Appendix A for further caveats and comments on indirect and induced effects.

Table 1 shows the calculated direct spending and multiplier estimates of indirect and induced spending of each of New Zealand's eight universities. Direct university spending is all university expenditure on personnel, operating expenses and an estimate of capital spending. Student spending is broken out into spending by:

- domestic students whose home address was previously from within the university region
- domestic students who came from out of region to study at the university
- international students.

Table 1 Estimates of direct university spending and indirect and induced regional footprint

University spending (2015 annual reports) and estimated student spending in \$ million

Description	University of Auckland	Auckland University of Technology	University of Waikato	Massey University ¹	Victoria University of Wellington	University of Canterbury	Lincoln University	University of Otago ²
ESTIMATED EXPENDITURE								
University direct	1,007	347	234	454	383	323	116	555
Domestic students from the region	437	247	111	88	184	110	18	41
Domestic students outside the region	109	62	37	159	102	105	20	232
International students	95	66	31	51	41	29	12	36
Estimated total student expenditure	641	375	179	298	327	245	50	309
Estimated Total Direct Expenditure	1,648	722	414	752	710	568	165	864
Estimated Indirect footprint³	2,310	1,010	580	1,050	990	800	230	1,210
Estimated induced footprint⁴	5,930	2,600	1,490	1,620	2,560	2,040	600	3,110
Note:								
1. The 'Total direct' spending by Massey University is spread across its three campuses: Palmerston North, Wellington and Auckland. For this table the expenditure for Massey University is shown in a single column.								
2. The 'Total direct' spending by Otago University occurs mainly in Dunedin with some expenditure in Wellington and Christchurch. For this table the expenditure for Otago University is shown in a single column.								
3. Estimated direct university and student expenditure plus estimated indirect effects on regional expenditure								
4. Estimated direct university and student expenditure plus estimated indirect and induced effects on regional expenditure								

Source: NZIER analysis of data provided by Universities New Zealand and gathered from university websites

Table 2 shows the contribution of activity to attributable to the universities to regional GDP. University activity that contributes to regional GDP is spending on people and capital plus operating surplus and student spending less GST. This is a different measure of contribution to the regional economy from the expenditure footprint measure shown in the previous table.

Table 2 University spending that contributes directly to regional GDP – 2015

University spending (2015 annual reports) and estimated student spending in \$million

Description	Auckland	Waikato	Manawatu-Wanganui	Wellington	Canterbury	Otago
University of Auckland	1,337					
Auckland University of Technology	597					
University of Waikato		318				
Massey University ¹	114		401	67		
Victoria University of Wellington				545		
University of Canterbury					427	
Lincoln University					108	
University of Otago ²				39	40	662
Total direct contribution	2,047	318	401	651	574	662
Regional GDP	88,295	19,649	9,197	32,617	32,882	10,173
Total direct/GDP	2.32%	1.62%	4.36%	2.00%	1.75%	6.51%

Note:

1. The 'direct' spending by Massey University and the estimated spending by Massey University students is allocated across its Palmerston North, Auckland and Wellington campuses based on advice from Massey University. For this table the estimated spending by distance students is added to the contribution to GDP for Manawatu Wanganui. If this spending was removed the estimated contribution of Massey University to Manawatu Wanganui would fall by \$84 million (0.92 percent of Manawatu Wanganui GDP).
2. The 'direct' spending by Otago University and the estimated spending by Otago University students is allocated across its Dunedin, Christchurch and Wellington campuses based on advice from Otago University on the allocation of university expenditure and students to each campus.

Source: NZIER analysis of data provided by Universities New Zealand and gathered from university websites

Table 3 shows the number of staff universities employ in each city or region and what proportion of overall city/regional job numbers and the city/regional salary and wages spend the universities represent.

Table 3 Universities as local employers – number employed

University employment (total full time equivalent from 2015 annual reports) compared to jobs filled by salary and wage earners in the territorial authority where the university is located

Description	Auckland	Hamilton	Palmerston North	Wellington ³	Christchurch	Selwyn district	Dunedin
University of Auckland	5,075						
Auckland University of Technology	2,349						
University of Waikato		1,510					
Massey University ¹	612		2,065	439			
Victoria University of Wellington				2,073			
University of Canterbury					1,839		
Lincoln University						682	
University of Otago ²				190	230		3,383
Total university employment	8,036	1,510	2,065	2,702	2,069	682	3,383
Filled jobs (by TLA)	665,075	77,105	44,813	217,385	193,313	15,003	52,805
University FTE/TLA Filled jobs	1.2%	2.0%	4.6%	1.2%	1.1%	4.5%	6.4%
Note:							
1. The number of full time equivalent staff employed by Massey University is allocated across its Palmerston North, Auckland and Wellington campuses based on advice from Massey University.							
2. The number of full time equivalent staff employed by Otago University is allocated across its Dunedin, Christchurch and Wellington campuses based on advice from Otago University.							
3. Wellington includes the TLAs of Wellington City, Lower Hutt City, Upper Hutt City, Porirua City and the Kapiti Coast District.							

