

3. The Employment Impact Ratios for 2001

3.1 General Introduction

As in previous reports, in this section we present three tables of employment ratios. Each table provides ratios for each of a number of important industries for each of the 63 local areas defined in this study. There are separate tables for Indirect only, for Indirect plus Induced where the social safety net is a factor, and for Indirect plus Induced where the short-term mitigation effects of the safety net can be ignored.

All of these ratios are of the form:

$$\text{Ratio} = \frac{\text{Total Employment attributable to the Activity which generates the Direct Employment}}{\text{Direct Employment}}$$

The **indirect ratios** are entirely concerned with any additional employment generated in the community because of other spending associated with the direct employment. For example, an industrial plant may have 100 employees. That would be the direct employment. However, the plant may also make other local purchases which lead to related employment – e.g. they may purchase some supplies from local retail stores, they may consult with local accountants or lawyers, or they may contract with local tradesmen for special jobs which their employees are not trained to handle. All of these hired services generate indirect employment. Strictly speaking, of course, it is not the direct employees themselves that generate the indirect employment but the other non-wage spending by the industry employing the direct workers. Nevertheless, we assume that the ratio remains constant even if the scale of plant changes – more or less direct employment means a bigger or smaller plant and more or less indirect employment. Table 3.1 shows indirect employment ratios for selected industries for the 63 local areas of this study.

The **induced ratios** are based on the same formula, but in addition to the indirect employment they assign some portion of the nonbasic employment in the community to the income source generating the direct employment. This is done in a very simple proportional way. Suppose, for example, that our allocation procedures have identified 1000 nonbasic jobs in a given community, and that Industry X's share of the after-tax basic income is 20%. The model will then assign 20% of the 1000, or 200, nonbasic jobs to Industry X, increasing the employment impact ratio accordingly.

The **social safety net** (specifically, transfer payments like employment insurance and income assistance) comes into the picture because when there are major changes in a community's industrial structure, estimation of the total impacts of those changes depends on how the income changes translate into changes in spending, because it is spending by local

residents that supports the nonbasic sector. In the case of a mill closure for example, if it is assumed that employment income drops to zero and is not replaced with anything, then we have to assume that spending also drops to zero with a correspondingly drastic effect on the nonbasic sector. However, if, as normally happens in the short-run at least, employment income is replaced by transfer payments then the effect is not nearly so dramatic. Tables 3.2 and 3.3 provide ratios for these two most extreme assumptions - where everyone who loses a job begins to receive employment insurance (3.2 - with safety net) and conversely, where spending drops to zero with lost jobs (3.3 - No Safety Net). The Safety Net case may also be thought of as the No-Migration case where everyone stays put and waits to see what will happen next - this is the likely Short-Run scenario. The No-Safety Net case is comparable in reality to a scenario where everyone who loses their job moves away from the community to seek work elsewhere - from the community's perspective their income and spending have dropped to zero. The No-Safety Net case is also what is more likely to happen in the long run. Finally, it should be noted that while all of the terminology and examples described in this paragraph are expressed in terms of shutdowns and job losses, there is a precisely comparable set of examples which relate to the opening of new employment opportunities - if the new jobs are filled by in-migrants to the community the impact on spending (and thus the nonbasic sector) will be greater than if they are filled by individuals in the community who were subsisting on transfer payments.⁹

All of the ratios in this report deal with employment rather than income. There is a comparable set of income ratios which have not been published but which can be computed by the model, or manually with appropriate income data. Here's an example: let the direct employment be DE and the other related employment be OE, and the relevant employment impact ratio be 1.3.

$$\text{Then } \frac{DE + OE}{DE} = 1.3 \quad \text{or} \quad \frac{OE}{DE} = 0.3$$

Let's assume we know that the average income of the DE is \$40,000 and the average income of the OE is \$30,000. We are interested in estimating the corresponding income ratio IR.

$$IR = \frac{(40000 \times DE) + (30000 \times OE)}{40000 \times DE} = 1 + 0.75 \times \frac{OE}{DE} = 1 + .75 \times .3 = 1.225$$

⁹ From a social and humane perspective it may be preferable to bring new industry to a community to provide jobs for the people who already live there, but from the perspective of the community's economics it's better if the new jobs are filled by new people moving to the community, so that it grows.

The trickiest part in this of course is having estimates of the relevant average incomes.

Employment impact ratios have been published in this report rather than income ratios because they seem to be more useful. Most people can relate more easily to a community's change in employment levels than to the comparable change in income levels.

The ratios that are presented in the tables of the following section are commonly called multipliers and, indeed, they are used as multipliers in the illustrative examples that follow in Section 3.3. We have chosen to call the table entries ratios rather than multipliers to emphasize that, while they are definitely *ratios* (a *ratio* is just one number divided by another), their application as multipliers to make predictions requires a few more assumptions. When we use a multiplier to predict the impacts of a change we are assuming that even though everything else is changing, the multiplier somehow remains the same. There is an intuitive logic to this, and some supporting empirical evidence, but it's largely an assumption - that the multiplier persists in the face of other economic changes. There are probably cases where, while the ratio is always a ratio, the ratio may not be a good multiplier.

The industry set (the columns) in these tables is different from the set used in the tables of Chapter 2. This is because the purposes are different. In the case of dependencies it was important to capture all sources of basic income somewhere in the table (the numbers in each row must sum to 100%), and with this in mind it seemed reasonable to aggregate vertically integrated industries like Forestry (logging, pulp and paper, and all wood-based manufacturing), Mining and Mineral Processing, or Agriculture and Food Processing. However, in the case of impact ratios, it is equally important not to aggregate industries that are distinct and that may have quite different ratios - for example, logging and Pulp and Paper are quite distinct activities and consequently have quite different ratios. Aggregating them would produce a hybrid multiplier that would not be accurate for either activity.

