

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILES 8672

107 SCOMM 9: HOUSE SPEC. COMM. ON PERMANENT FUND 1977-78

the saved revenues are depleted. Expenditures fall rapidly and finally approach the long-run growth of the other two cases.

The relative movements of aggregate economic variables in the three cases have comparable patterns as rapid expenditure growth stimulates rapid economic expansion and more moderate expenditure growth causes lower rates of increase in population, employment, and personal income (Table I.24). By 1999, however, all three cases are essentially back on the same growth track in terms of employment with less than 1 percent difference among them.

Per capita state expenditures measured in constant dollars, because of the parallel movements of total state expenditures and population, also have patterns similar to the patterns of total expenditures (Table I.25). Each of the special cases has one time period when per capita real expenditures exceed the base case comparable year and one period when expenditures per capita lag the base case. When expenditures are tied to expected revenues, the "bulge" occurs early and when tied to received revenues, it occurs later.

One variable displays a somewhat different pattern from those presented thus far. Total state revenues per capita in constant dollars falls relative to the base case when expenditure growth is linked to expected revenues (Table I.26). It returns on track in the 1990s but never exceeds the base case. In the case where growth is linked to revenues received, there is a period through 1987 when per capita

Table I.24

Employment Levels in Three Modified Target Cases

(Thousand)

	PRT.2.1	PRT.2.2	PRT.2.4
1977	187.487	187.487	187.487
1978	192.029	192.029	192.029
1979	201.314	202.068	200.365
1980	220.719	221.682	217.968
1981	232.928	232.68	227.114
1982	233.545	233.12	226.214
1983	236.415	238.298	230.883
1984	243.346	247.014	239.929
1985	253.07	257.657	251.99
1986	263.693	268.463	265.584
1987	276.056	280.478	281.794
1988	290.201	293.616	300.458
1989	306.862	308.64	321.963
1990	325.256	324.583	345.187
1991	345.603	341.723	370.111
1992	367.843	359.869	396.168
1993	393.956	380.739	370.468
1994	380.93	369.801	355.927
1995	369.425	366.75	360.533
1996	373.946	375.445	374.704
1997	391.916	392.88	395.189
1998	418.294	416.357	420.463
1999	451.459	445.813	451.231

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PRT.2.1 - Smooth growth

PRT.2.2 - Growth linked to expected revenues

PRT.2.4 - Growth linked to present balance

Table I.25

Real Per Capita State Expenditures in Three Modified Target Cases

	PRT.2.1	PRT.2.2	PRT.2.4
1977	1185.25	1185.25	1185.25
1978	1279.2	1279.2	1279.2
1979	1282.35	1297.56	1264.65
1980	1265.61	1283.9	1219.04
1981	1358.48	1357.14	1267.4
1982	1447.37	1447.97	1342.37
1983	1427.92	1461.03	1354.92
1984	1418.23	1475.03	1382.57
1985	1425.38	1490.83	1427.26
1986	1448.35	1510.61	1439.09
1987	1468.22	1521.2	1551.97
1988	1490.01	1528.46	1615.27
1989	1510.82	1529.78	1671.26
1990	1537.09	1532.48	1721.58
1991	1561.97	1532.28	1758.47
1992	1587.55	1532.1	1782.83
1993	1605.79	1524.69	1426.41
1994	1338.42	1272.88	1147.58
1995	1081.53	1078.27	1015.74
1996	941.403	968.977	952.27
1997	883.755	907.404	913.723
1998	864.578	870.625	887.189
1999	856.098	845.002	865.757

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PRT.2.1 - Smooth growth (constant \$)

PRT.2.2 - Growth linked to expected revenues (constant \$)

PRT.2.4 - Growth linked to present fund balance (constant \$)



Table I.26

Real Per Capita State Revenues in Three Modified Target Cases

	PRT.2.1	PRT.2.2	PRT.2.4
1977	1218.35	1218.35	1218.35
1978	1156.23	1156.23	1156.23
1979	1428.6	1424.98	1433.21
1980	1597.67	1592.44	1612.37
1981	1650.26	1649.85	1682.71
1982	1764.94	1763.19	1812.35
1983	1865.03	1852.32	1915.36
1984	2001.19	1977.52	2051.19
1985	2016.69	1985.23	2058.4
1986	1958.25	1922.75	1985.32
1987	1791.35	1756.06	1800.64
1988	1612.97	1580.55	1605.44
1989	1448.29	1419.93	1426.31
1990	1306.72	1283.47	1272.51
1991	1183.72	1166.	1139.29
1992	1077.93	1066.36	1025.48
1993	982.702	977.624	990.797
1994	946.939	940.932	927.215
1995	901.851	895.827	880.14
1996	858.16	859.549	849.586
1997	830.623	834.654	829.295
1998	815.06	819.333	815.738
1999	806.629	809.753	807.082

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PRT.2.1 - Smooth growth (constant \$)

PRT.2.2 - Growth linked to expected revenues (constant \$)

PRT.2.4 - Growth linked to present fund balance (constant \$)

revenues exceed the base case. Then for five years, the reverse is true before they return to essentially track the base case. It appears to be the case that overall per capita state revenues are maximized in these particular examples when growth occurs after revenues are received, rather than in anticipation of those revenues. They are minimized when growth follows movements of anticipated revenues. Targeting growth to personal income increases provides the middle ground. The return on a dollar investment by the state in terms strictly of tax revenue is thus maximized by investment in a fund which earns a fixed return, rather than through an investment seeking to provide tax revenues. This is because of the underlying average ratio of revenues to personal income of 13.6 percent which represents an average return to the state from a dollar of personal income created. A dollar invested in a fund such as the permanent fund might, by contrast, earn 7 percent annually in perpetuity.

How is the state to choose among these three types of growth paths? Each is superior to the others in at least one respect. The base case in which growth is targeted to demand variables only provides for steadily rising public expenditures and incorporates a rationale which can be easily understood. It suffers from a need for a severe downward adjustment of expenditures unless new revenue sources appear. This severe discontinuity is this method's largest problem, although all suffer from it to some degree.

It is more difficult to choose among the other two cases. The case with expenditures linked to anticipated revenues offers the dual advantages of more rapid economic growth in earlier years and larger real per capita levels of state expenditures. The other case offers lower growth of the economy in the present, although more rapid in the future, and it is the case which generates the largest amount of revenue per capita.

Viewed from this perspective, the decision regarding the aggregate spending level for the state rests upon a tradeoff between increased revenues in the long run from slower spending rates and the attendant future benefits derivable from these revenues, and increased benefits in the immediate present from increases in state spending and resulting economic growth. Among these present benefits will not, in general, be the generation of larger state revenues. The immediate benefits are in the form of necessary expenditures by the state and the general advantages of a larger, as opposed to a smaller, economy.

There are, of course, a large number of growth paths of which these three are only examples. They do illustrate the basic choice which the state faces and the tradeoff implicit in that choice. The establishment of the permanent fund was the beginning of the recognition that the tradeoff exists. The next step is to explicitly analyze those tradeoffs facing the state so that choices of expenditure levels can be made with full understanding of their long-term implications.



## PART II

### IMPACT OF ALTERNATIVE USES OF PERMANENT FUND EARNINGS

#### A. Introduction

An important policy question surrounding the permanent fund concerns the disposition of earnings generated by the fund. The Constitutional amendment creating the fund provides that all earnings be returned to the general fund to finance state expenditures unless the legislature directs otherwise. It is this option which is assumed in the economic simulations done for the other components of this report.

In this section, the analysis concentrates upon the economic impacts of different proposals which have been suggested for alternative uses of permanent fund earnings. These four are the Alaska Inc. proposal to distribute earnings to individuals who have passed some Alaska residency test, the suggestion that income be reinvested in the fund itself, and two less formal suggestions that personal income taxes be reduced or that state expenditures be increased by the amount of the earnings.

A fifth alternative had been suggested for analysis but was not included because of the feeling that the probable sensitivity of the results to necessarily speculative assumptions would not make the analysis particularly valuable. This was the suggestion to use the earnings in either market rate or below market rate loan programs. The impact of this suggestion, if one were to assume market rate loans and competitive capital markets, would be negligible in aggregate economic terms.



As the assumptions regarding the loan rate or the competitiveness of the capital market are altered to allow subsidized loans or the possibility of imperfect information or some other impediment to the free flow of capital, then a positive economic impact could be generated by the economy, and this would be reflected in the model. The impact would be a direct function of the type of activity, rate of subsidization, and strength of response of that particular economic sector to loan incentives. Any assumptions regarding these matters would be highly speculative and, thus, this particular proposal was not analyzed in order to eliminate the possibility of presenting misleading results.

Of the proposals analyzed, the Alaska Inc. idea has received the most attention in the public forum. The particular form of this idea analyzed here is that of the Governor as embodied in HB 525 - SB 384 (Tenth Legislature). The bill would require that at least half of the earnings of the fund which were transferred to the general fund be distributed each year as Alaska Inc. share payments beginning in 1981. Persons who had been residents of the state for a period of five years would be eligible to receive a share payment; and every fifth year thereafter, a person who had continued in residency in Alaska would be eligible to receive an additional share. This analysis assumes all fund earnings are transferred to the general fund and, of that total, 50 percent is distributed as Alaska Inc.

At this time, there is a legal question as to the constitutionality of such an income distribution program which would exclude a large percentage of the population. There are other legal and administrative questions, answers to which must be assumed in order to do the analysis of the impact of Alaska Inc. on the state economy. It can reasonably be assumed that the program would be structured in such a way to avoid the necessity of paying state personal income tax on the proceeds. However, it is less obvious that federal personal income taxes could be avoided. In this analysis, it is assumed that a method is developed which results in the payments not being liable for federal personal income taxes to maximize the potential economic impact on the state through the change in personal income resulting. Administratively, it is assumed that Alaska Inc. payments enter the personal income stream after the payment of federal and state taxes and are not a form of special credit on the state income tax.

The suggestion to reinvest fund earnings back into the permanent fund is motivated by a desire to increase the future earnings potential of the fund. Thus, saving in early years would lead to the generation of additional revenue in a later period. To compare the impact of this suggestion to that of the Alaska Inc. proposal it is assumed that the portion of permanent fund earnings which would have otherwise gone into the Alaska Inc. program is instead reinvested in the fund. Thus, 50 percent of fund earnings are reinvested and 50 percent are transferred to the general fund.

In the case where the personal income tax is reduced by the earnings of the permanent fund the proportion of the fund earnings allocated to this program is the exact amount which was distributed as Alaska Inc. payments in the first instance. The reduction in taxes is on the basis of an average reduction for the average taxpayer.

In the final alternative examined, the amount of state spending is increased by the amount which would have been distributed as Alaska Inc. shares in the first case. This has the primary effect of raising the level of expenditures above the predetermined target expenditure rate in early simulation years or of reducing the amount by which expenditures are curtailed below the target rate in later years.

All the alternatives analyzed in this portion of the study build upon the same base case, which is one selected from the cases generated in Part I of the study. A description of the basic assumptions underlying this base case follows.



