



# The Economic Impact of Brock University

in Niagara and Ontario

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# Executive Summary

This report was submitted to Brock University by the Niagara Workforce Planning Board. The purpose of this report is to estimate the economic impact of Brock University in Niagara and Ontario. We use two methods to estimate Brock University's impact: **the Sudmant Method, and the Canadian Input-Output Model.**



businesses of **\$19,949** per co-op student

## Total Economic Impact: Sudmant Method

The Sudmant method takes the direct impact and multiplies the value by **1.5** to estimate the total economic impact (see Appendix A for an explanation of this methodology). The economic impact of Brock University can be estimated using multiple indicators. Here, we consider Brock University's impact through spending on university operations, capital expenditures, student spending, visitor spending, and alumni premiums.

When we consider dollars spent on the aforementioned categories throughout the 2019-20 academic year, the Total Economic Impact: Sudmant Method

When we consider dollars spent on the aforementioned categories throughout the 2019-20 academic year, the impact of Brock University in Niagara is approximately **\$1,267,068,601**. The total estimated economic impact of Brock University in Ontario is approximately **\$2,404,893,623**.

Taking into account three additional indicators, we see the following impacts:

- **Research:** Brock University's total factor productivity share for the change in Ontario's GDP between 2018 and 2019 was **\$3,360,620**; over the past 10 years, Brock's research has led to an estimated increase of **\$41,711,296** to Ontario GDP.
- **Students working:** The estimated total impact for businesses who employ Brock students during the 2019-20 school year due is an increase in GDP output of **\$108,880,428**.
- **Co-op programs:** The overall benefit to Niagara businesses from co-op students was approximately **\$9,037,105**, for an estimated benefit to Niagara

## Total Economic Impact — Input Output Model

The second method of estimating Brock University's economic impact is by using the Canadian Input-Output model. This model ties all spending categories to a specific multiplier effect (rather than assuming a multiplier of 1.5 as in the Sudmant method).

To conduct this analysis, we consider Brock University's impact through spending on university operations, capital expenditures, and student spending. Following Brandon University's methods, we calculate student spending only for out-of-town students.

The total impact of Brock University in Niagara is approximately **\$451,288,752** and the impact in Ontario is approximately **\$570,295,593**.

## Additional Report Context

It is important to note that the data used throughout this report reflect the 2019/20 fiscal year; therefore, findings predate the disruption of the COVID-19 pandemic. In February 2021, NWPB completed a report for Niagara Region's Economic Rapid Response Team – a community-wide group set up by Niagara Region Economic Development in response to the COVID-19 pandemic. The findings from this report entitled, *Students Going Digital: The Economic Impact on Niagara*, indicated that, as a result of the pandemic, there was an enrollment decline of approximately 18% in the Fall of 2020<sup>1</sup>. It is likely that this decrease would impact pandemic-year analyses that include measures such as spending (university, students, and visitors) and the impact of students working locally. It is envisaged that post-pandemic – with full enrollment on campus – these 2019/20 trends may continue.

Another important note to make is that there was a 2021 report released by the Council of Ontario Universities on the economic impact of universities across Ontario. It is likely that the original study conducted by the Conference board of Canada<sup>2</sup> used different methodologies to source data. One significant difference is that the Conference Board of Canada's report uses data from the 2018/19 fiscal year rather than the 2019/20 year (as in the current report). Given these differences in methodology and data sources, it is expected that the outcomes of the reports differ.

<sup>1</sup> NWPB (2021) *Students going digital: The economic impact on Niagara*. Prepared for Niagara Region Economic Development.

<sup>2</sup> The Conference Board of Canada (December 2021). *How Ontario universities benefit regional economies: Assessing the regional economic impacts of universities in Ontario*. Available [here](#).

# Methods



**This report estimates the economic impact of Brock University using two methods: the **Sudmant model** and the **Canadian Input-Output model**. On a general note, as this report focuses on the 2019-20 academic year, these data reflect trends that generally occurred prior to COVID-19.**

## Sudmant Model<sup>3</sup>

This model estimates the economic impact of an institution by taking into account the following:

- Institutional spending
  - University operations
  - Capital expenditures
- Student spending
- Visitor spending
- Alumni premiums impact

The Sudmant model multiplies the direct impact of each of the above categories by **1.5** to estimate the total economic impact. For an explanation of the Sudmant model, please see Appendix A.

## Canadian Input-Output Model<sup>4</sup>

This model estimates the economic impact of an institution by taking into account the following:

- Institutional spending
  - University operations
  - Capital expenditures
- Student spending
- Visitor spending (this item is not used in the current report as this model requires specific spending data to conduct the analysis)

The Canadian Input-Output model uses industry-specific multipliers to estimate the total impact of direct

spending in each of the above categories. All spending categories can be tied to an industry, which then is tied to a specific industry multiplier. Input-output modeling pairs spending items with the IOIC (Input-Output Industry Code) classifications<sup>5,6</sup>. As a note, the most recent available multipliers are for 2017 and are, therefore, the multipliers used throughout this report.

We follow the methodology in Brandon University's Economic Impact report and utilize the provincial multipliers<sup>7</sup>. We also follow the methodologies used by Boggs and Peddle in The Brock University Effect, and use simple multipliers (i.e., use only direct and indirect impacts, exclude induced impacts)<sup>8</sup>.

## Other Economic Impact Indicators

Additional indicators of economic impact that are included in this report are:

- Research Impact
- Impact of students working
- Impact of co-op program

These three indicators are not included in the overall model as 1) research impact provides insights on the contribution of research at Brock to provincial GDP change over the past decade; 2) student working also indicates contribution to GDP output, and 3) co-op program impacts are presented as benefits to local Niagara businesses.

<sup>3</sup>Sudmant, W. (2009). *The Economic Impact of the University of British Columbia*. UBC Planning and Institutional Research. Retrieved from [https://president.ubc.ca/files/2013/02/economic\\_impact\\_2009.pdf](https://president.ubc.ca/files/2013/02/economic_impact_2009.pdf)

<sup>4</sup>Lesage, P. (DATE). *Open IO-Canada Model Methodological Report*. CIRAI International Reference Centre for the Life Cycle of Products, Processes and Services. Retrieved from [https://www.ciraig.org/en/open\\_io\\_canada/doc/Step-by-step\\_Open%20IO-Canada\\_v1.0\\_v1.pdf](https://www.ciraig.org/en/open_io_canada/doc/Step-by-step_Open%20IO-Canada_v1.0_v1.pdf)

<sup>5</sup>Summary-level provincial multipliers are available here: Statistics Canada. Table 36-10-0113-01 *Input-output multipliers, provincial and territorial, summary level*. DOI: <https://doi.org/10.25318/3610011301-eng>

<sup>6</sup>Detail-level provincial multipliers are available here: Statistics Canada. Table 36-10-0595-01 *Input-output multipliers, provincial and territorial, detail level*. DOI: <https://doi.org/10.25318/3610059501-eng>

<sup>7</sup>Institutional Data & Analysis Unit (2017). *Brandon University Economic Impact: Report 2014-2015*. Retrieved from <https://www.brandonu.ca/economic-impact/files/Brandon-University-Economic-Impact.pdf>

<sup>8</sup>Boggs, J. & Peddle, L. (2018). *The Brock University effect: How thousands of students and millions of dollars energize the economy of Niagara communities*. Niagara Community Observatory, Policy Brief #36. Retrieved from [https://brocku.ca/niagara-community-observatory/wp-content/uploads/sites/117/NCO\\_Policy-Brief\\_36-THE-BROCK-EFFECT-Final.pdf](https://brocku.ca/niagara-community-observatory/wp-content/uploads/sites/117/NCO_Policy-Brief_36-THE-BROCK-EFFECT-Final.pdf)

## SECTION 1



# Total Economic Impact: Sudmant Method

The economic impact of Brock University can be estimated using multiple indicators. In this report, we first consider Brock University's impact through spending on university operations, capital expenditures, student spending, visitor spending, and alumni premiums (undergraduate and graduate).