Section 3.2 presents the tables of employment impact ratios without further comment. Section 3.3 provides a number of examples illustrating their use as multipliers. Changes in the ratios over time are presented and discussed in Section 4.3.

3.2 The Employment Impact Ratios

Table 3.1
Indirect Employment Ratios ((Direct + Indirect)/Direct)

	Log- ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour- ism	Public Sector	Const.
VANCOUVER ISLAND/COAST									
1 Gulf Islands	1.23	N.A.	1.25	1.33	1.02	1.15	1.08	1.12	1.28
2 Victoria	1.22	1.74	1.24	1.34	1.07	1.15	1.08	1.17	1.29
3 Sooke-Port Renfrew	1.20	1.74	1.29	1.34	1.11	1.15	1.08	1.16	1.29
4 Duncan	1.19	1.60	1.27	1.32	1.07	1.15	1.06	1.14	1.28
5 Lake Cowichan	1.17	1.48	1.23	1.29	1.25	1.13	1.06	1.14	1.24
6 Ladysmith	1.20	1.72	1.32	1.32	1.14	1.15	1.07	1.13	1.28
7 Nanaimo	1.21	1.74	1.33	1.34	1.06	1.15	1.08	1.14	1.29
8 Parksville-Qualicum	1.20	1.74	1.32	1.34	1.25	1.15	1.07	1.14	1.29
9 Alberni	1.17	1.49	1.24	1.27	1.25	1.13	1.07	1.13	1.24
10 Courtenay-Comox	1.20	1.73	1.32	1.33	1.25	1.15	1.07	1.14	1.29
11 Campbell River	1.21	1.64	1.30	1.31	1.28	1.14	1.07	1.14	1.27
12 Bute Inlet	1.18	N.A.	1.25	1.28	1.26	1.13	1.06	1.13	1.23
13 Powell River	1.19	1.60	1.29	1.29	1.24	1.14	1.07	1.11	1.26
14 Alert Bay	1.14	N.A.	1.22	N.A.	1.00	1.12	1.05	1.12	1.22
15 Port Hardy	1.17	1.62	1.30	1.28	1.00	1.13	1.07	1.13	1.25
16 Central Coast	1.16	N.A.	1.29	N.A.	1.00	1.12	1.06	1.14	1.21
MAINLAND/SOUTHWEST (Excluding GVRD)									
17 Hope-Fraser Canyon	1.15	N.A.	1.30	1.29	N.A.	1.13	1.08	1.13	1.22
18 Chilliwack	1.18	1.74	1.27	1.33	1.23	1.15	1.09	1.14	1.29
19 Kent-Harrison	1.14	N.A.	1.27	1.29	1.07	1.14	1.07	1.15	1.27
20 Matsqui-Abbotsford	1.18	1.74	1.29	1.33	1.27	1.15	1.07	1.13	1.29
21 Pitt Meadows-Maple Ridge	1.21	1.74	1.30	1.34	1.22	1.15	1.08	1.13	1.29
22 Mission	1.19	1.73	1.32	1.33	1.29	1.15	1.08	1.14	1.28
23 Sunshine Coast	1.21	1.71	1.33	1.33	1.04	1.15	1.08	1.14	1.29
24 Squamish	1.21	1.72	1.33	1.32	1.05	1.15	1.07	1.13	1.28
25 Lillooet	1.16	N.A.	1.26	1.30	1.00	1.14	1.09	1.16	1.25
THOMPSON-OKANAGAN									
26 Princeton	1.11	1.67	1.28	1.26	N.A.	1.12	1.07	1.13	1.16
27 Oliver-Osoyoos	1.15	N.A.	1.28	1.30	1.27	1.14	1.08	1.12	1.25
28 Penticton	1.18	1.74	1.26	1.33	1.25	1.15	1.08	1.13	1.29
29 Ashcroft	1.14	1.68	1.31	1.28	1.23	1.13	1.08	1.13	1.21
30 Merritt	1.12	1.69	1.32	1.30	N.A.	1.14	1.08	1.15	1.26
31 Kamloops	1.20	1.74	1.29	1.34	1.21	1.15	1.09	1.15	1.29
32 North Thompson	1.11	1.59	1.28	1.25	N.A.	1.12	1.06	1.13	1.22
33 Peachland	1.20	1.74	1.32	1.34	1.13	1.15	1.08	1.13	1.29
34 Kelowna	1.21	1.74	1.26	1.34	1.11	1.15	1.08	1.12	1.29
35 Vernon	1.18	1.74	1.30	1.34	1.25	1.15	1.08	1.13	1.29
36 Spallumcheen	1.15	1.72	1.28	1.31	1.27	1.14	1.08	1.10	1.25
37 Salmon Arm	1.18	1.73	1.30	1.33	1.15	1.15	1.09	1.13	1.29
38 Golden	1.16	1.68	1.23	1.28	1.25	1.13	1.06	1.11	1.26
39 Revelstoke	1.19	N.A.	1.32	N.A.	1.17	N.A.	1.07	1.15	1.27

Table 3.1 (cont)
Indirect Employment Ratios ((Direct + Indirect)/Direct)

