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IMPACT OF A MAJOR ECONOMIC CHANGE ON A COASTAL RURAL ECONOMY:
A LARGE ALUMINUM PLANT IN CLATSOP COUNTY, OREGON ^{1/}

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Introduction

When industrialization occurs in a rural area, many aspects of the community may change. Such change affects various segments of the community differently. The controversy which often accompanies industrialization can be explained by the differential impact associated with the change. In this study some aspects of the economic portion of the overall impact are considered. A framework is provided through which the economic stress resulting from change can be traced and analyzed.

The basic idea of the study is simple: a descriptive model of the community's economy is utilized to appraise economic change. Representative businessmen are asked, "How much and to whom do you sell?" The sales include those to households, other businesses, local governments, schools, service organizations, and sales outside the local area. In short, an attempt is made to capture information on all the business transactions within the community during the period of one year. Given

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As information, it is possible to follow the changes in sales, regardless of their origin, throughout the local economy. In this manner the economic impact, and perhaps more importantly, the distribution of impact in the local community, can be measured. The distribution of the impact, whether negative or positive, is important as it has an influence on the acceptance or rejection by various segments of the community of the change being considered.

Anticipated Economic Impact

The economic change in the community analyzed in this study involved the addition of a large industrial plant in a coastal rural economy, specifically the potential construction of a large aluminum manufacturing plant in Clatsop County.^{2/} Detailed sales information was collected from local businesses in Clatsop County for 1968. On the basis of this and other information, a model was constructed by which the economic impact of the plant on the Clatsop County economy could be estimated. More detailed information about the nature of the plant and its business relationships with the rest of the local economy was obtained from local people working with the industrial development and from plant officials. Briefly the following direct economic impacts were assumed: The aluminum plant would purchase labor, some materials, and services within the local community as well as pay local taxes. The major expense items were: \$6,000,000 in annual payroll, \$8,288,000 for locally provided goods and services, and \$1,427,000 to local governments in taxes.

The above items represent direct expenditures of the new plant within the community; the total effect of these expenditures is greater and more widely distributed throughout the local economy. Certainly some of the income is respent locally and gives rise to additional economic activity in the community. Thus the total effect from a \$6,000,000 payroll was estimated to amount to \$9,000,000. Likewise, the

^{2/} The plant considered in this study is not the AMAX plant contemplated at the time of publication but that of Northwest Aluminum Inc. with data collected early in 1969.

\$8,250,000 in increased direct local business sales to the proposed aluminum plant amount to \$9,500,000 when all additional business is included. Furthermore, under the existing tax structure the total tax increase would amount to \$1,594,000 compared to the \$1,427,000 cited above.

The total effect of the anticipated economic impact from the plant is estimated to be \$11,183,000 in the Clatsop County economy. This would represent an increase of \$1,470,000 over the local direct purchases made by the proposed new industry.

Study Setting

Clatsop County is the extreme northwestern county in Oregon. It is geographically isolated from the Portland metropolitan area. Business and social activity of the county for the most part is conducted along the Columbia River, down the Pacific coast, and inland a short distance along main waterways. The County is well situated for a number of natural resource-based economic activities. Timber production utilizes the rough mountainous inland areas where the average annual rainfall exceeds 70 inches and cool moderate temperatures (average 51°) prevail. The County experiences high yields of good quality timber. Fishing and the processing of seafoods are major industries. Livestock, mink, dairy, and horticultural crops are the main sources of agricultural income. The natural setting makes the area very attractive for recreational use and a number of excellent recreational facilities are located in the county. Ninety percent of the County land is occupied by forests, 8 percent by farmland, 2 percent by recreational areas, towns, roads, and wastelands.

Estimates from the study indicate that in 1968 the businesses in the County sold \$255,410,000 worth of goods and services. Expenditures of the local government added another \$9,156,000 to the economic activity in the county. The distribution of the commercial portion of this economic activity is portrayed in Table 1. Lumber and fish processing are the most important industries in terms of sales. By combining some

Table 1. Sales from Clatsop County businesses during 1968,
by sector

Sector ^{1/}		Sector output in dollars
[1]	Lumber	\$ 60,565,000
[2]	Commercial fishing	3,567,000
[3]	Fish processing	39,786,000
[4]	Agriculture	3,800,000
[5]	Manufacturing	7,126,000
[6]	Lodging	7,597,000
[7]	Cafes and taverns	6,394,000
[8]	Service stations	6,593,000
[9]	Automotive sales and service	9,577,000
[10]	Communication and transportation	13,722,000
[11]	Professional services	7,453,000
[12]	Financial services	7,875,000
[13]	Construction	18,669,000
[14]	Retail and wholesale trade	45,396,000
[15]	Retail services and organizations	16,234,000
[16]	Port authority	1,056,000
TOTAL		\$ 255,410,000

^{1/} Sectors are defined in Appendix A.

of those sectors which are the primary beneficiaries of expenditures made by recreationists (restaurants, lodging, service stations, for example) this aggregate business becomes a sizeable portion of the total County business. Agricultural and commercial fishing activities are important but they are not large sectors when compared to lumber and fish processing. Retail and wholesale businesses of the County account for a large portion of economic activity, \$45.4 million. The number of businesses in the County is reported in Table 2 along with the number in each sector sampled in the study.

Before proceeding to further analyze the structure of this economy, one might look at the total worth of the assets of the community. This can only roughly be done, but again it is helpful in analyzing the magnitude of the proposed changes. The total assessed valuation on Clatsop County tax rolls as of July 1, 1968, was \$314,090,969. Total ad valorem revenue was \$6,733,633.28, composed of \$5,418,667.83 from real property, \$728,659.28 from personal property, and \$586,316.17 from utilities (Clatsop County, County Assessor, 1968). The proposed plant, assumed to have an appraised value of \$150,000,000, would certainly be a major addition to County wealth.