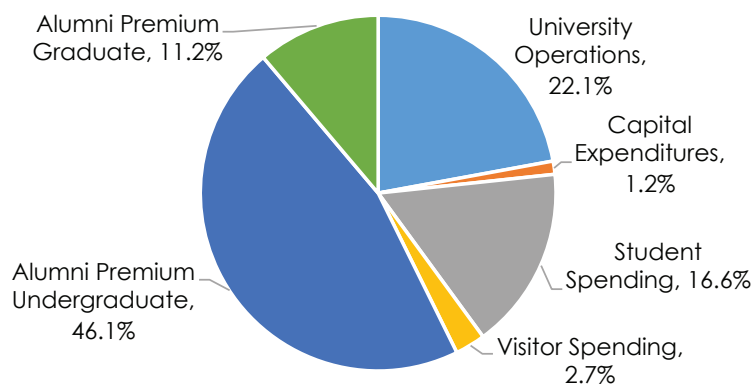
Section 1 outlines the estimated economic impact that Brock University has throughout Niagara (Table 1-1, Figure 1-2) and Ontario (Table 1-3, Figure 1-4) using the Sudmant method and the aforementioned indicators. As noted previously, the Sudmant method takes the direct impact and multiplies the value by **1.5** to estimate the total economic impact.

Taking these indicators into account, throughout the 2019-20 academic year the impact of Brock University in Niagara is approximately **\$1,267,068,601** (see Table 1-1). Over half of this impact can be attributed to alumni premiums (46.1% undergraduate, 11.2% graduate – see Figure 1-2).

**Table 1-1. Economic Impact in Niagara, 2019-20**

	Direct	Indirect	Total
University Operations	\$186,781,745	\$93,390,873	\$280,172,618
Capital Expenditures	\$10,119,962	\$5,059,981	\$15,179,942
Student Spending	\$140,621,424	\$70,310,712	\$210,932,136
Visitor Spending	\$23,204,192	\$11,602,096	\$34,806,289
Alumni Premium Undergraduate	\$389,522,324	\$194,761,162	\$584,283,486
Alumni Premium Graduate	\$94,462,754	\$47,231,377	\$141,694,130
<b>Total</b>	<b>\$844,712,401</b>	<b>\$422,356,200</b>	<b>\$1,267,068,601</b>

**Figure 1-2. Percentage Breakdown of the Economic Impact in Niagara, 2019-20**

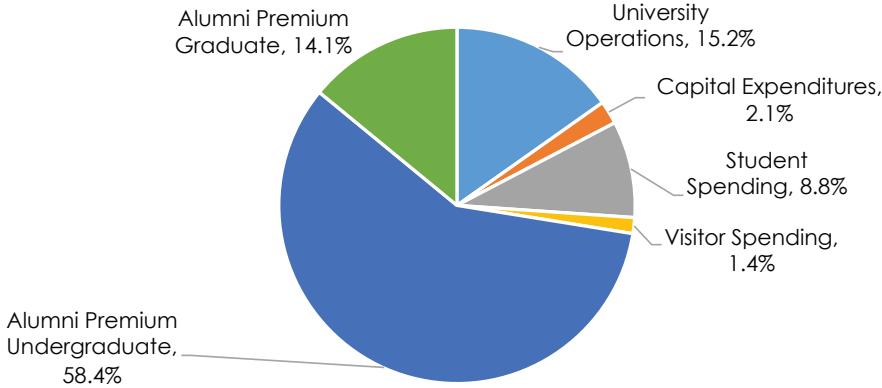


Throughout the 2019-20 academic year, we see that the total economic impact of Brock University in Ontario is approximately **\$2,404,893,623** (see Table 1-3). Over half of this impact can be attributed to alumni premiums (58.4% undergraduate, 14.1% graduate – see Figure 1-4).

**Table 1-3. Economic Impact in Ontario, 2019-20**

	Direct	Indirect	Total
University Operations	\$243,849,328	\$121,924,664	\$365,773,991
Capital Expenditures	\$33,868,252	\$16,934,126	\$50,802,378
Student Spending	\$140,621,424	\$70,310,712	\$210,932,136
Visitor Spending	\$23,204,192	\$11,602,096	\$34,806,289
Alumni Premium Undergraduate	\$936,429,517	\$468,214,758	\$1,404,644,275
Alumni Premium Graduate	\$225,289,703	\$112,644,851	\$337,934,554
<b>Total</b>	<b>\$1,603,262,415</b>	<b>\$801,631,208</b>	<b>\$2,404,893,623</b>

**Figure 1-4. Percentage Breakdown of the Economic Impact in Ontario, 2019-20**



Taking into account the three additional indicators of economic impact, we see the following:

- **Research Impact:**
  - Brock University’s total factor productivity (TFP) share for **the change in Ontario’s GDP** between 2018 and 2019 was **\$3,360,620**. When we consider the year-over-year change in Ontario’s GDP over the past 10 years, research at Brock has led to an estimated increase of over **\$41,711,296** to Ontario’s GDP.
- **Impact of students working:**
  - The estimated total impact for businesses during the 2019-20 school year due to Brock University is an increase in GDP output of **\$110,448,279**.
- **Impact of co-op program:**
  - The overall benefit to Niagara businesses from co-op students was \$9,157,532, for an estimated benefit to Niagara businesses of \$20,215 per co-op student.

## SECTION 2



# Total Economic Impact: Input/Output Model

The second method of estimating Brock University's economic impact is by using the Canadian Input-Output model. As noted in the Methods section, this model ties all spending categories to a specific multiplier effect (rather than assuming a multiplier of 1.5 as in the Sudmant method).

To conduct this analysis, we consider Brock University's impact through spending on university operations, capital expenditures, and student spending. Following Brandon University's methods, we calculate student spending only based on out-of-town students.

When we consider dollars spent on the below categories throughout the 2019-20 academic year, the impact of Brock University in Niagara is approximately **\$451,288,752** and the impact in Ontario is approximately **\$570,295,593** (see Table 2-1).