B. Base Case

The base case, which is used to analyze alternative uses of permanent fund earnings, is a simulation of the economy which incorporates a formula approach to the growth of state government expenditures. Under this formula, state expenditures grow at a rate which maintains a constant ratio between per capita real state expenditures and per capita real personal income. This does not involve the imposition of a constraint upon growth until 1990. At that time, growth expectations are gradually revised downward in an attempt to adjust to the long-run revenue constraints imposed on the state.

The other basic assumption concerning the base case which is important is the growth of the permanent fund. In this base case, the basic contribution rate to the permanent fund is 25 percent, but now additional monies are placed in the fund as they are found to be excess to the normal requirements of the general fund. In this way, they are able to earn the 7 percent return available on the permanent fund rather than the 6 percent average return on the general fund. The supplemental contributions to the fund are not "locked in" permanently to the fund and may be withdrawn in periods of deficit on current account in the state treasury.

The reason for this assumption is that it allows the permanent fund to build up a large balance in early years which, in turn, generates a



substantial amount of revenue. This revenue, in turn, becomes the direct cause of the impacts associated with redirecting the fund earnings into different programs.

Aggregate indicators of economic activity in the base case are depicted in Table II.1 and reflect a pattern of strong growth. Population increases to 683 thousand by 1990 and to 952 thousand by the end of the simulation period in 1999. Employment growth reflects the same basic trend, except that in the early 1990s, the rate of increase slows to almost a standstill for several years. This is an indication of the readjustment occurring during this period in expectation of state revenue reductions. Cutbacks in state employment are necessary to balance the state budget, and this reduces overall employment growth. Personal income growth seems less affected by the government slowdown in the early 1990s. It shows an almost ten-fold increase over the period of simulation.

The required reduction in state spending in the 1990s is shown in Table II.2. State expenditure growth follows the formula until 1990 and then curtailments from the desired growth path occur. Between 1990 and 1997, expenditures dip significantly in total amount. They are, in effect, waiting for revenue growth to catch up. At this time, petroleum revenues are declining, however, and total revenues are actually declining. Only in 1997 are revenues higher than the level attained in 1986. Each year, the target growth rate is reduced and, yet, each year state spending must adjust downward to compensate for insufficient revenues.

Table II.1

Base Case Aggregate Variables

	POP	EM99	PI
1977	398.502	187.487	3292.21
1978	408.317	192.029	3600.29
1979	425.552	201.316	4055.06
1980	457.817	220.719	4869.6
1981	484.214	232.927	5505.91
1982	495.249	233.346	5771.65
1983	508.399	236.416	6163.83
1984	525.55	243.345	6725.12
1985	546.213	253.068	7437.71
1986	568.45	263.693	8241.99
1987	593.34	276.057	9183.67
1988	621.203	290.201	10285.
1989	653.135	306.862	11599.8
1990	682.79	321.033	12890.7
1991	700.811	326.132	13782.5
1992	712.9	327.504	14502.2
1993	729.005	332.932	15491.
1994	752.009	344.049	16903.8
1995	781.344	359.799	18639.8
1996	814.335	377.756	20651.2
1997	852.652	399.07	23041.3
1998	897.797	424.673	25933.
1999	952.154	456.042	29509.6

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POP - Population (thousand)  
EM99 - Employment (thousand)  
PI - Personal income (million \$)

Table II.2

Base Case State Revenue & Expenditure Variables

	E99S	R99S	SAVS
1977	1099.65	1130.36	0.
1978	1271.17	1148.8	0.
1979	1385.2	1538.81	0.
1980	1550.86	1943.59	0.
1981	1839.37	2229.13	0.
1982	2067.2	2512.21	0.
1983	2164.87	2814.78	0.
1984	2307.17	3240.62	0.
1985	2508.56	3531.36	0.
1986	2762.07	3713.25	0.
1987	3046.78	3692.58	0.
1988	3377.94	3624.77	0.
1989	3762.69	3570.7	0.
1990	4061.85	3536.82	155.933
1991	4004.61	3488.56	486.024
1992	3795.62	3428.84	474.706
1993	3669.65	3404.99	317.237
1994	3696.35	3450.24	213.927
1995	3842.31	3561.77	176.178
1996	4010.37	3711.14	207.572
1997	4197.45	3914.45	224.611
1998	4451.29	4184.93	207.364
1999	4791.29	4542.83	188.939

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E99S - Total State expenditure (million \$)

R99S - Total state revenues (million \$)

SAVS - Expenditure cuts below target rate of expenditures (million \$)



Because the state has anticipated its revenue problems and begun reducing expenditure levels before it completely eliminates its fund balances, at the end of the simulation period there remains a positive balance in the general fund (Table II.3). In the interim, it had grown to be in excess of \$3 billion; but by 1999, it has essentially hit "rock bottom" at a level of \$722 million.

The permanent fund has actually built up a substantial supplemental account in this case over and above the amount accumulated by the 25 percent contribution of bonus and royalty receipts. The inclusion of the supplemental account brings the balance rapidly to the \$3 billion level in 1985 and over \$5 billion by 1995. The supplemental balance is all accumulated by 1986, at which time it is approximately \$2.276 billion. This fund level remains constant until 1998, when the first drawdowns occur to fund deficits on current account which cannot be paid out of general fund balances. The rule used in this case in specifying what amount of the current account surplus would go to the general fund and what would go to the permanent fund supplement was simply that 75 percent of excess revenues in excess of 120 percent of expenditures would be transferred to the supplemental fund. This allows the general fund balance to build up in the 1980s. When expenditure levels exceed revenues, the general fund balance is drawn down to a low level before the supplemental permanent fund is opened for spending on current programs.



Table II.3

Base Case State Fund Variables

	GFBAL	PFBAL	PFSUPBL
1977	570.081	2.4	0.
1978	461.377	62.4	0.
1979	547.732	185.56	0.
1980	861.622	327.492	0.
1981	1177.55	482.56	0.
1982	1535.35	661.655	0.
1983	1669.32	1268.8	401.932
1984	1869.23	2096.97	1001.66
1985	2089.32	3003.44	1661.93
1986	2293.96	3869.3	2275.85
1987	2855.01	4097.12	2275.85
1988	3076.17	4294.33	2275.85
1989	2920.22	4462.03	2275.85
1990	2475.66	4604.7	2275.85
1991	2040.77	4725.97	2275.85
1992	1738.54	4829.21	2275.85
1993	1529.68	4917.31	2275.85
1994	1353.67	4992.4	2275.85
1995	1148.99	5056.69	2275.85
1996	927.995	5110.82	2275.85
1997	722.345	5156.41	2275.85
1998	722.337	5005.91	2086.94
1999	722.328	4869.16	1917.8

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GFBAL - General fund balance (million \$)  
PFBAL - Permanent fund balance (million \$)  
PFSUPBL - Permanent fund balance in excess of 25% (million \$)

Two components of state revenues are of interest for purposes of comparisons with later cases (Table II.4). The personal income tax remains an important source of state revenues. As petroleum revenues decline over time, this regains its role as the largest tax revenue generator in the Alaskan tax structure. Permanent fund earnings increase rapidly as the permanent fund balance is built up in the early 1980s. After this time of rapid growth, the rate of increase declines and a plateau near \$350 million is reached in about 1995. Future fund withdrawals will drive the total earnings down rapidly after 1999.

Three indicators of average per capita well-being are presented in Table II.5. Real per capita disposable income increases over the simulation period at a fairly constant rate. Real state expenditures per capita increase according to the target formula until 1989 and then fall significantly over the next ten years, until they are below the level of the initial simulation year. Real per capita state revenues reach a peak in 1985 of \$2,007 and then they also begin a steady decline. By 1991 they are below the 1977 level, and the fall continues until the simulation ends. At that time, real per capita expenditures are about one-third less than at the beginning of the simulation. This reflects the continuing decline in the importance of oil revenues.

Table II.4

Base Case Components of State Revenues

	RTIS	IPF1
1977	120.479	0.
1978	117.077	0.168
1979	139.925	4.368
1980	172.252	12.989
1981	207.617	22.924
1982	221.933	33.779
1983	231.03	46.316
1984	254.682	88.816
1985	284.217	146.788
1986	322.313	210.241
1987	366.23	270.851
1988	418.676	286.798
1989	483.3	300.603
1990	546.04	312.342
1991	590.936	322.329
1992	618.586	330.818
1993	656.3	338.044
1994	722.41	344.212
1995	809.468	349.468
1996	911.348	353.968
1997	1033.65	357.757
1998	1182.1	360.948
1999	1370.62	350.414

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RTIS - Personal income tax (million \$)

IPF1 - Permanent fund earnings



Table II.5

Base Case Real Per Capita Economic Variables

	DIRPA	E99SRPC	R99SRPC
1977	2897.39	1185.25	1218.35
1978	2997.94	1279.2	1156.06
1979	3104.74	1282.35	1424.55
1980	3293.58	1265.61	1586.11
1981	3345.17	1358.48	1646.34
1982	3307.67	1447.27	1758.83
1983	3332.05	1427.93	1856.61
1984	3393.5	1418.23	1992.03
1985	3470.31	1425.39	2006.55
1986	3542.6	1448.33	1947.1
1987	3626.	1468.23	1779.44
1988	3710.27	1490.01	1598.89
1989	3806.06	1510.81	1433.72
1990	3875.18	1497.01	1303.51
1991	3889.23	1389.44	1210.39
1992	3894.72	1254.58	1133.34
1993	3934.03	1146.15	1063.49
1994	4006.7	1077.05	1005.34
1995	4093.9	1038.16	962.36
1996	4182.51	1000.62	925.958
1997	4279.07	961.413	896.593
1998	4383.1	929.007	873.417
1999	4494.84	902.506	855.706

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DIRPA - Real per capita disposable personal income (constant \$)

E99SRPC - Real per capita State expenditures (constant \$)

R99SRPC - Real per capita State revenues (constant \$)



C. The Economic Impact of Alaska Inc. Payments

In order to analyze the impact on the economy of Alaska Inc., a model simulation was done in which the only change from the base case described above was to allow 50 percent of permanent fund earnings to be transferred to Alaskans eligible under the Alaska Inc. program. The specific assumptions and their rationale for their incorporation into the model are described in detail in Appendix D.

The impacts which are traced through the model derive from the effect the program has on the level of disposable personal income. The increase in this component of income generates an increase in the demand for goods and services by Alaskans which, in turn, generates additional income and with it, employment. It is assumed that for the individual, the change in income is marginal and thus does not affect his overall pattern of consumption. It is further assumed that the Alaska Inc. program does not have a direct impact on migration to the state.