	Log ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour- ism	Public Sector	Const.
KOOTENAY									
40 Fernie	1.16	1.53	1.25	1.27	1.22	1.12	1.08	1.10	1.21
41 Cranbrook-Kimberley	1.19	1.72	1.34	1.32	1.28	1.14	1.09	1.13	1.26
42 Invermere	1.17	1.58	1.28	1.31	N.A.	1.14	1.08	1.12	1.27
43 Castlegar-Arrow Lakes	1.15	1.59	1.27	1.30	1.16	1.14	1.08	1.12	1.25
44 Nelson	1.17	1.72	1.33	1.32	1.16	1.15	1.08	1.14	1.28
45 Creston	1.13	N.A.	1.31	1.30	N.A.	1.14	1.08	1.11	1.23
46 Grand Forks-Greenwood	1.16	1.65	1.28	1.31	1.22	1.14	1.09	1.13	1.27
47 Trail-Rossland	1.16	1.46	1.21	1.27	1.22	1.13	1.07	1.11	1.24
CARIBOO									
48 Williams Lake	1.15	1.71	1.30	1.31	1.24	1.14	1.08	1.15	1.27
49 Quesnel	1.15	1.60	1.27	1.29	1.00	1.13	1.07	1.12	1.26
50 Prince George	1.20	1.73	1.34	1.33	1.08	1.15	1.08	1.14	1.29
51 McBride-Valemount	1.15	N.A.	1.31	N.A.	1.00	1.14	1.07	1.13	1.27
NORTH COAST									
52 Queen Charlotte Island	1.19	1.72	1.33	N.A.	1.00	1.15	1.08	1.14	1.27
53 Prince Rupert	1.20	1.67	1.31	1.30	1.00	1.14	1.07	1.13	1.26
54 Kitimat-Terrace	1.18	1.60	1.29	1.30	1.27	1.14	1.07	1.14	1.25
55 Hazelton	1.09	N.A.	1.23	1.23	1.23	1.12	1.05	1.13	1.23
56 Stewart	1.09	N.A.	1.29	1.22	N.A.	N.A.	1.06	1.12	1.14
NECHAKO									
57 Smithers-Houston	1.17	1.71	1.33	1.31	1.00	1.14	1.08	1.17	1.27
58 Burns Lake	1.14	1.55	1.26	1.25	N.A.	1.12	1.06	1.13	1.18
59 Vanderhoof	1.12	1.52	1.25	1.27	1.26	1.13	1.07	1.14	1.25
60 Stikine	1.11	1.63	1.20	1.25	1.18	N.A.	1.07	1.14	1.17
NORTHEAST									
61 Dawson Creek	1.13	1.68	1.29	1.28	1.20	1.12	1.08	1.11	1.19
62 Fort St. John	1.13	1.66	1.30	1.26	1.20	1.11	1.07	1.10	1.19
63 Ft. Nelson	1.14	N.A.	1.20	1.25	1.15	1.11	1.09	1.13	1.15

Table 3.2
Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
No Migration (with Safety Net)

	Log ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour- ism	Public Sector	Const.
VANCOUVER ISLAND/COAST									
1 Gulf Islands	1.30	N.A.	1.32	1.36	1.08	1.19	1.13	1.19	1.36
2 Victoria	1.35	1.92	1.36	1.54	1.19	1.22	1.14	1.29	1.40
3 Sooke-Port Renfrew	1.35	1.80	1.39	1.36	1.22	1.22	1.13	1.29	1.41
4 Duncan	1.37	1.90	1.40	1.41	1.16	1.21	1.12	1.24	1.38
5 Lake Cowichan	1.32	1.97	1.35	1.30	1.25	1.18	1.10	1.22	1.33
6 Ladysmith	1.40	2.03	1.54	1.35	1.22	1.22	1.12	1.23	1.38
7 Nanaimo	1.47	2.12	1.54	1.49	1.19	1.23	1.15	1.28	1.43
8 Parksville-Qualicum	1.36	1.97	1.43	1.48	1.30	1.20	1.12	1.22	1.37
9 Alberni	1.29	1.68	1.34	1.28	1.27	1.17	1.10	1.19	1.31
10 Courtenay-Comox	1.37	1.98	1.44	1.50	1.37	1.22	1.12	1.24	1.39
11 Campbell River	1.38	1.88	1.41	1.52	1.30	1.22	1.12	1.23	1.36
12 Bute Inlet	1.24	N.A.	1.32	1.36	1.27	1.18	1.10	1.19	1.29
13 Powell River	1.29	1.85	1.37	1.40	1.27	1.18	1.11	1.20	1.34
14 Alert Bay	1.18	N.A.	1.25	N.A.	1.07	1.15	1.07	1.15	1.25
15 Port Hardy	1.27	1.76	1.36	1.60	1.03	1.18	1.10	1.18	1.32
16 Central Coast	1.21	N.A.	1.33	N.A.	1.03	1.15	1.08	1.18	1.26
MAINLAND/SOUTHWEST (Excluding GVRD)									
17 Hope-Fraser Canyon	1.24	N.A.	1.44	1.42	N.A.	1.19	1.11	1.19	1.31
18 Chilliwack	1.32	1.94	1.40	1.50	1.32	1.23	1.15	1.26	1.41
19 Kent-Harrison	1.19	N.A.	1.38	1.37	1.12	1.18	1.10	1.20	1.32
20 Matsqui-Abbotsford	1.33	2.05	1.45	1.57	1.42	1.24	1.15	1.27	1.44
21 Pitt Meadows-Maple Ridge	1.38	2.15	1.48	1.73	1.42	1.25	1.17	1.28	1.46
22 Mission	1.33	2.17	1.52	1.59	1.43	1.24	1.15	1.27	1.42
23 Sunshine Coast	1.34	2.04	1.50	1.58	1.11	1.22	1.13	1.24	1.39
24 Squamish	1.32	1.94	1.47	1.49	1.12	1.19	1.13	1.21	1.38
25 Lillooet	1.23	N.A.	1.33	1.31	1.06	1.18	1.12	1.21	1.31
THOMPSON-OKANAGAN									
26 Princeton	1.26	1.72	1.44	1.36	N.A.	1.15	1.10	1.20	1.28
27 Oliver-Osoyoos	1.21	N.A.	1.36	1.43	1.28	1.17	1.11	1.18	1.31
28 Penticton	1.30	1.80	1.37	1.51	1.34	1.21	1.13	1.24	1.39
29 Ashcroft	1.21	1.73	1.46	1.46	1.25	1.16	1.11	1.17	1.27
30 Merritt	1.19	1.72	1.43	1.44	N.A.	1.17	1.11	1.21	1.33
31 Kamloops	1.36	2.17	1.46	1.69	1.34	1.21	1.16	1.29	1.43
32 North Thompson	1.15	1.61	1.36	1.29	N.A.	1.14	1.08	1.17	1.26
33 Peachland	1.33	2.08	1.50	1.67	1.26	1.22	1.15	1.25	1.42
34 Kelowna	1.38	1.97	1.41	1.51	1.23	1.24	1.16	1.26	1.43
35 Vernon	1.32	1.82	1.46	1.57	1.38	1.22	1.15	1.25	1.41
36 Spallumcheen	1.25	1.78	1.42	1.63	1.35	1.20	1.13	1.19	1.35
37 Salmon Arm	1.28	1.79	1.45	1.44	1.24	1.21	1.14	1.23	1.39
38 Golden	1.23	1.71	1.33	1.35	1.27	1.17	1.10	1.18	1.33
39 Revelstoke	1.27	N.A.	1.45	N.A.	1.20	N.A.	1.11	1.22	1.34

