

Alaska Natives and the “New Harpoon”: Economic Performance of the ANCSA Regional Corporations

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Comments Solicited

Abstract

In this paper I develop and analyze 20 years of data on the economic performance of the 12 regional corporations created by the Alaska Native Claims Settlement Act of 1971 (ANCSA). The act was a radical departure from previous U.S. policy toward indigenous peoples. Alaska's 75,000 Aleuts, Eskimos, and Indians received almost \$1 billion in cash and acquired clear title to more than 40 million acres of land, an area larger than New England. This wealth was vested in 12 regional and almost 200 village-level business corporations. As a group, the 12 regional corporations lost 80 percent of their original cash endowment -- about \$380 million -- in direct business operations between 1973 and 1993. But behind this poor overall financial performance is a surprising amount of cross-sectional variation. I first show that allocation of business assets to different economic sectors plays a statistically significant but empirically minor role in explaining this differential performance. I then construct panel data on shareholder employment, wages, and quasirents and test the hypothesis that the regional corporations traded off business profits for Native jobs. The data strongly reject this hypothesis. Quasirents from Native shareholder employment were important to only three firms -- the rest lost money without any countervailing employment. Case history evidence suggests that internal sharing networks and common preferences helped the high-employment firms to deliver both jobs and dividends. Overall, these results suggest caution in the use of group-based lump-sum transfers as economic development tools.

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1. Introduction

Many thousands of Aleuts, Eskimos, and Indians used and occupied the land now known as Alaska for at least the past 8,000 years (Chance 1990). During the past century, European society finally encroached on these people, and by 1968 the Alaska Natives' political struggle for a just settlement of their land claims was crystallized in the slogan "Take our Land, Take our Life." The struggle was successful, at least in comparison to previous United States Indian policies.¹ Under the Alaska Native Claims Settlement Act (ANCSA) of 1971, Alaska's 75,000 Aleuts, Eskimos, and Indians received almost \$1 billion in cash and acquired clear title to more than 40 million acres of land -- an area larger than New England.

ANCSA was intended to be a development tool as much as a claims settlement,² a way for one of America's poorest minority groups³ to escape from poverty on a self-determined path. In a deliberate repudiation of previous United States Indian policy based on reservations and federal oversight, the act vested the land and the money in Alaska Native business corporations, not tribes. Referring to his people's historic reliance on whaling, one Inupiat Eskimo called these corporations the "New Harpoon."⁴

¹ See Appendix A for a brief review of the Alaska Natives' land claims struggle and the passage of ANCSA.

² "The bill before you is not just a question of land,' said John Sackett, an Athabascan Indian, as the U.S. Senate considered the initial settlement. 'It is a grasp, a handhold for the development of our future.' " (Bernton 1992)

³ In 1966 a front-page New York Times story reported: "The worst slums in the United States are not in the racially turbulent quarters of New York, Cleveland, Chicago or Los Angeles. By all available indices of poverty, they are sparsely strewn, like garbage on an ice floe, along the nation's desolate sea frontier with the the Soviet Union." (Bigart 1966)

⁴Charlie Edwardsen, in Edwardsen (1974).

In a previous paper (Colt 1999) I showed that the consolidated financial performance of the Alaska Native corporations over their first two decades was surprisingly poor. The twelve regional corporations lost about \$380 million -- more than three quarters of their original cash endowment -- in business operations between 1973 and 1993. Only the one-time sale of old growth timber and other natural assets and a one-time tax windfall allowed them to report positive accounting income.

Behind this poor average performance, however, is a surprising amount of variation across corporations. Cumulative per capita dividends varied from zero to \$17,000. The average annual accounting return on book equity was 3.9% for the consolidated group, but the range runs from -71% to +13%. And beyond financial returns, several corporations provided hundreds of high-wage jobs for their Native shareholders, while others provided none.

What accounts for this variation? Why have several corporations become largely moribund while others have produced growth, dividends and jobs in a difficult economic climate? I explore these questions using ideas from development economics and political economy to generate testable hypotheses about differential performance. I develop data on each firm's asset allocations, joint venture participation, and shareholder employment over time and exploit this temporal variation to augment the small cross-sectional sample.

The regional corporations made money in local village enterprises, but faced rapidly diminishing returns to investment in these very small markets. The evidence suggests that the Natives exploited their locational advantages in these businesses and handled the diminishing returns by respecting the limited size of the local markets within their own regions and not encroaching into the markets of other regions. In contrast, financial losses were large and widespread in statewide enterprises outside the oil industry, such as fishing, construction, real estate, and hotels. And in spite of the underlying strength of Alaska's North Slope oil industry, petroleum-related investments produced mixed results.

There was wide variation among corporations due to management effects. By importing scarce management, joint ventures with established non-Native firms lost less money than wholly Native-owned operations. Controlling for this strategy, however, does little to reduce the importance of persistent, firm-specific fixed effects in explaining performance (Cockburn & Henderson 1996).

Some have suggested that the corporations deliberately sacrificed profits to provide Native jobs. But counting the economic benefits of job creation changes the picture only slightly. Three corporations provided significant cash flows to their shareholders in the form of wages, while sacrificing little in the way of profits. In contrast, those who made the greatest financial losses produced little or no employment. These data are inconsistent with the hypothesis of an efficient trade-off of profits for wages.

Finally, the pattern of profits and losses provides mixed support for the concept of economic dualism (Todaro 1989) in a remote, resource-dependent region. The Alaska Natives gained control of land, natural resources, and capital, but could not parlay that control into profits and in fact suffered huge losses in the attempt. Modern sector enterprises provided jobs and sometimes profits, but were limited to a fixed pool of opportunities. Attempts to create new opportunities generally failed.

These results provide a quantitative basis for evaluating ANCSA as policy, and may be of interest to others engaged in the settlement of indigenous land claims.⁵ The Alaska experience provides insight into the process of place-based development in a remote regional economy. ANCSA corporations tried many of the same strategies that have been proposed, at one time or another, as answers to the problems of sustainable development in northern or remote regions. The large losses they suffered are a sobering lesson about the challenges inherent in this process.