**Table 2-1. Brock University's Economic Impact in Niagara and Ontario, 2017 Multipliers**

	Niagara			Ontario		
	Direct (Initial Spending)	Indirect	Total Output	Direct (Initial Spending)	Indirect	Total Output
University Operations	\$186,781,745	\$94,496,778	\$281,278,523	\$243,849,328	\$122,054,297	\$365,903,625
Capital Expenditures	\$10,119,962	\$4,483,292	\$14,603,253	\$33,868,252	\$15,116,741	\$48,984,993
Out of Town Student Spending	\$104,861,615	\$50,545,360	\$155,406,975	\$104,861,615	\$50,545,360	\$155,406,975
<b>Total</b>	<b>\$301,763,322</b>	<b>\$149,525,430</b>	<b>\$451,288,752</b>	<b>\$382,579,195</b>	<b>\$187,716,399</b>	<b>\$570,295,593</b>



## SECTION 3



# Institutional Spending

Institutional spending<sup>9</sup> comprises both operations expenditures and capital expenditures. Operations expenditures are categorized into four areas:

- 1) Salaries and benefits
- 2) Scholarships
- 3) Materials, supplies, and service expenses (e.g., telecommunications)
- 4) General expenses (e.g., marketing, maintenance, printing, etc.)

Capital expenditures are a separate category and include a variety of costs including resources like linear assets, equipment, and computer software.

When we take into account institutional spending for these items throughout the 2019-20 academic year, the total economic impact of Brock University in Niagara was approximately **\$295,352,560** using the Sudmant method (see Table 3-1). The total economic impact of Brock University in Ontario (including spending in Niagara) was estimated to be approximately **\$416,576,369** using the Sudmant method.

**Table 3-1. Economic Impact for Institutional Spending – Sudmant Method**

	Niagara			Ontario		
	% spent in Niagara	Direct (Millions)	Total Impact (Millions)	% spent in Ontario	Direct (Millions)	Total Impact (Millions)
<b>Total University Operations Expenditures</b>	<b>61.2%</b>	<b>\$186.78</b>	<b>\$280.17</b>	<b>79.9%</b>	<b>\$243.85</b>	<b>\$365.77</b>
<i>Salaries &amp; Benefits</i>	79.5%	\$148.02	\$222.03	99.1%	\$184.50	\$276.74
<i>Scholarships</i>	\$10,119,962	\$4,483,292	\$14,603,253	\$33,868,252	\$15,116,741	\$48,984,993
<i>Materials, Supplies &amp; Service Expenses</i>	24.7%	\$5.78	\$8.67	63.7%	\$14.89	\$22.34
<i>General Expenses</i>	11.7%	\$8.30	\$12.45	27.9%	\$19.78	\$29.67
<b>Capital Expenditures</b>	<b>25.2%</b>	<b>\$10.12</b>	<b>\$15.18</b>	<b>84.5%</b>	<b>\$33.87</b>	<b>\$50.80</b>
<b>Grand Total</b>	<b>57.02%</b>	<b>\$196.90</b>	<b>\$295.35</b>	<b>80.4%</b>	<b>\$277.72</b>	<b>\$416.58</b>

<sup>9</sup>Data on institutional spending was provided by Brock University's Human Resources, Accounting and Financial Reporting, and Financial Planning departments.

**Figure 3-1. 2019 Employment Income by Location<sup>10</sup>**

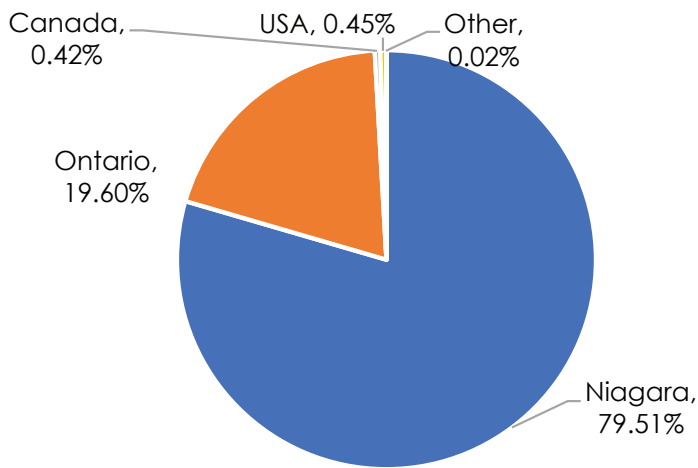
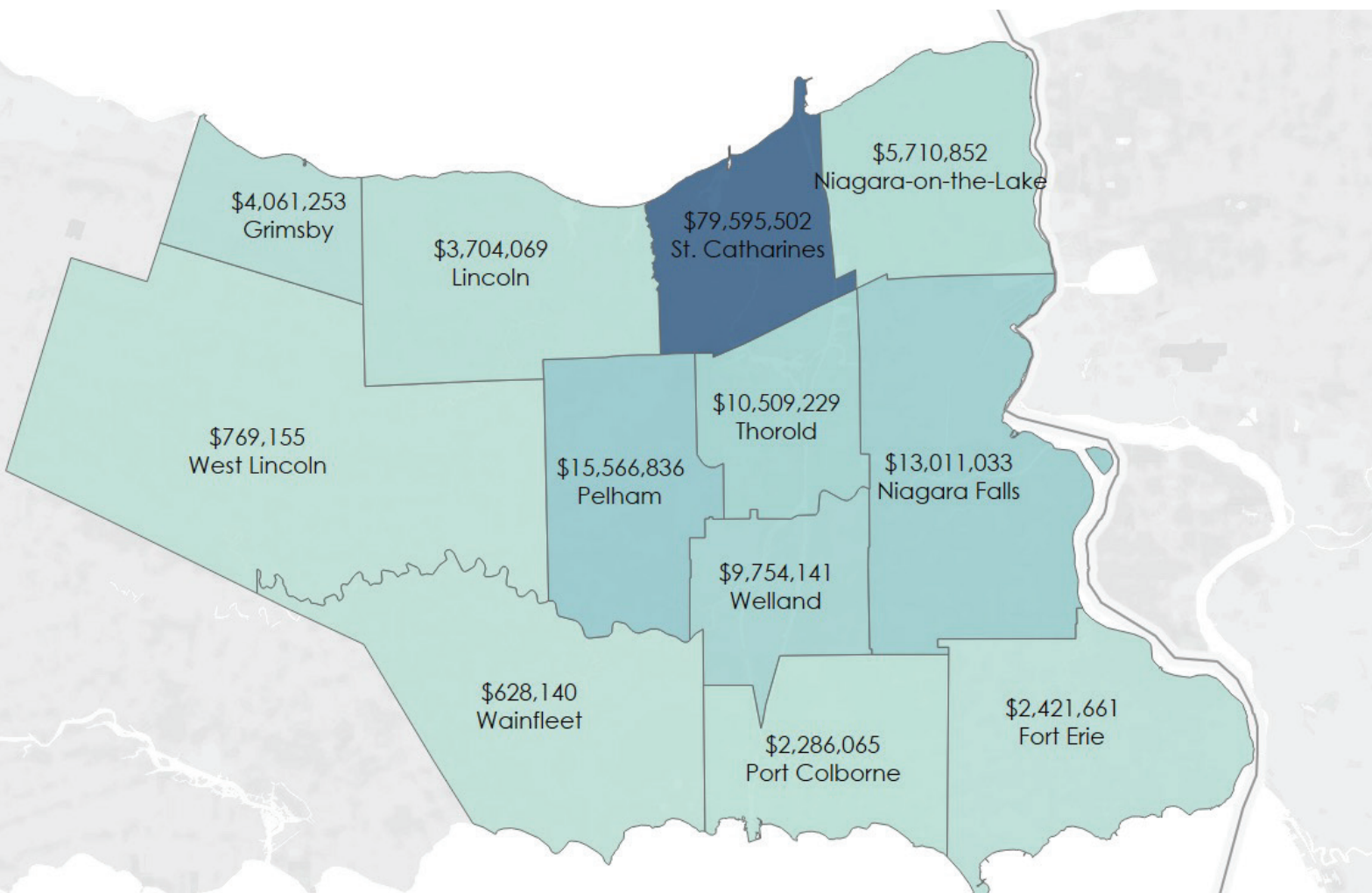


