

**ECONOMIC IMPACT OF THE
UNIVERSITY OF NORTHERN BRITISH COLUMBIA
ON
PRINCE GEORGE**

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INTRODUCTION

It is not often that there is an opportunity to examine the opening of a new university in Canada, particularly during the last two decades. The September 1994 opening of the University of Northern British Columbia (UNBC) in Prince George offers just such an opportunity. What makes UNBC's circumstances additionally interesting is that the university is opening in a relatively small community of approximately 71,000 that is regionally important and presently very dependent on resource exploitation. UNBC is therefore seen as a potential avenue for diversification, enabling Prince George and northern British Columbia to reduce its dependence on primary industries and heartland centres, most notably Vancouver and Edmonton.

In the short term, UNBC's incarnation offers an opportunity to employ economic impact analysis to answer questions about income, population, and housing demand changes, i.e. traditional economic impact analysis. In the longer term, UNBC offers an experimental climate for testing the accuracy and reliability of economic impact analysis.

An additional benefit of the UNBC project as a research specimen is that it will be a significant but not overwhelming project for Prince George that can be closely monitored over the next decade or two. By being significant, UNBC should generate a measurable impact on the community without being buried by other changes. Prince George's economic base has been relatively stable since the recession of the early eighties and looks to continue along this path as the forest industry matures and grows intensively. UNBC should therefore stand out against the background developments of at least the next decade. On the other hand, by not being a megaproject, UNBC is not likely to overwhelm the local economy. So often impact studies are done on projects that inalterably and unpredictably adjust the host economic structure (e.g. Northeast Coal and Tumbler Ridge; or, the pulp boom in Prince George during the 1960's), making it difficult to do any ex post analysis of the predictive theory.

Finally, UNBC will offer an opportunity to compare the short term predictive power of economic impact analysis against the more ad hoc analysis of what might be casually termed the synergies of economic development. It has been touted that UNBC's economic impact, though significant in the short run, is not the best measure of UNBC's importance. The argument is that UNBC's most significant impact will come via diversifying the economy, creating a climate for development that cannot

necessarily be quantified. Because of the university, employers, governments, entrepreneurs, and the general population will look at Prince George as a centre of opportunity, a place where the collective output is greater than the sum of the individual inputs. In this way Prince George will become a centre of growth and development, independent of its historical linkages to natural resources and heartland communities. The development of UNBC over the next two decades should offer at least some cursory evidence on the validity of this thesis.

The intent of this study will be to analyze, using traditional economic analysis methods, the potential economic impact of the University of Northern British Columbia on Prince George. Along the way we will review the numerous impact studies of universities and colleges that have already been written, summarize a few important principles of any economic analysis, develop a model specific for UNBC and Prince George, and, finally, offer our predictions about UNBC's economic impact on Prince George, against which the actual impact can eventually be compared.

METHODOLOGY

Introduction

It should be said at the outset that this is not a benefit/cost analysis of UNBC though some benefit/cost analysis principles will be employed. The decision to build UNBC has already been made rendering a benefit/cost analysis somewhat irrelevant. Besides, there is plenty of evidence pointing towards positive private and social rates of return from education investment (Vaillancourt and Henriques, 1986), though one should note that the social returns to post-secondary education do not appear to be as lucrative as they once were (Constantatos and West, 1991). Any benefit/cost analysis would in all probability show that UNBC would be a wise investment, though it could be argued that there may have been economically wiser investments, investments with larger benefit/cost ratios. Being an impact study this study is much less heroic, simply analysing how much money will be spent, where it will be spent, etc.

Secondly, we are concerned only about the impact on Prince George. It is not that the regional impacts of UNBC will be unimportant or insignificant. On the contrary, UNBC will probably have an outreach emphasis, meaning that in many small communities throughout the north, UNBC will have a very significant impact. Neglecting the regional impact is the result of more mundane, practical problems in data collection and method. With so many communities likely to be affected by UNBC's operation, it would require much footwork, time, and expense (there is an abundance of the first but a relative scarcity of the latter two elements) to collect the necessary data. Perhaps once the procedure is developed for Prince George, then others with more local expertise could better apply the methods to their individual communities. As well, what UNBC's current regional role will be is still under development.