Table II.6 shows the basic calculation of the money which would be annually distributed as Alaska Inc. shares, given the economic assumptions of the base case. The total earnings of the permanent fund, assumed to be 7 percent, are placed in two separate accounts. One-half of the proceeds are paid into the general fund, and the other half are paid out as Alaska Inc. payments. In the first year of the program, 1981, the money available for the program is quite small, amounting to just over \$11 million. In subsequent years, the total grows rapidly, approaching

Table II.6

Determinants of Total "Alaska Inc." Payments

	PFBAL	IPF1	ALINC
1977	2.4	0.	0.
1978	62.4	0.168	0.
1979	185.56	4.368	0.
1980	327.492	12.989	0.
1981	482.56	22.924	11.462
1982	661.655	33.779	16.89
1983	1242.11	46.316	23.158
1984	2023.19	86.948	43.474
1985	2849.31	141.623	70.812
1986	3592.36	199.452	99.726
1987	3920.19	251.465	125.733
1988	4017.39	267.413	133.706
1989	4185.09	281.218	140.609
1990	4327.77	292.956	146.478
1991	4449.04	302.943	151.472
1992	4552.27	311.432	155.716
1993	4640.38	318.659	159.329
1994	4715.47	324.826	162.413
1995	4585.04	330.083	165.041
1996	4444.16	320.952	160.476
1997	4321.41	311.091	155.545
1998	4212.46	302.498	151.249
1999	4120.27	294.872	147.436

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PFBAL - Permanent fund balance (million \$)

IPF1 - Permanent fund earnings transferred to general fund (million \$)

ALINC - Permanent fund earnings allocated to Alaska Inc. payments (million \$)

\$100 million in 1986. From that point onward, the rate of increase slows until the peak year of 1995 is reached, at which point available Alaska Inc. funds in that year are \$165 million. After that time, the amount available in any year gradually declines.

Determination of the value of a share of Alaska Inc. requires prior calculation of not only the total amount of money available to fund the program but also the number of individuals eligible under the program and the number of individuals eligible for multiple shares. In Table II.7, the calculation of the number of individuals eligible is presented. In 1980 when the first calculation for distribution is made, the number of individuals eligible is approximately 146 thousand. Over time, this eligibility group increases steadily until it has more than doubled by the year 2000.

During the first five years of the program, the number of permanent fund shares is equal to the number of individuals eligible. In 1985 the first group of individuals will become eligible for receipt of one additional share of Alaska Inc., based upon ten years of residence since 1974. Thus, between 1984 and 1985, the number of shares jumps from 163 thousand to 270 thousand, while the increase in the previous year had been 7 thousand. Table II.8 indicates for 1985 and later years the number of persons eligible for multiple shares. In 1990, for example, the first group becomes eligible to receive three shares.



Table II.7

Basic Elements of Alaska Inc. Payment Determination

	ELIGIBLE	SHARES	ALINCSH
1977	121.130	121.13	0
1978	123.077	123.077	0
1979	131.243	131.243	0
1980	145.607	145.607	0
1981	156.340	156.340	73.31
1982	151.845	151.845	111.23
1983	155.830	155.83	148.61
1984	162.827	162.827	266.99
1985	175.927	270.134	402.51
1986	186.950	288.101	346.14
1987	191.759	290.002	433.55
1988	197.455	298.276	448.26
1989	205.170	310.518	452.82
1990	214.741	387.977	445.81
1991	225.234	409.981	369.46
1992	236.932	422.956	368.16
1993	249.485	440.821	361.43
1994	262.714	461.896	351.62
1995	270.605	518.723	342.89
1996	270.875	533.037	301.06
1997	279.754	550.291	282.66
1998	287.120	569.127	265.75
1999	296.864	592.376	248.88
2000	308.688		

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ELIGIBL - Number of eligible individuals (thousand)

SHARES - Number of shares payable based upon length of residence of eligible individuals (thousand)

ALINCSH - Size of individual share payment (\$)

Table II.8

Estimate of Individuals Eligible for Multiple Shares of Alaska Inc.

	ELIG2	ELIG3	ELIG4	ELIG5
1977	0.	0.	0.	0.
1978	0.	0.	0.	0.
1979	0.	0.	0.	0.
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	0.	0.	0.	0.
1985	94.207	0.	0.	0.
1986	101.151	0.	0.	0.
1987	98.243	0.	0.	0.
1988	100.821	0.	0.	0.
1989	105.348	0.	0.	0.
1990	113.824	59.412	0.	0.
1991	120.956	63.791	0.	0.
1992	124.067	61.957	0.	0.
1993	127.752	63.583	0.	0.
1994	132.744	66.438	0.	0.
1995	138.936	71.783	37.399	0.
1996	145.725	76.281	40.156	0.
1997	153.294	78.243	39.001	0.
1998	161.416	80.567	40.024	0.
1999	169.975	83.716	41.822	0.

---

ELIG2 - Individuals eligible for 2 shares (thousand)  
 ELIG3 - Individuals eligible for 3 shares (thousand)  
 ELIG4 - Individuals eligible for 4 shares (thousand)  
 ELIG5 - Individuals eligible for 5 shares (thousand)

The number of shares which must be paid out obviously affects the monetary value of each share. This is reflected in the long-term patterns of individual share monetary value. The share value in the initial year of payment in 1981 is \$73. This increases rapidly over the next five years to over \$400. Then the value bumps slightly down as individuals become available for two shares. It grows again until 1989, when eligibility increases overtake the growth of the base of the permanent fund itself. Henceforth, the value of a share declines continuously. In the last simulation year, it is less than \$250.

The impact on aggregate economic activity of an Alaska Inc. program of the magnitude outlined above is shown in Table II.9. The multiplier effect of the increase in disposable income from the share distribution is immediately obvious. In the first year of the program, total personal income increases by a multiple of the increase in disposable income associated with the original share payment. The increase in personal income is associated with a rise in both employment and population.

This effect can be traced as far as 1989, when the impact from the base case reaches its absolute peak in positive terms. At that time, personal income is 5 percent larger than the base case at \$12.2 billion; while employment exceeds the base case by 10.5 thousand, or 3 percent. After that, the positive impact rapidly is transformed into a negative impact because of the state expenditure cutbacks. In the Alaska Inc. case the cutback must be more severe than in the base case because of both a



Table II.9

Aggregate Economic Effect of Alaska Inc. Program

(Measured as Differences From Base Case)

	POP	EM99	PI
1977	-0.	0.	-0.003
1978	-0.	0.	-0.003
1979	-0.	-0.	0.005
1980	0.	0.	0.016
1981	0.753	0.565	27.566
1982	1.563	1.101	50.875
1983	2.444	1.647	76.988
1984	4.296	2.869	142.004
1985	7.205	4.772	244.746
1986	10.814	7.042	373.211
1987	14.737	9.366	514.082
1988	17.793	10.882	616.898
1989	18.444	10.549	636.125
1990	8.226	2.229	233.867
1991	0.87	-2.922	-44.965
1992	0.65	-2.22	-15.75
1993	2.686	-0.001	112.105
1994	3.682	1.151	187.109
1995	3.471	1.255	198.961
1996	2.417	0.726	160.211
1997	1.485	0.324	126.258
1998	0.996	0.181	114.383
1999	0.81	0.276	116.793

---

POP - Population (thousand)  
EM99 - Employment (thousand)  
PI - Personal income (million \$)

larger population and a lower average level of state revenues resulting from the loss in permanent fund earnings income. After this downward shift, there is a return to a positive impact in all aggregate indicators in the final years of the simulation. The values are not very different from the base case and are moving closer to the base case in all three indicators.

The overall pattern indicates a short-run, positive economic impact of Alaska Inc. but one which is not lasting. In the long run, the impact generated in the short run is eliminated and the economy returns to its original growth path. By 1999 the Alaska Inc. distribution is becoming an insignificant portion of the total economy. It represents less than one-half of one percent of personal income and less than 3 percent of state revenues. Thus, the decision between distributing it as Alaska Inc. payments or using it to increase revenues to the general fund is becoming less and less important.

Table II.10 reflects what is happening to the state current account over the simulation period because of Alaska Inc. payments. Initially, the levels of both revenues and expenditures rise, although expenditure growth is much more rapid than that of revenues. This is because of two factors. First, the Alaska Inc. shares are not directly taxable, and so any additional tax receipts must be generated by secondary income effects associated with population and income growth. Second, the slight increase in revenues reflects the average non-petroleum revenue generating capacity

Table II.10

State Fiscal Impact of Alaska Inc. Program

(Measured as Difference From Base Case)

	E99S	R99S	SAVS
1977	0.	0.	0.
1978	0.	-0.	0.
1979	0.	-0.001	0.
1980	0.006	0.	0.
1981	0.009	0.864	0.
1982	9.395	2.732	0.
1983	17.671	3.785	0.
1984	26.812	5.294	0.
1985	49.282	8.9	0.
1986	84.113	13.194	0.
1987	127.373	16.134	0.
1988	174.354	16.51	0.
1989	153.451	7.256	54.437
1990	-165.614	-31.183	316.923
1991	-373.798	-80.111	50.041
1992	-360.318	-89.263	-115.827
1993	-286.747	-72.324	-84.298
1994	-252.542	-57.833	-24.868
1995	-258.439	-53.41	-3.133
1996	-275.477	-57.018	-9.876
1997	-287.927	-62.11	-27.179
1998	-289.855	-64.219	-39.904
1999	-285.605	-61.371	-42.86

---

E99S - State expenditures (million \$)

R99S - State revenues (million \$)

SAVS - Expenditure cuts below target rate of expenditures (million \$)



of the state which is much less than the average per capita revenue generated during this time. (Total permanent fund earnings are counted as revenues, so this series does not reflect the revenue loss of the Alaska Inc. payments themselves, which otherwise would have gone into the general fund.)

Expenditure growth is more rapid than revenue growth also because of the formula by which expenditures are targeted to grow. As long as possible, it automatically grows with population and personal income. When the state financial crunch finally occurs in 1990 the impacts of both expenditures and revenues become negative and remain so through the end of the simulation period. State expenditures stabilize at a level which is permanently lower than the base case, contributing to the lack of positive impact in the aggregate variables. As the positive impact of Alaska Inc. on revenues is not pronounced, neither is the negative impact. The reduction of expenditures from the target level is greater in the Alaska Inc. case in the early years of the fiscal crunch, but later any difference from the base case becomes almost negligible.