Business Transactions

Table 3 is called the Transactions Matrix. It shows the dollar amounts of actual sales or purchases (transactions) made by the various sectors in the Clatsop County economy. It contains all the information utilized in studying the economy. Included are the business sectors, sectors consisting of local government and finally the sectors that make up final demand. Final demand consists of the households of the community, business and government outside of the county, also those expenditures related to maintaining or expanding the capital stock of the local economy (depreciation and investment). When reading Table 3, it should be noted that all sectors are recorded twice, once across the top and again down the side. By reading down a column from a sector listed across the top, one can see where that sector made its purchases and how

Table 2. Number of firms by sector in the Clatsop County economy, 1968

Sector	Number of firms	
	Total in the county	Included in sample
[1] Lumber	19	7
[2] Commercial fishing	316	64
[3] Fish processing	13	4
[4] Agriculture	61	12
[5] Manufacturing	11	3
[6] Lodging	236	54
[7] Cafes and taverns	95	25
[8] Service stations	69	16
[9] Automotive sales & service	57	14
[10] Communication & transportation	35	11
[11] Professional services	80	19
[12] Financial services	13	6
[13] Construction	111	31
[14] Retail & wholesale trade	271	70
[15] Retail services and organizations	431	99
TOTAL	1818	435

much was spent for goods and services produced by the various sectors listed on the left. As an example, manufacturing bought nothing from lumber or commercial fishing, purchased \$6,000 of inputs from fish processing and \$910,000 from agriculture. The manufacturing sector reported no direct purchases from the cafes and taverns or lodging sectors. However, there were purchases of goods or services from most of the remaining sectors.

The subtotal of business purchases among the commercial businesses in the County is noted (Σ_{1-16}) after the first sixteen rows in Table 3. The total purchases from local businesses by manufacturing amounted to \$2,472,000. The entries in rows 17 to 28 indicate the uses made of the total tax payments by a sector. The sum (Σ_{17-28}) after line 28 shows an approximation of local taxes paid by manufacturing with a total of \$48,000. Below the heavy line are the sectors considered outside the local economy. Here \$435,000 went to households in the form of wages, profit, interest, royalties, or rent. An additional \$34,000 was paid in state and federal taxes. A large amount (\$3,377,000) was spent outside the local economy, primarily to purchase raw materials imported for manufacturing. Finally, manufacturers spent \$755,000 to maintain or expand their operations. The total expenditures by the manufacturing sector added to a total of \$7,121,000.

The purchasing patterns of all of the other sectors of the economy can be identified in a similar manner. In summary, one is able to identify the magnitude and distribution of purchases by the various sectors by reading down the columns in Table 3. To discover the pattern of sales in the community one engages in a similar exercise: reading across the rows of Table 3. For example, finding service stations in the left hand column, and reading across, gives an indication to whom they sell: \$429,000 to lumber, \$200,000 to commercial fishing, none to fish processing, etc.

Interpretation of the transactions in the public sectors of local government (sectors 17-28) requires some additional explanation. Local

government does purchase goods and services from local businesses. These purchases are shown in the intersections of columns 17-28 with rows 1-16. However, the reverse is only partially true. Taxes may be viewed as payments by the private sectors for the purchase of goods and services from local government. But the purchase-sale analogy is not perfect in this case of public transaction. To some extent the tax goes into a common coffer and the funds thus collected are disbursed as local government provides its various services. Some of these services are quite general in that they benefit about equally broad segments of the local community. Others are directed at some very specific groups. For a variety of reasons it may be impossible or undesirable for local government (or any level of government) to collect its revenue from various groups of the public only on the basis of the benefits which these groups may derive from the local government's services. However, attempting to interpret the numbers in the intersections of columns 1-15 and rows 16-28 of Table 3 in the manner outlined above for the upper part of the Table, would require such an assumption. It would have to be assumed that goods and services provided by the local government sectors to the various sectors of the economy would be exactly equal to the tax payments. Of course, a much simpler explanation is called for: these numbers simply represent tax payments.

Tables 4 and 5 summarize the relationships of the various sectors within the local economy in comparison to their relationships with the rest of the world. It is helpful to know which sectors are heavily dependent upon the local economy. Fish processing purchases 33.1 percent of inputs locally from businesses and sells 98.8 percent outside the local area (Tables 4 and 5). On a dollar basis, the total volume of business transacted by this sector is large. The lumber sector is similar. These are obviously export sectors, important in drawing outside money into the County. Many of their input needs are also met from outside the county borders. Agriculture is somewhat different; 78.3 percent of the purchases are made locally, while 71.6 percent of the product goes outside the County. Agriculture is being serviced to a greater extent from within the local economy than is true of the two sectors mentioned earlier. However, the total volume of business is much smaller.

Table 4. Local and non-local purchases by sector in thousands of dollars, in the Clatsop County economy, 1968

Sector	Purchases	Purchases	Percent	Percent
	by local sectors*	by non-local sectors	purchased by local sectors*	purchased by non-local sectors
	\$	\$	%	%
[1] Lumber	22,112,	38,451,	36.5	63.5
[2] Commercial fishing	2,591,	976,	72.6	27.4
[3] Fish processing	13,153,	26,634,	33.1	66.9
[4] Agriculture	2,975,	824,	78.3	21.7
[5] Manufacturing	2,957,	4,166,	41.5	58.5
[6] Lodging	4,520,	3,078,	59.5	40.5
[7] Cafes & taverns	3,513,	2,882,	54.9	45.1
[8] Service stations	2,376,	4,220,	36.0	64.0
[9] Automotive sales and service	2,908,	6,672,	30.3	69.7
[10] Communication & transportation	4,149,	9,573,	30.2	69.8
[11] Professional services	3,982,	3,470,	53.4	46.6
[12] Financial services	2,042,	5,834,	25.9	74.1
[13] Construction	6,876,	11,793,	36.8	63.2
[14] Retail & whole- sale trade	11,985,	33,410,	26.4	73.6
[15] Retail services & organizations	7,740,	8,496,	47.7	52.3
[16] Port authority	664,	392,	62.9	37.1
[17] Education	4,289,	723,	85.6	14.4
[18] County roads	425,	18,	95.9	4.1
[19] Law enforcement	204,	25,	89.1	10.9
[20] Health department	81,	6,	93.1	6.9
[21] Welfare	766,	0	100.0	0
[22] General fund	435,	99,	81.5	18.5
[23] City of Astoria	1,033,	289,	78.1	21.9
[24] City of Warrenton	121,	42,	74.2	25.8
[25] Town of Hammond	23,	4,	85.2	14.8
[26] City of Gearhart	69,	14,	83.1	16.9
[27] City of Seaside	334,	56,	85.6	14.4
[28] City of Cannon Beach	84,	22,	79.2	20.8
[29] Household	78,397,	0	100.0	0
[30] Government	7,701,	0	100.0	0
[31] Exports	126,383,	0	100.0	0
[32] Capital formation & inventory	3,377,	12,590,	21.1	78.9
Total inputs	318,265,	174,759,	64.6	35.4

* Includes households.