Figure 3-1 outlines the distribution of Brock University employment income. Figure 3-2 provides a map displaying income by municipality across Niagara.

**Figure 3-2. 2019 Employment Income by Municipality<sup>11</sup>**



<sup>10</sup>Data source: Brock University Human Resources

<sup>11</sup>Map source: Base map and data from OpenStreetMap and OpenStreetMap Foundation made available under the Open Database License linked [here](#). © OpenStreetMap contributors



Using the I-O method, when we take into account institutional spending for these items throughout the 2019-20 academic year, the total economic impact of Brock University in Niagara was approximately **\$295,881,777** (see Table 3-2). The total economic impact of Brock University in Ontario was estimated to be approximately **\$414,888,618** using the I-O method.

**Table 3-2. Economic Impact for Institutional Spending — Input-Output Method**

	Niagara		Ontario	
	Direct (Millions)	Total Impact (Millions)	Direct (Millions)	Total Impact (Millions)
<b>Total University Operations Expenditures</b>	<b>\$186.78</b>	<b>\$281.28</b>	<b>\$243.85</b>	<b>\$365.90</b>
<i>Salaries &amp; Benefits</i>	\$148.02	\$221.29	\$184.50	\$275.82
<i>Scholarships</i>	\$24.68	\$40.18	\$24.68	\$40.18
<i>Materials, Supplies &amp; Service Expenses</i>	\$5.78	\$8.17	\$14.89	\$21.30
<i>General Expenses</i>	\$8.30	\$11.64	\$19.78	\$28.60
<b>Capital Expenditures</b>	<b>\$10.12</b>	<b>\$14.60</b>	<b>\$33.87</b>	<b>\$48.98</b>
<b>Grand Total</b>	<b>\$196.90</b>	<b>\$295.88</b>	<b>\$277.72</b>	<b>\$414.89</b>

## SECTION 4



# Student Spending

Section 4 outlines estimated student spending for the 2019 academic year and its potential economic impact for Niagara. Table 4-1 outlines the number of students registered at Brock for 2019-20 programs. Of these 19,681 students, **17,066** students registered in full time programs.

**Table 4-1. Student Enrollment, Brock University, 2019-20<sup>12</sup>**

Degree	
Certificate	109
Bachelors	17,628
Masters	1,740
Doctorate	204
<b>Total</b>	<b>19,681</b>

For both the Sudmant and Input-Output methods, we used the following guidelines:

- The analysis includes only the **17,066** students that were enrolled full time;
- Non-rent expenses are calculated by multiplying the monthly non-rent expense total (i.e., excluding rent, utilities, and internet) by **8** (i.e., two semesters of school), for all **17,066** students; and
- Rent expenses are calculated by multiplying the monthly rent expense total (i.e., rent, utilities, and internet) by **12** (i.e., an annual renting contract students likely sign), for the **10,107** students we estimate are renting in Niagara (i.e., students that are not living at home or in residence).

Monthly student spending was estimated through consultation with Brock University's Student Engagement and Student Financial Services and Accounts Receivable departments. Where data were unavailable, we used estimates from Boggs and Peddle's report<sup>13</sup> and the Niagara Poverty Reduction Network cost of living<sup>14</sup>, with inflation adjustments to account for 2019-20 spending (note: the resulting total estimates for student expenses are likely conservative). Rental cost data were retrieved from Maclean's student rental costs and are inclusive of utility payments<sup>15</sup>; Maclean's estimate of \$531 for average rent was deemed to be fairly accurate by the Off-Campus Living offices.

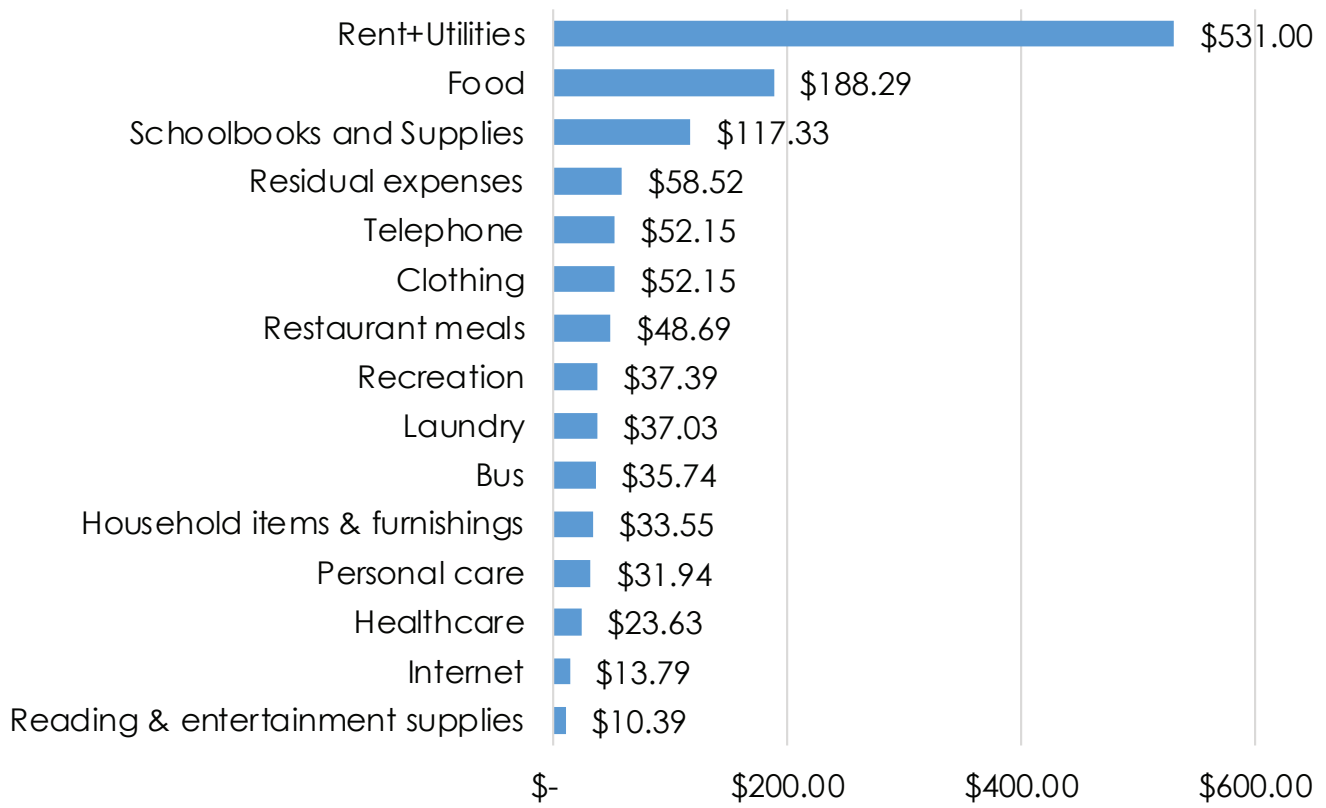
<sup>12</sup>Data provided by Brock University's Institutional Analysis department.