Thirdly, this is an economic impact study and as such is not concerned about the social or environmental impact of the university, social and environmental impact studies being two other important analyses usually done for major projects. Therefore, we are not commenting on how UNBC will possibly change the quality of life in Prince George or how the perception of Prince George will change in the eyes of

visitors. Our neglect is not meant to lessen the importance of these impacts but rather to highlight our ignorance of this type of analysis.

What is an impact study?

One way to think about the impact of any project is to imagine what the world would be like without the project, and then imagine the world with the project. Any changes in the states of these worlds can then be attributed to the project and be called an impact of the project. Because we are dealing in imaginary worlds and there are other events occurring simultaneously, it is not always easy to isolate the impacts. Despite these difficulties, we will be trying to measure the economic changes attributable to UNBC in terms of financial flows. See Appendix 2 for a summary of the various methodologies and case studies regarding university impact studies.

In assessing the net impact of a project, a note of caution must be given about activity that is merely displaced by a project and activity that is created by a project. For example, suppose you were going to open a roadside coffeeshop (a university), adjacent to another coffeeshop (an already established community college) that happens to be the only coffee stop for 100 kilometres in either direction. One impact of your coffeeshop will certainly be to generate new coffee sales that are brand new to either restaurant; perhaps you offer a brand of coffee or service that travellers wanted but were not receiving in the original coffeeshop. However, your coffeeshop is also going to generate business that is not new to either coffeeshop; you may steal away customers from the original coffeeshop. These stolen customers, though important to you, should not be considered a positive impact, at least to the surrounding community, of your coffeeshop. These customers represent a transfer of customers from one coffeeshop to another and do not represent any new business to the community. The person supplying coffee to the coffeeshops will not have to supply any more coffee because of these transfer customers and as such is not concerned about this impact. Therefore, any impact study must be careful to recognize these potential displacement effects.

Once the initial impacts of the project are determined (the multiplicand), they are then multiplied by a number (the multiplier) reflecting the "spin-off" activities, to arrive at the final impact. A

subsequent step might then be to take this final impact and use it as an input in other models to forecast housing demands, population changes, etc.

The "Multiplier"

The multiplier concept, central to all economic impact studies, is a simple idea yet extremely difficult to accurately quantify. The multiplier concept simply says that if there is a new \$100 spent in the community, the recipients of this \$100 will in turn save a portion and spend a portion. The portion they spend will, if it is spent in the community, generate a second round of economic impact. The recipients of this second round of spending will in turn save a portion and spend a portion, creating a third round of economic impact. The process continues on forever, with each round becoming progressively smaller and eventually being inconsequential. Each round's spending can be summed to arrive at a total impact. For example, if the total of all new spending generated from a new \$100 was \$400, then the multiplier would equal 4 ($400/\$100$). Because of their ability to make the even the smallest project seem important (simply use a large multiplier), the multiplier concept is often subject to considerable misuse. We will be developing a model specific to Prince George to estimate the multiplier employed in this study.

The Davis Model

We have chosen to adopt a method that finds its roots in the national income accounting techniques of macroeconomics (Davis, 1976). What this model does is to conveniently allow us, with one equation, to describe both the multiplier process and the multiplicand. In other words, we can slot the new spending into the correct categories and follow the spending through the multiplier process to estimate the total impact.

Therefore, our approach is to first develop a multiplier model for Prince George. Once this is done, the appropriate figures for UNBC can then be plugged into the model, and the final economic impact estimated. By proceeding this way, as more accurate figures become available regarding UNBC's spending patterns, or any of the model's parameters, the impact can be updated quite easily.

MULTIPLIER MODEL FOR PRINCE GEORGE

The multiplier model used for this study is Davis' simple Keynesian macroeconomic model that has been modified for a small, local economy (171). The structural model for the economy is first presented and then the reduced form is solved for, yielding the various multipliers for the exogenous parameters. Finally, the parameters are estimated using data from Davis' 1975 model for Prince George and other current information.