Table 5. Local and non-local sales by sector in thousands of dollars, in the Clatsop County economy, 1968

Sector	Sales to local sectors*	Sales to non-local sectors	Percent sales to local sectors*	Percent sales to non-local sectors
	\$	\$	%	%
[1] Lumber	4,960,	55,605,	8.2	91.8
[2] Commercial fishing	2,645,	921,	74.2	25.8
[3] Fish processing	482,	39,304,	1.2	98.8
[4] Agriculture	1,081,	2,718,	28.4	71.6
[5] Manufacturing	4,148,	2,976,	58.2	41.8
[6] Lodging	7,390,	208,	97.3	2.7
[7] Cafes & taverns	6,289,	106,	98.4	1.6
[8] Service stations	6,394,	201,	97.0	3.0
[9] Automotive sales and service	8,520,	1,060,	89.0	11.0
[10] Communication & transportation	12,062,	1,660,	87.9	12.1
[11] Professional services	4,946,	2,506,	66.4	33.6
[12] Financial services	5,289,	2,588,	67.2	32.8
[13] Construction	5,548,	13,121,	29.7	70.3
[14] Retail & wholesale trade	34,837,	10,557,	76.7	23.3
[15] Retail services & organizations	15,515,	721,	95.6	4.4
[16] Port authority	124,	932,	11.7	88.3
[17] Education	3,975,	1,038,	79.3	20.7
[18] County roads	200,	242,	45.0	55.0
[19] Law enforcement	229,	0	100.0	0
[20] Health department	87,	0	103.6	0
[21] Welfare	528,	238,	68.8	31.2
[22] General fund	492,	42,	92.1	7.9
[23] City of Astoria	1,164,	157,	88.0	12.0
[24] City of Warrenton	136,	27,	83.4	16.6
[25] Town of Hammond	11,	16,	40.7	59.3
[26] City of Gearhart	19,	64,	22.9	77.1
[27] City of Seaside	287,	104,	73.4	26.6
[28] City of Cannon Beach	98,	8,	92.4	7.6
[29] Household	53,380,	340,	99.4	0.6
[30] Government	15,026,	0	100.0	0
[31] Imports	132,695,	12,590,	91.3	8.7
[32] Depreciation & inventory	14,417,	0	100.0	0
Total outputs	342,974,	150,050,	69.6	30.4

* Includes households.

The above examples are extractive industries. They are expected to be important exporters. On the other hand, the service sectors offer an opportunity to observe a different behavior. For example, about half of the purchases from the retail services sector are made outside the local area (52.3 percent), while this sector sells 95.6 percent of its services inside the county. These retail and wholesale businesses purchase 26.4 percent (Table 4) locally and sell 76.7 percent (Table 5) locally.

Direct Business Per Dollar

The description of the economy to this point has been in terms of absolute dollar transactions among sectors. Another description of the economy is based on the distribution of purchases made by each sector in generating one dollar of sales. These numbers are reported in Table 6. Again, reading down the columns we note that per dollar of total sales the fish processing sector spends nothing within the lumber sector, over 6.6 cents with local commercial fishermen, a small amount with other processors, then spends 9.3 cents with manufacturers, 0.2 cents in auto sales, and 4.1 cents in communication and transportation, etc., until there has been an accounting for the entire dollar. Below sector 16 is presented a subtotal (Σ_{1-16}) for the total purchases made by the fish processing sector among the businesses in Clatsop County (24 cents). Continuing down the column, we find the listing of this sector's purchases (taxes or user charges) from local government (Σ_{17-28}) is 0.3 cents.

Continuing with fish processing, three-quarters of the purchases were made from sources not yet mentioned; 9.0 cents from households; 4.0 cents for state and federal taxes. The largest item is the 61.6 cents spent in the import sector. This heavily reflects the purchase of fish for processing. The final 1.3 cents reflect inventory changes and depreciation allowance. A similar use can be made of the data for the other sectors reported in Table 6.

The above discussion on distribution of direct purchases is summarized in Table 7. Certainly payrolls are largely paid to county residents. As

Table 6. Purchases (in dollars) per dollar of sales by sector; matrix of direct (technical) coefficients, Clatsop County, Oregon, 1968