<sup>13</sup>Boggs, J. & Peddle, L. (2018). *The Brock University effect: How thousands of students and millions of dollars energize the economy of Niagara communities*. Niagara Community Observatory, Policy Brief #36.

<sup>14</sup>Niagara Poverty Reduction Network 2019 Living Wage Report. Retrieved from: [https://d3n8a8pro7vhmx.cloudfront.net/ontariolivingwage/pages/110/attachments/original/1580321235/Niagara\\_Living\\_Wage\\_Calculation\\_2019.pdf?1580321235](https://d3n8a8pro7vhmx.cloudfront.net/ontariolivingwage/pages/110/attachments/original/1580321235/Niagara_Living_Wage_Calculation_2019.pdf?1580321235)

<sup>15</sup>Maclean's University Guide: Build your Own Ranking. Retrieved from <https://www.macleans.ca/education-hub/build-your-own-university-ranking/>

**Figure 4-2. Estimated Monthly Student Spending, 2019-20**



When we add together student non-rent and rent expenses, and take away the dollars provided through scholarships, the estimated total direct student spending was approximately **\$141,825,371**. Using the Sudmant method, we see approximately **\$212,738,057** total impact in Niagara (see Table 4-3).

**Table 4-3. Economic Impact for Student Spending in Niagara, 2019-20 — Sudmant Method**

Degree	Total
Non-Rent Expenses	\$99,227,603
Rent Expenses	\$66,074,821
Scholarships, Bursaries, and Awards	\$24,681,000
<b>Total Direct Spending</b>	<b>\$140,621,424</b>
<b>Sudmant Total Impact</b>	<b>\$210,932,136</b>

When we use the Canadian Input-Output model to estimate the impact of student spending, the methods used differ slightly. For this model, we estimate the impact of student spending only for out of town students that are renting (approximately 10,107 students). This follows the methods set out by Brandon University.

To examine the impact of student spending using the I-O model, we categorize student spending into specific industry categories and use the industry-specific multipliers rather than 1.5 (i.e., as used in the Sudmant method). In the I-O method, we also account for scholarship dollars at the initial spending point. With these taken into consideration, we see that the estimated total direct student spending was approximately **\$104,861,615**. Using the I-O method, we see approximately **\$155,406,975** total impact in Niagara (see Table 4-3).

**Table 4-4. Economic Impact for Student Spending in Niagara/Ontario, 2019-20 — Canadian Input-Output Method**

	<b>Initial Spending less Scholarship</b>	<b>Input-Output Model Total Impact</b>
Non-Rent Expenses	\$49,361,053	\$75,552,202
Rent Expenses	\$55,500,562	\$79,854,773
<b>Total</b>	<b>\$104,861,615</b>	<b>\$155,406,975</b>

## SECTION 5



# Visitor Spending

Section 5 outlines the economic impact of visitor spending. Table 5-1 provides contextual information from Brock University's Ancillary Services to demonstrate the type of events that can occur throughout an academic year. The number of attendees only includes those registered and does not represent any other conference supporters/fans that may have been in attendance. In addition, it does not reflect all visitors to Brock University's campus.

**Table 5-1. Conferences and Events held at Brock, May 1 2019 to April 30 2020<sup>16</sup>**

Booked Conferences Groupings	# of Attendees
Academic	535
Association	456
Religious	460
Sports	6,113
Youth	1,223
Other	318
<b>Sudmant Total Impact</b>	<b>9,105</b>

Given the difficulty with tracking all on-campus visitors, the Sudmant method recommends estimating the total number of visitors by multiplying the number of enrolled students by eight. To estimate visitor spending, we used Niagara's 2018 Regional Tourism profile<sup>17</sup> which suggests the average spending per visitor in 2018 was **\$166.71**. When we consider the average amount spent by visitors and the total estimated number of visitors for the 2019-20 year, we see total direct spending of approximately **\$23,204,192**. Using the Sudmant method, we see the total impact is about **\$34,140,874** (see Table 5-2).

**Table 5-2. Economic Impact for Visitor Spending in Niagara, 2019-20 — Sudmant Method**

Spending Category	Total
Average spent per visitor (inflation adjusted from 2018 to 2019 dollars <sup>18</sup> )	\$169.96
Total Visitors (enrollment x8)	136,528
<b>Total Direct Spending</b>	<b>\$23,204,192</b>
<b>Sudmant total impact (x1.5)</b>	<b>\$34,806,289</b>

<sup>16</sup>Source: Ancillary Services Staff, Brock University

<sup>17</sup>Source: Niagara Region Tourism Profile, 2018. Ministry of Heritage, Sport, Tourism, and Culture Industries.

<sup>18</sup>Inflation adjusted using the Consumer Price Index. Statistics Canada. Table 18-10-0005-01 Consumer Price Index, annual average, not seasonally adjusted. Available here <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501>



## SECTION 6



# Alumni Education Premiums

Alumni education premiums allow for the estimation of wage premiums for university graduates relative to individuals that did not complete a university degree. Table 6-1 outlines the total number of graduates from Brock University by level of study as reported by Brock University Institutional Analysis. These data represent graduates over the past 52 years (from 1967 to 2019)<sup>19</sup>. Data provided by Brock’s Director of Alumni Engagement suggests that approximately 29.4% of graduates stay in Niagara and 70.7% live across Ontario.

**Table 6-1. Brock Graduates by degree**

	All Graduates
Bachelor’s Degree	100,122
Master’s Degree	13,130
Earned Doctorate	255

Calculating the alumni education premium allows us to assess the economic contribution graduate earnings<sup>20</sup> have had at both the local and provincial level. Census data allow us to estimate the wages individuals with either a bachelor’s, master’s, or doctoral degree make relative to individuals that complete a college or other non-university certificate/ diploma (note that census data reflect 2015 wages and have been inflation adjusted to 2019 dollars<sup>21</sup>).

Table 6-2 presents alumni education premiums for the year of 2019 and does not reflect cumulative, lifetime earnings. We see that the total alumni premium for graduates in 2019-20 was approximately **\$483,985,077** in Niagara and **\$1,161,719,219** in Ontario. Provincially, we see the education premium for an undergraduate degree is approximately **\$14,093** and is about **\$25,554** for a graduate degree.