Source: NZIER analysis of data provided by Universities New Zealand and the 'Linked Employer Employee Database' from Statistics New Zealand

Table 4 Universities as local employers – salary and wages paid

University 'people cost' (\$m from 2015 annual reports) compared to estimated salary and wage payments (\$m) in the territorial authority where the university is located

Description	Auckland	Hamilton	Palmerston North	Wellington ³	Christchurch	Selwyn district	Dunedin
University of Auckland	601						
Auckland University of Technology	216						
University of Waikato		135					
Massey University ¹	49		192	31			
Victoria University of Wellington				208			
University of Canterbury					171		
Lincoln University						63	
University of Otago ²				27	27		331
People costs	865	135	192	266	198	63	331
Salary & wages (by TLA)	39,270	4,131	2,267	13,511	10,419	784	2,600
University people costs/TLA Salary & wages	2.2%	3.3%	8.5%	2.0%	1.9%	8.1%	12.7%
Note:							
1. The expenditure on 'people cost' by Massey University is allocated across its Palmerston North, Auckland and Wellington campuses based on advice from Massey University.							
2. The expenditure on 'people cost' by Otago University is allocated across its Dunedin, Christchurch and Wellington campuses based on advice from Otago University.							
3. Wellington includes the TLAs of Wellington City, Lower Hutt City, Upper Hutt City, Porirua City and the Kapiti Coast District.							

Source: NZIER analysis of data provided by Universities New Zealand and the 'Linked Employer Employee Database' from Statistics New Zealand

2. Introduction

The purpose of this report is to present a short profile of the size and shape of university activity relative to the region and territorial authority in which it is located. The profiles summarise:

- direct economic impacts of spending on staff, research, facilities and suppliers
- effects of retaining local students in the region and attracting domestic and international students to the region including:
 - spending on goods and services in the region
 - share of the housing rental market.

In addition to the profiles we have also included a summary of the main sources of data that we have used to assess the size and shape of the university activity relative to the region in which it is located.

In the presentation of this analysis for the six universities outside Auckland we have used both a broad definition of the area affected by the university – ‘region’¹ and a narrower definition of the area affected by the university – territorial local authorities (TLA) – as the comparators for university activity. For University of Auckland and Auckland University of Technology we have used the Auckland TLA as the area affected by the university.

The tables in this note mainly use data from 2015 (with some data from 2014 depending the availability of data from Statistics New Zealand).

In response to your questions we have also included an example of how a multiplier analysis could be applied to estimate university and student expenditure and we have described the issues and challenges in using this approach in Appendix A.

¹ As defined by Statistic New Zealand

3. University of Auckland

We have estimated the contribution of the University of Auckland (UoA) to the economy of the Auckland region (or territorial local authority (TLA)) in 2015 compared to a situation where the services offered by the UoA were not available in Auckland. UoA makes a direct contribution to the economy of the Auckland region through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the Auckland region)
- retention of university students in the Auckland region (who would otherwise have to move to access a university education).

We estimate that in 2015 this direct contribution was approximately \$1,648m made up as follows:

- direct UoA spending² of approximately \$1,007m in 2015 including:
 - \$601m on staff and contractors. (UoA employed 5,075 full time equivalent staff which is about 0.8 percent of the estimated filled jobs and about 1.5 percent of the salary and wages paid in the Auckland TLA.)
 - operating and occupancy spending of \$283m, most of which is spent on service providers in the region
 - capital spending of \$123m primarily on university building projects and upgrades
- UoA attracted or retained student spending³ (excluding tuition fees)⁴ to the region of up to \$641m made up as follows:
 - \$437m by an estimated 28,500 domestic equivalent full time students (EFTS) from within the Auckland region
 - \$109m by an estimated 5,700 domestic EFTS from outside the Auckland region
 - \$95m by an estimated 4,900 international EFTS.

In addition to the quantifiable direct contribution we also note the following ‘direct’ linkages that we have not been able to quantify.

² Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from UoA to regional GPP would be spending on staff, capital and operating surplus, a total of \$792m (0.9 percent of regional GDP). Estimated spending by UoA students (less GST) was \$545m (0.6% of regional GDP).

³ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See “The Economic Impact of International Education 2012/13 for Education New Zealand September 2013”, p19). We estimate retained student spending by multiplying the number of equivalent full time students (EFTS) by the estimated expenditure per student.