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]		
[1] Lumber	0.0762	0	0	0	0	0	0	0	0	0.0127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
[2] Commercial fishing	0	.0028	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
[3] Fish processing	0	0	.0006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
[4] Agriculture	0	0	0	.0119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
[5] Manufacturing	0	0	0	.0933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
[6] Lodging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
[7] Cafes & taverns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
[8] Service stations	.0071	.0562	0	0	0	0	0	.0110	.0019	.0062	.0024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[9] Automotive sales and service	.0014	.0234	.0024	.0038	.0145	.0030	.0003	.0067	.0033	.0056	.0103	.0019	.0069	.0026	.0009	.0026	.0128	.1111	0	0	0	0	0	0	0	0	0	0	0	0	0
[10] Communication & transportation	.0306	.0410	.0408	.2756	.1046	.0917	.0241	.0287	.0307	.0153	.0176	.0196	.0091	.0133	.0017	.0015	.0076	0	.0177	.0182	.0029	.0485	.0075	.0090	0	.0117	.0057	.0015	0	0	
[11] Professional services	.0186	.0361	.0003	.0012	.0006	.0003	.0042	.0011	.0007	.0002	.0052	.0034	.0007	.0005	.0012	.0174	.0041	.0427	.0244	0	.2737	.0214	.0107	.0252	.0037	.0234	.0784	.0320	.0008	0	0
[12] Financial services	.0108	.0030	.0109	.0362	.0229	.0016	.0008	.0009	.0587	0	.0008	.0043	.0103	.0022	.0102	.0069	0	0	0	0	0	0	0	0	0	.0009	.0115	0	0	0	0
[13] Construction	.0005	.0012	.0026	.0039	.0081	.0036	.0521	.0020	.0044	.0028	.0135	.0100	.0445	.0016	.0029	.0991	.0275	.02355	.0007	.0009	0	.0109	.0512	.3267	.4445	.2078	.0663	.5258	0	0	0
[14] Retail & wholesale trade	.0364	.0488	.0176	.1708	.0485	.0875	.1104	.1703	.0281	.0145	.0291	.0230	.0186	.0300	.0103	.0382	.0843	.0724	.0489	.0482	.0219	.0685	.0707	.0890	.1206	.1134	.0885	.0540	.1094	0	0
[15] Retail organizations & organizations	.0069	.0882	.0055	.0448	.0059	.1139	.0532	.0217	.0170	.0015	.0345	.0088	.0073	.0249	.0153	.0026	.0220	.0146	.0225	0	.0502	.0205	.0574	.0395	.0270	.0309	.0272	.0012	0	0	0
[16] Port authority	.0006	.0001	*	.0004	.0001	.0007	.0001	*	.0016	.0016	*	.0013	.0001	.0002	.0002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I_{1-16}	.1891	.3008	.2398	.5826	.3472	.3023	.2452	.2424	.1458	.0604	.1134	.0733	.1056	.0754	.0654	.1886	.1693	.5156	.1198	.0835	.3487	.1774	.2332	.5592	.5965	.4274	.2996	.6540	.1381	0	0
[17] Education	.0215	.0048	.0018	.0167	.0035	.0273	.0048	.0014	.0017	.0234	.0020	.0031	.0020	.0086	.0071	0	.0140	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[18] County roads	.0010	.0002	.0001	.0007	.0002	.0012	.0002	.0001	.0001	.0010	.0001	.0001	.0001	.0004	.0003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[19] Law enforcement	.0012	.0003	.0001	.0009	.0002	.0014	.0002	.0001	.0001	.0012	.0001	.0002	.0001	.0004	.0004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[20] Health department	.0005	.0001	*	.0003	.0001	.0005	.0001	*	.0005	.0005	*	.0001	.0001	.0002	.0001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[21] Welfare	.0031	.0006	.0002	.0022	.0005	.0036	.0006	.0002	.0002	.0031	.0003	.0004	.0003	.0011	.0009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[22] General fund	.0028	.0006	.0002	.0020	.0004	.0032	.0006	.0002	.0002	.0027	.0002	.0015	.0002	.0010	.0008	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[23] City of Astoria	.0002	0	.0006	0	.0021	.0088	.0008	.0022	.0097	.0011	.0010	.0005	.0002	.0033	.0016	.0026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[24] City of Warrenton	0	0	.0001	.0001	0	.0001	.0004	.0002	.0001	.0001	0	0	0	.0008	.0003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[25] Town of Hammond	0	0	.0001	0	0	*	*	0	*	0	0	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[26] City of Gearhart	0	0	0	0	0	.0014	0	*	0	0	0	0	0	.0001	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[27] City of Seaside	0	*	*	0	0	.0079	.0016	.0009	.0003	.0004	.0004	.0004	.0001	.0015	.0007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[28] City of Cannon Beach	0	0	0	0	0	.0024	*	.0001	0	*	0	0	0	.0002	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I_{17-28}	.0303	.0066	.0032	.0229	.0071	.0570	.0093	.0054	.0033	.0335	.0041	.0064	.0030	.0176	.0122	.0123	.0140	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$I_{1-16} + I_{17-28}$	.2194	.3074	.2430	.6055	.3543	.3593	.2545	.2478	.1491	.0939	.1175	.0797	.1086	.0930	.0776	.2009	.1833	.5156	.1198	.0835	.3487	.1810	.2787	.5636	.6067	.5092	.3008	.6747	.1619	0	0
[29] Aluminum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[30] Household	.1458	.4191	.0876	.1777	.0611	.2355	.2947	.1123	.1544	.2083	.4168	.1798	.2597	.1712	.3987	.4279	.6724	.4445	.7698	.8520	.6513	.6331	.5030	.3633	.2603	.3225	.5566	.1202	.1000	0	0
[31] Government	.1014	.0790	.0402	.0376	.0048	.0313	.0403	.0241	.1038	.1048	.0689	.0396	.0363	.0463	0	0	0	.0399	.0015	.0645	0	.0319	.0134	.0056	.0191	.0046	.0032	.0500	0	0	
[32] Imports	.4205	.1347	.6159	.0592	.4741	.2335	.3791	.5974	.6611	.4950	.3395	.6633	.5604	.6693	.4420	.3712	.1442	0	.1090	0	.1359	.2049	.0676	.1138	.1636	.1395	.2052	.6881	0	0	
[33] Depreciation & inventory	.1129	.0599	.0133	.1201	.1060	.1403	.0314	.0194	.0113	.0988	.0214	.0084	.0318	.0304	.0350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Indicates a number too small to round up to 0.0001.
 † The aluminum sector is shown here to report the direct coefficients;
 this sector was not used in the analysis until later.

Table 7. Direct purchases per dollar of business within the local economy by sectors, Clatsop County, Oregon, 1968

Sector	Purchases from			Total local purchases	Leak-ages ^{a/}
	Local businesses	Local government	Households		
	\$	\$	\$	\$	\$
[1] Lumber	0.19	0.031	0.15	0.37	0.63
[2] Commercial fishing	.30	.007	.42	.73	.27
[3] Fish processing	.24	.003	.09	.33	.67
[4] Agriculture	.58	.023	.18	.78	.22
[5] Manufacturing	.35	.007	.06	.42	.58
[6] Lodging	.30	.058	.24	.60	.40
[7] Cafes & taverns	.25	.009	.29	.55	.45
[8] Service stations	.24	.005	.11	.37	.63
[9] Automotive sales and service	.15	.003	.15	.31	.69
[10] Communication & transportation	.06	.035	.21	.31	.69
[11] Professional services	.11	.004	.42	.54	.46
[12] Financial services	.07	.008	.18	.27	.73
[13] Construction	.11	.003	.26	.37	.63
[14] Retail & wholesale trade	.08	.018	.17	.27	.73
[15] Retail services & organizations	.07	.013	.40	.48	.52
[16] Port authority	.19	.012	.43	.63	.37
[17] Education	.17	.014	.67	.86	.14
[18] County roads	.52	0	.44	.96	.04
[19] Law enforcement	.12	0	.77	.89	.11
[20] Health department	.08	0	.85	.94	.06
[21] Welfare	.35	0	.65	1.00	0
[22] General fund	.18	.004	.63	.82	.18
[23] City of Astoria	.23	.046	.50	.79	.21
[24] City of Warrenton	.56	.004	.36	.93	.07
[25] Town of Hammond	.60	.010	.26	.87	.13
[26] City of Gearhart	.43	.082	.32	.88	.17
[27] City of Seaside	.30	.001	.56	.86	.14
[28] City of Cannon Beach	.65	.021	.12	.80	.20

^{a/} Leakages are the combined totals for imports, state and federal taxes, and capital accumulation and depreciation allowances.

an example, the wages paid by lodging and cafes and taverns largely go to county residents; 24 and 29 cents per dollar of business, respectively. In Table 7 it is possible to see the purchases of each sector from other local businesses, local government, and households.

The expenditures of households in the county were collected from the business sectors. Largely for reasons of research economy it was decided to view households as final consumers. The research did not intend to imply that households were not important to the local economy, but rather to focus the time and funds available on the business and tax revenue effects of the proposed aluminum plant.