<sup>19</sup>We are using 40 years as the initial standard because we can work with the assumption graduates work from 25 to 65, a standard practice for this type of report.

<sup>20</sup>As available data do not allow for wages to be broken down by both age and level of education, wages reflect average earnings by level of education. While premiums likely increase with age, the average likely overestimates earnings for younger graduates and underestimates earnings for older graduates which is acceptable given that they will even each other out.

<sup>21</sup>Inflation adjusted using the Consumer Price Index. Statistics Canada. Table 18-10-0005-01 Consumer Price Index, annual average, not seasonally adjusted. Available here <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501>



Using the Sudmant method to multiply the alumni premiums by 1.5, the total impact of alumni premiums is about **\$725,977,616** in Niagara and **\$1,742,578,829** in Ontario<sup>22</sup>.

**Table 6-2. Education Premium for Niagara and Ontario as a result of Brock University, 2019-20**

	Degree	Niagara		Ontario	
		# of Grads	Total Earnings Premium 2019	# of Grads	Total Earnings Premium 2019
<b>Total Direct</b>	Undergraduate	27,639	\$389,522,324	66,446	\$936,429,517
	Graduate	3,684	\$94,462,754	8,816	\$225,289,703
	<b>Total Alumni Premium</b>		<b>\$483,985,077</b>		<b>\$1,161,719,219</b>
<b>Sudmant Total impact</b>			<b>\$725,977,616</b>		<b>\$1,742,578,829</b>

<sup>22</sup>Note: these education premiums are based on employment income. Thus, these totals do not reflect any applicable taxes or savings individuals would have deducted from their employment income.



## SECTION 7

# Research Impacts



Brock University is home to over 20 **institutes and research centres**, five of which are official transdisciplinary hubs. In addition, Brock University currently hosts eight active **Canada Research Chairs** with an additional six allocations underway. Given the focus of research at Brock, we included research as a measure of Brock University's impact across Ontario.

To do this, we use Total Factor Productivity (TFP). TFP implies that the growth in GDP is not as simple as just labour and capital increases. While these two factors do drive GDP growth, there are also improvements through research and development that lead to increases in productivity. Previous work done by universities have relied on Fernand Martin's 1998 research paper *The economic impact of Canadian University R&D*<sup>23</sup> which suggests that TFP accounts for 20% of the change in GDP. However, only 69% of this overall change can be attributed to domestic R&D.

In addition, Statistics Canada indicates that approximately 36% of R&D funding in 2018 was allocated to higher education (including universities and colleges)<sup>24</sup>. Data from the Council of Ontario Financing Officers (COFO) and Research Infosource Inc. suggest that Brock University's share of higher education research spending is approximately 0.5386%. We can apply these percentages to Ontario GDP data from the previous decade to estimate the impact of research conducted at Brock.

When considering the above calculations, we see that Brock University's TFP share for **the change in Ontario's GDP** between 2018 and 2019 was **\$3.36M** (direct). When we consider the year-over-year change in Ontario's GDP over the past 10 years, research at Brock has led to an estimated increase of over **\$41.71M** to Ontario's GDP.

<sup>23</sup> Martin, Fernand, 1998. *The Economic Impact of Canadian University R&D*. *Research Policy*, Vol.27, pp 677-687

<sup>24</sup> Statistics Canada Table 27-10-0273-01. *Gross domestic expenditures on research and development, by science type and by funder and performer sector*.



**Table 7-1. Brock University TFP values, 2009-2019**

	<b>Ontario GDP Change<sup>25</sup> (\$M)</b>	<b>Total Factor Productivity (20%) (\$M)</b>	<b>Domestic R&amp;D (69%) (\$M)</b>	<b>Share of Ontario R&amp;D by Higher Education Sector (36.191%) (\$M)</b>	<b>Increase to Ontario GDP due to Research at Brock University (\$M)</b>
2009-10	\$18,800.00	\$3,760.00	\$2,594.40	\$938.94	\$5.07
2010-11	\$15,800.00	\$3,160.00	\$2,180.40	\$789.11	\$4.26
2011-12	\$8,900.00	\$1,780.00	\$1,228.20	\$444.50	\$2.40
2012-13	\$9,300.00	\$1,860.00	\$1,283.40	\$464.48	\$2.51
2013-14	\$17,100.00	\$3,420.00	\$2,359.80	\$854.04	\$4.61
2014-15	\$17,400.00	\$3,480.00	\$2,401.20	\$869.02	\$4.69
2015-16	\$16,800.00	\$3,360.00	\$2,318.40	\$839.05	\$4.53
2016-17	\$20,600.00	\$4,120.00	\$2,842.80	\$1,028.84	\$5.56
2017-18	\$17,500.00	\$3,500.00	\$2,415.00	\$874.01	\$4.72
2018-19	\$12,460.80	\$2,492.16	\$1,719.59	\$622.34	\$3.36
<b>Total</b>	<b>\$154,660.80</b>	<b>\$30,932.16</b>	<b>\$21,343.19</b>	<b>\$7,724.31</b>	<b>\$41.71</b>

<sup>25</sup>Source: <https://budget.ontario.ca/2019/fallstatement/ecotables.html#t1>. Note: 2019 is an estimate based off the 2020 FAO report on growth (1.6%) <https://fao-on.org/web/default/files/publications/EC2002%202020%20Spring%20EBO/2020%20Spring%20EBO-EN.pdf>

## SECTION 8



# Students Working

In this section we focus on the local impact of students working in Niagara. Assessing the economic output generated by local students actively engaging in the workforce takes a number of steps:

- Calculating the number of Brock students that work while in school;
- Estimate the number of Brock students working in each industry in Niagara;
- Calculating the average GDP-output-per-worker for each industry in Niagara;
- Using these estimates, present the total economic output and output per sector.

Statistics Canada presents annual data at a provincial level on the percentage of employed university students by age cohort<sup>26</sup>. By applying these provincial-wide trends to Brock-specific enrollment data, we are able to gain an understanding of the approximate number of Brock University students who would have worked during the 2019-20 academic year.

Table 8-1 outlines provincial trends for employed students, and uses these percentages to estimate the total number of employed students at Brock University based on enrollment figures. We see that approximately 5,608 students aged 15-29 at Brock University were employed during the 2019-20 school year. Students work an average of 18 hours per week (.45 FTE), so when we adjust to reflect the number of FTE students working (to avoid overestimating the impact of students and allow the data to be compared to the GDP data), the total estimated FTE students working is 2,524.

**Table 8-1. Estimated number of FTE Brock Students Working in Niagara, 2019-20**

Age Cohort	Percent Employed (Ontario estimate)	Total Enrolled at Brock University	Estimated Total Employed
15 to 19	\$3,760.00	\$2,594.40	\$938.94
20 to 24	\$3,160.00	\$2,180.40	\$789.11
25 to 29	\$1,780.00	\$1,228.20	\$444.50
<b>Total</b>	<b>34.4%</b>	<b>16,299</b>	<b>5,608</b>
		<b>FTE hours worked/student</b>	<b>0.45 hours</b>
		<b>Total Estimated FTE Students employed (0.45 * 5,608)</b>	<b>2,524</b>

Next, we can estimate the proportion of youth (age 15-24) with a high school diploma that reported employment throughout 2015<sup>27</sup> across different industries. We can then use these employment estimates to infer the number of Brock University students that worked in each industry throughout 2019-20, and the estimated overall impact of students working in Niagara during the 2019-20 academic year (see Table 8-2).