The results may also hold lessons for Indian reservations, where the stubborn persistence of poverty has inspired much discussion about what tribes and governments can do to improve welfare. A central issue in these debates is whether aid should be directed towards individuals, tribes, or places (Cornell & Kalt 1992). The Alaska corporations tried all of these basic strategies to some degree, as well as different contracting relationships such as joint ventures, partnerships, and leases. Their experiences may provide lessons for other American Indians, especially those tribes with recent cash windfalls from gambling.

The paper proceeds as follows. Section 2 offers background and motivates the inquiry. Section 3 considers economic dualism and asset allocation in a multi-sector context. Section 4 considers firm-specific fixed effects and the use of the joint venture form to import scarce

⁵ Claims processes are underway at least in Australia (Case 1995), Canada (Nickerson 1998), New Zealand (Kalt, Joseph, Harvard University, personal communication, May 15, 1997), and Russia (Fischer, Victor, University of Alaska, personal communication, February 7, 1995). Other examples undoubtedly abound.

management skills. Section 5 considers employment as a substitute for profits. Section 6 considers individual incentives and the internal political economy of Native corporations as a source of differential performance. Section 7 closes with conclusions. A historical appendix provides background on the Alaska Native peoples and their land claims struggle. A data appendix provides further detail on the construction of the asset allocation and employment data set.

2. Background and Motivation

2.1. Alaska Native Claims Settlement Act (ANCSA)

ANCSA transferred more than 40 million acres of land and \$962.5 million in cash to business corporations owned exclusively by Alaska Natives. The act established 12 regional corporations and approximately 200 village corporations. Every Alaska Native alive at the time of passage (December 17, 1971) became a voting shareholder in a regional business corporation operated under state law. Most Natives also owned part of a village corporation. Significantly, no one was allowed to sell their shares until 1991 at the earliest.⁶ Table 1 shows the wide variation in land areas and number of shareholders across regions. Appendix A provides a concise history of Alaska Native land claims and explains other legal aspects of ANCSA.

TABLE 1: ALASKA NATIVE REGIONAL CORPORATIONS

Name	Number of Shareholders	Regional and Village Land Area (million acres)	Initial ANCSA Cash (\$ million)	Major Natural Resource Endowments
Ahtna	1,100	1.7	6.4	
Aleut	3,249	1.6	19.5	
Arctic Slope	3,738	5.1	22.5	potential oil and gas
Bristol Bay	5,200	3.0	32.5	
Bering Straits	6,200	2.2	38.1	
Calista	13,306	7.0	80.1	
Chugach Natives	2,109	1.0	11.5	timber
Cook Inlet	6,553	2.5	34.4	known oil and gas
Doyon	9,061	12.5	53.4	potential minerals
Koniag	3,731	1.7	20.0	
NANA	5,000	2.2	28.9	zinc-lead deposits
Sealaska	15,700	0.3	92.5	old-growth timber
Total	74,947	40.8	439.9	

2.2. Overall Financial Performance

Because of several unique features of ANCSA, standard accounting measures are poor indicators of actual economic performance. Reported accounting profits are a mixture of asset sales, windfall gains from tax preferences, and other direct transfers, as well as productive economic activity (Colt 1999).

By breaking down accounting income flows into windfall transfers, natural resource asset sales, passive investments, and active business operations, I showed in a previous paper that the regional corporations lost more than \$380 million in direct business operations. The pattern of losses persisted over time. Some corporations did better than others, but almost no one made money from active business. Passive investments, natural resource asset sales, and a special tax preference provided enough cash to cover these losses, to support corporate overhead, and to generate reported net income of \$596 million between 1974 and 1993. However, after adjusting for inflation, real financial wealth was barely preserved, and natural resources were depleted.

2.3. Variation in Dividends and Jobs

All corporations faced similar initial conditions, including the general stability of the surrounding economy and the statewide (and worldwide) menu of investment opportunities circa 1972. But there were also important differences in natural resource endowments, in the size of local markets, and in human capital and cultural background.

Table 2 summarizes the wide variation in regional corporation performance that developed during their first 20 years. Cumulative per capita dividends varied from zero to 17,000 dollars. Per capita book equity at the end of 1993 varied by a factor of 100. The average annual accounting return on book equity was 3.9% for the consolidated⁷ group, but the range runs from +13% to *minus* 71%.

The cross-sectional variation in returns is not due to unequal endowments or windfall transfers. Column 4 of the table shows that when natural resource rents and tax windfalls are removed from income, the average "nonwindfall" return on equity drops to -3.0% and the range remains essentially the same, running from -67% to +7% (Colt 1999). The variation also persists over time: The time trend of annual "between" variances is slightly negative but insignificant.

⁶ Despite subsequent amendments to ANCSA that allow corporations to make their stock tradable, no group of shareholders has approved such a step, so stock sales remain prohibited as of January 2001.

⁷ equivalent to a weighted average of individual returns with the weights equal to relative amounts of equity.

The typical cross-sectional variance of nonwindfall returns in any given year exceeds the typical variance over time for any given corporation by about 30%.

TABLE 2: SUMMARY OF VARIATION IN FINANCIAL PERFORMANCE

Corporation Name	Cumulative	Per capita	Average ⁽¹⁾	Average ⁽¹⁾
	Real per capita Dividends 1976-1993 (1993\$)	Book Equity at 1993 (1993\$)	Reported Return on Equity 1976-1993	Nonwindfall ⁽²⁾ Return on Equity 1976-1993
Ahtna	3,269	21,965	4.3%	1.8%
Aleut	661	4,282	-11.9%	-13.0%
Arctic Slope	4,918	25,170	27.2%	2.8%
Bristol Bay	2,554	9,788	2.1%	-0.7%
Bering Straits	166	4,693	-48.7%	-66.9%
Calista	65	668	-24.6%	-28.0%
Chugach Natives	847	(1,180)	4.0%	-13.4%
Cook Inlet	16,952	66,453	16.8%	7.3%
Doyon	2,603	15,573	12.6%	0.8%
Koniag	0	6,215	4.8%	-12.2%
NANA	3,770	10,017	4.8%	0.5%
Sealaska	5,366	13,489	10.2%	-3.2%
Overall (consolidated)	3,721	14,412	5.4%	-3.0%
Unweighted Average ⁽³⁾	3,431	14,761	0.1%	-10.4%

Notes:

(1) Arithmetic average of annual returns

(2) Adjusted to remove tax loss sales and natural resource rents from sales of assets not carried on the books

(3) Simple average of each corporation's quantity, without weighting by equity or number of shareholders

For many Alaska Natives jobs are more important than cash dividends. Table 3 shows that in 1991 two corporations managed to employ more than 20% of their shareholders, a notable achievement considering that both of them are in especially remote areas. Others generated only token numbers of jobs.