The manner in which household spending was analyzed in this study reduces the economic activity estimated, in that the increase in salaries and wages is not recirculated in the model as they would be in the real world.

Total Business Per Dollar

The study deals with an estimate of the impact of an economic change in the local community. In the section above, the breakdown was given of the distribution of the expenditures made to generate an additional dollar of output. In essence, we had a view of the first round impact on the economy for each dollar of output. Of particular interest was who received the business and how much. But our specific interest is to determine how much total business is generated or lessened by one dollar change in sales of a particular sector. This requires that we observe the effects of the additional dollar of sales as it passes through the community paying bills. One dollar may be exchanged many times in settling accounts. As this dollar circulates, it adds to the total county business.

Figure 1 attempts to illustrate how money flows through and out of a local economy. A dollar is spent for local goods or services and the business receiving the dollar in turn pays for its purchases. The new dollar generates a series of transactions or turnovers to satisfy the

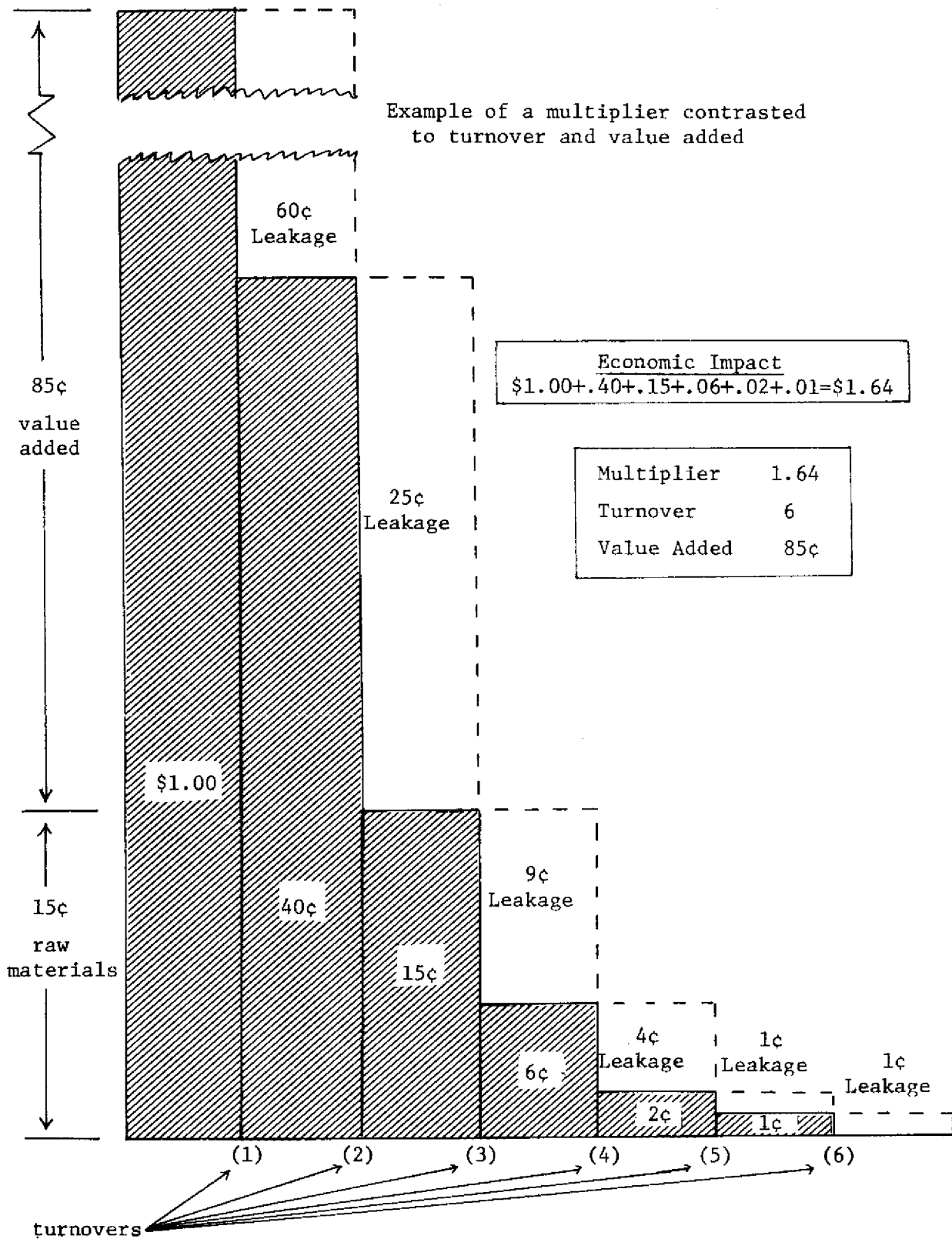


Figure 1. Illustration of transactions of one dollar through a local economy.

needs for generating the product or service sold. In the illustration in Figure 1, 40 cents is spent within the local community. This first expenditure is similar to the type of expenditure reported in Table 6. The 60 cents not spent locally are called leakages. The larger portion of the dollar is usually a leakage; that is, a majority of the bills occurred outside of what we call here the "local community".

Returning to Figure 1, 60 cents was a leakage, but 40 cents reappears within the economy and will be spent again.^{3/} However, when it is returned for a second turnover, leakages continue to occur in our illustration resulting in 25 cents leaving the local economy and 15 cents remaining. This process continues until the effects of the original and subsequent transactions can no longer be felt in the local area.

Leakages represent the extent of the economy's dependence upon other economies, or conversely, its measure of self-sufficiency. A local economy enjoys diversity in available goods and services if trade and the accompanying leakages take place. Of course, some of the money comes back again in purchases, restarting the cycle as surrounding areas once again buy local goods and services. This brings out an important point; the leakage tends to be less at each turnover for economies that are more nearly self-sufficient. This results in the money circulating longer in the larger communities (large metropolitan areas as opposed to hamlets). The size of leakages differ widely by business sectors as noted in Tables 4 or 6. Those economic sectors which can obtain a larger share of the needed inputs within the local community have lower leakages at the first turnover.

The total effect of a dollar of additional business for each sector is summarized in Table 8. The difference between it and Table 6 is that the total of the first, second, third, and subsequent rounds of effects are reported. In Table 6 the sum of each column is limited to direct

^{3/} Saving is also a leakage as this money is withheld from further circulation locally.

purchases from one dollar of additional sales. In Table 8 all transactions resulting from an additional dollar are identified and summed for the many rounds of transactions within the local economy. This means the total is greater than the original one dollar.