Looking at Table II.11 provides a picture of the long-run impact of Alaska Inc. on the position of the general and permanent funds. The increase in state expenditures required by the population increase has largely been paid for by drawing down the level of the general fund. At the same time, supplemental balances in the permanent fund do not increase as rapidly as the base case. The drawdown reaches a peak

Table II.11

State Fund Impact of Alaska Inc. Program

(Measured as Difference From Base Case)

	GFBAL	PFBAL	PFSUPBL
1977	0.	0.	0.
1978	-0.	0.	0.
1979	-0.001	0.	0.
1980	-0.006	0.	0.
1981	-10.613	0.	0.
1982	-33.385	0.	0.
1983	-42.281	-26.688	-26.688
1984	-57.976	-73.775	-73.775
1985	-84.761	-154.128	-154.128
1986	-125.696	-276.934	-276.934
1987	-352.259	-276.934	-276.934
1988	-629.635	-276.934	-276.934
1989	-905.65	-276.934	-276.934
1990	-942.199	-276.934	-276.934
1991	-843.413	-276.934	-276.934
1992	-767.192	-276.934	-276.934
1993	-743.351	-276.934	-276.934
1994	-739.742	-276.934	-276.934
1995	-535.062	-471.656	-471.654
1996	-314.066	-666.664	-666.658
1997	-108.419	-835.004	-834.998
1998	-108.416	-793.445	-793.439
1999	-109.428	-748.895	-748.887

---

GFBAL - General fund balance (million \$)

PFBAL - Permanent fund balance (million \$)

PFSUPBL - Permanent fund balance in excess of 25% contribution rate (million \$)

(beyond the base case) in 1990 of \$1.22 billion. After the reduction in the level of state activity in 1990, the relative drawdown is moderated. However, by 1990 the drawdown is still \$850 million below the base case.

Details of the impact on state revenues is shown in Table II.12. Personal income tax receipts rise moderately as the level of aggregate economic activity increases. The rise is smaller than would be the case if Alaska Inc. payments were taxable. When the economy returns essentially to its original growth path in the late 1990s, the level of total personal income is approximately the base case level, but the level of personal income taxes is slightly lower because of the Alaska Inc. exception from liability.

In comparison to the moderate rise in the personal income tax in early years, the general fund revenues provided by the permanent fund decline sharply and continuously until nearly the end of the simulation period. The negative impact of this revenue source is most pronounced in 1998 when it is about \$210 million. Later, the revenues lost from this source would be of less and less relative importance.

Finally, the impact of Alaska Inc. on three real per capita variables is shown in Table II.13. Real per capita disposable personal income increases because of Alaska Inc. The impact increases until 1987 and then over the long run, declines slowly towards the base case. Real per capita state expenditures, because total expenditures rise according to a formula,



Table II.12

Revenue Impact of Alaska Inc. Program

(Measured as Difference From Base Case)

	RTIS	RIPF
1977	-0.	0.
1978	0.	0.
1979	-0.	0.
1980	0.	0.
1981	0.419	-11.462
1982	1.328	-16.89
1983	2.236	-23.158
1984	3.86	-45.342
1985	7.069	-75.976
1986	11.788	-110.515
1987	17.466	-145.118
1988	22.907	-153.092
1989	24.757	-159.994
1990	8.751	-165.864
1991	-15.735	-170.857
1992	-18.456	-175.101
1993	-8.671	-178.715
1994	-1.896	-181.798
1995	-0.883	-184.427
1996	-2.916	-193.492
1997	-5.207	-202.212
1998	-5.892	-209.699
1999	-5.348	-202.977

---

RTIS - Personal income tax (million \$)

RIPF - General fund income from permanent fund (million \$)

Table II.13

Impact on Per Capita Variables of Alaska, Inc. Program

(Measured as Difference From Base Case)

	DIRPA	E99SRPC	R99SRPC
1977	0.002	0.001	0.001
1978	0.006	0.002	0.001
1979	-0.	0.001	0.
1980	-0.001	0.002	-0.001
1981	11.544	-2.923	-2.914
1982	16.148	0.338	-5.644
1983	21.078	2.354	-9.517
1984	36.747	0.779	-18.583
1985	55.387	2.533	-30.193
1986	71.86	6.821	-41.898
1987	82.679	12.152	-49.744
1988	78.94	19.59	-51.472
1989	64.738	5.832	-48.052
1990	10.512	-90.594	-29.087
1991	-9.53	-128.66	-26.825
1992	4.239	-118.384	-28.811
1993	19.884	-93.545	-26.515
1994	25.219	-79.39	-22.568
1995	24.254	-75.026	-19.52
1996	19.727	-72.	-17.423
1997	17.008	-67.733	-15.984
1998	15.215	-61.614	-14.512
1999	14.625	-54.713	-12.47

---

DIRPA - Per capita real disposable income (constant \$)

E99SRPC - Per capita real state expenditures (constant \$)

R99SRPC - Per capita real state revenues (constant \$)

remain at the same level as in the base case until the state downward fiscal adjustment. From that time forward, real per capita state expenditures are significantly less than in the base case because of higher population and lower income. Real per capita state revenues actually decline in every year after the commencement of the Alaska Inc. program. At the individual level, there has thus been a tradeoff favoring present consumption in the private sector over future state spending in the public sector.



D. The Impact of Alternative Proposals for the  
Disposition of Permanent Fund Earnings

In contrast to the case in which one-half of permanent fund earnings were distributed as shares of Alaska Inc., a simulation was done in which that money was redirected back into the permanent fund. This simulation will be referred to as the reinvestment case throughout the discussion in this section.

Table II.14 shows the basic variables affecting this case. Because of reinvestment of 50 percent of earnings, the permanent fund grows to a much higher balance in this case. This results in an increase in the long run of both the level of earnings transferred to the general fund and the level of earnings reinvested into the permanent fund. On the other hand, the level of revenues in the short run could be expected to fall relative to the base case.

A second contrast simulation was done in which the level of the personal income tax was reduced by the same amount in aggregate as disposable personal incomes were increased by Alaska Inc. in the aggregate. This policy would affect economic growth in two subtly different ways from the Alaska Inc. case. First, the tax cut would be liable for the federal personal income tax which would tend to reduce somewhat the multiplier effect which this addition to disposable personal income would have. Second, it would have a slightly different impact upon the incentive to migrate between Alaska and other states. Since the increase in

Table II.14

Permanent Fund Totals With 50% Earnings Reinvestment

	PFBAL	IPF	IPFPF
1977	2.4	0.	0.
1978	62.4	0.168	0.
1979	185.56	1.368	0.
1980	327.492	12.989	0.
1981	494.022	11.462	11.462
1982	690.40	17.291	17.291
1983	1303.79	24.164	24.164
1984	2143.61	45.633	45.633
1985	3069.2	75.026	75.026
1986	3962.44	107.422	107.422
1987	4328.95	138.685	138.685
1988	4677.67	151.513	151.513
1989	5009.09	163.718	163.718
1990	5327.08	175.318	175.318
1991	5634.79	186.448	186.448
1992	5935.25	197.218	197.218
1993	6231.09	207.734	207.734
1994	6524.27	218.088	218.088
1995	6816.91	228.349	228.349
1996	6908.14	238.592	238.592
1997	7019.42	241.785	241.785
1998	7146.77	245.68	245.68
1999	7293.72	250.137	250.137

---

PFBAL - Permanent fund balance (million \$)

IPF - Earnings from permanent fund transferred to general fund (million \$)

IPFPF - Earnings retained in permanent fund (million \$)

disposable personal income associated with the tax reduction would be available to anyone who earned income in Alaska, there would be a slight incentive to migrate to Alaska or not to migrate out of Alaska. This would be the result of the slight increase in the real disposable personal income in Alaska relative to the rest of the United States, which has been shown to have a causal relationship to the migration rate between Alaska and the rest of the United States.

This alternative will be referred to as the tax reduction case in the remainder of this section. The taxes which would actually be collected under such a plan, in both fiscal year and calendar year totals, are shown in Table II.15.

One final case examined in this section is the alternative of taking the money which would have gone towards the Alaska Inc. program and spending it upon an increase in government expenditures. The increase in expenditures is spread among all programs, operating and capital, in accordance with the existing proportion that each program gets of the budget. The impact of this alternative will operate very much like the Alaska Inc. program itself in that the original expenditure will lead to an increase in personal income which is a multiple of the original increase. This can only be obtained at the cost of a substantial reduction in revenues for the general fund.

There are two primary differences between these cases. First, in the expenditure case, the original expenditure level does not, as Alaska Inc.



Table II.15

Personal Income Tax Receipts Under Tax Reduction Plan

	RTIS	RTISC
1977	120.479	107.467
1978	117.077	129.209
1979	137.925	153.454
1980	172.252	195.985
1981	203.029	211.921
1982	209.408	206.236
1983	213.384	222.408
1984	226.079	230.714
1985	235.202	240.867
1986	249.406	260.185
1987	270.517	283.561
1988	309.328	341.858
1989	370.066	405.677
1990	415.459	427.809
1991	432.612	438.675
1992	451.353	467.358
1993	493.272	525.986
1994	562.664	608.969
1995	648.646	698.737
1996	749.996	814.708
1997	875.332	951.867
1998	1028.31	1124.8
1999	1222.8	1346.52

---

RTIS - Fiscal year receipts (million \$)

RTISC - Calendar year receipts (million \$)

does, totally find its way into Alaskan incomes. Some of the original expenditure will go for items other than wages and salaries and a proportion of these items will be purchased outside Alaska. All the Alaskan increase will be taxable also. Second, as in the tax reduction case, any increase in disposable personal income per capita relative to the rest of the United States will have some impact on the level of migration to the state.

This case will be referred to as the high spending case in the rest of this section. Table II.16 shows the modified value taken in this simulation by the variable which indicates differences from the target growth rate of state expenditures. Its negative value in early years reflects the increment to spending coming out of permanent fund earnings.

These three alternative uses of a portion of permanent fund earnings will be discussed in the remainder of this section in relation to the alternative of Alaska Inc. Thus, all tables indicate differences from the Alaska Inc. case rather than from the first case discussed in this part of the study which represented returning 100 percent of permanent fund earnings to the general fund.

Beginning with the aggregate economic impacts of the three alternatives, Table II.17 shows the employment differences from the Alaska Inc. case. Employment is down consistently in the reinvestment case as money is, in this instance, being saved rather than distributed to individuals.

Table II.16

Change in Expenditures Under Increased Expenditure Case

(Million \$)

	SAVS
1977	0.
1978	0.
1979	0.
1980	0.
1981	-11.462
1982	-16.89
1983	-23.158
1984	-43.486
1985	-70.853
1986	-99.815
1987	-125.887
1988	-133.361
1989	538.362
1990	745.199
1991	452.275
1992	-155.87
1993	602.486
1994	353.376
1995	194.622
1996	189.65
1997	193.089
1998	173.45
1999	162.578



Table II.17

Employment Impact of Various Permanent Fund Earnings Uses (Thousand)

(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	-0.	0.
1979	0.	0.	0.
1980	0.	-0.	0.
1981	-0.565	-0.169	-0.008
1982	-1.102	0.036	-0.111
1983	-1.649	0.554	-0.197
1984	-2.867	1.192	-0.282
1985	-4.771	2.394	-0.462
1986	-7.041	4.837	-0.722
1987	-9.367	8.956	-0.982
1988	-10.882	15.385	-1.191
1989	-10.548	7.125	0.233
1990	-7.034	-3.045	1.815
1991	-5.27	-5.404	2.101
1992	-5.828	7.129	1.723
1993	-6.728	2.932	1.529
1994	-7.158	-2.363	1.626
1995	-7.232	-4.517	1.883
1996	-6.895	-4.581	2.152
1997	-6.667	-3.99	2.285
1998	-6.501	-3.333	2.487
1999	-6.528	-3.002	2.764

---

PFD.7.2 - Reinvestment of 50% earnings  
PFD.7.3 - Increased government spending  
PFD.7.5 - Reduce personal income tax

The negative values continue because the savings continues throughout the simulation period. In the case of increased spending, the impact is initially smaller, but it quickly rises sharply to a peak of over 15 thousand. The explanation for this surprisingly large increase lies in the nature of the state expenditure function assumed.