⁴ We estimate that the number of students is equivalent to approximately 11 percent of the estimated number of rooms available for rent in the residential housing market (excluding hostel accommodation) in the Auckland TLA based on Census 2013 data.

UoA acts as attractor for research spending⁵ in the region that would otherwise be allocated to other parts of the country. UoA also provides a bridge between academic research and the application of this research to local innovation through the Auckland Uniservices which in 2015 had 1,200 active contracts with 300 firms.

UoA also attracts visitors to the region for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by UoA and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to UoA
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find⁶) to the direct UoA expenditure and spending by UoA students and estimated the 'indirect' and 'induced' footprint of UoA in the Auckland region as:

- indirect footprint – direct spending plus estimated indirect effects – \$2,310m
- induced footprint – direct spending plus estimated indirect and induced effects – \$5,930m.

The approach to estimating the size of the footprint and the caveats on their interpretation are explained in detail in Appendix A.

⁵ In 2015 UoA earned research and contract revenues of \$253m. The direct contribution from this spend is already included in our estimates through the direct spending by UoA.

⁶ The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

4. Auckland University of Technology

We have estimated the contribution of the Auckland University of Technology (AUT) to the economy of the Auckland region (or territorial local authority (TLA)) in 2015 compared to a situation where the services offered by the AUT were not available in Auckland. AUT makes a direct contribution to the economy of the Auckland region through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the Auckland region)
- retention of university students in the Auckland region (who would otherwise have to move to access a university education).

We estimate that in 2015 this direct contribution was approximately \$722m made up as follows:

- direct AUT spending⁷ of approximately \$347m in 2015 including:
 - \$216m on staff and contractors. (AUT employed 5,075 full time equivalent staff which is about 0.4 percent of the estimated filled jobs and about 0.6 percent of the salary and wages paid in the Auckland TLA.)
 - operating and occupancy spending of \$84m, most of which is spent on service providers in the region
 - capital spending of \$47m primarily on university building projects and upgrades
- AUT attracted additional student spending⁸ (excluding tuition fees)⁹ to the region of up to \$375m per year made up as follows:
 - \$247m by an estimated 12,900 domestic EFTS from within the Auckland region
 - \$62m by an estimated 3,200 domestic EFTS from outside the Auckland region
 - \$66m by an estimated 3,500 international EFTS.

In addition to the quantifiable direct contribution we also note the following 'direct' linkages that we have not been able to quantify.

⁷ Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from AUT to regional GDP would be spending on staff, capital and operating surplus, a total of \$278m (0.3 percent of regional GDP). Estimated spending by AUT students (less GST) was \$319m (0.36 percent of regional GDP).

⁸ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See "The Economic Impact of International Education 2012/13 for Education New Zealand September 2013", p19). We estimate retained student spending by multiplying the number of equivalent full time students (EFTS) by the estimated expenditure per student.

⁹ We estimate that the number of students is equivalent to approximately 6 percent of the estimated number of rooms available for rent the residential housing market (excluding hostel accommodation) in the Auckland TLA based on Census 2013 data.

AUT acts as attractor for research spending¹⁰ in the region that would otherwise be allocated to other parts of the country.

AUT also attracts visitors to the region for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by AUT and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to AUT
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find¹¹) to the direct AUT expenditure and spending by AUT students and estimated the 'indirect' and 'induced' footprint of AUT in the Auckland region as:

- indirect footprint – direct spending plus estimated indirect effects – \$1,010m
- induced footprint – direct spending plus estimated indirect and induced effects – \$2,600m.

The approach to estimating the size of the footprint and the caveats on their interpretation are explained in detail in Appendix A.

¹⁰ In 2015 AUT earned research and contract revenues of \$11m. The direct contribution from this spend is already included in our estimates through the direct spending by AUT.

¹¹ The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

5. University of Waikato

We have estimated the contribution of the University of Waikato (UoW) to the economy of the Waikato region (and Hamilton territorial local authority (TLA)) in 2015 compared to a situation where the Waikato region did not have a university. UoW makes a direct contribution to the economy of the Waikato region through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the Waikato region)
- retention of university students in the Waikato region (who would otherwise have to move to access a university education).

We estimate that in 2015 this direct contribution was approximately \$414m made up as follows:

- direct UoW spending¹² of approximately \$234m in 2015 including:
 - \$135m on staff and contractors. (UoW employed 1,510 full time equivalent staff which is about 2 percent of the estimated filled jobs and about 3.3 percent of the salary and wages paid in the Hamilton TLA.)
 - operating and occupancy spending of \$78m, most of which is spent on service providers in the region
 - capital spending of \$22m primarily on university building projects and upgrades
- UoW attracted additional student spending¹³ (excluding tuition fees)¹⁴ to the region of up to \$179m per year made up as follows:
 - \$111m by an estimated 12,900 domestic EFTS from within the Waikato region
 - \$37m by an estimated 3,200 domestic EFTS from outside the Waikato region
 - \$31m by an estimated 3,500 international EFTS.