TABLE 3: REGIONAL CORPORATION EMPLOYMENT IN 1991

Corporation	Corporate Offices	Joint Ventures	Subsidiaries	Total	Shareholder Employment	% of shareholders employed
Ahtna	25	250	100	375	55	5%
Aleut	9	13	176	198	5	0%
Arctic Slope	53	247	2,162	2,462	827	22%
Bristol Bay	11	0	300	311	7	0%
Bering Straits	12	0	3	15	9	0%
Calista	n/a	n/a	n/a	n/a	n/a	n/a
Chugach	20	75	60	155	39	2%
Cook Inlet	66	434	722	1,222	120	2%
Doyon	24	156	0	180	69	1%
Koniag	7	0	0	7	4	0%
NANA	33	1,408	609	2,050	978	20%
Sealaska (1)	n/a	n/a	n/a	560	n/a	n/a
Total	260	2,583	4,132	7,535	2,113	3%

2.4. Anecdotal Evidence on Performance⁸

Behind the statistics are some striking and sometimes tragic stories. The following sketches provide a sample.

Bering Straits. Located just miles from Russian Siberia, the Bering Straits region is devoid of obvious economic opportunities other than sporadic gold mining. Undeterred by these bleak conditions, the Bering Straits Native Corporation simply bought up a raft of existing statewide enterprises in mobile home sales, real estate, banking, and other industries. To finance these acquisitions, they used not only their own share of ANCSA cash payments, but also the money designated for the village corporations in their region. A Bering Straits board member funneled all of the money into one co-mingled account in a Fairbanks bank.

While the bank earned more than \$1 million in fees from all the transactions, Bering Straits lost more than \$55 million by 1988, an amount which greatly exceeded its own ANCSA cash assets. When the villages found out that their money was also gone they sued the company, and both sued the bank. The bank failed and the FDIC assumed a debt to the villages. The corporation entered chapter 11 bankruptcy with its own villages as the chief creditors. The sale of tax losses saved Bering Straits from liquidation and after more costly litigation with its own villages it signed over all of its subsurface ANCSA lands to them.

⁸ This section relies heavily on Strohmeyer (1993).

Just to the north of the Bering Straits region, things turned out quite differently for the **Nana Corporation**. From the start, Nana leaders sought to cast the corporation as an extended family of shareholders, a source of cultural pride and stability during the turbulent oil pipeline construction era. In 1980, they quietly merged the regional corporation with its 10 constituent village corporations. At the same time, they put their initial business investments close to the huge cash flows generated by the North Slope oil fields, operating the water, sewer, and electric utilities on the slope and using joint ventures to enter the lucrative construction camp catering business.

While these early ventures produced jobs and modest profits, Nana methodically selected lands containing the world's largest zinc deposit. Rather than simply auction the mineral rights, however, they negotiated for years with potential partners and finally extracted a broad array of employment and training benefits from Canadian mining giant Cominco. By 1996 Nana shareholders held almost 50% of all mine jobs. Never a big producer of cash dividends, Nana focused on employment. Through a combination of break-even local business, the zinc mine, and cautious expansion into tourism, the corporation was able by 1991 to employ almost 1,000 shareholders, or 25% of the working-age population.

The **Calista Corporation** is one of the largest, with more than 13,000 shareholders scattered among 50 villages along the tundra-covered banks of the Yukon and Kuskokwim rivers. There are no roads and few trees in the area, and unemployment hovered at around 60 percent in 1971. Vowing to "pursue every available employment [sic] for shareholders,"⁹ the new corporation plowed the first receipts of its \$80 million dollars of ANCSA cash payments into a new construction business in Anchorage. Lacking construction projects, Calista built a huge new downtown hotel that was more than \$30 million over budget before it was half-finished. It bought fish from shareholders at inflated prices and resold them into the world market at a loss. It poured \$6 million into an artificial crabmeat plant in Washington.

Led by the hotel, which was finally sold at a loss of more than \$40 million, all of these businesses failed miserably. By 1988 Calista had lost more than \$98 million in business operations and its shareholder equity was down to only \$400 per person. Sales of tax losses and shared revenues from other regions' oil and timber sales have kept Calista marginally solvent

⁹ Calista Corporation, *1974 Annual Report*.

since then. In 1991 the corporation employed less than 10 people. In 1993 the president was arrested in the Anchorage airport with a suitcase full of illegally hunted geese.

Unlike Calista, Anchorage-based **Cook Inlet Region Incorporated** was able to select known oil and gas reserves as part of its land entitlement. But because the State of Alaska had already taken much of the land in the Anchorage region, Cook Inlet went back to Congress in 1976 and pleaded hardship. In exchange for giving up several million acres of land, they got bidding rights at federal auctions of surplus properties, including military bases and the FDIC's inventory of real estate from failed banks. During the next 20 years the corporation used these rights to purchase more than \$200 million worth of real estate, or more than 7 times their original ANCSA cash entitlement.

Cook Inlet parlayed these assets and its oil and gas earnings into a string of broadcasting acquisitions throughout the U.S. with partners who could take advantage of the Natives' minority status to gain preferences from the FCC. By 1988 the corporation had earned more than \$260 million, more than four times as much as the combined total of the other 11 regional corporations.

3. Asset Allocation and Dualism

The anecdotes above suggest that the Native corporations faced a real challenge in deciding where to invest their money. This problem of sectoral choice is a major one for a small group that receives a sudden increase in its wealth endowment. It is particularly important when the endowment is vested in a corporate organization whose ostensible purpose is to pursue investment and production on a scale that individuals could not undertake on their own, and when there is a presumption that the economic activities are to be largely place-based, i.e., within Alaska.