Year-to-year growth in expenditures is a function of population, price, and income change calculated on the base from the previous year. There is a built-in "ratchet effect" on government spending such that increases in the previous year become part of the base for calculating the increase in the present year.

In later years, the impact is reversed as the higher expenditure growth catches up with the state and cutbacks must be more severe. In the tax reduction case, the initial impact is almost identical to the Alaska Inc. case. The influence of the federal taxation of the income increase is somewhat stronger than the impact on migration, so the net effect is slightly slower growth. This pattern is reversed later as a positive impact appears. It is attributable to a higher population level than in the Alaska Inc. case which leads to high state spending and, thus, private employment.

This is reflected in the pattern of Table II.18 where the differences in population from the Alaska Inc. case are shown. The only instance of a divergence from the pattern of employment is that population growth occurs consistently in the tax reduction case somewhat independently of

Table II.18

Population Impact of Various Permanent Fund Earnings Uses (Thousand)

(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.	0.
1980	0.	-0.	0.
1981	-0.753	-0.225	-0.009
1982	-1.562	0.024	-0.019
1983	-2.437	0.753	0.029
1984	-4.287	1.73	0.111
1985	-7.196	3.588	0.208
1986	-10.814	7.32	0.352
1987	-14.739	13.682	0.606
1988	-17.794	23.752	0.931
1989	-18.446	15.01	3.462
1990	-14.623	2.146	6.32
1991	-12.524	-1.802	7.615
1992	-13.208	13.847	7.984
1993	-14.472	9.234	8.456
1994	-15.19	2.355	9.242
1995	-15.446	-1.104	10.189
1996	-15.119	-1.959	11.085
1997	-14.865	-1.854	11.738
1998	-14.751	-1.615	12.351
1999	-14.823	-1.553	13.058

---

PFD.7.2 - Reinvestment of 50% earnings  
 PFD.7.3 - Increased government spending  
 PFD.7.5 - Reduce personal income tax



the slight decline in employment. The differences are small but the cumulative effect is significant, for by 1999 the impact level is 13 thousand. As mentioned above, this is partially attributable to the fact that migration into the state is a function of not only employment availability but also the real personal income differential between Alaska and the rest of the United States.

In the reinvestment alternative, personal income generated has fallen as expected (Table II.19). The largest difference is, surprisingly, in 1989 after which time the difference declines markedly for a ten-year period. The reason is that some of the initial savings has later become available as expenditures to buoy up the declining level of government expenditures.

A large portion of the increase in government spending in the second case does not find its way initially into Alaska personal income. It leaks out of the Alaskan economy immediately. The effect of growth in state expenditures quickly overcomes this leakage effect however, so that personal income rises significantly. When the state suffers its financial squeeze, it is felt particularly acutely in this case because the earlier expansion more rapidly depleted revenues.

Personal income in the tax reduction case does not rise as much as it did under the Alaska Inc. assumptions. The federal government takes a large part of the initial increase. At the end of the simulation

Table II.19

Personal Income Impact of Various Permanent Fund Earnings Uses (Million \$)

(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.003	0.
1978	0.	0.003	0.
1979	0.	-0.005	0.
1980	0.	-0.016	0.
1981	-27.562	-15.039	-11.664
1982	-50.852	-13.23	-20.738
1983	-76.91	-0.266	-30.359
1984	-141.898	8.016	-54.402
1985	-244.656	36.695	90.043
1986	-373.309	123.07	-131.836
1987	-514.105	301.375	-172.547
1988	-616.895	630.52	-194.543
1989	-636.109	261.223	-135.
1990	-483.723	-258.031	-57.539
1991	-405.746	-402.68	-41.855
1992	-449.75	294.594	-62.664
1993	-521.844	75.766	-74.535
1994	-571.059	-251.645	-66.891
1995	-598.66	-407.52	-47.629
1996	-594.168	-423.066	-19.352
1997	-595.535	-388.949	2.707
1998	-606.582	-349.664	28.281
1999	-629.309	-323.984	65.84

---

PFD.7.2 - Reinvestment of 50% earnings  
PFD.7.3 - Increased government spending  
PFD.7.5 - Reduce personal income tax

period, the situation is reversed because the effect of the increased level of employment has finally surpassed the federal income tax leakage effect.

Turning next to an examination of state expenditures and revenues, Table II.20 shows that the reduced population growth in the reinvestment case has obviated the necessity for expenditures to grow as rapidly as before. In addition, in later years when the expenditure level is being cut back, the higher level of earnings generated by the permanent fund allows expenditures to occur at a higher level. In the higher spending case, expenditures are higher in each period because of not only the assumption of the simulation but also because of the higher population level. When personal income taxes are reduced, state expenditures are initially lower and subsequently higher than in the Alaska Inc. case. The initial slower growth is the result of slower growth in personal income. Eventually, the effect of population becomes more important and expenditures rise to accommodate the increase in demand reflected in the larger population.

Total state revenues fall by a very small amount initially as the economy slows down in the reinvestment case (Table II.21). This is recouped later, however, when revenues greatly exceed those generated under the Alaska Inc. alternative. When state expenditures are increased, the impact on state revenues is initially almost identical to the Alaska Inc. case. Beginning in 1989, it becomes apparent that any revenue increases



Table II.20

State Expenditures Impact of Various  
Permanent Fund Earnings Uses (Million \$)  
(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.	0.
1980	0.	-0.006	0.
1981	0.	11.627	0.
1982	-9.386	25.122	-3.925
1983	-17.643	50.827	-7.096
1984	-26.747	103.389	-10.415
1985	-49.24	187.876	-18.587
1986	-84.077	319.999	-30.519
1987	-127.419	514.297	-44.357
1988	-174.35	772.521	-57.62
1989	-153.44	493.087	-9.847
1990	-12.619	119.966	47.449
1991	64.268	47.936	57.251
1992	54.208	531.409	40.758
1993	29.58	388.511	29.801
1994	23.548	194.432	29.807
1995	32.513	118.302	35.162
1996	44.508	111.424	39.982
1997	54.906	132.276	39.867
1998	64.617	156.441	40.164
1999	72.832	172.926	42.469

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PFD.7.2 - Reinvestment of 50% earnings  
PFD.7.3 - Increased government spending  
PFD.7.5 - Reduce personal income tax

Table II.21

State Revenues Impact of Various Permanent Fund Earnings Uses (Million \$)

(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.001	0.
1980	0.	-0.	0.
1981	-0.864	-0.181	-5.043
1982	-2.62	-0.357	-13.806
1983	-3.491	0.732	-19.675
1984	-4.912	-1.552	-31.855
1985	-8.378	-0.541	-54.677
1986	-12.461	2.323	-81.987
1987	-15.099	4.885	-108.46
1988	-14.014	17.3	-125.016
1989	-3.096	-11.107	-126.024
1990	23.5	-89.837	-121.057
1991	52.896	-135.527	-120.647
1992	65.753	-106.284	-126.684
1993	70.281	-87.499	-132.837
1994	77.25	-153.475	-135.855
1995	88.526	-196.414	-136.425
1996	104.88	-199.29	-133.024
1997	120.882	-183.606	-126.084
1998	135.859	-167.33	-119.324
1999	149.465	-153.844	-111.961

---

PFD.7.2 - Reinvestment of 50% earnings  
PFD.7.3 - Increased government spending  
PFD.7.5 - Reduce personal income tax

generated by a higher level of economic activity resulting from more government spending have been swamped by reductions in earnings from the general and permanent funds. In the tax reduction case, the total revenue loss is less than the initial tax reduction (equivalently, the Alaska Inc. payments) because of the generation of other income which, in turn, produces state revenues. It is also less, in all but the first few years, than the Alaska Inc. revenue loss because the larger population and personal income levels result in more employment in state government with its attendant impact on private spending.

State spending exceeds the target amount by definition in the increased spending case, as indicated by negative values in Table II.22. In the reinvestment case, when the financial crunch comes the forced reduction in the first years is not as severe as in the Alaska Inc. case. The same is true to a lesser degree in the tax reduction case, where lower levels of personal income result in a slightly lower target.

The general fund and permanent fund impacts are shown in Table II.23 and Table II.24. As indicated previously, the permanent fund consists of the sum of the contributions made at the 25 percent rate and supplementary contributions. The basic contributions cannot be withdrawn; but if the general fund balance is reduced to an arbitrary floor level, then the supplementary permanent fund contributions can be withdrawn.

As expected, the general and permanent funds are much larger where the reinvestment case is assumed. The permanent fund contains an



Table II.22

Target Spending Reduction Impact of Various  
Permanent Fund Earnings Uses (Million \$)  
 (Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.	0.
1980	0.	0.	0.
1981	0.	-11.462	0.
1982	0.	-16.89	0.
1983	0.	-23.158	0.
1984	0.	-43.486	0.
1985	0.	-70.853	0.
1986	0.	-99.815	0.
1987	0.	-125.887	0.
1988	0.	-133.861	0.
1989	-54.437	483.925	-54.437
1990	-139.566	272.342	-30.543
1991	-15.568	-83.79	20.268
1992	40.821	-514.749	24.068
1993	21.949	369.548	8.666
1994	-0.334	164.317	0.603
1995	-6.517	21.577	0.589
1996	-2.541	-8.046	3.779
1997	6.872	-4.342	10.09
1998	8.069	4.97	8.187
1999	9.646	16.499	6.273

---

PFD.7.2 - Reinvestment of 50% earnings  
 PFD.7.3 - Increased government spending  
 PFD.7.5 - Reduce personal income tax

Table II.23

General Fund Balance Impact of VariousPermanent Fund Earnings Uses (Million \$)

(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.001	0.
1980	0.	0.006	0.
1981	-0.864	0.92	6.419
1982	4.722	-4.82	13.082
1983	7.644	349.102	15.571
1984	12.013	336.535	20.848
1985	20.161	312.204	29.117
1986	34.413	619.758	40.5
1987	123.368	290.83	98.171
1988	251.725	-249.448	159.31
1989	368.171	-565.765	183.899
1990	380.443	-619.347	167.596
1991	346.113	-283.244	147.055
1992	326.326	-703.852	139.114
1993	326.543	-517.838	138.458
1994	332.58	-486.661	137.828
1995	140.111	-816.448	137.826
1996	140.111	-1146.24	137.825
1997	140.113	-1456.9	137.825
1998	140.11	-1756.3	137.829
1999	140.122	-2038.14	137.845

---

PFD.7.2 - Reinvestment of 50% earnings  
PFD.7.3 - Increased government spending  
PFD.7.5 - Reduce personal income tax