In addition to the quantifiable direct contribution we also note the following ‘direct’ linkages that we have not been able to quantify.

¹² Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from UoW to regional GPP would be spending on staff, capital and operating surplus, a total of \$166m (0.84 percent of regional GDP). Estimated spending by UoW students (less GST) was \$153m (0.78 percent of regional GDP).

¹³ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See “The Economic Impact of International Education 2012/13 for Education New Zealand September 2013”, p19). We estimate retained student spending by multiplying the number of equivalent full time students (EFTS) by the estimated expenditure per student.

¹⁴ We estimate that the number of students is equivalent to more than 20 percent of the estimated number of rooms available for rent in the residential housing market (excluding hostel accommodation) in the Hamilton TLA based on Census 2013 data.

UoW acts as attractor for research spending¹⁵ in the region that would otherwise be allocated to other parts of the country. UoW also provides a bridge between academic research and the application of this research to local innovation through WaikatoLink.

UoW also attracts visitors to the region for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by UoW and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to UoW
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find¹⁶) to the direct UoW expenditure and spending by UoW students and estimated the 'indirect' and 'induced' footprint of UoW in the Waikato region as:

- indirect footprint – direct spending plus estimated indirect effects – \$580m
- induced footprint – direct spending plus estimated indirect and induced effects – \$1,490m.

The approach to estimating the size of the footprint and the caveats on their interpretation are explained in detail in Appendix A.

¹⁵ In 2015 UoW earned research and contract revenues of \$41m. The direct contribution from this spend is already included in our estimates through the direct spending by UoW.

¹⁶ The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

6. Massey University

We have estimated the contribution of Massey University (MU) to the economies of the areas in which it operates (primarily Palmerston North but also Auckland and Wellington) in 2015 compared to a situation where the services offered by MU were not available in these areas. MU makes a direct contribution to the economies of the three areas¹⁷ in which it operates through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the areas in which it operates)
- retention of university students in the area in which Massey operates (who would otherwise have to move to access a university education).

We estimate that in 2015 the total direct contribution was approximately \$752m made up as follows:

- direct MU spending¹⁸ of approximately \$454m in 2015 including:
 - \$271m on staff and contractors. (MU employed 3,115 full time equivalent staff primarily in Palmerston North.)
 - operating and occupancy spending of \$131m, most of which is spent on service providers in the regions in which MU operates
 - capital spending of \$52m primarily on university building projects and upgrades
- MU attracted additional student spending¹⁹ (excluding tuition fees)²⁰ to the regions in which it operates of up to \$298m per year made up as follows:
 - \$88m by an estimated 5,500 domestic EFTS from within the regions in which MU operates
 - \$159m by an estimated 10,000 domestic EFTS from outside the regions in which MU operates
 - \$51m by an estimated 3,200 international EFTS.

In addition to the quantifiable direct contribution we also note the following 'direct' linkages that we have not been able to quantify.

¹⁷ As a working assumption 60 percent of Massey University spending is allocated to the Manawatu/Wanganui region, 25 percent to the Auckland region and 15 percent to the Wellington region.

¹⁸ Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from MU to regional GPP would be spending on staff, capital and operating surplus, a total of \$329m spread over Manawatu/Wanganui - \$197m (2.15 percent of regional GDP), Auckland - \$82m (0.09 percent of regional GDP) and Wellington - \$49m (0.15 percent of regional GDP). Estimated spending by MU students (less GST) was \$253m in total spread over Manawatu/Wanganui - \$152m (1.65 percent of regional GDP), Auckland - \$63m (0.07 percent of regional GDP) and Wellington - \$38m (0.12 percent of regional GDP).

¹⁹ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See "The Economic Impact of International Education 2012/13 for Education New Zealand September 2013", p19). We estimate retained student spending by multiplying the number of equivalent full time students (EFTS) by the estimated expenditure per student.

²⁰ We estimate that the number of students in Palmerston North is about 25 percent of the estimated number of rooms available for rent in the residential housing market (excluding hostel accommodation) in the Palmerston North TLA based on Census 2013 data.

MU acts as attractor for research spending²¹ in the region that would otherwise be allocated to other parts of the country. MU also provides a bridge between academic research and the application of this research to local innovation through Massey Ventures.