To generate testable propositions about the importance of sectoral choice I use the concept of economic dualism, which Todaro (1989) defines as “a persistent set of undesirable differences between two sectors.” The dualism paradigm takes at least some factor prices and factor proportions as essentially exogenous. If wages differ among sectors and fixed proportions create a queue for high-wage jobs, then a Native group may wish to invest capital to allow its people to enter the high-wage sector. But this strategy could be constrained by a key feature of the arctic economy: random, fixed deposits of natural resources. If resource deposits limit the

size of the "modern" sector and capital is a complement to this fixed factor, then embedded capital can earn positive economic profit while marginal capital may make losses no matter where it is invested.

This multisector approach can generate hypotheses that might be logically untenable in a more aggregated growth model. In particular, it is easier to justify a persistent difference between prevailing modern sector wages set in urban labor markets and the low opportunity cost of Native labor in a remote village. This opportunity cost of village labor is often set at the margin by some combination of subsistence hunting and fishing opportunities and transfer payments (Knapp and Huskey 1988). With significant quasi-rents embodied in modern sector wages, the pursuit of modern economy market share is a form of rent seeking. It is a good strategy for a small group with political clout, even though it does nothing to increase overall output (Rama 1993).

3.1. *Dualism as a Development Paradigm*

Lewis (1954) was one of the first to use a two-sector model in which wages are not equalized between sectors. In his framework the size of the modern, high-wage sector is limited over time by the supply of capital and at any moment by the necessity of paying the high modern wage. In the traditional sector the marginal product of labor is zero and each worker receives the average product as a subsistence wage. Harris & Todaro (1970) generated an urban unemployment equilibrium by equalizing the expected urban sector wage and the low but certain traditional wage. Like Lewis, they simply assumed the existence of a parametric urban wage and then traced its effects and policy implications.

Although the concept of a dual economy has proven difficult to formalize, the idea of dualism remains useful in studies of the Arctic, where unemployment and underemployment are persistent facts of life (Alaska Federation of Natives 1991). First, it informs the observation of sometimes widely differing technologies in use in what appears to be the same economy. Second, it provides a useful basis for generating testable empirical propositions. Perhaps for these reasons, concepts of dualism and conflict between the "modern" and "traditional" economies are a common thread running through applied research on northern remote regions (Huskey and Morehouse 1992).

Notions of dualistic development naturally emerge from the geographical juxtaposition of ultra-modern resource extraction and primitive traditional subsistence that typifies the remote

circumpolar north. However, the coexistence of such different activities in space need not require the conclusion that the two sectors constitute a "persistent set of undesirable differences," to use Todaro's phrase. Human capital theory provides a direct and efficient explanation for the existence of apparently dual labor markets. Complex resource extraction projects may import all of their labor at high wages simply because local people do not have the required skills.

Dualism in the arctic: evidence from Canada

Stabler (1989) tested for dualism in Canada's Northwest Territories by analyzing differential employment patterns conditional on simple measures of human capital. As an example, he found that among employed male high school graduates aged 15-24, 65% of the non-Natives had jobs in the primary sector, while only 57% of the Natives held such jobs. Overall, his conclusions were mixed: Although equally experienced or educated Natives have lower participation rates than whites in what he called "primary" jobs, the difference goes away as the required human capital increases.

Although Stabler lacks a detailed model of dualism and hence has no compelling alternative hypotheses, his formal tests corroborate a long anecdotal history of discrimination against northern Native people. In light of this evidence, one must take seriously the notion that individual Alaska Natives faced fundamental difficulties participating in the modern resource-extraction sector of the Alaska economy. Even if there is a solid basis in human capital differences for differential employment patterns, the simple existence of the two very different types of activities may lead to important strategy considerations for a Native corporation dedicated to long run development.

The modern economy in Alaska: capital-limited or resource-limited?

It is clear from the historical record that Native leaders and policymakers had a notion of dualism in mind when framing ANCSA.¹⁰ The corporation was viewed as the overt means by which the Natives could enter the modern economy. It is also likely that many participants had a Lewis-type model in the back of their minds. That is, capital was seen as the bottleneck factor limiting development of modern, high-wage enterprise in rural Alaska.

¹⁰ See, e.g., the extensive congressional hearing records surrounding ANCSA (U.S. Senate, 1968, 1970) or the transcripts of the retrospective inquiry conducted by the Inuit Circumpolar Conference (1975).

In contrast to this Lewis-type model where capital is the limiting factor, I will also consider a resource-limited economic base model. In this model, the supply of capital is unlimited in response to adequate rates of return, but the supply of profitable opportunities is strictly limited by natural resource deposits.

3.2. A Simple Model of Investment in the Remote Northern Economy

To begin, I make the following baseline assumptions about the arctic economy as epitomized by Alaska. There is a *modern* economy and a *traditional* or subsistence/transfer economy. In the modern economy agents continuously exhaust all opportunities for earning economic profits through direct resource extraction and provision of associated support services. This economy is tightly integrated with national and global markets, and responds quickly to changes in world prices of goods and factors. Within the modern economy, it is also useful to distinguish between existing oil development and production from North Slope fields, which I will call the *oil* sector, and the rest of the modern economy, which I will call the *statewide* sector. Note that the modern sector includes investments in processing natural resources, such as minerals and timber, but excludes the simple sale of these assets *in situ*, which activity merely earns rents for the owner. Because the Native Corporations did not buy the land, I treat natural resource asset sales as one-time cash windfalls, and exclude them when calculating profits.

The traditional economy includes hunting and trapping, small-scale fish harvesting, and small-scale local services. It is limited at the extensive margin by the fish and wildlife base and the amount of government transfers flowing to rural areas (Knapp and Huskey 1988). I use the term *local* sector to refer to the opportunities for corporate business activity tied to the traditional economy.

These definitions are admittedly vague, and the proper boundaries between the sectors are ultimately a subject for empirical inquiry. But with the definitions in place, several fundamental questions can be posed: Which sectors offer the best returns to the aspiring Native corporation? Are the returns in each sector the same across corporations? Which matters more, asset allocation to the right sector or management skill within a sector? Which sectors can be tapped for Native jobs? To give these questions empirical content, I use the following very simple asset allocation model.