Table II.24

Permanent Fund Balance Impact of VariousPermanent Fund Earnings Uses (Million \$)

(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.	0.
1980	0.	0.	0.
1981	11.462	0.	0.
1982	28.753	0.	0.
1983	61.682	-375.244	7.465
1984	120.42	-412.945	23.299
1985	219.892	-485.931	48.102
1986	370.078	-977.048	82.258
1987	508.762	-977.048	82.258
1988	660.274	-977.048	82.254
1989	823.992	-977.045	82.254
1990	999.312	-977.042	82.254
1991	1185.76	-1338.14	82.254
1992	1382.98	-1338.14	82.254
1993	1590.71	-1801.97	82.254
1994	1808.8	-1998.9	82.254
1995	2231.87	-1804.18	78.656
1996	2463.98	-1609.17	69.203
1997	2698.01	-1440.83	61.363
1998	2934.3	-1293.47	55.25
1999	3173.46	-1168.89	50.07

---

PFD.7.2 - Reinvestment of 50% earnings  
PFD.7.3 - Increased government spending  
PFD.7.5 - Reduce personal income tax



additional \$3.173 billion above the Alaska Inc. case by 1999. The general fund is also larger. The situation is dramatically reversed in the case of increased expenditure levels where, by 1999, the combined totals are \$3.207 billion below the Alaska Inc. base. Comparing the tax reduction case with the Alaska Inc. case indicates a larger combined balance of the two funds from a tax reduction. In early years, this is the result of relatively lower levels of state expenditures in the tax reduction case. The maintenance of the difference essentially throughout the rest of the period must be attributed to slightly higher tax revenues in the tax reduction case and slightly higher shortfalls from the target expenditure rate.

Looking at particular components of state revenues, it can be seen from Table II.25 that total permanent fund earnings are particularly sensitive to the method of earnings disposition. They increase most rapidly in the case where a portion of the earnings are reinvested. Alternatively, they decrease most rapidly when government spending increases are being fueled by permanent fund earnings. Since the tax reduction case is most similar to that of Alaska Inc., it is not surprising that the permanent fund earnings in the two cases are nearly identical.

Regarding personal income taxes, Table II.26 shows that they obviously fall the most in the tax reduction case. What cannot be seen from this comparison is that the difference between the Alaska Inc. and the

Table II.25

Total Permanent Fund Earnings Impact of Various  
Permanent Fund Earnings Uses (Million \$)  
 (Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.	0.
1980	0.	0.	0.
1981	0.	0.	0.
1982	0.802	0.	0.
1983	2.013	0.	0.
1984	4.318	-26.267	0.523
1985	8.429	-28.906	1.631
1986	15.392	-34.015	3.367
1987	25.905	-68.393	5.758
1988	35.614	-68.393	5.758
1989	46.219	-68.393	5.758
1990	57.679	-68.393	5.758
1991	69.952	-68.393	5.758
1992	83.003	-93.67	5.758
1993	96.808	-93.67	5.758
1994	111.35	-126.138	5.758
1995	126.616	-139.923	5.758
1996	156.231	-126.292	5.506
1997	172.479	-112.642	4.844
1998	188.861	-100.658	4.295
1999	205.401	-90.543	3.868

---

PFD.7.2 - Reinvestment of 50% earnings  
 PFD.7.3 - Increased government spending  
 PFD.7.5 - Reduce personal income tax

Table II.26

Personal Income Tax Impact of VariousPermanent Fund Earnings Uses (Million \$)

(Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	0.	0.
1978	0.	-0.	0.
1979	0.	0.	0.
1980	0.	-0.	0.
1981	-0.419	-0.03	-5.007
1982	-1.329	0.201	-13.853
1983	-2.236	1.114	-19.882
1984	-3.858	2.72	-32.462
1985	-7.066	5.556	-56.084
1986	-11.791	11.23	-84.695
1987	-17.469	21.567	-113.179
1988	-22.905	38.706	-132.254
1989	-24.756	34.049	-137.991
1990	-17.726	-1.526	-139.331
1991	-8.838	-18.705	-142.589
1992	-9.553	9.841	-148.777
1993	-14.501	28.081	-154.357
1994	-17.896	-2.347	-157.849
1995	-19.24	-16.318	-159.939
1996	-19.279	-17.289	-158.436
1997	-19.131	-14.257	-153.109
1998	-19.804	-11.201	-147.902
1999	-21.156	-9.346	-142.469

---

PFD.7.2 - Reinvestment of 50% earnings  
PFD.7.3 - Increased government spending  
PFD.7.5 - Reduce personal income tax



tax reduction cases is less than the tax reduction itself because of secondary income generated. Personal income taxes are less in the reinvestment case because of the relative decline in economic activity. In the increased government spending case, they rise as government spending grows and fall sometime after government spending is forced to decline.

Finally, real per capita impacts between the Alaska Inc. proposal and the suggested alternative can be compared. Table II.27 shows that, as expected, real per capita disposable income is less when permanent fund earnings are reinvested than when they are distributed as Alaska Inc. They are less in the two other cases also, but by lesser amounts in early years. The tax reduction case operates like Alaska Inc. to raise disposable income but is less successful because of the federal income tax. The negative impact on disposable personal income in the case of government spending is a combination of the direct effect of the Alaska Inc. payments and the sharp decrease in government spending in the early 1990s.

Table II.28 shows the impact on real per capita state expenditures of the three alternatives to Alaska Inc. With reinvestment of earnings, the initial impact is negligible and it then becomes positive as spending is made possible by past savings. When increased state spending is the use of the fund earnings, it is indeed possible to cause an increase in real per capita terms, although by the end of the simulation period, the real increase is not rising. Reducing the personal income tax has an effect which is almost identical to that of the Alaska Inc. case.

Table II.27

Real Per Capita Disposable Income Impact of Various  
Permanent Fund Earnings Uses (Constant \$)  
 (Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	-0.002	0.
1978	0.	-0.006	0.
1979	0.	0.	0.
1980	0.	0.001	0.
1981	-11.543	-8.614	-0.158
1982	-16.183	-8.545	-0.795
1983	-21.149	-7.607	-1.97
1984	-36.783	-13.59	-3.38
1985	-55.419	-16.967	-5.356
1986	-71.868	-12.924	-8.242
1987	-82.668	-0.303	-11.563
1988	-78.929	25.696	-14.883
1989	-64.723	-39.803	-9.224
1990	-38.87	-92.443	-5.474
1991	-30.874	-92.084	-9.696
1992	-35.224	-0.929	-16.409
1993	-37.793	-47.203	-20.865
1994	-35.823	-72.639	-23.546
1995	-31.77	-73.917	-25.281
1996	-24.949	-63.988	-26.617
1997	-19.723	-53.172	-28.488
1998	-14.645	-43.23	-29.172
1999	-11.047	-36.641	-29.488

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PFD.7.2 - Reinvestment of 50% earnings  
 PFD.7.3 - Increased government spending  
 PFD.7.5 - Reduce personal income tax

Table II.28

Real Per Capita State Expenditure Impact of Various  
Permanent Fund Earnings Uses (Constant \$)  
 (Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	-0.001	0.
1978	0.	-0.002	0.
1979	0.	-0.001	0.
1980	0.	-0.002	0.
1981	2.927	9.449	0.037
1982	-0.34	17.399	-2.516
1983	-2.362	30.349	-4.448
1984	-0.776	56.332	-6.238
1985	-2.543	91.599	-10.291
1986	-6.804	136.478	-15.542
1987	-12.168	189.236	-20.913
1988	-19.586	240.657	-25.327
1989	-5.923	144.285	-11.869
1990	33.775	41.865	2.313
1991	51.018	24.623	4.13
1992	44.985	143.513	-0.718
1993	36.118	103.298	-4.039
1994	32.743	54.335	-4.678
1995	33.195	35.807	-4.264
1996	33.108	32.401	-3.937
1997	32.387	34.053	-4.391
1998	31.546	35.523	-4.733
1999	30.394	34.932	-4.823

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PFD.7.2 - Reinvestment of 50% earnings  
 PFD.7.3 - Increased government spending  
 PFD.7.5 - Reduce personal income tax



In Table II.29 the changes in real per capita state revenues are shown. The impacts are distinct. Revenues per capita rise when earnings are reinvested and fall when expenditures are increased, primarily because of the impact of these programs on the general and permanent fund balances. With the reduction in the personal income tax, the real per capita level of state revenues also declines.

Table II.29

Real Per Capita State Revenue Impact of Various  
Permanent Fund Earnings Uses (Constant \$)  
 (Measured as Difference From Alaska Inc. Case)

	PFD.7.2_ ER	PFD.7.3_ ER	PFD.7.5_ ER
1977	0.	-0.001	0.
1978	0.	-0.001	0.
1979	0.	0.	0.
1980	0.	0.001	0.
1981	2.91	0.928	-3.673
1982	5.713	-0.385	-9.359
1983	9.676	-3.256	-12.634
1984	18.765	-9.632	-19.236
1985	30.442	-17.427	-30.406
1986	42.28	-30.758	-41.836
1987	50.251	-48.693	-50.844
1988	52.574	-66.784	-53.972
1989	49.726	-42.061	-55.925
1990	43.403	-34.146	-56.828
1991	45.254	-39.964	-55.936
1992	49.151	-61.436	-55.023
1993	48.707	-42.36	-53.814
1994	48.318	-46.235	-51.839
1995	48.116	-49.193	-49.439
1996	47.999	-45.331	-46.019
1997	47.511	-38.507	-41.563
1998	46.526	-32.208	-37.352
1999	45.004	-26.732	-33.377

---

PFD.7.2 - Reinvestment of 50% earnings  
 PFD.7.3 - Increased government spending  
 PFD.7.5 - Reduce personal income tax

E. Conclusion

The economic impact of changes in the use of the earnings of the permanent fund is significant because of the large size of the fund itself. Thus as the fund grows more slowly as time passes, the importance of any policy change regarding earnings disposition declines.

The most important impact in any case is upon the level of the fund balance itself. Reinvestment of earnings increases the balance significantly, while using the earnings to increase state revenues leads to rapid depletion of the general fund and any money which can be withdrawn from the permanent fund. Alaska Inc. and a personal income tax rebate occupy essentially middle ground in their impact on the fund. This is because they prevent a faster balance buildup but do not increase demand on the fund as did the state expenditure increase case under the conditions of the "ratchet effect" of state spending assumed in this analysis.

In terms of aggregate economic impact, all alternatives were significant. Reinvestment of earnings shifted the pattern of growth toward more rapid future growth, while the opposite was true in the other three cases. They all reflected the fact that an increase in the level of disposable personal income would result in overall growth of the economy much larger than the original change.

The cases in which growth of the economy was accelerated in early years also illustrated the fact that in those cases, the slowdown



necessitated by the financial difficulties projected for the state would also be larger.

Finally, the Alaska Inc. program seemed to be more effective in getting additional income into the hands of individuals than a tax rebate. Because of the provision of multiple shares after every five-year increment in a person's length of residence, the value of an individual share begins to erode in real dollars less than ten years after the program is instituted.