Table 3.2 (cont)
Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
No Migration (with Safety Net)

	Log ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour- ism	Public Sector	Const.
KOOTENAY									
40 Fernie	1.21	1.56	1.35	1.39	1.44	1.15	1.11	1.16	1.27
41 Cranbrook-Kimberley	1.31	1.98	1.53	1.56	1.41	1.21	1.15	1.24	1.36
42 Invermere	1.26	1.78	1.41	1.48	N.A.	1.18	1.13	1.21	1.35
43 Castlegar-Arrow Lakes	1.25	1.86	1.41	1.53	1.26	1.18	1.12	1.21	1.35
44 Nelson	1.27	1.95	1.44	1.44	1.24	1.19	1.13	1.24	1.38
45 Creston	1.21	N.A.	1.42	1.51	N.A.	1.19	1.12	1.19	1.31
46 Grand Forks-Greenwood	1.26	1.68	1.42	1.41	1.25	1.19	1.12	1.21	1.35
47 Trail-Rossland	1.22	1.66	1.32	1.48	1.25	1.20	1.11	1.21	1.34
CARIBOO									
48 Williams Lake	1.24	1.83	1.43	1.46	1.29	1.19	1.12	1.23	1.36
49 Quesnel	1.25	1.84	1.41	1.42	1.06	1.18	1.12	1.21	1.34
50 Prince George	1.34	2.10	1.56	1.47	1.19	1.22	1.16	1.27	1.43
51 McBride-Valemount	1.20	N.A.	1.38	N.A.	1.05	1.16	1.10	1.18	1.31
NORTH COAST									
52 Queen Charlotte Island	1.37	1.77	1.44	N.A.	1.05	1.22	1.13	1.22	1.35
53 Prince Rupert	1.28	1.90	1.44	1.33	1.07	1.19	1.12	1.22	1.36
54 Kitimat-Terrace	1.29	1.83	1.45	1.41	1.29	1.18	1.12	1.23	1.34
55 Hazelton	1.15	N.A.	1.29	1.29	1.24	1.14	1.08	1.17	1.27
56 Stewart	1.11	N.A.	1.29	1.27	N.A.	N.A.	1.07	1.15	1.17
NECHAKO									
57 Smithers-Houston	1.27	1.88	1.47	1.48	1.08	1.19	1.12	1.26	1.37
58 Burns Lake	1.19	1.58	1.35	1.30	N.A.	1.14	1.09	1.18	1.24
59 Vanderhoof	1.22	1.62	1.34	1.40	1.28	1.17	1.09	1.20	1.33
60 Stikine	1.15	1.66	1.21	1.31	1.19	N.A.	1.09	1.20	1.23
NORTHEAST									
61 Dawson Creek	1.22	1.96	1.45	1.43	1.21	1.18	1.12	1.20	1.28
62 Fort St. John	1.21	1.97	1.48	1.38	1.22	1.17	1.12	1.18	1.29
63 Ft. Nelson	1.24	N.A.	1.34	1.34	1.16	1.15	1.13	1.19	1.22

Table 3.3
Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
Migration (No Safety Net/No Public Sector Impacts)