The null hypothesis: equal returns in all sectors

Suppose there are only four places to invest: external financial capital markets (the *PASSIVE* sector); the modern oil sector (the *OIL* sector), the modern non-oil economy (the *STATEWIDE* sector) and strictly local business supported by the traditional sector (the *LOCAL* sector). Then Native corporation *i*'s *ex post* realized profit in year *t* from invested capital is given by the following accounting identity:

$$\pi_{it} \equiv \alpha_{it} PASSIVE_{it} + \beta_{1it} OIL_{it} + \beta_{2it} STATEWIDE_{it} + \beta_{3it} LOCAL_{it} \quad (1)$$

where $PASSIVE_{it} + OIL_{it} + STATEWIDE_{it} + LOCAL_{it} \equiv 1$ are fractions of total assets deployed in each sector and α_{it} , β_{1it} , β_{2it} and β_{3it} are the realized rates of return in each sector for corporation *i* in year *t*. Although (1), with all its subscripts, holds as an identity, it can be used to test hypotheses about Native corporations and possible dualism in their economic environment. If the economy is in a unified efficient equilibrium, then the marginal risk-adjusted returns in all sectors are equal. Although this does not necessarily mean that the *average* returns are equal, if the Native corporation is small relative to the economy, then all of its investments can be considered marginal. Thus, a useful null hypothesis is that the returns to all sectors are constant over time, constant across firms, and equal to each other:

$$\begin{aligned} \mathbf{H0:} \quad & \alpha_{it} = \alpha_{js} = \alpha ; \beta_{1it} = \beta_{1js} = \beta_1 ; \dots \text{etc.}, \\ \text{and} \quad & \alpha = \beta_1 = \beta_2 = \beta_3 \end{aligned}$$

Unequal returns across sectors

As a first alternative to the null hypothesis of equal returns, the *capital-limited* Lewis-type model says that profitable projects abound. Since all Native corporations received equal amounts of capital per capita, they should all develop equally. Indeed, because in the Lewis story the traditional economy has been historically starved of capital, the marginal product of capital is high in the local sector. Under asymmetric information banks in distant urban centers will be less willing to lend to the rural periphery, thus passing up viable projects. Transferring wealth to the local people brings capital to the agents with the private information about how best to use it. The corporations from these poorer, remote areas should do better. In the modern statewide

sector, Native firms can also earn normal profits (and generate employment at market wages) from modest investments at the margin, such as buying and expanding an existing fish processing plant or building a new hotel. The profit-maximizing Native corporation will invest actively in each of the oil, statewide, and local sectors until the marginal project yields the [risk-adjusted] rate of return in the passive sector. The capital-limited model implies:

H1 (Capital-limited modern economy): The returns in the statewide and local sectors equal or exceed those from passive investment. $\beta_2 = \beta_3 \geq \alpha$.

A second alternative is generated by the following stylized version of a *resource-limited* model. At any time t there is a fixed number of viable large-scale resource extraction projects. Each resource project may generate inframarginal rents. The rents may be captured by landowners, government, labor, or owners of capital. Under the assumption of fixed-proportions production technology, the number of jobs is strictly limited by the amount of physical capital invested and ultimately by the number of viable projects. Finally, almost all inputs (capital, labor, services) used in the direct resource extraction activities are purchased through long-term contract rather than on competitive spot markets.

The resource-limited model says that, absent increases in the resource base, there are *no* positive-NPV projects at the margin anywhere in the economy. What looks like capital starvation in the traditional economy is actually a rational response to rapidly decreasing marginal productivity. The only ways for a Native group to grow its GDP are 1) to discover and develop new resource extraction projects on their own lands or 2) to usurp rents from existing markets by stealing market share. The Native corporation facing this situation must compete in the business and political arena for access to the rationed contracts offered by the major oil companies and their prime contractors. The barriers to entry are largely political. Of course, a third option for increasing group welfare is passive external investment. This provides dividend income ("GNP" as opposed to "GDP"), but without the benefits of employment, human capital development, and learning by doing.

In a resource-limited world, the average return to oil sector investment may contain some rents and exceed passive financial returns, but such investments are rationed. Any investments in the non-oil statewide sector or the traditional sector will make economic losses. The resource-limited model implies:

H2 (Resource-limited modern economy): $\beta_1 > \alpha$ and $\beta_2 \approx \beta_3 < \alpha$. The returns to oil exceed those from passive investment, but returns from statewide and local investment are less than passive returns.

The regression equation

Under the unified economy hypothesis and neglecting risk premia,¹¹ (1) becomes a regression equation with testable restrictions:

$$ROE_{it} = \alpha PASSIVE_{it} + \beta_1 OIL_{it} + \beta_2 STATEWIDE_{it} + \beta_3 LOCAL_{it} + \varepsilon_{it}; \quad (2)$$

with $\beta_1 = \beta_2 = \beta_3 = \alpha$ as the testable hypothesis that all sectors yield equal returns. To test hypotheses about unequal returns, I estimate equation (2) with two minor adjustments. First, I add an additional sector, *PUBWORKS*, to capture investments made by the Arctic Slope Regional Corporation in order to complete large, lucrative public construction projects for the North Slope Borough.¹² These projects were financed by billions of dollars of property taxes levied on the North Slope oilfields. No other regional corporation had access to this type of opportunity, so I treat it as a separate sector. Second, to make the interpretation of the coefficients more straightforward I add and subtract the term $\alpha (1 - PASSIVE)$ from the right side of (2) and rearrange terms. I measure the overall rate of return π_{it} as ROE_{it} , the nominal return on book equity excluding windfalls.¹³ The resulting regression equation is:

$$\begin{aligned} ROE_{it} = & \alpha + \gamma_1 OIL_{it} \\ & + \gamma_2 STATEWIDE_{it} \\ & + \gamma_3 LOCAL_{it} \\ & + \gamma_4 PUBWORKS_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

The constant term α measures the baseline return to passive investment. The regression coefficients $\gamma_1 = (\beta_1 - \alpha)$, $\gamma_2 = (\beta_2 - \alpha)$, *etc.* on the active asset shares measure the *differential* returns to those sectors over and above the baseline passive return. The *t*-statistics on each

¹¹ It makes most sense to account for risk premia when interpreting the coefficients rather than imposing additional restrictions on the model.

¹² A borough in Alaska is equivalent to a county elsewhere in the U.S.

¹³ The adjustments to remove windfalls are significant and are discussed in Colt (1999).

coefficient are test statistics for hypotheses of the form $\beta_i > \alpha$. These hypotheses compare active returns to passive returns.