Structural Form

The small, local economy can be thought of as a small, open country, the difference being that monetary policy can be ignored as the money supply is controlled outside the local area. As well, a population variable is added to capture local population changes due to local income changes, which in turn generate more provincial tax transfers. Finally, taxation needs to be broken down into local and non-local taxation. It should also be noted that spending outside the local area is analogous to imports in the country model. UNBC is specifically incorporated into the model by adding a UNBC variable.

$$(1) Y = C + I + G + X + U - M$$

where: Y = local income/expenditure
C = spending on consumption goods and services in the local area
I = spending on investment goods and services in the local area
G = spending by local government on all goods and services (local and imported)
X = spending on local goods and services by those outside the local economy (akin to exports in the Keynesian macroeconomic models)
U = direct spending generated by UNBC
M = spending by local industries and government on goods and services produced outside the region

$$(2) C = C_0 + c_1 Y(1 - t_n - t_l)$$

where: C_0 = autonomous spending on local consumption goods and services
 c_1 = marginal propensity to consume local goods and services
 t_n = income tax rate set by government outside the local area
 t_l = income tax rate set by the local government
 U_w = spending by UNBC employees on local consumption goods and services

$$(3) I = I_0$$

where: I_0 = autonomous investment in the local economy

$$(4) G = t_1 Y + t_b C + R$$

where: t_1 = income tax rate set by the local government
 t_b = sales tax rate set by the local government
 R = transfers from government outside the local area

$$(5) X = X_0$$

where: X_0 = autonomous spending by those outside the local area

$$(6) U = U_K + U_B + U_W + U_S$$

where: U_K = spending by UNBC on goods and services (e.g. computers, textbooks, heat, etc.)
 U_B = spending by UNBC on infrastructure (e.g. roads, buildings, sewers, etc.)
 U_W = spending by UNBC on employee wages
 U_S = spending by UNBC students on non-university related items

$$(7) M = m_c C + m_g G + m_K U_K + m_B U_B$$

where: m_c = marginal propensity to import by local firms supplying consumer goods
 m_g = marginal propensity of the local government to buy imported goods
 m_K = marginal propensity of UNBC to buy imported goods
 m_B = marginal propensity of UNBC to buy imported goods and services for infrastructure construction

$$(8) R = rP$$

where: r = provincial grant per person
 P = local population

$$(9) P = P_0 + p_1 Y$$

where: P_0 = autonomous local population
 p_1 = marginal propensity for the local population to change as local income changes

Reduced Form

To calculate the impact of an event on local income and to provide insight into the various multipliers, it is helpful to solve the above set of simultaneous equations for their reduced form. It can be shown (Appendix 1) that the reduced form is:

$$(10) \quad Y = K (\partial C_0 + \Omega P_0 + X_0 + U_S + U_W + I_0 + \delta U_K + \theta U_B)$$

$$\begin{aligned} \text{where } K &= 1/(\partial - f) \\ &= 1/(1 - c_1(1 - t_n - t_l)(1 - m_c + t_b(1 - m_g)) - ((1 - m_g)(t_l + r p_1))) \end{aligned}$$

$$\begin{aligned} \text{and, } \partial &= 1 - m_c + t_b - m_g t_b \\ \Omega &= (1 - m_g)r \\ \delta &= 1 - m_K \\ \theta &= 1 - m_B \end{aligned}$$

From (10) we can see that if there was an exogenous increase in the wages paid by UNBC, the total impact on local income would be K times the new spending. Note also that the specification of K is very dependent on the structural model; a change in the model will translate into a change in K. Therefore, it should not be concluded that this is the only possible specification for K. Part of future research could be to test several different structural models to determine which works best.

Values were then interpolated for the various parameters to derive a numerical value for K. Given enough information, the model's reduced form lends itself to statistical estimation. Unfortunately, for a small economy like Prince George it would be very difficult to collect enough data to generate statistically significant coefficients. Instead we had to use other sources of information to infer what we think are reasonable values for each of the parameters. By using work done for the Northeast Coal Project and the estimates that study generated for Chetwynd, Davis' own estimates for Prince George, as well as our own local knowledge, we suggest the following parameter estimates:

Parameter Inferences:

- c_1 The marginal propensity to consume local goods is generously set at 0.75. In the NorthEast Coal Study, Chetwynd's parameter value was 0.657 (Province of British Columbia, 51). Because Prince George is a larger center than Chetwynd, likely supplying more products locally, c_1 should be larger for Prince George. Note that this number represents the spending that occurs after account has been made for savings, taxation, and non-local spending. From the Statistics Canada Survey of Family Expenditures (14), 0.75 would be more realistic of spending on both local and non-local goods (i.e. all spending). The larger is c_1 the larger is the multiplier.
- t_n The income tax rate set by non-local government is set at 20% of total income as derived from the 1986 Statistics Canada Survey of Family Expenditures (14). In that survey personal taxes accounted for 18.5% of family spending. This number was increased to take account of increased taxation since 1986. The larger is t_n the smaller is the multiplier.
- t_l The local income tax rate was estimated using the same survey as for t_n . Though there is no local income tax rate, it is inferred that the local property tax is linked to income. According to the consumer survey, local taxes comprised 1.66% of all family spending. This figure was rounded up to 3% to cover for other municipal charges (e.g. garbage, water, etc.). The larger is t_l the smaller is the multiplier.
- t_b This the local tax revenue generated from local spending; alternatively it can be thought of as the local business tax expressed as a percentage of sales. Davis estimated this for Prince George at 4.3% (175). The larger is t_b the larger is the multiplier.
- m_c The marginal propensity to import by the consumer goods and services sector is set at 0.5. In Chetwynd's case this parameter was 0.7 (Province of British Columbia, 52). However, because Prince George is more of a regional centre it was thought 0.5 would be more realistic, implying firms in Prince George import less than similar firms in Chetwynd. Note that in the Dahllöf report, an m_c of 0.59 was implied leading to a smaller multiplier than ours (45). The larger is m_c the smaller is the multiplier.

- m_K The marginal propensity to import goods and services by UNBC was set at 0.2. This is the approximate percentage of goods and services that the College of New Caledonia (CNC) currently imports, so the assumption is that UNBC and CNC will not be that much different. The larger is m_K the smaller is the multiplier. Once UNBC is operating, this figure can easily be accurately established.
- m_B The marginal propensity of UNBC to buy imported goods and services for infrastructure construction was also set at 0.2. Essentially this parameter reflects the amount of construction contracting that is awarded to firms outside the local area. For example, a design contract may be awarded to a Vancouver firm. Most of that money would therefore not be spent in Prince George. Also, a concrete firm may bring in its workers who live out of town to work on the UNBC site. Most of the money paid to those workers would flow back to their communities without first being spent in Prince George. UNBC has stated that they will try to award as many local contracts as possible. As the construction stage reaches completion, a more accurate estimate will certainly be possible. In the early stages of construction, UNBC officials announced that 66% of the construction contracts had been awarded to local firms (The Valley Sentinel, 1). This would imply a value for m_B of .34, therefore our estimate is perhaps overestimating the impact of UNBC construction. The larger is m_B the smaller is the multiplier.
- m_g This represents how much local government income ends up being exported via spending on non-local goods. The income could be exported through interest charges on debt and capital purchases made outside the local economy. The Chetwynd value of 0.182 (Province of British Columbia, 52) was rounded up to 0.20, representing the monies set aside by the City of Prince George in the 1991 budget for debt charges and other contingencies (City of Prince George, 1). The larger is m_g the smaller is the multiplier.
- r There were \$3,672,475 dollars in provincial grants given to the City in the 1991 budget, yielding \$52.46 (r) per person based on a population of 70,000. The larger is r the larger is the multiplier.
- p_1 Total income was divided by total population to obtain per capita income. The per capita income was then divided into 1, to reflect how many people are represented by \$1 of local income. This calculation gives the average propensity for population to change as income changes and not the marginal propensity to change. In this case, the average is used as an estimate of the marginal, with the actual estimate being 0.0000817. In other words, a \$12240 (1986 dollars) increase in local income will lead to a population increase of 1. The larger is p_1 the larger is the multiplier.

Multiplier Calculation and Sensitivity

With these parameters in place, the various multipliers were calculated for Prince George. Because of the somewhat spurious nature of our estimating procedure, the sensitivity of the multiplier calculation was examined. The results are presented in Table 1.

Table 1: Multiplier sensitivity

	PG	c_1	t_n	t_l	t_b	m_c	m_g	m_B	m_K	r	P_1
c_1	0.75	0.85	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
t_n	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
t_l	0.03	0.03	0.03	0.045	0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_b	0.043	0.043	0.043	0.043	0.065	0.043	0.043	0.043	0.043	0.043	0.043
m_c	0.5	0.5	0.5	0.5	0.5	0.75	0.5	0.5	0.5	0.5	0.5
m_g	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2
m_B	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2
m_K	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2
r	52.46	52.46	52.46	52.46	52.46	52.46	52.46	52.46	52.46	78.69	52.46
P_1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
K	1.508	1.608	1.422	1.522	1.531	1.238	1.494	1.508	1.508	1.513	1.517
K δ	1.206	1.286	1.138	1.217	1.225	0.991	1.195	1.206	1.056	1.210	1.214
K θ	1.206	1.286	1.138	1.217	1.225	0.991	1.195	1.056	1.206	1.210	1.214

Note: K is the multiplier with respect to UNBC spending on wages and salaries and the multiplier with respect to student spending on non-UNBC goods and services.