Using GDP data from the Conference Board of Canada as well as employment data from Statistics Canada<sup>28</sup>, we can estimate the average GDP output per FTE employee (as hours worked/industry differ) in each industry in the St.

<sup>26</sup>Source: Statistics Canada. Table 37-10-0106-01 Proportion of students who are working aged 15 to 29, by age group and type of institution attended.

Catharines-Niagara Census Metropolitan Area. To account for wages that employees receive, GDP/FTE is adjusted to show GDP output per employee, *after accounting for average salary*<sup>29</sup>.

Thus, Table 8-2 outlines estimates of youth employment, estimates of GDP per FTE employee after accounting for wages, and the 2019-20 impact of students working in Niagara. As estimates, these GDP figures assume that 1) employees are the only driver of GDP (e.g., robotics and other non-employee production is ignored), and 2) the relationship between employees and GDP output is linear (ignoring diminishing returns per new employee, etc.).

**Table 8-2. Estimated number of students employed and student GDP output by industry, Niagara, 2019**

	2015 Youth Employment <sup>30</sup>	2019 FTE Student Employment	GDP per FTE employee, salary adjusted	2019-20 Student Impact
Retail trade	25.9%	654	\$23,528	\$15,386,554.05
Accommodation & food services	34.4%	869	\$28,416	\$24,701,262
Health care & social assistance	1.9%	47	\$19,485	\$914,737
Construction	2.7%	68	\$26,161	\$1,789,403
Finance & Insurance, Real Estate & Rental and Leasing, & Building, Business & Other Support Services	6.7%	168	\$213,461	\$35,936,310
Manufacturing	5.4%	136	\$44,620	\$6,058,980
Professional, scientific & technical services	1.2%	30	\$26,047	\$769,185
Educational services	2.4%	61	\$25,449	\$1,560,838
Information, culture & recreation	7.1%	179	\$31,976	\$5,738,224
Other services (except public administration)	3.1%	77	\$15,390	\$1,192,491
Public administration	1.9%	49	\$45,572	\$2,231,446
Transportation & warehousing	1.3%	32	\$12,445	\$392,628

<sup>27</sup>These data do not account for any youth who have not graduated high school, or who have a degree above a high school level (i.e., an apprenticeship or trades certificate, a bachelor's degree, etc.), as we are trying to only capture those students who currently attend university. Admittedly, this method suffers two flaws: 1) it captures students who have graduated high school but are not attending university and 2) it does not capture current graduate students who have a bachelor's degree (or equivalent) but are currently attending university for a Master's degree (or equivalent/higher degree). However, even given those constraints, these data should be considered fairly accurate.

<sup>28</sup>Conference Board of Canada GDP by CMA, Custom Order and Statistics Canada Table 14-10-0098-01 (formerly CANSIM 282-0131). Data are inflation adjusted to 2019 dollars using CPI as indicated previously.

<sup>29</sup>Source: NWPB Custom Calculation utilizing Statistics Canada Table: 14-10-0204-01 (formerly CANSIM 281-0027)

<sup>30</sup>Statistics Canada 2016 Census. Custom Data Tabulation.

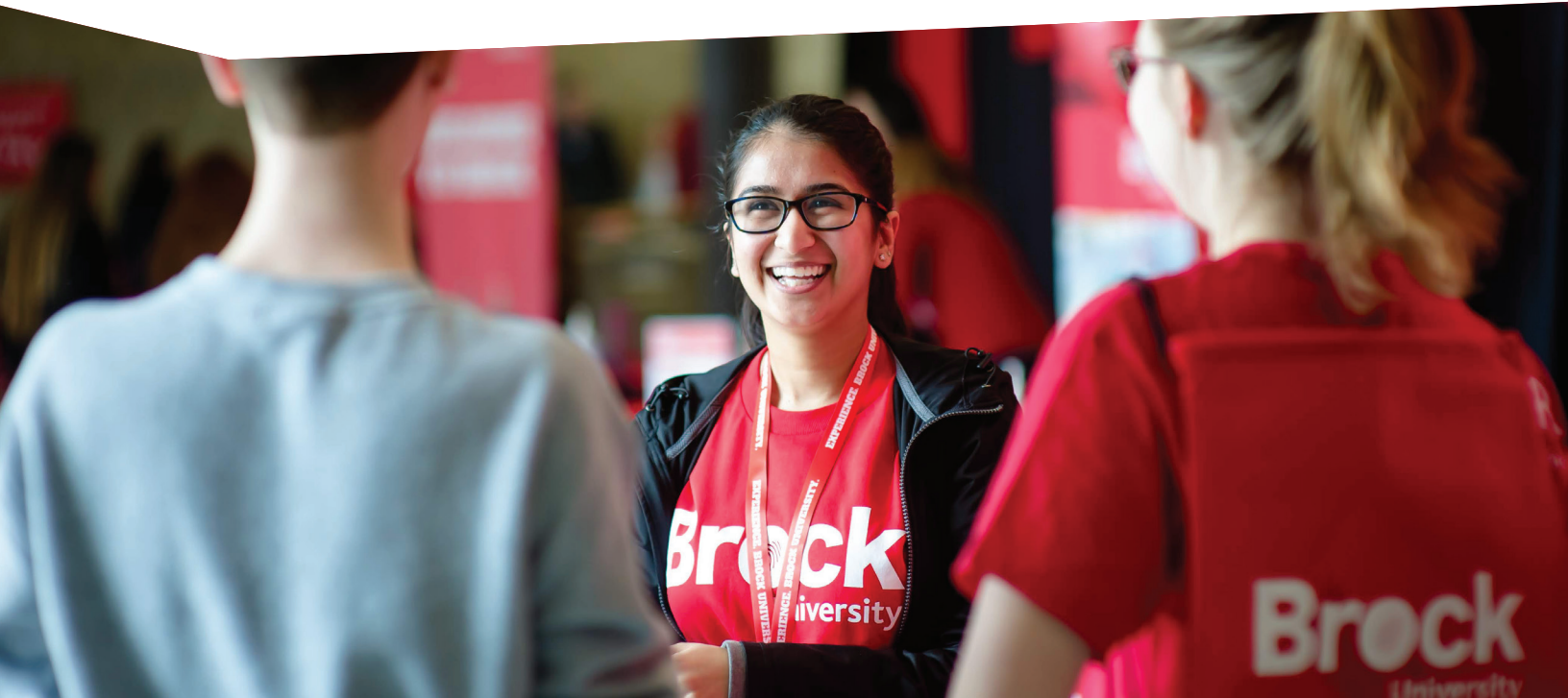
Primary (agriculture, forest, fishing, mining, quarrying, oil and gas) & utilities	4.3%	108	\$116,845	\$12,622,447
Wholesale trade	1.8%	45	\$103,000	\$4,627,514
<b>Total</b>	<b>100.00%</b>	<b>2,524</b>	<b>\$48,181</b>	<b>\$113,922,020</b>

Finally, each student employee needs to be trained. A 2018 report by Deloitte suggested that training a new employee costs an employer, on average, \$899, according to data from the Conference Board of Canada<sup>31</sup>. As such, to adjust for training we must multiply the 5,608 students working by \$899 and then subtract that total from the 2019-20 student employment impact outlined in Table 8-3.