3.3. The Asset Allocation Model: Identification, Data and Results

Identification Issues

Because the asset allocation fractions are chosen by management in an effort to maximize some objective function, there is a potential endogeneity problem if the choice of projects in any given year is a function of the actual returns from the project. Projects are chosen prior to their actual financial return becoming known, but if returns are correlated over time, managers can potentially make choices based on actual returns. If these feedback effects are strong, the coefficients estimated in (3) will be biased versions of the true average returns to sectors.

I address this problem in two complementary ways. First, I assume that asset allocations to the *OIL*, *LOCAL*, and *PUBWORKS* sectors are largely exogenous. Since it was fairly obvious that contracting with the major oil companies was lucrative work, Native firms got what oil-related contracts they could. The contracts were arguably rationed by political means and secured through political skill. Sometimes lawsuits were used to secure them.¹⁴ In other cases firms came up with novel ways to tap the rents from the industry.¹⁵ In a similar vein, local business opportunities were quickly seized by several corporations, but the size of the market was quite limited. (In many cases the ANCSA *village* corporations took these opportunities.) In summary, I assume that exogenous endowments and constraints were mainly responsible for the allocations to these sectors.

The second part of my approach to identification is to generate an instrument for the *STATEWIDE* sector asset allocation fraction. The exogeneity assumption is less reasonable for asset allocations to this sector. The menu of opportunities here was broader and entry was politically easy. Clearly managers were more free to choose projects on the basis of expected economic benefits. The corporations' persistent losses suggests that they were unable to choose

¹⁴ Ahtna Corporation fought hard for maintenance contracts related to the Trans-Alaska oil pipeline, arguing that they had been promised such work as a quid pro quo for supporting the project. (Ahtna 1977 *Annual Report*). The pipeline traversed Ahtna lands.

¹⁵ While other Native firms were struggling to land oil-related construction contracts, Nana corporation entered the electric, water, and sewer business on the North Slope oilfields.

these projects based on their actual profits. It seems clear, however, that they could and did choose projects based on their expected employment benefits.

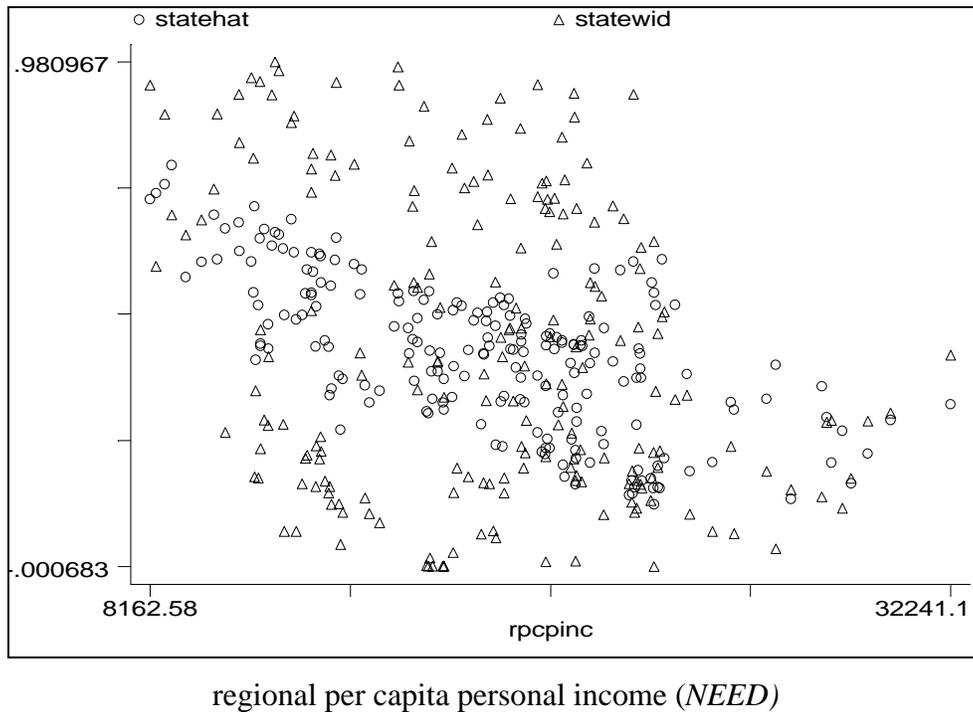
The instrument *STATEHAT* is a fitted value for *STATEWIDE* from the following regression:

$$\begin{aligned}
 STATEWIDE_{it} = & .715 - .0000025 NEED_{it} \\
 & (.026) (.000001) \\
 & + .00038 OPPORTUNITY_{it} - .139 NOLFRAC_{it} \\
 & (.000018) (.057) \\
 & + \gamma_t + \varepsilon_{it}
 \end{aligned} \tag{4}$$

The variable *NEED* is real per capita income in corporation region *i* in year *t*. It captures (with its negative-signed coefficient) the intensity of pressure on management to "do something" to promote development. The variable *OPPORTUNITY* is total real private sector income for the region divided by the number of Native shareholders. It excludes government wages and is intended to capture the perceived size of the corporation's opportunity set. *NOLFRAC* is the current year's windfall cash from tax loss sales expressed as a fraction of year-end assets. It captures the exogenous decline in the statewide sector asset share that occurred during the years of tax loss sales. The large cash inflows from the sales were placed in passive investment, driving down the statewide sector fraction. The γ_t are time shocks.

The coefficients in (4) are all highly significant. Figure 1 shows the negative relationship between per capita regional income and the actual and fitted values of the *STATEWIDE* asset fraction.

FIGURE 1: ACTUAL STATEWIDE ASSET ALLOCATIONS (*STATEWIDE*) AND FITTED INSTRUMENT VALUES (*STATEHAT*) AS A FUNCTION OF PER CAPITA REGIONAL INCOME (*NEED*).



I use the instrument *STATEHAT* to check the robustness of the financial returns results presented in this section. In section 5, below, I use the instrument in all specifications involving wages and quasirents.

The data

I estimate equation (3) using pooled data for $N=12$ corporations over $T=17$ years. I constructed the data on asset allocation from accounting data in annual reports. The data measure the assets deployed at the beginning of the year for which the return is measured. The data appendix discusses the allocation process and the operational definitions of the sectors in more detail.