	Log ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour- ism	Public Sector	Const.
VANCOUVER ISLAND/COAST									
1 Gulf Islands	1.40	N.A.	1.43	1.39	1.18	1.24	1.20	1.31	1.49
2 Victoria	1.57	2.25	1.57	1.80	1.40	1.35	1.25	1.51	1.60
3 Sooke-Port Renfrew	1.58	1.92	1.58	1.41	1.40	1.33	1.23	1.50	1.61
4 Duncan	1.58	2.20	1.61	1.56	1.31	1.31	1.21	1.42	1.56
5 Lake Cowichan	1.49	2.20	1.54	1.33	1.27	1.26	1.18	1.37	1.49
6 Ladysmith	1.62	2.34	1.78	1.40	1.36	1.34	1.21	1.40	1.55
7 Nanaimo	1.77	2.56	1.86	1.75	1.44	1.35	1.28	1.54	1.67
8 Parksville-Qualicum	1.54	2.23	1.61	1.67	1.40	1.27	1.20	1.36	1.52
9 Alberni	1.40	1.83	1.46	1.30	1.29	1.24	1.15	1.29	1.41
10 Courtenay-Comox	1.58	2.28	1.63	1.73	1.55	1.33	1.21	1.42	1.56
11 Campbell River	1.56	2.12	1.58	1.72	1.34	1.36	1.20	1.38	1.51
12 Bute Inlet	1.32	N.A.	1.42	1.48	1.29	1.24	1.16	1.28	1.39
13 Powell River	1.45	2.08	1.51	1.58	1.31	1.25	1.18	1.33	1.46
14 Alert Bay	1.23	N.A.	1.32	N.A.	1.13	1.19	1.10	1.20	1.30
15 Port Hardy	1.36	1.87	1.45	1.71	1.08	1.25	1.15	1.25	1.41
16 Central Coast	1.29	N.A.	1.39	N.A.	1.08	1.19	1.12	1.26	1.33
MAINLAND/SOUTHWEST (Excluding GVRD)									
17 Hope-Fraser Canyon	1.37	N.A.	1.59	1.57	N.A.	1.28	1.17	1.30	1.44
18 Chilliwack	1.54	2.31	1.64	1.79	1.48	1.38	1.26	1.49	1.64
19 Kent-Harrison	1.26	N.A.	1.50	1.48	1.19	1.25	1.15	1.28	1.40
20 Matsqui-Abbotsford	1.57	2.50	1.76	1.91	1.71	1.41	1.29	1.54	1.73
21 Pitt Meadows-Maple Ridge	1.68	2.65	1.82	2.13	1.76	1.43	1.33	1.55	1.79
22 Mission	1.57	2.60	1.82	1.90	1.68	1.39	1.27	1.50	1.68
23 Sunshine Coast	1.55	2.36	1.74	1.83	1.24	1.35	1.23	1.42	1.57
24 Squamish	1.49	2.18	1.66	1.68	1.25	1.26	1.23	1.35	1.54
25 Lillooet	1.32	N.A.	1.44	1.34	1.16	1.24	1.15	1.30	1.40
THOMPSON-OKANAGAN									
26 Princeton	1.39	1.80	1.61	1.52	N.A.	1.18	1.17	1.32	1.43
27 Oliver-Osoyoos	1.29	N.A.	1.50	1.58	1.30	1.23	1.16	1.29	1.40
28 Penticton	1.48	1.92	1.56	1.74	1.50	1.30	1.21	1.43	1.57
29 Ashcroft	1.29	1.80	1.59	1.59	1.27	1.21	1.15	1.25	1.35
30 Merritt	1.29	1.77	1.56	1.56	N.A.	1.23	1.15	1.31	1.44
31 Kamloops	1.62	2.59	1.76	2.02	1.57	1.32	1.29	1.53	1.69
32 North Thompson	1.21	1.64	1.44	1.35	N.A.	1.17	1.11	1.22	1.32
33 Peachland	1.56	2.47	1.79	1.97	1.51	1.33	1.26	1.47	1.65
34 Kelowna	1.66	2.37	1.68	1.81	1.45	1.40	1.29	1.50	1.67
35 Vernon	1.55	1.96	1.73	1.87	1.60	1.34	1.26	1.47	1.62
36 Spallumcheen	1.38	1.88	1.64	1.87	1.47	1.30	1.21	1.35	1.51
37 Salmon Arm	1.44	1.89	1.68	1.62	1.38	1.31	1.22	1.40	1.56
38 Golden	1.35	1.78	1.47	1.46	1.29	1.24	1.16	1.28	1.45
39 Revelstoke	1.39	N.A.	1.62	N.A.	1.24	N.A.	1.18	1.34	1.45

Table 3.3 (cont)
Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
Migration (No Safety Net/No Public Sector Impacts)

	Log ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour- ism	Public Sector	Const.
KOOTENAY									
40 Fernie	1.29	1.60	1.46	1.50	1.55	1.19	1.15	1.24	1.35
41 Cranbrook-Kimberley	1.51	2.31	1.78	1.81	1.64	1.33	1.24	1.44	1.55
42 Invermere	1.41	1.98	1.58	1.65	N.A.	1.24	1.20	1.35	1.49
43 Castlegar-Arrow Lakes	1.40	2.11	1.60	1.73	1.42	1.26	1.19	1.37	1.52
44 Nelson	1.42	2.23	1.63	1.65	1.38	1.26	1.20	1.40	1.53
45 Creston	1.31	N.A.	1.60	1.71	N.A.	1.26	1.18	1.33	1.42
46 Grand Forks-Greenwood	1.40	1.75	1.59	1.56	1.31	1.26	1.18	1.33	1.46
47 Trail-Rossland	1.32	1.89	1.50	1.69	1.31	1.30	1.19	1.37	1.51
CARIBOO									
48 Williams Lake	1.38	2.02	1.62	1.64	1.36	1.26	1.19	1.37	1.49
49 Quesnel	1.39	2.08	1.61	1.62	1.15	1.25	1.19	1.35	1.47
50 Prince George	1.57	2.50	1.86	1.73	1.38	1.34	1.29	1.51	1.69
51 McBride-Valemount	1.28	N.A.	1.49	N.A.	1.12	1.20	1.14	1.25	1.39
NORTH COAST									
52 Queen Charlotte Island	1.54	1.85	1.62	N.A.	1.12	1.33	1.21	1.35	1.48
53 Prince Rupert	1.40	2.16	1.64	1.37	1.18	1.28	1.21	1.38	1.52
54 Kitimat-Terrace	1.46	2.07	1.64	1.58	1.33	1.24	1.19	1.38	1.50
55 Hazelton	1.23	N.A.	1.38	1.39	1.26	1.18	1.12	1.24	1.33
56 Stewart	1.15	N.A.	1.30	1.34	N.A.	N.A.	1.09	1.19	1.21
NECHAKO									
57 Smithers-Houston	1.42	2.13	1.67	1.67	1.22	1.28	1.20	1.41	1.54
58 Burns Lake	1.28	1.62	1.46	1.37	N.A.	1.17	1.13	1.26	1.32
59 Vanderhoof	1.33	1.77	1.47	1.53	1.30	1.23	1.14	1.29	1.46
60 Stikine	1.20	1.70	1.22	1.40	1.20	N.A.	1.13	1.30	1.33
NORTHEAST									
61 Dawson Creek	1.35	2.21	1.64	1.63	1.24	1.28	1.19	1.35	1.43
62 Fort St. John	1.32	2.24	1.68	1.57	1.25	1.26	1.20	1.33	1.47
63 Ft. Nelson	1.37	N.A.	1.49	1.48	1.18	1.23	1.20	1.30	1.34