MU also attracts visitors to the regions it operates in for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by MU and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to MU
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find²²) to the direct MU expenditure and spending by MU students²³ and estimated the 'indirect' and 'induced' footprint of MU in the regions in which it operates as:

- indirect footprint – direct spending plus estimated indirect effects – \$730m in Manawatu/Wanganui, \$200m in Auckland and \$120m in Wellington
- induced footprint – direct spending plus estimated indirect and induced effects – \$1,880m in Manawatu/Wanganui, \$520m in Auckland and \$310m in Wellington.

The approach to estimating the size of the footprint and caveats on their interpretation are explained in detail in Appendix A.

²¹ In 2015 MU earned research and contract revenues of \$54m. The direct contribution from this spend is already included in our estimates through the direct spending by MU.

²² The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

²³ For this calculation, the estimated spending by distance students is added to the expenditure for Manawatu Wanganui. If this spending was removed the estimated footprint of MU in the Manawatu Wanganui region would shrink by just under 20 percent.

7. Victoria University of Wellington

We have estimated the contribution of Victoria University of Wellington (VUW) to the economy of the Wellington region in 2015 compared to a situation where Wellington did not have a university. VUW makes a direct contribution to the economy of the Wellington region through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the Wellington region)
- retention of university students in the Wellington region (who would otherwise have to move to access a university education).

We estimate that in 2015 this direct contribution was approximately \$710m made up as follows:

- direct VUW spending²⁴ of approximately \$383m in 2015 including:
 - \$208m on staff and contractors. (VUW employed 2,073 full time equivalent staff which is about 1 percent of the estimated filled jobs and about 1.5 percent of the salary and wages paid in the Wellington region.)
 - operating and occupancy spending of \$134m, most of which is spent on service providers in the region
 - capital spending of \$40m primarily on university building projects and upgrades
- VUW attracted additional student spending²⁵ (excluding tuition fees)²⁶ to the region of up to \$327m per year made up as follows:
 - \$184m by an estimated 9,600 domestic EFTS from within the Wellington region
 - \$102m by an estimated 5,300 domestic EFTS from outside the Wellington region
 - \$41m by an estimated 2,100 international EFTS.

In addition to the quantifiable direct contribution we also note the following 'direct' linkages that we have not been able to quantify.

²⁴ Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from VUW to regional GPP would be spending on staff, capital and operating surplus, a total of \$267m (0.82 percent of regional GDP). Estimated spending by VUW students (less GST) was \$278m (0.85 percent of regional GDP).

²⁵ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See "The Economic Impact of International Education 2012/13 for Education New Zealand September 2013", p19). We estimate retained student spending by multiplying the number of equivalent full time students (EFTS) by the estimated expenditure per student.

²⁶ We estimate that the number of students is equivalent to about 22 percent of the estimated number of rooms available for rent in the residential housing market (excluding hostel accommodation) in the Wellington region based on Census 2013 data.

VUW acts as attractor for research spending²⁷ in the region that would otherwise be allocated to other parts of the country. VUW also provides a bridge between academic research and the application of this research to local innovation through sponsored chairs, and the VicLink programme that creates commercial applications of VUW research projects and provision of advice and research to local businesses.

VUW also attracts visitors to the region for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by VUW and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to VUW
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find²⁸) to the direct VUW expenditure and spending by VUW students and estimated the 'indirect' and 'induced' footprint of VUW in the Wellington region as:

- indirect footprint – direct spending plus estimated indirect effects – \$1,000m
- induced footprint – direct spending plus estimated indirect and induced effects – \$2,560m.

The approach to estimating the size of the footprint and caveats on their interpretation are explained in detail in Appendix A

²⁷ In 2015 VUW earned research and contract revenues of \$49m. The direct contribution from this spend is already included in our estimates through the direct spending by VUW.

²⁸ The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

8. University of Canterbury

We have estimated the contribution of the University of Canterbury (UC) to the economy of the Canterbury region and Christchurch territorial local authority (TLA) in 2015 compared to a situation where the services offered by UC were not available in these areas. UC makes a direct contribution to the economy of the Canterbury region through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the Canterbury region)
- retention of university students in the Canterbury region (who would otherwise have to move to access a university education).

We estimate that in 2015 this direct contribution was approximately \$568m made up as follows:

- direct UC spending²⁹ of approximately \$323m in 2015 including:
 - \$171m on staff and contractors. (UC employed 1,839 full time equivalent staff which is about 1 percent of the estimated filled jobs and about 1.6 percent of the salary and wages paid in the Christchurch City TLA.)
 - operating and occupancy spending of \$108m, most of which is spent on service providers in the region
 - capital spending of \$44m primarily on university building projects and upgrades
- UC attracted additional student spending³⁰ (excluding tuition fees)³¹ to the region of up to \$245m per year made up as follows:
 - \$110m by an estimated 5,300 domestic EFTS from within the Canterbury region
 - \$105m by an estimated 5,100 domestic EFTS from outside the Canterbury region
 - \$29m by an estimated 1,400 international EFTS.