**Table 8-3. Student employment impact, adjusted for training costs**

	Economic Impact
Total	\$113,922,020
Training Costs	\$5,041,592
<b>Adjusted Total</b>	<b>\$108,880,428</b>

All in, the suggested total impact for businesses during the 2019-20 school year due to Brock University is an increase in GDP output of **\$108,880,428**.



<sup>31</sup>Deloitte (2019). University of Waterloo economic impact assessment. Retrieved from [https://uwaterloo.ca/about/sites/ca.about/files/uploads/files/university\\_of\\_waterloo\\_economic\\_contribution\\_analysis\\_2019.pdf](https://uwaterloo.ca/about/sites/ca.about/files/uploads/files/university_of_waterloo_economic_contribution_analysis_2019.pdf)

## SECTION 9



# Student Co-ops

In addition to research strengths, Brock University also invests in student learning experiences. Brock University's Co-op, Career and Experiential Education department focuses on linking Brock students with local opportunities. Some opportunities are within co-op placements, but other opportunities impact the community without direct employment from a local business.

For example, throughout 2019-2020, Brock University offered more than 890 Work-Integrated Learning (WIL) courses that saw students have an impact on Niagara as part of their academic credits. Work-Integrated Learning opportunities typically range from 10-420 hours per semester per student and are available across a variety of faculties. Some examples of student engagement include the following:

Applied Health Sciences	Education	Humanities
<ul style="list-style-type: none"><li>• Work in long-term care</li><li>• Nursing</li><li>• Work in hospital system</li><li>• Athletic therapy</li><li>• Sports management within organizations</li></ul>	<ul style="list-style-type: none"><li>• Facilitation reading/tutoring programs</li><li>• In-school placements</li></ul>	<ul style="list-style-type: none"><li>• Contributions to local arts and culture programming</li><li>• Development of museum exhibits</li><li>• Internships with educational programs</li></ul>
Math and Sciences	Social Sciences	
<ul style="list-style-type: none"><li>• Using Niagara data for math and stats case studies</li><li>• Developing apps for NGOs</li></ul>	<ul style="list-style-type: none"><li>• Social media strategies</li><li>• Video creation</li><li>• Event planning</li><li>• Placements with children's programs</li></ul>	

The following data focus on the potential economic impact of student co-op placements in Niagara. Like student employment, estimating the impact of co-op placements requires a series of steps:

- Identifying the industries Brock University co-op students work in
- Pair these data with GDP output/FTE employee in Niagara (outlined in Section 8)

Data from Brock’s Co-op, Career, and Experiential Education (CCEE) department identified 453 work term placements for Brock students during the 2019-20 academic year. The most common placements were within the professional, scientific and technical services and public administration industries (see Table 9-1).

Following the methods used by Deloitte in their report for the University of Waterloo<sup>33</sup>, we can calculate net GDP output/co-op student by taking into account these factors:

- Estimating student output from average annual GDP and wages by industry (divided by 3 as a co-op term is 4 months)
- Calculating co-op subsidies (25% of overall salary)
- Considering the effect of training costs (estimated to be \$899/student<sup>34</sup>)

The net GDP per co-op student is presented in Table 9-1. Combining the number of co-op students and net GDP/student allows us to estimate the total GDP output provided by Brock University co-op students. Therein, the overall benefit to Niagara businesses from co-op students was **\$9.0 million**, for an estimated benefit to Niagara businesses of **\$19,949** per co-op student (see Table 9-1).<sup>35</sup>

**Table 9-1. Total estimated GDP from co-op students, Niagara 2019-20**

	Number of Co-Op Students	Net GDP per Co-op student	Total Co-op GDP
Accommodation and food services	5	\$11,035	\$55,177
Retail trade	2	\$10,160	\$20,319
Construction	4	\$12,407	\$49,630
Health care and social assistance	14	\$10,037	\$140,517
Manufacturing	60	\$19,257	\$1,155,425
Educational services	52	\$14,779	\$768,528
Finance and Insurance, Real Estate and Rental and Leasing, and Building, Business and Other Support Services	27	\$74,009	\$1,998,252

<sup>33</sup>Deloitte used the formula: Employer gain = Co-op student output + Co-op subsidies – Co-op wages – Co-op training cost. One challenge at the outset with this Co-op data is that it uses output and salary data that represent the average employee within an industry. It is of course almost certainly true that the average Co-op student does not produce the same output as the average worker within an industry and also does not earn the average salary for a worker within any given industry. We are fortunate in that these overestimates cancel each other out to some degree. It is our expectation that the difference between Co-op student output and average employer output is the same as the difference between Co-op student wages and average employee wages. In this way, the net output would be accurate.

<sup>34</sup>The Conference Board of Canada. Learning and Development Outlook. January 2018.

<sup>35</sup>These data are comparable to the University of Waterloo report by Deloitte, which estimated per-student benefits of ~\$24,298 (21,606 students totaling \$525 million overall benefit)



Other services (except public administration)	5	\$7,629	+
Information, culture and recreation	6	\$14,058	\$172,569
Professional, scientific and technical services	139	\$12,506	\$1,738,369
Wholesale trade	0	\$38,451	\$0
Transportation and warehousing	3	\$7,907	\$23,722
Public administration	132	\$21,152	\$2,792,109
<b>Total</b>	<b>453</b>	<b>\$19,949</b>	<b>\$9,037,105</b>

# Appendix A

The Sudmant methodology was developed by Walter Sudmant, Planning and Institutional Research, University of British Columbia, in 2009<sup>36</sup>.

Sudmant notes that, historically (i.e., work conducted throughout the 1990s), universities used multipliers ranging from 1.57 to 2.34. However, he notes that,

**“The importance of the multiplier is not in the exact value, which varies with economic conditions and the nature of the local economy, but in illustrating the value of stable public spending in maintaining the level of economic activity, as well as in the quantification of the extent to which different sectors of the economy are interconnected through trade.”**

(Sudmant, 2009, page 10).

Thus, a multiplier of 1.5 takes into account both direct, induced, and indirect effects. Sudmant notes that 1.5 is likely a conservative multiplier, but provides a solid estimate of a university's economic impact within an economy.

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<sup>36</sup>Sudmant, W. (2009). *The Economic Impact of the University of British Columbia. Planning and Institutional Research, UBC*. Retrieved from [https://president.ubc.ca/files/2013/02/economic\\_impact\\_2009.pdf](https://president.ubc.ca/files/2013/02/economic_impact_2009.pdf)

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