K δ is the multiplier with respect to UNBC spending on goods and services

K θ is the multiplier with respect to UNBC spending on infrastructure

All the parameters that influence the size of the multiplier are listed in the first row and column. Our best estimates of the appropriate values for these parameters are given in the second column under the heading PG, with the resulting multiplier values given in the last three rows. In the subsequent columns, each parameter's value is in turn changed to highlight the effect on the multipliers. In most cases, each parameter value is increased by 50% from our best estimate. The exceptions are c_1 and p_1 , with c_1 increasing only by 13% and p_1 increasing by 100%. Increasing c_1 by 50% would yield a value of 1.25, which does not make economic sense since it implies that consumer spending increases by \$1.25 for every extra \$1 in income. Increasing p_1 by 100% reflects the observation that p_1 is a very small value, and so it was thought that to give it any hope of influencing the multiplier it should be increased by a large amount.

The multiplier associated with spending by UNBC on wages and salaries (K) was calculated to be 1.508. This is also the multiplier associated with student spending. The multiplier for spending on buildings and infrastructure (K θ) is estimated to be 1.206. This is also the multiplier for UNBC spending on goods and services (K δ). The reason these latter two multipliers are smaller is that when the money in these categories is spent, some of it will immediately leave the community through such channels as purchasing non-local goods or awarding contracts to non-local contractors. In contrast, the spending on wages and spending by students is assumed, at least in the initial round, to be all done locally.

As can be seen from the table, the multipliers are quite insensitive to most parameters, with the exception being the marginal propensity of local firms to import (m_c). Having the multipliers sensitive to m_c certainly makes sense since this parameter reflects the amount of final demand that is ultimately produced locally. A low value for m_c would reflect a very mature, diverse economic base. The smaller, and the younger the community, the more it will import goods and services and the larger will be m_c .

Our multiplier values are in keeping with other university impact studies (Table 2) and are perhaps towards the lower end of the range. However, it is not unreasonable to expect this relatively low value as Prince George's economy, being heavily dependent on forestry (Bernsohn, 1992), is much less diversified than the economies of cities in which most other universities are located (e.g. UBC in Vancouver). Being less diversified, it would be expected that more spending is done outside the region

than would be the case if the regional economy was fully diversified, thereby yielding a small multiplier. Note too that the multiplier for Prince George is larger than that for Chetwynd ($K = 1.255$) (Province of British Columbia, 52), which is consistent with the argument that a greater portion of output is locally produced in Prince George than in Chetwynd.

Table 2: Other Estimates for the Expenditure Multiplier

University of Stirling	1.24 - 1.54
Kent State University	1.09 - 1.82
CFB Esquimalt	1.64 - 1.86
University of Victoria	1.9
University of British Columbia	1.99
Brandon University	1.4 - 1.7
University of Calgary	1.7
University of Alberta	1.49
University of Western Ontario	2 - 3
McMaster University	2
University of P.E.I.	1.47
Malaspina College	1.18 - 1.42
Northeast Coal---Chetwynd	1.255
UNBC	1.508

Source: see Appendix 2: Literature Review

More important perhaps than the specific estimate for the multiplier (other researchers could quite reasonably make different assumptions, yielding different values), is the order of magnitude. The multiplier is certainly not 3 or 4, implying that a new activity injecting \$20 or \$30 million annually into an economy that annually generates close to \$900 million is not going to ensure the perpetual, self-sustaining growth of that economy.