3.3 Applications

3.3.1 General Introduction

Several examples that illustrate the ways in which the ratios can be used as multipliers to estimate impacts are presented in the following sections. *Please note that the examples given are entirely fictitious, with places and industry changes selected essentially at random, and the numbers used have been pulled out of thin air.*

3.3.2 Simple Example

Suppose that a shellfish farming operation has been approved for the Port Hardy area. It is expected to employ 25 people directly once it is fully operational. What are the economic implications?

As noted earlier, shellfish farming is considered part of Agriculture in the NAICS classification scheme. Therefore, the relevant employment ratios are those for Agriculture in the Port Hardy area, namely,

Indirect: 1.13

Indirect plus Induced (with Safety Net): 1.18

Indirect plus Induced (no Safety Net): 1.25

The indirect ratio (used as a multiplier) tells us that there will be another $0.13 \times 25 = 3.25$ jobs created in the Port Hardy area by the shell-fish farming operation spending money in local businesses. If we assume that no new people move to the community because of these new job opportunities (both direct and indirect - in other words that the new jobs are filled by laid off fishermen or loggers), then the incremental spending caused by this boost in incomes will result in another $1.18 - 1.13 = .05 \times 25 = 1.25$ jobs in the nonbasic sector - maybe one fulltime position in the local supermarket and a part-time position in a fast-food restaurant.

However, if all the new workers come from outside the community, so that all of their spending is new, the effects are larger:

$1.25 - 1.13 = .12 \times 25 = 2.75$ new jobs in the nonbasic sector.

Probably, the impacts on the nonbasic sector will lie between the extremes of 1.25 and 2.75 because some of the new hires will be people from elsewhere with relevant experience and some will be unemployed locals.

3.3.3 Example which examines two industries simultaneously

Assume that the Squamish area is losing logging employment because of a depleted timber supply in the area and, at the same time, is experiencing considerable growth in tourism because of its natural beauty and the announcement of the 2010 Winter Olympics.

To be specific, suppose that our crystal ball tells us that next year there will be 150 fewer logging positions, and, because of increased tourism opportunities, there will be another 300 people employed in jobs, which support the tourist industry. What will be the net effects of these changes on the area?

First, find the relevant multipliers from Tables 3.1, 3.2 and 3.3. They are displayed for convenience in Table 3.4.

Table 3.4 Employment Impact Ratios for Squamish Area

	Logging	Tourism
Indirect	1.21	1.07
Indirect plus Induced (SN)	1.32	1.13
Indirect plus Induced (NSN)	1.49	1.23

Since we don't know precisely how the displaced loggers will react (retire?, move away?, go on EI?, change professions?...?) or where the new tourist workers will come from, let's assume that the true Indirect plus Induced multipliers in each case correspond to 50% SN and 50% NSN, or 1.40 for Logging and 1.18 for Tourism.

With these simplifying assumptions the 150 jobs lost in logging will have a negative employment impact of $150 \times 1.4 = 210$ jobs. On the other hand, the 300 new jobs in Tourism will have a total positive employment impact of $300 \times 1.18 = 354$ jobs. Therefore, the net effect of both expected changes will be an increase in employment of $354 - 210 = 144$ jobs.

It should be noted that the jobs gained and the jobs lost are not in the same industries, and that the skills required in the new jobs may not be held by the displaced workers, necessitating considerable employment flux in the area - such things need to be considered, but they are outside the scope of this simple economic model.

Before we leave this example, there are a couple more questions that might be asked. One would be: can we use the multipliers to figure out the trade-off between direct jobs in Logging and those in Tourism? Or, put another way, how many tourist workers does it take to replace one logger, assuming that our trade-off condition is that total employment in the area remains the same?

For simplicity, assume that the midpoint multipliers are used: 1.40 for Logging and 1.18 for Tourism. Assume that 1 direct job is lost in Logging. Then the total employment declines by 1.4. Assume that x direct jobs in Tourism are required to restore employment equilibrium. Then, $1.18x = 1.40$ or $x = 1.40/1.18 = \sim 1.19$.

So this analysis suggests that it takes roughly 1.2 jobs in tourism to replace each logging job lost.

3.3.4 Example where both Employment Income and Non-Employment Income are Considered

When reading this section, it might be helpful to refer to Figure 2.1 on page 7, the graphical presentation of the basic and non-basic sectors.