Figure 2 summarizes the time path of the data. There are three important patterns to note. First, in 1980 there was a large increase in passive holdings because the bulk of the ANCSA cash settlement payments were actually made in that year. During the next six years, this cash was deployed into active business. Second, from 1986 through 1990 there were numerous write-downs of these physical assets and cash infusions from windfall tax loss sales, both of which

served to shift the mix of asset holdings towards cash and securities. Third, the figure clearly shows how the local sector allocation was never very large to begin with and steadily declined over time.

FIGURE 2: AVERAGE OF ASSET ALLOCATIONS BY YEAR

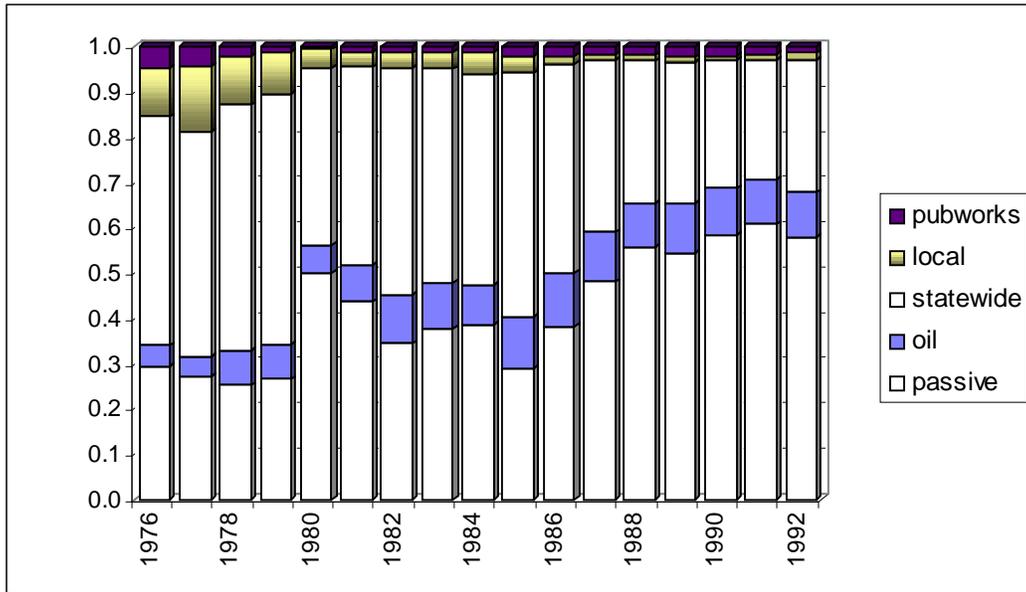
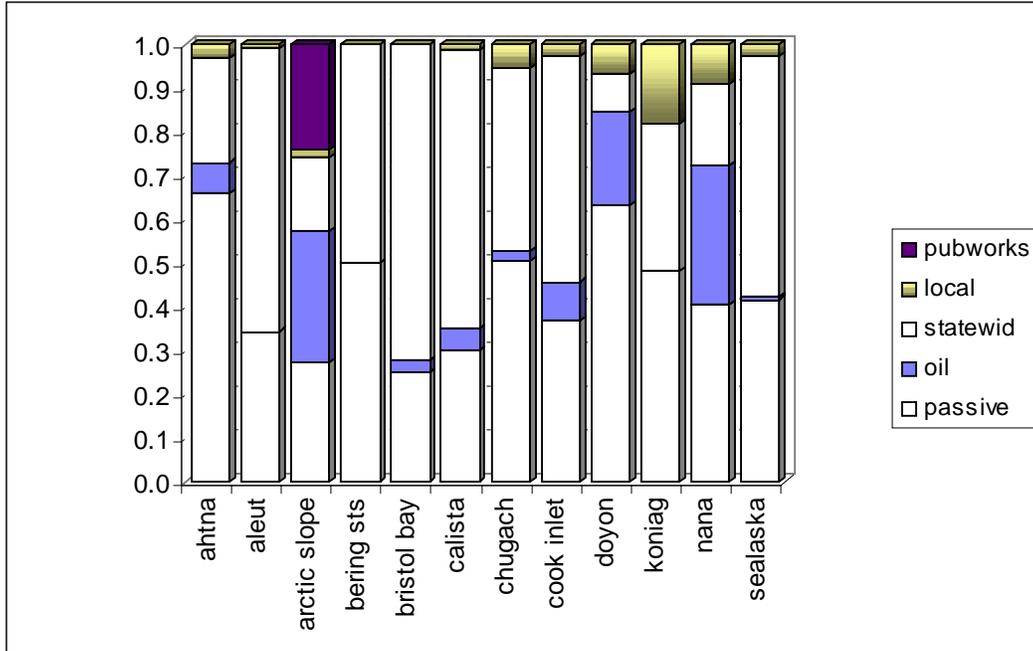


Figure 3 summarizes the data in cross-section, showing the average (over time) asset allocation fractions for each corporation. Of course these summaries hide a great deal of change within each group over time. Still, the figure shows that there was substantial cross-sectional variation. Overall, there appear to be reasonable degrees of freedom in both dimensions.

Analysis of individual corporations and years strongly suggests that the disturbances are heteroskedastic (even though earnings are normalized by using rates of return) and correlated across corporations due to common time shocks. The heteroskedasticity arises because some corporations experienced periods of very low equity, leading to extremely volatile measures of ROE during those periods. Others used aggressive accounting procedures that added volatility to earnings. I test for this error structure using a Breusch-Pagan LM test (Greene 1993, p. 454) and correct for it using feasible GLS with estimated covariances across groups.

FIGURE 3: AVERAGE ASSET ALLOCATION BY CORPORATION
(unweighted averages over time)



Asset Allocation Regression Results

Table 4 presents the asset allocation regression using GLS.¹⁶ Columns 1 and 2 show the basic results. Columns 3 and 4 are robustness checks discussed below. The estimated return to passive investment shown in panel A is a reasonable 6.7%. In panel B, column 1 shows the differential returns to active investment as specified in equation (3). Investments in the oil sector, for example, produced estimated returns 6.8 percentage points below the baseline passive returns. The statewide sector provided an estimated differential return of -26.7%. The returns are all significantly different (at 5%) from passive returns. Column 2 of panel B restates the estimated coefficients as average absolute returns and shows the estimated standard errors of these constructed coefficients. These provide test statistics against the less interesting null hypotheses that the returns in each sector are zero.