DIRECT, INDIRECT, AND INDUCED IMPACTS

Knowing what the parameters are, we now need to calculate the exogenous initial shocks UNBC will generate. These initial shocks can then be multiplied by the multiplier, generating the final impact. Following on the practices employed in most other economic impact studies, the next step is to breakdown the total impact into its component parts. For UNBC the breakdown would be as follows:

$$(11) \quad T = A + B + C - D$$

where: T = Total Impact
 A = Direct Impact
 B = Indirect Impact
 C = Induced Impact
 D = Activity displaced by UNBC (i.e. a smaller CNC)

Further, A = Expenditures by UNBC (e.g. payroll, other operating expenses, capital spending)
 B = Spending by students and visitors to UNBC
 C = Spending by recipients of A and B's spending
 $=$ Multiplied spending of A and B less what A and B spend
 $= K(A + B) - (A + B)$
 $= (K-1)(A+B)$
 K = "the" multiplier

$$\text{Therefore,} \quad T = A + B + (K-1)(A + B - D) - D$$

$$T = (A + B - D)(1 + K - 1)$$

$$(12) \quad T = K(A + B - D)$$

$$(10) \quad Y = K(\partial C_0 + \Omega P_0 + X_0 + I_0 + U_W + U_S + \delta U_K + \theta U_B)$$

Once the multiplier, K , is estimated, then the total impact calculation requires only a careful calculation of the direct and indirect impacts. Note that this method can be applied to both income and employment.

Though it may not appear so at first glance, Eqs. (10) and (12) are actually quite similar. Both terms in brackets are multiplicands, the K 's are identical, and T and Y are identical. Equation (10) simply has a

more sophisticated multiplicand. We only have to make sure we match the right shock with the correct element in the multiplicand, based on our previous specification of the model.

Direct Impacts

What are the direct income impacts of UNBC? Generally, direct spending can be broken into capital and operating expenditure, with the former dominating in the early years of the university and the latter taking over as the initial construction phase is complete. It should be noted that the actual figures will almost certainly vary in amount and timing as UNBC develops. Instead of assessing the impact on a yearly basis, we separated the impact into a construction phase and an operating phase, recognizing of course that these phases will most likely overlap. Attention should therefore focus on how the figures are applied and the general result as opposed to the exact dollar outcome.

CONSTRUCTION PHASE

Beginning with UNBC's direct expenditures on infrastructure, there has been \$137.5 million budgeted for spending, beginning April 1, 1991 (UNBC(a) 1). In addition, \$7.9 million be spent on planning and \$500,000 on initial site clearing, preliminary site and off-site work. Therefore, total construction phase spending will be \$145 million.

The City of Prince George is also spending \$4.7 million on off-site water and sewer and road access to UNBC (Prince George Citizen(a), 1) This money is not included in the construction phase multiplicand because it does not represent new money to the community. This money would have either been spent on other projects in Prince George or not have been collected from local taxpayers. In other words, the money represents a transfer within the community and not an increase in local income.

OPERATING PHASE

UNBC's academic plan is not yet fully specified but it is anticipated that UNBC will be roughly equivalent in size to CNC implying an operating budget of approximately \$20 million, of which 80% goes to labour and 20% to supplies and capital (College of New Caledonia, 1). Therefore, labour income

will be approximately \$16.0 million (80% of \$20 million) and total direct spending during the operating phase will be as follows \$20 million. Remember again, that when UNBC actually opens its doors to students, the budget will be set by enrolment and could easily vary from these figures.

Table 3: Direct Spending by UNBC

Phase	Construction (U _B)	Wages (U _W)	Goods/Services (U _K)	TOTAL
Construction	\$145 million	-	-	\$145 million
Operating	-	\$16 million	\$4 million	\$20 million

Indirect Impacts

The indirect spending flows are slightly more complex but can also be separated into various categories:

- a) Spending by students who attend UNBC and would not have spent this money in the community if UNBC had not been built. What we are trying to capture is spending that would not have occurred in Prince George if the university had not been built. We also want to avoid double counting, so any spending by students on tuition, books, on-campus housing, etc. or other expenditures that would show up as UNBC revenues (and in turn as UNBC expenditures) are excluded. If a student is living at home while attending UNBC, it is assumed that no new spending in the community pertaining to living expenses results from their attending UNBC. However, it is assumed that they will spend some money (e.g. entertainment, recreation, transportation, etc.) because of attending UNBC that they would not have spent if UNBC was not in the community.