In addition to the quantifiable direct contribution we also note the following ‘direct’ linkages that we have not been able to quantify.

²⁹ Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from UC to regional GPP would be spending on staff, capital and operating surplus, a total of \$219m (0.67 percent of regional GDP). Estimated spending by UC students (less GST) was \$208m (0.63 percent of regional GDP).

³⁰ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See “The Economic Impact of International Education 2012/13 for Education New Zealand September 2013”, p19). We estimate retained student spending by multiplying the number of equivalent full time students (EFTS) by the estimated expenditure per student.

³¹ We estimate that the number of students is equivalent to about 14 percent of the estimated number of rooms available for rent in the residential housing market (excluding hostel accommodation) in the Christchurch City TLA based on Census 2013 data.

UC acts as attractor for research spending³² in the region that would otherwise be allocated to other parts of the country. UC also provides a bridge between academic research and the application of this research to innovation through centres of research excellence such as Quake.³³

UC also attracts visitors to the region for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by UC and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to UC
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find³⁴) to the direct UC expenditure and spending by UC students and estimated the 'indirect' and 'induced' footprint of UC in the Canterbury region as:

- indirect footprint – direct spending plus estimated indirect effects – \$800m
- induced footprint – direct spending plus estimated indirect and induced effects – \$2,040m.

The approach to estimating the size of the footprint and caveats on their interpretation are explained in detail in Appendix A.

³² In 2015 UC earned external research income of \$27m. The direct contribution from this spend is already included in our estimates through the direct spending by UC.

³³ A joint effort with the University of Auckland.

³⁴ The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

9. Lincoln University

We estimated the contribution by Lincoln University (LU) to the economy of the Canterbury region and Selwyn territorial local authority (TLA) in 2015 compared to a situation where the services offered by LU were not available in the Canterbury region. LU makes a direct contribution to the economy of the Canterbury region through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the Canterbury region)
- retention of university students in the Canterbury region (who would otherwise have to move to access a university education).

We estimate that in 2015 this direct contribution was approximately \$165m made up as follows:

- direct LU spending³⁵ of approximately \$116m in 2015 including:
 - \$63m on staff and contractors. (LU employed 682 full time equivalent staff which is about 4.6 percent of the estimated filled jobs and about 8.1 percent of the salary and wages paid in the Selwyn TLA.)
 - operating and occupancy spending of \$45m, most of which is spent on service providers in the region
 - capital spending of \$7m primarily on university building projects and upgrades
- LU attracted additional student spending³⁶ (excluding tuition fees)³⁷ to the region of up to \$50m per year made up as follows:
 - \$18m by an estimated 1,000 domestic EFTS from within the Canterbury region
 - \$20m by an estimated 1,100 domestic EFTS from outside the Canterbury region
 - \$12m by an estimated 700 international EFTS.

In addition to the quantifiable direct contribution we also note the following 'direct' linkages that we have not been able to quantify.

LU acts as attractor for research spending³⁸ in the region that would otherwise be allocated to other parts of the country. LU also provides a bridge between academic

³⁵ Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from LU to regional GPP would be spending on staff, capital and operating surplus, a total of \$65m (0.2 percent of regional GDP). Estimated spending by LU students (less GST) was \$42m (0.13 percent of regional GDP).

³⁶ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See "The Economic Impact of International Education 2012/13 for Education New Zealand September 2013", p19). We estimate retained student spending by multiplying the number of equivalent full time students (EFTS) by the estimated expenditure per student.

³⁷ We estimate that the number of students is 43 percent of the estimated number of rooms available for rent in the residential housing market (excluding hostel accommodation) in the Selwyn TLA based on Census 2013 data.

³⁸ In 2015 LU received external research funding of \$21m. The direct contribution from this spend is already included in our estimates through the direct spending by LU.

research and the application of this research to local innovation through Lincoln Agritech.

LU also attracts visitors to the region for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by LU and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to LU
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find³⁹) to the direct LU expenditure and spending by LU students and estimated the 'indirect' and 'induced' footprint of LU in the Canterbury region as:

- indirect footprint – direct spending plus estimated indirect effects – \$230m
- induced footprint – direct spending plus estimated indirect and induced effects – \$600m.

The approach to estimating the size of the footprint and caveats on their interpretation are explained in detail in Appendix A.

³⁹ The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

10. University of Otago

We have estimated the contribution of the University of Otago (UoO) to the economy of the Otago region and Dunedin City territorial local authority (TLA) in 2015 compared to a situation where the Otago region where the Canterbury region did not have a university. UoO makes a direct contribution to the economy of the Otago region through the following:

- spending on staff, operations and capital equipment
- attraction of students to the region (both from overseas and outside the Otago region)
- retention of university students in the Otago region (who would otherwise have to move to access a university education).