### PART III

## ANALYSIS OF ECONOMIC IMPACT OF PETROCHEMICAL FACILITIES AND FISH HATCHERIES ON THE ALASKAN ECONOMY

### A. Introduction

Portions of the permanent fund may be invested in new ventures in the Alaskan economy, particularly in natural resource related areas. Such investments may be done for a variety of reasons which all generally fall into the category of broad economic benefits for the Alaskan economy. Objectives most often suggested are diversification of the economy, the creation of jobs, and the generation of additional tax revenues for state and local government.

In this analysis two particular types of facility are examined to determine their impact on the state economy. Emphasis is placed upon the impact on the overall growth of the aggregate economy, the regional components of growth, and the fiscal impact of the construction and operation of the facilities.

The first alternative is a petrochemical complex. The facility incorporated into the simulation is patterned after, but does not correspond exactly to, the final proposals presented to the Royalty Oil and Gas Board for the construction of Alaskan refineries for the refining of Alaska's share of the production from Prudhoe Bay. This refinery would be located on the Kenai peninsula and would utilize 150,000 barrels of oil per day. Construction would begin in 1979 and operations would start

in 1985. Employment during the construction phase would peak at an annual average of 2,550, while 460 would be employed during the operations phase. The value of the refinery for tax purposes would be \$1.5 billion. (A more detailed description of the assumptions can be found in Appendix E.)

The second alternative is a series of 30 fish hatcheries located in various parts of the state. The Southeast and Southwest of Alaska each receive eight hatcheries, the Southcentral area receives six, and the Interior part of the state receives eight hatcheries, of which two are located in the vicinity of Fairbanks. These private, non-profit hatcheries are built over a four-year period at a cost of from \$2 to \$4 million each. Two construction seasons and 30 construction workers are required for each. Operating employment is eight full-time equivalent employees for each hatchery. Fish begin to return two years after operations commence. The hatcheries generate increased economic activity in both the fishing and the manufacturing (processing) industries.

Both the petrochemical facility and the fish hatchery program are assumed to be economically viable operations. Thus, there are no implicit or explicit subsidies to either from the state. In particular, the refinery purchases royalty oil from the state at the same price as the best alternative which is available to the state. The fish hatchery program does not receive an operating subsidy from the state.



This assumption carries over to the form of financial participation by the permanent fund in these projects. At this time the legislature has not determined either what types of projects in which the permanent fund might invest or what form that participation might take, such as the purchase of bonds or an actual ownership position. Neither has the phrase "income producing" been defined. For these reasons, it is not possible to specify either the form of investment or the earnings which might accrue to the permanent fund from participation in the financing of either of these types of projects. Therefore, a neutral assumption is made regarding the impact on the fund itself of financial participation in these projects. It is assumed that whatever form the investment may take, it does not change the average rate of earnings of the fund.

This assumption of neutral impact serves two purposes. First, it allows the analysis to isolate those fiscal impacts which occur through changes in the economic activity of the state from the fiscal impact of a change in the permanent fund and its earnings potential. Second, it allows the reader, if so inclined, to easily substitute his own assumptions concerning the impact on the fund of these participation programs. Any different assumption regarding fiscal impact would be additive to that impact presented in the results. Thus, for example, either a rate of earnings greater than or less than the average for the fund could be accommodated.

Use of this assumption also eliminates the necessity of scaling the two projects so that permanent fund participation is equal in each. This would clearly be impossible in the present case because of the huge difference in the capital requirements, and total resources demanded, by the two projects. The refinery costs \$1.5 billion and the 30 fish hatcheries, at most, \$ .12 billion. To increase the number of hatcheries to make the total capital requirements of the program equivalent to that of the refinery would require more than 360 fish hatcheries, an impossibly large number.

Because of this, it is not possible to directly compare the two projects in the sense of general economic return to the state from investment of a certain dollar amount. In the sense of scale, this is a comparison of "apples and oranges" which is not completely valid. The projects do offer an interesting contrast, however, in the fact that the refinery is an extremely capital intensive facility, while the series of fish hatcheries is much more labor intensive. As a result, the configuration of impact in the two cases should be quite different.

In assessing the results of this impact analysis, it is important to bear in mind that the validity of the results for the projects is only as robust as the validity of the underlying assumptions which went into the model. In some instances, there may be a difference of opinion regarding the level of a variable in the assumptions, and the results might be sensitive to that variability. For example, the capital-labor

ratio in petrochemicals manufacture is not the same for each facility. It is dependent upon such factors as the relative cost of inputs, the types of feedstock employed, and the mix of products produced. With this in mind, it follows that the impact analyses of these facilities should be interpreted not as the analysis of specific projects but of types of projects with the mixture of characteristics as outlined in the discussion of assumptions. The comparison then is between a capital intensive project built on one site and a number of labor intensive facilities scattered around the state.



B. Base Case

The impacts are measured from a base simulation described in Part I of this study. In the base case, state expenditures grow at a rate which maintains a constant ratio between per capita real personal income and per capita real state expenditures. There is no constraint on this growth imposed by a lack of revenues until beyond 1990. Since these simulations go no further than that, the impending fiscal crunch is ignored here.

Aggregate economic growth is strong between 197 and 1990 in this base case (Table III. 1). By 1990, population is 688 thousand and employment has increased nearly 75 percent from its present level to over 325 thousand. Personal income has increased nearly three times to \$13.1 billion.

Up to 1990, the fiscal condition of the state appears healthy, as described by the variables in Table III.2. Expenditure growth is strong and steady as increases track growth in real per capita personal income. Through most of the 1980s, revenue growth more than keeps pace and growth of both the permanent fund and the supplemental fund keep pace. The supplemental fund is the depository of all state revenues in excess of current needs which are not "locked up" into the permanent fund. They are set aside during peak revenue years to be used in times of revenue shortfalls on current account.

Table III.1

Base Case Aggregate Economic Indicators

	POP	EM99	PI
1977	398.502	187.487	3292.21
1978	408.317	192.029	3600.29
1979	425.551	201.316	4055.06
1980	457.817	220.719	4869.61
1981	484.215	232.928	5505.92
1982	495.25	233.345	5771.67
1983	508.406	236.415	6163.91
1984	525.56	243.346	6725.23
1985	546.222	253.07	7437.8
1986	568.45	263.693	8241.89
1987	593.337	276.056	9183.64
1988	621.202	290.201	10285.
1989	653.134	306.862	11599.8
1990	688.407	325.256	13111.5

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POP - Population (thousand)  
 EM99 - Employment (thousand)  
 PI - Personal Income (million \$)

Table III.2

Base Case Fiscal Indicators

	E99S	R99S	PFBAL	PFSUPBL
1977	1099.65	1130.36	2.4	0.
1978	1271.17	1148.96	62.4	0.
1979	1385.2	1543.19	276.293	90.733
1980	1550.86	1957.76	746.281	418.789
1981	1839.38	2234.44	1212.58	730.018
1982	2067.21	2520.95	1748.2	1086.55
1983	2164.9	2827.61	2492.13	1625.27
1984	2307.23	3255.6	3525.13	2429.83
1985	2508.6	3549.28	4659.57	3318.07
1986	2762.11	3734.52	5741.3	4147.86
1987	3046.73	3717.27	6544.9	4723.64
1988	3377.95	3656.71	6985.21	4966.74
1989	3762.7	3606.98	7033.23	4847.05
1990	4218.49	3586.25	6641.29	4312.44

E99S - State Expenditures (million \$)

R99S - State Revenues (million \$)

PFBAL - Permanent Fund and Supplementary Fund Balance (million \$)

PFSUPBL - Supplementary Fund Balance (million \$)



Warning signs are, nonetheless, beginning to appear. The level of total revenues peaks in 1986 and begins to inch downward from that point in time. Shortly thereafter in 1988, the level of accrued revenues in the supplementary fund reaches a peak at \$4.966 billion and subsequently begins a decline.

These trends are mirrored in movements of the indicators of average per capita economic activity shown in Table III.3. Real per capita disposable personal income shows fairly steady growth throughout the period of analysis, reflecting aggregate economic activity. Likewise, real state expenditures per capita increase according to a smooth pattern. Only real per capita state revenues show a period of growth and then after 1985, a sharp decline from the peak of \$2,016 to \$1,306 in 1990. This is a drop to below the level of a decade earlier when, in 1980, it was \$1,597. In addition, in 1989, for the first time since the beginning of production from Prudhoe Bay, revenues fall short of expenditures.

The pattern of local finances is a healthy one because of both the strong level of state expenditures and revenues from local sources (Table III.4). Local revenues and expenditures are closely tied to the level of state expenditures through a variety of programs. Since state expenditures grow throughout the simulation period, so also do local expenditures and revenues. Increases in the local property tax base contribute an important local source of revenues.

Table III.3

Base Case Per Capita Economic Indicators

	DIRPA	E99SRPC	R99SRPC
1977	2897.39	1185.25	1218.35
1978	2997.95	1279.2	1156.23
1979	3104.74	1282.35	1428.6
1980	3293.58	1265.61	1597.67
1981	3345.17	1358.48	1650.26
1982	3307.63	1447.27	1764.94
1983	3331.98	1427.92	1865.03
1984	3393.46	1418.23	2001.19
1985	3470.27	1425.38	2016.69
1986	3542.59	1448.35	1958.25
1987	3626.01	1468.22	1791.35
1988	3710.28	1490.01	1612.97
1989	3806.07	1510.82	1448.29
1990	3899.71	1537.09	1306.72

---

DIRPA - Per Capita Real Income (constant \$)

E99SRPC - Per Capita Real State Expenditures (constant \$)

R99SRPC - Per Capita Real State Revenues (constant \$)

Table III.4

Base Case Local Government Indicators

	E99L	R99L	E99LRPC	R99LRPC
1977	597.078	543.726	643.559	586.053
1978	585.067	550.219	588.765	553.697
1979	641.161	603.132	593.552	558.347
1980	731.859	693.146	597.247	565.654
1981	852.174	802.897	629.377	592.983
1982	949.687	898.929	664.885	629.348
1983	1015.12	975.536	669.553	643.445
1984	1100.87	1069.73	676.692	657.552
1985	1210.69	1186.5	687.908	674.166
1986	1324.9	1308.12	694.73	685.931
1987	1460.42	1452.86	703.775	700.133
1988	1617.5	1623.34	713.478	716.057
1989	1799.42	1822.27	722.51	731.687
1990	2014.12	2060.59	733.883	750.816

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E99L - Local Expenditure (million \$)

R99L - Local Revenues (million \$)

E99LRPC - Per Capita Real Expenditures (constant \$)

R99LRPC - Per Capita Real Revenues (constant \$)



This steady growth is reflected also in the per capita measures of revenues and expenditures. As long as state transfers grow from year to year, the level of local services is able to expand.

C. Aggregate Economic Impacts

Upon this basic simulation of the economy the two projects described above are overlain and impacts measured. The pattern of aggregate economic impact differs considerably between the two cases.