Using the lumber sector as an example, \$1.08 of lumber sales is generated from \$1.00 additional business. Naturally there is the original dollar plus 8.3 cents in business due to transactions among various firms in the County. If we refer back to Table 6 we note direct purchases of 7.6 cents within the lumber sector, resulting from a dollar of increased sale. The difference, 0.7 cents, is the result of subsequent transactions in the County's business community, some of which result in additional sales by the lumber sector.

The lumber column reveals that a dollar of sales has an impact on every other sector even though no direct purchases were made from several of them. Again reference to Table 6 will illustrate that lumber made no direct purchases from commercial fishing, fish processing, agriculture, manufacturing, etc. However, in Table 8 there is money showing up from each dollar of business in lumber in each of these sectors. It is small, but it does show up. The final result is that for the lumber sector in Clatsop County the sum of all effects of a dollar of additional business is \$1.26 when followed completely through the community. This same relationship can be determined for each sector studied. The sums are recorded at the bottom of Table 8 and in Table 10. This sum of total business effects, direct and indirect, is called the business multiplier.

The Business Multiplier

The business multipliers vary widely depending upon the nature of the sector gaining the additional dollar. (The range in Clatsop County was \$1.09 to \$1.69.) Affecting the business multiplier are the size and self-sufficiency of the community. The local economy is more nearly self-sufficient in supplying the agricultural sector needs than supplying lumber; multipliers are respectively 1.69 and 1.26. This makes sense when

Table 8. Direct and indirect effects of one dollar change in business within Clatsop County, Oregon, 1968

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
[1] Lumber	1.0830	0.0007	0.0008	0.0040	0.0021	0.0014	0.0008	0.0005	0.0005	0.0141	0.0004	0.0004	0.0074	0.0002	0.0002	0.0051	0.0004	0.0019	0.0003	0.0003	0.0002	0.0008	0.0007	0.0038	0.0034	0.0027	0.0006	0.0040	0.0002
[2] Commercial fishing	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001	* .0001	* .0004	* .0001	* .0001	* .0002	* .0002	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0005	* .0001	* .0001	* .0002	* .0002	* .0001	* .0002
[3] Fish processing	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001	* .0001	* .0004	* .0001	* .0001	* .0002	* .0002	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0002	* .0001	* .0002
[4] Agriculture	* .0001	* .0004	* .0004	* .0003	* .0002	* .0005	* .0003	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001	* .0002	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[5] Manufacturing	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[6] Lodging	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[7] Cafes & taverns	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[8] Service stations	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[9] Automotive sales and service	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[10] Communication & transportation	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[11] Professional services	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[12] Financial services	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[13] Construction	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[14] Retail & wholesale trade	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[15] Retail services & organizations	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[16] Port authority	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[17] Education	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[18] County roads	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[19] Law enforcement	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[20] Health department	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[21] Welfare	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[22] General fund	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[23] City of Astoria	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[24] City of Warrenton	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[25] Town of Hammond	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[26] City of Gearhart	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[27] City of Seaside	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[28] City of Cannon Beach	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
[29] Aluminum	* .0001	* .0005	* .0001	* .0003	* .0002	* .0008	* .0003	* .0002	* .0002	* .0002	* .0002	* .0008	* .0001	* .0001	* .0005	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0001	* .0002	* .0001	* .0001
Total	1.2599	1.3523	1.3198	1.6859	1.4704	1.4071	1.2836	1.2773	1.1652	1.1124	1.1315	1.0900	1.1227	1.1058	1.0918	1.2307	1.0271	1.5885	1.1340	1.0951	1.3919	1.2025	1.3264	1.6424	1.6837	1.6149	1.3387	1.7704	1.1862

* Indicates a number too small to round up to 0.0001.

we think about the needs of these industries and the local economy's ability to meet them. Local government multipliers may be interpreted as the additional business generated locally from the purchases made from tax revenues.

New Industry Effects

The principal objective of this study goes beyond a description of the Clatsop County economy. It is focused on the analysis of the economic impact of the addition of a large aluminum plant. In this section we shall summarize our estimates of the expected changes resulting from the aluminum plant. Only time will tell whether or not these projections are "correct", assuming the plant will be built.

This analysis might assist the people in the community to partially answer the following questions:

1. From the viewpoint of the local economy, are the overall beneficial effects of the change greater than the required sacrifices?
2. If the change comes to pass, how much and where will its effects be felt in the local economy?
3. What other changes could be made to offset the effects or to complement the effects expected from the additional industry?

Our first task will be to see what might be expected from the proposed aluminum plant. The new plant will affect the community mainly by hiring people and by buying some inputs locally for operational purposes. The bauxite or alumina will be imported and the aluminum ingots will be exported, so this aspect is of little direct concern to the local community. The assignment is to determine where this plant will purchase within the local community and the magnitude of these purchases. These purchases are reported in Tables 3 and 9. The purchases represent estimates based on "informed guesses". If better estimates become available, they can be fitted into the model and the impact can be reevaluated. In the same manner, the total business reported in Table 9 is an estimate, hopefully close enough to reality to be useful to the community.

Table 9. Direct purchases and resulting increase in total business estimated for the aluminum plant in the Clatsop County economy

Sector	Direct purchases	Total business
[1] Lumber	\$ 0	\$ 10,333
[2] Commercial fishing	0	765
[3] Fish processing	0	11,588
[4] Agriculture	0	985
[5] Manufacturing	0	7,623
[6] Lodging	0	1,780
[7] Cafes & taverns	0	2,006
[8] Service stations	100,000	137,870
[9] Automotive sales and service	50,000	93,501
[10] Communication & transportation	0	131,835
[11] Professional services	50,000	133,391
[12] Financial services	0	37,542
[13] Construction	0	264,181
[14] Retail & whole- sale trade	6,564,000	6,994,441
[15] Retail services & organizations	0	235,265
[16] Port authority	1,524,000	1,525,152
Σ_{1-16}	8,288,000	9,588,858
[17] Education	957,000	1,038,668
[18] County roads	41,000	43,734
[19] Law enforcement	50,000	53,402
[20] Health department	19,000	20,174
[21] Welfare	126,000	134,390
[22] General fund	113,000	131,334
[23] City of Astoria	0	29,107
[24] City of Warrenton	121,000	130,486
[25] Town of Hammond	0	176
[26] City of Gearhart	0	478
[27] City of Seaside	0	11,281
[28] City of Cannon Beach	0	1,185
Σ_{17-28}	1,427,000	1,594,415
[29] Household	6,000,000	9,180,000
[30] Government	3,000,000	NA
[31] Imports	41,286,463	NA
[32] Depreciation & inventory	0	NA
Total Inputs	\$ 60,000,000	NA