We estimate that in 2015 this direct contribution was approximately \$864m made up as follows:

- direct UoO spending⁴⁰ of approximately \$555m in 2015 including:
 - \$385m on staff and contractors. (UoO employed 3,803 full time equivalent staff which is about 7.2 percent of the estimated filled jobs and about 14.8 percent of the salary and wages paid in the Dunedin TLA.)
 - operating and occupancy spending of \$110m, most of which is spent on service providers in the region
 - capital spending of \$61m primarily on university building projects and upgrades
- UoO attracted additional student spending⁴¹ (excluding tuition fees)⁴² to the regions in which it operates of up to \$309m per year made up as follows:
 - \$41m by an estimated 2,400 domestic EFTS from within the Otago region
 - \$232m by an estimated 13,800 domestic EFTS from outside the Otago region
 - \$36m by an estimated 2,100 international EFTS.

In addition to the quantifiable direct contribution we also note the following 'direct' linkages that we have not been able to quantify.

UoO acts as attractor for research spending⁴³ in the region that would otherwise be allocated to other parts of the country. UoO also provides a bridge between academic

⁴⁰ Note that these numbers are measures of expenditure, rather than value-added or GDP. The estimated direct contribution from UoO to regional GPP would be spending on staff, capital and operating surplus, a total of \$478m (4.7 percent of regional GDP). Estimated spending by UoO students (less GST) was \$263m (2.58 percent of regional GDP).

⁴¹ The estimated expenditure per student excluding fees is \$15,000 to \$20,000 per year and is based on suggested student budgets provided on a sample of New Zealand university websites. Infometrics completed a survey of overseas student spending by in 2013 and estimated average living costs were \$17,400 per year. (See "The Economic Impact of International Education 2012/13 for Education New Zealand September 2013", p19).

⁴² We estimate that the number of students is equivalent to more than half of the estimated number of rooms available for rent in the residential housing market (excluding hostel accommodation) in the Dunedin City TLA based on Census 2013 data.

⁴³ In 2015 UoO earned externally funded research revenue of \$92m. The direct contribution from this spend is already included in our estimates through the direct spending by UoO.

research and the application of this research to local innovation through Otago Innovation.

UoO also attracts visitors to the region for both graduation ceremonies and conferences for experts. Data on the number of conference attendees and the amount spent by either conference attendees or visitors is sparse.

The direct spending by UoO and its students also encourages both:

- indirect activity; the first round spending by suppliers of goods and services to UoO
- induced activity; second and subsequent rounds of spending in supplier industries, and spending by households whose incomes are increased by the direct spending and indirect activity.

Estimating the size of these indirect and induced effects in a way that is economically meaningful is problematic. The multiplier analysis approach (used in the mid-2000s but now discredited) massively overstates the indirect and induced economic activity attributable to any industry because it fails to consider alternative uses for the resources employed by the industry. At best, multiplier based estimates of indirect and induced effects are a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.

In response to your interest, we have applied a multiplier analysis (using the most recent relevant example we could find⁴⁴) to the direct UoO expenditure and spending by UoO students and estimated the 'indirect' and 'induced' footprint of UoO in the Otago region as:

- indirect footprint – direct spending plus estimated indirect effects – \$1,080m in Dunedin, \$60m in Wellington and \$60m in Christchurch
- induced footprint – direct spending plus estimated indirect and induced effects – \$2,780m in Dunedin, \$160m in Wellington and \$170m in Christchurch.

The approach to estimating the size of the footprint and the caveats on their interpretation are explained in detail in Appendix A.

⁴⁴ The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006. This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- Indirect activity; output multiplier of 1.4
- Induced activity (including indirect activity); output multiplier of 3.6.

11. Direct spending

This section reports data on the direct university spending as a measure of gross domestic product (GDP), local employment and spending on suppliers.

11.1. Contribution to GDP

The direct impact of university spending on regional gross domestic product can be measured as the sum of payments to staff, depreciation (as a proxy for the average rate of capital formation) and the university operating surplus compared to the gross domestic product for the region. The measure of these classes of university spending as a share of GDP tends to be a relatively low percentage for two reasons:

- the large number of industry classifications which mean that any one industry accounts for only a small percentage total GDP. (For example the entire Education and Training sector is one of 21 industries and accounts for just under 5 percent of national GDP.)
- regions include a wide range of businesses some of which have little or no direct connection with the university.