To measure the impact on the number of jobs in a community resulting from an influx of non-employment income (transfer payments, investment income, etc.), an alternative methodology is required to that used in previous examples which measured the impact of an influx of basic sector jobs. An extra step must be taken which is to estimate the nonbasic income that would be generated from the expenditure of non-employment income and then convert that non-basic income into non-basic jobs.

This next example shows how to calculate the economic impact of a decrease of 20 logging jobs in the Nelson area at the same time as an increase of 50 typical senior citizens in the same area receiving non-employment income.

Consider first the impacts of the reduction in logging employment. The employment ratios for the logging industry in the Nelson area given in Tables 3.1, 3.2 and 3.3, are reproduced below.

Indirect 1.17

Indirect plus Induced (with Safety Net/No migration) 1.27

Indirect plus Induced (No Safety Net/with migration) 1.42

What this means is that the direct job loss of 20 will lead to an estimated loss of

$$20 \times (1.17 - 1) = 3.4 \text{ indirect jobs}$$

Even under the assumption that all displaced workers stay in the community and draw employment insurance, there could be an additional loss of

$$20 \times (1.27 - 1.17) = 2.0 \text{ Induced jobs}$$

If the situation persists and all displaced workers leave the Nelson area to seek employment elsewhere, there could be an additional loss of

$$20 \times (1.42 - 1.27) = 3.0 \text{ Induced jobs}$$

as a result of reduced spending in the community. Thus, with a loss of 20 direct jobs in the basic sector, the community would lose either 5.4 indirect and induced jobs under the safety net assumption or 8.4 jobs with no safety net.

Now let us consider the economic gains associated with the in-migration of 50 seniors. It is assumed they would bring with them, basic non-employment income, such as CPP benefits, investment income, etc. and their spending of that income on goods and services in the community would create "induced" jobs. To determine how many induced jobs

would be created, we first need to estimate the non-basic income their expenditures would generate.

To do that, it is necessary to estimate the after-tax incomes of these people. Data from the 2001 Census¹⁰ suggests an average annual income for British Columbians, age 65 and over, of \$24,864. Using the same reasoning and methodology described in Appendix A.7 of this report yields an average after-tax income of \$22,258¹¹ for seniors. Thus, if Nelson gains 50 seniors, the total increase in basic after-tax income would be:

$$50 \times \$22,258 = \$1,112,900$$

We also need two additional pieces of information on the Nelson area -- the nonbasic income ratio (non-basic income divided by basic income), and the average nonbasic after-tax income in the community. Fortunately, that information is available from the database developed for this project and the results are compiled in Tables 3.5 and 3.6.

Table 3.5 indicates that the nonbasic income ratio for the Nelson Area is 0.164. That means that for every dollar generated from activities in the basic sector, be it from employment income or non-employment income, an additional \$0.164 of nonbasic income is generated.

Multiplying the basic income of the seniors (\$1,112,900) by the nonbasic income ratio (0.164), we find that the corresponding increase in nonbasic after-tax income resulting from the spending of these seniors is:

$$0.164 \times \$1,112,900 = \$182,516$$

Using the community average of nonbasic after tax income in the Nelson Area of \$19,105, (found in Table 3.6), we can assume that the \$182,516 nonbasic income generated by the seniors demand for goods and services would create:

$$\$182,516 / \$19,105 = 9.5 \text{ induced jobs, or } 0.19 \text{ of an induced job per senior (i.e. } 9.5 / 50 = 0.19).$$

Thus to replace all the jobs lost from the loss of 20 direct jobs in the forest sector, plus the 3.4 indirect jobs and 5.0 induced jobs, for a total of 28.4 jobs, it would take 149 seniors to move into Nelson and start spending their non-employment income.

$$28.4 \text{ jobs lost} / 0.19 \text{ jobs created per senior} = 149 \text{ seniors}$$

¹⁰ The specific reference for this is 2001 Census – Statistics Canada 95F0431XCB01003

¹¹ Here as elsewhere in this work we assume that local spending equals after-tax income. In fact, of course, senior citizens may be drawing funds from accumulated wealth and spending more than their incomes. The counter-argument would be that seniors are no longer accumulating assets and may spend significant amounts of time outside the local area, which would make their local spending less than their income.

Note that this example assumed that all the new induced jobs resulting from the influx of seniors are filled by in-migrants (no safety net). To apply another twist to the non-employment income economic impact calculation, below we look at the same example of 50 seniors moving into Nelson, but this time under the safety-net assumption, that is, all the new induced jobs are filled by workers who previously lived in the community but were unemployed and receiving EI.

3.3.5 Example Incorporating the Safety Net Assumption

To determine the impact of this assumption, it is necessary to first calculate how many induced jobs the 9.5 ex-unemployed would have supported through the expenditure of their income from employment insurance.

We assume an average EI benefit of \$10,000 per year. Thus the 9.5 unemployed would have generated a total of

$$9.5 \times \$10,000 = \$95,000 \text{ basic non-employment income}$$

With the non-basic income ratio equal to 0.164, the nonbasic income generated would be \$15,580

$$0.164 \times \$95,000 = \$15,580$$

Given a nonbasic average income of \$19,105, the 9.5 unemployed would have generated less than 1 induced job ((0.82)

$$\$15,580 / \$19,105 = 0.82 \text{ induced jobs}$$

So if the safety net assumption is used, there will be a net of 8.7 induced jobs generated when 50 seniors move into the area

$$9.5 \text{ jobs} - 0.82 \text{ jobs} = 8.7 \text{ jobs,}$$

instead of the 9.5 jobs generated under the non-safety net assumption.