It becomes clear in Table 9 who is affected directly and who indirectly from the increased business from the aluminum firm. Only five business sectors of 16 are anticipated to make significant sales directly to the new plant, although, when all the transactions are traced through the economy, everyone gets some additional business. Distribution is not at all even, however, throughout the 16 sectors. Commercial fishing and agriculture will not feel the impact estimated in this study. Given the size of lumber and fish processing, they also will not feel the magnitude of the impact nor will manufacturing, lodging, and cafes and taverns. Impact estimates for the latter three sectors may not well represent the potential in the final outcome due to sampling problems, but given the estimated structure, little additional business is anticipated. It should be remembered that we are considering the effects of the operating plant, not the construction period before the plant begins operation. The construction period may result in considerable business for local manufacturing, cafes and taverns, and lodging. The final nine sectors of the business community receive significant business increases from the increased economic activity generated by the plant, although several of these receive no direct purchases at all. These groups would logically include the strongest supporters for the economic expansion expected from an aluminum plant.

Associated with the economic expansion effects discussed above there are other economic effects which this study does not take into account explicitly. Very important may be the new industry's impacts upon real property values in the area. Because of the increased economic activity and perhaps because of a higher rate of immigration, the demand for certain types of commercial and residential properties may rise, resulting in higher values for these properties. Nor is it likely that this effect upon real property values would be spread evenly throughout the entire County. In this uneven distribution of the impact upon local asset values may be another source of the conflict associated with local industrial development projects.

Our study also does not address itself to the question of the environmental impact which might result from the industrial addition. However, if there

were negative effects of the kind which would reduce recreationists' expenditures in the local area, the study is useful in tracing out the community impact of these. The procedure for doing this is analogous to that outlined for estimating the impact of the aluminum plant.

The Public Sector

The taxes are projected for the new plant and listed as direct purchases in Table 9 for sectors 17 through 28. These taxes are based on the projected appraised value of the plant, its location, and the 1968 tax rates in the County. The taxing structure may be altered after the plant is built. However, it is possible to observe the impact of local government revenues given the 1968 conditions. The second column in Table 9 includes the total local tax increases anticipated from the general increase in business, resulting from the general expansion in business resulting from the effects of the proposed plant.

The new plant is expected to pay a total of \$1,427,000 in direct local taxes. This increases to \$1,594,000 when the total tax impact in the County is collected. Of this total increase, \$1,039,000 would be allocated to education within the County under the 1968 budgeting conditions. The question facing taxpayers in the County will be whether this annual increase is sufficient to pay the total increased annual school costs. How many families and how many school-aged children will be added to the community is a problem for the local school board to determine. How much does it cost for one year of public education in Clatsop County? Will \$1,039,000 cover the costs of the increased needs for education in the county? The school boards and others in the community can begin to figure the impact on schools and school costs and make some judgments with respect to future tax bills in Clatsop County.

In similar fashion, will \$44,000 handle the increased demand for streets and roads on an annual basis? Will \$53,000 annually meet the additional needs for law enforcement? This process can be continued down the entire list of local government expenditures. There may be several places for

considerable savings to be realized and shifts can take place among governmental sector budgets. Perhaps welfare payments will decline as a result of incoming employment opportunities. It is through this kind of analysis that we are able to judge whether the community will enjoy any net benefits by addition of the aluminum plant.

The Port Authority receives the large increase; this should be explained. At the time of the study it was not clear whether the company or the Port Authority would own the docks and would handle the ore across the docks. For convenience, this activity was placed within the Port Authority sector, and treated as a normal business for this activity. Regardless of who handled the ore, the expenditure pattern within the community would be very similar and the costs would not vary greatly.

Household Income

It is possible to estimate the impact of the proposed plant's wages on other wages and salaries in the county. All wages in the county are projected to rise by \$9,180,000 (Table 9) as a result of the \$6,000,000 wage bill from the new aluminum industry. It is possible to obtain a great deal more information on how much total increase in wages results from additional dollar in wages (payments to household) paid by any sector. These relationships will be called household income multipliers. Again they represent the total increase in salaries and wages per dollar increase in salaries and wages from a given sector. This multiplier is not tied to increases in total business but to increases in local salaries and wages.

The aluminum industry has a household income multiplier of 1.53. Other sectors' income multipliers may also be found in Table 10. They range from 2.61 for the City of Cannon Beach and the manufacturing sector to 1.02 for the health department. The implications are that manufacturing wages and the wages from the Cannon Beach city operations generate an additional \$1.61 in wages in the county. Similarly, the health department creates relatively little in additional local wages from expenditures they

Table 10. 1968 and projected gross output and output and income multipliers all by economic sector for Clatsop County, Oregon

Sector	(1) Total output 1968 \$	(2) Projected total output with the aluminum plant \$	(3) Direct plus indirect change in total output (2)-(1) \$	(4) Output multiplier	(5) Income multiplier
[1] Lumber	60,564,452	60,574,585	10,333	1.26	1.47
[2] Commercial fishing	3,566,305	3,567,070	765	1.35	1.23
[3] Fish processing	39,786,831	39,798,419	11,588	1.32	1.81
[4] Agriculture	3,799,475	3,800,460	985	1.69	1.89
[5] Manufacturing	7,124,345	7,131,968	7,623	1.47	2.61
[6] Lodging	7,597,314	7,599,094	1,780	1.41	1.55
[7] Cafes & taverns	6,395,356	6,397,362	2,006	1.28	1.25
[8] Service stations	6,594,843	6,732,713	137,870	1.28	1.53
[9] Automotive sales and service	9,580,321	9,673,822	93,501	1.16	1.24
[10] Communication & transportation	13,722,312	13,854,147	131,835	1.11	1.18
[11] Professional services	7,452,140	7,585,531	133,391	1.13	1.09
[12] Financial services	7,876,573	7,914,115	37,542	1.09	1.13
[13] Construction	18,669,454	18,933,635	264,181	1.12	1.11
[14] Retail & whole- sale trade	45,394,380	52,388,821	6,994,441	1.11	1.20
[15] Retail services & organizations	16,235,945	16,471,210	235,265	1.09	1.07
[16] Port authority	1,056,011	2,581,763	1,525,752	1.23	1.14
[17] Education	5,012,717	6,051,385	1,038,668	1.21	1.08
[18] County roads	442,644	486,378	43,734	1.59	1.31
[19] Law enforcement	229,842	283,244	53,402	1.13	1.05
[20] Health department	86,297	106,471	20,174	1.10	1.02
[21] Welfare	765,777	900,167	134,390	1.39	1.23
[22] General fund	534,166	665,500	131,334	1.20	1.08
[23] City of Astoria	1,321,309	1,350,416	29,107	1.33	1.20
[24] City of Warrenton	162,965	293,451	130,486	1.64	1.44
[25] Town of Hammond	26,777	26,953	176	1.68	1.66
[26] City of Gearhart	83,224	83,702	478	1.61	1.50
[27] City of Seaside	390,796	402,077	11,281	1.34	1.17
[28] City of Cannon Beach	105,938	107,123	1,185	1.77	2.61
[29] Aluminum	0	60,000,000	*	1.19	1.53
TOTAL			11,183,273		