As a contrast to the 'geographically broad' regional measures we have also used the following 'geographically narrower' measures based on territorial authority data:

- compared university payments to staff and number employed to salary/wage payments with numbers employed and salary and wage payments by territorial authority as reported in Linked Employer Employee⁴⁵ database.
- compared estimated student accommodation 'demand with availability of rental accommodation by territorial authority.

⁴⁵ This database is published by Statistics New Zealand and is based on data gathered by the Inland Revenue Department.

Table 5 University spending that contributes directly to regional GDP – 2015

University spending (2015 annual reports) in \$ million per year

Description	University of Auckland	Auckland University of Technology	University of Waikato	Massey University ¹	Victoria University of Wellington	University of Canterbury	Lincoln University	University of Otago
University direct								
People costs	601	216	135	271	208	171	63	385
Depreciation	123	47	22	52	40	44	7	61
Net surplus	68	15	9	6	18	4	-5	33
Total direct	792	278	166	329	267	219	65	478
Region	Auckland	Auckland	Waikato	Manawatu-Wanganui	Wellington	Canterbury	Canterbury	Otago
Regional GDP	88,295	88,295	19,649	9,197	32,617	32,882	32,882	10,173
Total direct/GDP	0.90%	0.31%	0.84%	3.58%	0.82%	0.67%	0.20%	4.70%
Note:								
1. The 'Total direct' spending by Massey University is spread across its three campuses: Palmerston North, Wellington and Auckland. For this table the expenditure for Massey University is shown in a single column.								
2. The 'Total direct' spending by Otago University occurs mainly in Dunedin with some expenditure in Wellington and Christchurch. For this table the expenditure for Otago University is shown in a single column.								

Source: NZIER analysis of data provided by Universities New Zealand and gathered from university websites

Appendix A Economic footprint

A.1 Measures of economic impact

Regional economic impact analysis studies argue that spending associated with organisations such as universities contributes to the economic activity of the cities in which they are located through their employment of staff, expenditure on capital, attraction of students from outside the city and retention of students who would arguably leave the city to study in another city. Impact studies go on to apply multipliers to these direct spending effects to calculate the ‘full economic contribution’ of universities to a ‘city or regional’ economy.

In Table 1 we present estimates of both the direct spending by universities and the spending by domestic students who are either retained in the region or attracted from other regions.

Table 1 includes direct spending estimated as:

- direct spending by the university on employees, capital equipment⁴⁶ and the operating surplus of the university
- living expenses for domestic students remaining in the area and attracted to the area (based on the number of domestic students enrolled multiplied by the university advice to students on living expense budgets).⁴⁷

A.2 Regional indirect and induced impacts

Previous economic impact studies of university spending (in the mid-2000s) estimated the value of the indirect and induced output from the university spending using multipliers calculated from input-output tables. However, multiplier analysis overstates the reliance of the flow-on activity on the initial expenditure as it does not net out alternative use of those resources. Therefore, they describe the difference between the city/region economy as it is now compared to a city/region economy without a university and also all the resources in the city/region economy that are currently linked to the university in the city/region.⁴⁸

Dwyer et al (2005) find multiplier model estimates are 180 percent to 500 percent higher than Computable General Equilibrium (CGE) model estimates that do account for such offsetting effects. Based on our previous experience with the NZIER CGE model, more realistic multipliers are likely to be closer to 1.1 (in other words the ‘ripple effect’ of this type of spend is about an additional 10 percent of the initial direct spend).

⁴⁶ We have used depreciation as a proxy for capital spending.

⁴⁷ The estimated living expense per student for each university and the source of these estimates are included in the table. The university living expense budgets vary across universities but are broadly in line with the average estimate used in the body of the report.

⁴⁸ See Dwyer, L, Forsyth, P and Spurr, R., 2005. Estimating the Impacts of Special Events on the Economy. *Journal of Travel Research*, Vol 43, pp 351-359.

At your request we have considered how a multiplier analysis could be applied to the direct university expenditure and spending by domestic students of each university on a city/region basis.

The last NZIER full economic impact analysis of a university that used multipliers was 'The University of Auckland, Economic contribution to the Auckland region', dated April 2006.

This report applied the following multipliers to the expenditure by Auckland University and students of Auckland University:

- indirect activity; output multiplier of 1.4
- induced activity (including indirect activity); output multiplier of 3.6.

These multipliers are likely to understate leakages of activity for regions. If these multipliers were applied to our estimate of each university's direct contribution to the city/region a multiplier analysis would suggest the indirect and induced impacts listed in Table 1

As explained in our previous report 'Economic impact of universities: An analysis of the contribution of New Zealand universities to economic activity' these indirect and induced effects are at best a measure of the current footprint of the university in the city/region. They cannot be added to calculate a national total across cities/regions and they are not accepted by central government as a credible argument for increased expenditure on university education or R&D.