We also want to be careful to not include displaced students, UNBC students who would have gone to CNC if UNBC had not been built. We conservatively estimate that 250 students would fall into this category and assume that they all live at home. While UNBC is currently conducting a detailed survey of student intentions, it is anticipated that the start-up enrolment could be as high as 2000 FTE's (University of Northern British Columbia, 14). As the survey results become known, this figure can certainly be modified. No spending by these students would be included. Note also that UNBC's tuition revenue should be reduced to reflect that these students would have paid tuition at CNC if they did not choose to attend UNBC. Given the uncertainty regarding how many students actually fall into this category, the unknown tuition fees of UNBC, and the small size of this transfer, it has been ignored.

Table 4 summarizes one possible scenario regarding the student spending impact. Note that this table assumes that all student spending is done locally. Considering that a student's expenditures consist almost entirely of food, clothing, and shelter, this assumption does not seem unreasonable. Our estimates of student expenses are derived from a survey we conducted of first and second year students attending CNC in 1991.

Table 4: Student Spending (excluding education related items)

Type	Students	Living Expenses	Other Expenses	Total
Living at home	1000	\$0	\$2000	\$2,000,000
Living on campus	400	\$0	\$3000	\$1,200,000
Living In-town	600	\$4000	\$3000	\$4,200,000
Less displaced students	250	\$0	\$2000	\$500,000
TOTAL				\$5,900,000

- b) Visitor spending is another indirect impact. Again, you want to only include that spending which would occur because of the university. You want to avoid including spending by visitors who simply happen to be in town and visit the university.

Because it is difficult to estimate the number of visitors and their total spending tends to be relatively small when compared to the other impacts, we will ignore this element.

Total Impact

Taken altogether therefore, total spending before the multiplier process is applied ($A + B - D$), and assuming no displacement of activity from CNC, is summarized in Table 5.

Table 5: Total direct and indirect spending generated by UNBC

Phase	U_B	U_W	U_K	U_S	TOTAL
Construction	\$145 million	-	-	-	\$145 million
Operating	-	\$16 million	\$ 4 million	\$5.9 million	\$25.9 million

Applying these numbers to the appropriate multipliers (Table 6), yields a total impact on Prince George during the construction phase of \$175 million. Each year, UNBC will have a \$38 million (constant dollars) impact stemming from its regular operations. Therefore, most of the initial impact will come via the construction, with the operating impact being smaller but continuous. Clearly, as UNBC expands over the years, this annual impact will grow.

Table 6: Total direct ,indirect , and induced spending generated by UNBC

Phase	U_B	U_W	U_K	U_S	TOTAL
Construction	\$175 million	-	-	-	\$175 million
Operating	-	\$24.2 million	\$ 4.8 million	\$8.9 million	\$37.9 million

CONCLUSION

What this cursory study suggests is that UNBC will have a significant economic impact on Prince George during its construction phase and a more modest impact during its operating years. The operating impact will be similar to the impact CNC is currently having on the community. What the study does not suggest is that UNBC will be the key element leading to a self-sustaining, well diversified economy. Of course this conclusion is imbedded in the theoretical model used to predict the impact and so the next decade will, in some sense, be more a test of this theory than a test of the actual dollar estimate.

The income figures generated could be used to make some tentative estimates of the impact on housing and population. It is commonly done that the multipliers used for income are also used for population predictions. In UNBC's case, for every student moving from out of town to attend UNBC and for every employee moving from out of town to work at UNBC (assuming no reduction in CNC employees), there would be approximately another 0.5 person increase in Prince George's population. For example, (is) there are 250 new, out-of-town employees and 250 new, out-of-town students, the change in population would be 750. Of course, these people will come with dependents and assuming a family size of 2.5, the total population change would be 1875 people.

The increased demand for housing could be similarly developed, with the influx of 750 new families. Assuming that 250 families live in residence, the next impact would be 500 new housing units.

Of course the experts in housing market analysis and those knowledgeable about demographics would have more accurate models, but at least we have a ball park understanding of the impacts in these areas.

As a final reminder, we are not so much concerned about the actual dollar figures generated here as we are about clearly stating the methodology, deriving an order of magnitude estimate, and watching

UNBC develop over time. UNBC will have a positive impact on Prince George and we will be able to track that impact, continuously upgrading the parameter estimates and input figures as they become available. By comparing the actual impact to the impact predicted by the traditional economic impact method employed here, we may be able to shed some new light on the usefulness of impact analysis in predicting actual outcomes.