* Sales of aluminum are not included because all are exported.

make on wages and salaries with only 2 cents being found in other wages and salaries in the community resulting from this original expenditure.

Summary of the Economic Impact

Table 10 may be used to summarize the impacts anticipated from the proposed aluminum plant. The Clatsop County economy is pictured in column 1 as it was in 1968 without the plant. In column 2 the plant is operating within the economy. The third column simply reports the anticipated differences in total economic change in business within the county resulting from this major industrial addition.

There are no answers given here as to whether the plant should be built, whether the impacts are good or bad. But more information is provided to allow this community and others in similar circumstances to discuss the issues surrounding the proposed change in the community. Hopefully, this information is an aid to improve social decision-making.

Appendix A. Aggregation of Businesses of Clatsop County, Oregon

Sector No.	Sector	Business types
1	Lumber	Logging, log hauling, lumber mills, plywood mills, timber dealers, shingle manufacturing, logging contractors, paper and pulp plants.
2	Commercial fishing	Trollers, otter trawlers, gill-netters, commercial clambers, commercial crabbers.
3	Fish processing	Fish and sea food dealers, fish packing and processing, fish packing cooperatives, crab companies, clam and shrimp processors.
4	Agriculture	All farms and ranches which derive at least one-half of the gross receipts from the sale of agriculture and fur products.
5	Manufacturing	Food processors (other than sea foods), soft drink bottling companies, meat and poultry processors, creameries, machine manufacturing, stone and clay processors, glass products, box products, canvas products, metal cans, bio-products, ice cream, bakers, and foundaries.
6	Lodging	Hotels, motels, trailer parks, apartments, boarding houses, rooming houses.
7	Cafes & taverns	Restaurants, cafes, taverns, drive-ins and short order eating places, and ice cream parlors.
8	Service stations	All service stations and wholesale gasoline distributors.
9	Automotive sales & service	New and used auto and trailer sales, tire stores, parts and accessories, auto repair shops, towing, automotive body and paint shops, tire stores, auto upholstery, boat dealers, trailer towing, tire recapping and farm tractor dealers.

Appendix A — Continued

Sector No.	Sector	Business types
10	Communication & transportation	Trucking, railroads, airlines, buses, radio and television stations, telephone company, telegraph, newspapers, television cable company, taxicabs, auto leasing, moving vans, trailer rentals, tug and barge service.
11	Professional services	Doctors, dentists, lawyers, accountants, bookkeepers, chiropractors, architects, surveyors, engineers, medical and dental laboratories, optometrists, veterinarians, ambulance service, nursing homes, and appraisers.
12	Financial services	Banks, savings and loan associations, stockbrokers, financial companies and credit bureaus.
13	Construction	Firms that contract for building, electrical, plumbing, road and highway, painting, heating, roofing, flooring, shipbuilders, sand and gravel operations, carpenters, asphalt paving companies, concrete manufacturers, excavators, land levelers, masonries, well drillers, cabinet makers, tile layers, sheet metal firms, plasterers, electrical and hardware stores, steel and pipe dealers, retail lumber yards, salvage companies, and commercial refrigeration contractors.
14	Retail & whole- sale trade	Natural gas companies, fuel oil dealers, electric utilities, bottled gas suppliers, clothing stores, shoe stores, department stores, variety stores, furniture and appliance stores, jewelry stores, beer distributors, drug stores, office supply stores, milliners, state-owned liquor stores, music stores, flower shops, camera shops, paint stores, news stands, gift shops, fisherman's supply stores, printing companies, cold storage and ice dealers, wholesale-retail groceries and supermarkets, and all wholesale dealers supplying the above stores if located in Clatsop County.

Appendix A -- Continued

Sector No.	Sector	Business types
15	Retail services & organizations	Privately owned kindergartens and child nurseries, photo studios, theaters and other recreational facilities, laundries and cleaners, tailors, barbers and beauty shops, upholsterers, funeral homes, machine and welding shops, car wash, private business schools, music teachers, repair shops, unions, lodges, and service organizations, building rental services, garbage collectors, insurance and real estate, churches, vending machine operators, private parking lots, trading stamp companies, private employment agencies, janitorial service, credit services, telephone answering service, security police.
16	Port authority	All transactions of the Port of Astoria as recorded by the county port authority.
17	Education	Includes all six school districts, intermediate education district (I.E.D.), Clatsop Community College, and the county superintendent of schools.
18	County roads	Includes all transactions involved in construction and maintenance of county roads.
19	Law enforcement	Includes all transactions concerning the county sheriff's office including tax collection, all justices of the peace, and district court.
20	Health department	Includes all transactions of the county health department.
21	Welfare	All funds administered by the county welfare department, including federal, state, and local. Also all salaries, office supplies of employees of county welfare department.
22	General fund	All transactions of the following county departments: assessor, treasurer, county commissioners, elections, county

Appendix A -- Continued

Sector No.	Sector	Business types
		clerk, county surveyor, courthouse maintenance, planning commission, land agent, humane officer and department, veterans service and current expense account.
23	City of Astoria	All transactions conducted by the city government, includes all departments and divisions.
24	City of Warrenton	All transactions conducted by the City of Warrenton.
25	Town of Hammond	All transactions conducted by the Town of Hammond.
26	City of Gearhart	All transactions conducted by the City of Gearhart.
27	City of Seaside	All transactions conducted by the City of Seaside.
28	City of Cannon Beach	All transactions conducted by the City of Cannon Beach.
29	Household	Transactions by private individuals who are Clatsop County residents.
30	Aluminum	All transactions conducted by the proposed aluminum plant.