Looking first at the impact of the petrochemical facility (Table III.5), a definite "mini-boom" period can be observed in the early 1980s in contrast to the base case, coming essentially at the end of the peak associated with the construction of the Prudhoe Bay gas pipeline. The boom is evidenced by an employment increase which peaks at over 13 thousand in 1983. This is associated with a population impact of over 24 thousand which peaks in the following year.

After the labor intensive construction phase of the facility, the employment and population differences decline until the late 1980s. Then they appear to stabilize back to the growth rates in the base case which in 1990 result in levels 5 thousand and 15 thousand above the base case, respectively. From that point forward, equal growth rates between the two cases would result in an ever widening margin in terms of employment and population between the two cases. This large construction project, coupled with a small permanent labor force, has put the whole economy on a somewhat higher growth path.

Increases in wages and salaries, and with it personal income, follow the same pattern as the increases in employment. In the peak employment

Table III.5

Aggregate Economic Impact of Petrochemical Facility

(Measured as Differences From the Base Case)

	POP	PI	WS99	EM99
1977	0.	0.	0.	0.
1978	0.	0.	0.	0.
1979	0.239	5.867	5.109	0.181
1980	4.742	134.059	117.121	3.546
1981	12.998	376.582	329.758	9.142
1982	18.71	479.625	420.02	12.001
1983	22.797	551.137	483.172	13.432
1984	24.426	530.23	465.457	13.014
1985	18.161	274.121	240.961	7.005
1986	15.73	210.934	185.711	4.955
1987	14.811	195.91	172.789	4.304
1988	14.557	204.266	180.473	4.248
1989	14.665	226.16	200.23	4.484
1990	15.088	260.086	230.703	4.948

---

POP - Population (thousand)

PI - Personal Income (million \$)

WS99 - Wages and Salaries (million \$)

EM99 - Employment (thousand)



year of 1983, the level of employment is 5.7 percent above the base case, while the level of wages and salaries is 8.9 percent above the base. Thus, the employment generated by this facility adds significantly more to personal income than the average employment for the state.

The pattern for the fish hatchery program does not contain a "bulge" because there is no massive construction phase (Table III.6). Growth of all indicators in relation to the base case is incremental. Employment increases come gradually and fall behind the refinery case in early years. After both facilities are operating, however, the two cases show long-run growth above the base case which is almost equal. Because of the incremental nature of the growth, the level of population has not increased by as large an amount relative to employment.

Growth in wages and salaries and personal income shows the same smooth pattern of increase over the base case. In early years, this growth turns out to be less than in the refinery case, but by the late 1980s, the impact on both of these variables is substantially larger from fisheries enhancement than from the refinery.

Part of the reason behind this is the fact that the fisheries enhancement program leads directly to increases in economic activity in two other sectors of the economy. First, the increased level of the fishery increases the value of the fish taken by Alaskan fishermen. This is assumed to lead directly to increases in incomes in this sector

Table III.6

Aggregate Economic Impact of Fisheries Enhancement

(Measured as Differences From the Base Case)

	POP	PI	WS99	EM99
1977	0.	0.	0.	0.
1978	0.	0.	0.	0.
1979	0.725	23.539	20.486	0.55
1980	1.912	54.93	47.984	1.302
1981	3.044	80.238	70.238	1.906
1982	4.729	125.672	110.	2.884
1983	5.153	114.348	100.184	2.76
1984	5.226	107.805	94.582	2.505
1985	6.141	142.141	124.922	2.977
1986	7.229	174.137	153.305	3.531
1987	8.229	205.645	181.375	4.002
1988	9.231	239.875	211.941	4.47
1989	10.286	279.133	247.145	4.977
1990	11.417	324.738	288.082	5.539

---

POP - Population (thousand)  
 PI - Personal Income (million \$)  
 WS99 - Wages & Salaries (million \$)  
 EM99 - Employment (thousand)

without an associated increase in employment because of the limited entry laws which effectively limit the number of fishermen working in Alaskan waters. The increased catch, in turn, leads to increased fish processing and is reflected in an increase in the levels of employment and value added in the fish processing industry in the state.

The inclusion of these economic "links" in the analysis of the fish hatchery case highlights the complicated nature of the assumption necessary to carry out this analysis. It is assumed that the fish which the hatcheries produce are all caught by Alaskans and that their incomes are spent in Alaska. Thus, there is no leakage of this income outside the state economy at the time of the initial transaction to the fishermen from the buyers of the fish.

In reality, some of this income to fishermen would not go to Alaskan fishermen and to measure the importance of this assumption, a special case simulation was done in which none of the increase in incomes was received by Alaskans. There was, in this special case, no increase in the fishing sector of the economy from the point of view of Alaskans. Comparing total wages and salaries in the fish hatchery case, including increases in fishermen's incomes, with the case of no increase in fishermen's incomes indicated there is a substantial impact on the wage and salary level as a result of including these incomes. The total loss is several times the assumed increase in income to the fishermen directly.



This is because of the employment and resulting wages and salaries generated in other sectors of the economy because of the demand created by these incomes. The increase in wages and salaries to the state as a whole from either project, assuming no increase in fishermen's incomes, is approximately the same by 1990.

There are other assumptions which could be changed and which would also change the results of the aggregate analysis. It is assumed that the refinery construction work is carried out by Alaskans who will spend their incomes in Alaska. The experience of the construction of the Alyeska pipeline has indicated that this might not be valid. Some income would leak out of the state in this case, and the impact on wages and salaries would be reduced accordingly.

D. Regional Economic Impacts

The economic impact of these two projects can be analyzed on a regional basis also. Here the patterns should also differ because of the concentration of the refinery in the Southcentral part of the state, while the fish hatchery program directly affects most regions of the state.

The regional impact on employment, population, and personal income of the refinery case is shown in Tables III.7, III.8, and III.9. The regions are indicated by Figure III.1. Construction and operating employment are concentrated in the Southcentral region on the Kenai peninsula and in Anchorage. The aggregate growth of the economy as a result of this project affects all regions, but the largest impacts are concentrated in those two regions. During construction the Kenai peninsula has the largest relative impact but after that most of the growth is centered upon Anchorage.

This is the result of two causes. First, a portion of the operating employment for the refinery is assumed to reside in Anchorage, as well as the operational headquarters staff. Second, Anchorage is the commercial and service center of the state and, thus, a large percentage of any secondary employment growth would be centered in Anchorage. In fact, in this case, 80 percent of the growth in 1990 has occurred in the Anchorage area.

Table III.7

Regional Employment Impacts of Petrochemical Facility

(Measured as Differences From the Base Case)

(Thousands)

	EM99R1	EM99R2	EM99R3	EM99R4	EM99R5	EM99R6	EM99R7
1977	-0.	0.	0.	0.	0.	0.	0.
1978	0.	0.	0.	0.	0.	0.	0.
1979	0.	-0.	-0.001	0.	0.178	0.	0.003
1980	0.005	-0.004	-0.017	0.995	2.472	0.009	0.085
1981	0.081	0.024	0.137	4.187	4.374	0.046	0.294
1982	0.249	0.099	0.529	4.385	6.201	0.09	0.448
1983	0.324	0.135	0.695	4.527	7.084	0.115	0.553
1984	0.362	0.154	0.782	2.836	8.156	0.13	0.595
1985	0.319	0.141	0.717	0.733	4.48	0.12	0.496
1986	0.18	0.075	0.376	0.525	3.462	0.065	0.273
1987	0.128	0.05	0.246	0.447	3.199	0.045	0.189
1988	0.112	0.042	0.201	0.421	3.274	0.038	0.16
1989	0.112	0.041	0.188	0.414	3.539	0.037	0.153
1990	0.121	0.044	0.192	0.42	3.974	0.039	0.158

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EM99R1 - Northwest  
 EM99R2 - Southwest  
 EM99R3 - Southeast  
 EM99R4 - Southcentral  
 EM99R5 - Anchorage  
 EM99R6 - Interior  
 EM99R7 - Fairbanks



Table III.8

Regional Population Impact of Petrochemical Facility

(Measured as Differences From the Base Case)

(Thousands)

	POPR1	POPR2	POPR3	POPR4	POPR5	POPR6	POPR7
1977	0.	0.	0.	0.	0.	0.	0.
1978	0.	0.	0.	0.	0.	0.	0.
1979	-0.002	-0.005	-0.018	-0.01	0.283	-0.001	-0.006
1980	-0.04	-0.081	-0.279	1.41	3.816	-0.026	-0.059
1981	0.081	-0.094	-0.28	6.354	6.781	0.009	0.146
1982	0.478	0.061	0.387	6.741	10.448	0.10	0.493
1983	0.694	0.188	0.877	7.184	12.84	0.181	0.833
1984	0.831	0.297	1.294	4.803	15.863	0.248	1.091
1985	0.903	0.484	1.928	1.907	11.17	0.335	1.433
1986	0.634	0.411	1.532	1.661	10.078	0.249	1.164
1987	0.526	0.372	1.33	1.532	9.809	0.212	1.03
1988	0.483	0.346	1.209	1.451	9.924	0.193	0.95
1989	0.468	0.325	1.125	1.39	10.288	0.181	0.891
1990	0.467	0.308	1.053	1.338	10.903	0.175	0.844

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POPR1 - Northwest  
 POPR2 - Southwest  
 POPR3 - Southeast  
 POPR4 - Southcentral  
 POPR5 - Anchorage  
 POPR6 - Interior  
 POPR7 - Fairbanks

Table III.9

Regional Personal Income Impact of Petrochemical Facility

(Measured as Differences From the Base Case)

(Million \$)

	PIR1	PIR2	PIR3	PIR4	PIR5	PIR6	PIR7
1977	0.	0.	0.	0.	0.	0.	0.
1978	0.	-0.	0.	0.	0.	-0.	0.
1979	0.08	0.062	0.195	0.198	4.844	0.161	0.328
1980	1.447	1.255	3.592	38.043	75.745	5.447	8.528
1981	5.881	4.448	14.769	164.358	149.232	13.43	24.466
1982	12.377	8.103	30.294	176.084	213.451	9.852	29.459
1983	15.728	10.071	37.998	188.811	252.17	10.988	35.37
1984	16.902	10.48	40.35	126.334	289.514	10.484	36.164
1985	12.621	7.316	30.733	33.279	158.698	6.582	24.891
1986	8.345	4.891	19.276	27.469	130.102	4.507	16.341
1987	6.915	4.072	15.096	26.073	126.543	3.865	13.344
1988	6.828	3.989	14.147	26.744	135.918	3.823	12.807
1989	7.426	4.263	14.681	28.49	153.934	4.001	13.371
1990	8.562	4.789	16.145	30.756	180.621	4.489	14.716

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PIR1 - Northwest  
 PIR2 - Southwest  
 PIR3 - Southeast  
 PIR4 - Southcentral  
 PIR5 - Anchorage  
 PIR6 - Interior  
 PIR7 - Fairbanks