While these calculations suggest that a sufficient number of seniors would keep the community as a whole viable, it is unlikely that the loggers and indirect employees would have the appropriate aptitudes and skills to fill the new non-basic positions – or that they would be willing to assume them, given the reduction in average income levels.

Table 3.5
2001 Nonbasic Income Ratios* Based on After-Tax Income

VANCOUVER ISLAND/COAST		KOOTENAY	
1 Gulf Islands	0.142	40 Fernie	0.088
2 Victoria	0.221	41 Cranbrook-Kimberley	0.202
3 Sooke-Port Renfrew	0.204	42 Invermere	0.132
4 Duncan	0.181	43 Castlegar-Arrow Lakes	0.158
5 Lake Cowichan	0.141	44 Nelson	0.164
6 Ladysmith	0.169	45 Creston	0.141
7 Nanaimo	0.247	46 Grand Forks-Greenwood	0.124
8 Parksville-Qualicum	0.159	47 Trail-Rossland	0.154
9 Alberni	0.100	CARIBOO	
10 Courtenay-Comox	0.171	48 Williams Lake	0.139
11 Campbell River	0.149	49 Quesnel	0.139
12 Bute Inlet	0.099	50 Prince George	0.244
13 Powell River	0.132	51 McBride-Valemount	0.071
14 Alert Bay	0.069	NORTH COAST	
15 Port Hardy	0.076	52 Queen Charlotte Island	0.143
16 Central Coast	0.085	53 Prince Rupert	0.162
MAINLAND/SOUTHWEST		54 Kitimat-Terrace	0.151
17 Hope-Fraser Canyon	0.121	55 Hazelton	0.082
18 Chilliwack	0.224	56 Stewart	0.049
19 Kent-Harrison	0.109	NECHAKO	
20 Matsqui-Abbotsford	0.272	57 Smithers-Houston	0.159
21 Pitt Meadows-Maple Ridge	0.310	58 Burns Lake	0.092
22 Mission	0.241	59 Vanderhoof	0.095
23 Sunshine Coast	0.179	60 Stikine	0.046
24 Squamish	0.191	NORTHEAST	
25 Lillooet	0.087	61 Dawson Creek	0.157
THOMPSON-OKANAGAN		62 Fort St. John	0.179
26 Princeton	0.108	63 Ft. Nelson	0.158
27 Oliver-Osoyoos	0.106		
28 Penticton	0.186		
29 Ashcroft	0.076		
30 Merritt	0.092		
31 Kamloops	0.234		
32 North Thompson	0.055		
33 Peachland	0.233		
34 Kelowna	0.263		
35 Vernon	0.225		
36 Spallumcheen	0.171		
37 Salmon Arm	0.170		
38 Golden	0.129		
39 Revelstoke	0.128		

*Total nonbasic income divided by
total basic income

Table 3.6
Average Nonbasic After-Tax Income, 2001

VANCOUVER ISLAND/COAST		KOOTENAY	
1 Gulf Islands	\$20,328	40 Fernie	\$19,410
2 Victoria	\$23,673	41 Cranbrook-Kimberley	\$21,932
3 Sooke-Port Renfrew	\$20,695	42 Invermere	\$19,322
4 Duncan	\$20,154	43 Castlegar-Arrow Lakes	\$19,730
5 Lake Cowichan	\$18,072	44 Nelson	\$19,105
6 Ladysmith	\$8,985	45 Creston	\$17,593
7 Nanaimo	\$20,368	46 Grand Forks-Greenwood	\$17,922
8 Parksville-Qualicum	\$20,982	47 Trail-Rossland	\$18,651
9 Alberni	\$19,073	CARIBOO	
10 Courtenay-Comox	\$19,683	48 Williams Lake	\$19,428
11 Campbell River	\$19,518	49 Quesnel	\$17,779
12 Bute Inlet	\$15,727	50 Prince George	\$22,774
13 Powell River	\$17,943	51 McBride-Valemount	\$14,963
14 Alert Bay	\$20,781	NORTH COAST	
15 Port Hardy	\$18,836	52 Queen Charlotte Island	\$19,534
16 Central Coast	\$19,182	53 Prince Rupert	\$21,445
MAINLAND/SOUTHWEST		54 Kitimat-Terrace	\$21,273
17 Hope-Fraser Canyon	\$20,204	55 Hazelton	\$16,755
18 Chilliwack	\$21,011	56 Stewart	\$16,151
19 Kent-Harrison	\$24,346	NECHAKO	
20 Matsqui-Abbotsford	\$21,596	57 Smithers-Houston	\$21,944
21 Pitt Meadows-Maple Ridge	\$24,123	58 Burns Lake	\$20,038
22 Mission	\$21,751	59 Vanderhoof	\$17,613
23 Sunshine Coast	\$20,189	60 Stikine	\$9,466
24 Squamish	\$29,191	NORTHEAST	
25 Lillooet	\$16,258	61 Dawson Creek	\$21,050
THOMPSON-OKANAGAN		62 Fort St. John	\$24,427
26 Princeton	\$16,363	63 Ft. Nelson	\$27,883
27 Oliver-Osoyoos	\$17,776		
28 Penticton	\$21,172		
29 Ashcroft	\$16,686		
30 Merritt	\$18,225		
31 Kamloops	\$20,721		
32 North Thompson	\$16,221		
33 Peachland	\$22,159		
34 Kelowna	\$23,077		
35 Vernon	\$20,949		
36 Spallumcheen	\$18,750		
37 Salmon Arm	\$18,800		
38 Golden	\$23,356		
39 Revelstoke	\$20,814		