¹⁶ The LM test confirming XC correlation is highly significant ($\chi^2(66) = 99.6$) and the efficiency gains over OLS are large. The magnitude of all coefficients is reduced from the OLS estimates as the more volatile data are damped by the GLS weights. In particular the differential return on statewide investment changes from -45% to -27% as the volatile data from the highly unprofitable Bering Straits Corporation are downweighted by GLS.

TABLE 4: ESTIMATED AVERAGE RETURNS IN EACH SECTOR

	(1)	(2)	(3)	(4)
estimation method:	FGLS	FGLS	IV	FGLS
Investment sector	dependent variable = nonwindfall return on book equity			dep. var. = net income / assets
<i>A. Absolute Return to Passive investment:</i>				
Passive Investment	.067* (0.013)	.067* (0.013)	.043* (0.016)	.054* (0.010)
<i>B. Differential and Absolute Returns to Active Investment in:</i>				
	Differential	Absolute	Absolute	Absolute
Oil sector (OIL)	-.068* (0.035)	-.001 (0.028)	.130* (0.038)	-.015 (0.022)
Statewide sector (STATEWID or STATEHAT)	-.267* (0.024)	-.200* (0.016)	-.128* (0.030)	-.122* (0.008)
Local sector (LOCAL)	.148* (0.069)	.215* (0.068)	.089 .100	.014 (0.047)
Local public works (PUBWORKS)	.526* (0.145)	.592* (0.148)	.629* (0.158)	.477* (0.095)

notes: Differential return is over and above return to passive investment.
 Absolute return = passive return plus differential return.
 Pooled sample of N=12 corporations over T=17 years.
 Estimated by GLS with correction for groupwise heteroskedasticity
 and cross-sectional correlation. Standard errors in parentheses.
 IV estimates in column 3 use fitted value for fraction of assets in statewide investments.

All of the estimated active sector investment returns are somewhat surprising. The differential return to oil is negative and the absolute return is zero, contradicting the popular view that Natives made money in the oil service business. The negative sign of the statewide sector returns is not surprising given the well-known business failures, but the magnitude is remarkable. So too is the large magnitude -- +52% -- of the differential returns to local public works. These are the rents that Arctic Slope Corporation earned from its monopoly on regional government construction contracts funded by oil property taxes.

Most surprising, however, is the +14.8% estimated differential return to local sector investments. This is more than 40 percentage points higher than the return to statewide sector investments. The estimate casts serious doubt on the conventional wisdom that there are no good investments in the local private economy. It also raises the question of why a higher share of assets was not invested in the local sector. One explanation for both the high returns and the low investment shares is that the local markets offered lucrative but very limited opportunities.

Because these markets were isolated, the diminishing returns were apparent to all, preventing overcapacity. Fixed setup and transport costs can explain why these locational rents were not competed away.

The explanatory power of this model is not great: the R^2 using OLS is only .12. Still, the coefficients are large and significant, while the addition of time trends, time dummies, and proxies for the overall health of the Alaska economy all yield insignificant coefficients. Taken together, the estimates suggest that the set of profitable opportunities was very limited; that the Native corporations correctly observed this fact in their own local markets; and that, as a group, they failed to appreciate it for statewide investments. The result was a long string of business losses.

Robustness Checks

Column 3 of Table 4 uses the instrument *STATEHAT* in place of *STATEWIDE*. The pattern of the IV results is not very different from the basic GLS results in column 2, but the magnitude of the returns is attenuated. The losses on statewide investments average only -12.8% and the return to *OIL* jumps up.

Column 4 provides another check of the results by using net income divided by total assets as the dependent variable. Total assets were far more stable than equity during the early years when many corporations had wild swings in the return on equity simply because their equity was so low. Since the numerator remains the same, all coefficients should be scaled down somewhat. The very low coefficients on the *OIL* and *LOCAL* sectors in column 4 suggest that these estimates in the basic equation are in fact being influenced by extreme values from data points with low equity. In particular, the high *LOCAL* sector coefficient in columns 1 and 2 could be due to the fact that allocations to this sector were high during the same early years when the equity base was very low.

Summary of Asset Allocation Tests

In this section I considered the Natives' asset allocation problem in a multi-sector world. The null hypothesis that all sectors are in a unified equilibrium yielding equal returns to capital is strongly rejected by the data. Alternative hypothesis **H1** said that capital is the limiting factor for growth of the modern sector and that the Alaska Natives, with their new supplies of capital, could find many profitable projects in all sorts of industries throughout the state. The data

strongly reject this hypothesis for the oil and statewide sectors. The return in the statewide modern sector was hugely negative (minus 27%), and the return in the oil sector was essentially zero.

Alternative **H2** said that fixed resource deposits limit growth and that the only way to make money in active business is to steal market share in an existing oil-related industry. The results support the resource-limited hypothesis for the statewide and oil sectors.

Finally, the surprising positive estimated average return of 21.5% in the local sector is consistent with elements of both alternatives. The high return suggests that the local areas were initially starved for capital, but the very limited scope of investment in this sector suggests that this need was quickly met, leaving no room for further profitable expansion.¹⁷

Overall, the concept of undesirable dualism is not well supported by these tests. The Alaska Natives gained control of land, natural resources, and capital, but could not parlay that control into profits and in fact suffered huge losses in the attempt. This outcome is consistent with Knowler's (1989) findings that absentee ownership of natural resources in Canada's Yukon has advantages for local people because nonwage income is less stable than wage income. Absentee ownership exports this volatility to other places. In contrast, the ANCSA corporations may have imported the volatility of shaky statewide ventures into their home regions.

4. Management Effects and Joint Venture Participation

In the previous section I considered investment opportunities as technologically fixed, with each yielding up a predetermined level of profits. Yet in spite of their willingness to accumulate factors of production and to deploy these factors in all sectors of the surrounding economy, most ANCSA Native corporations still lost large amounts of money. The circumstantial evidence is very strong that management skill was a critical scarce resource affecting economic success.

I now focus on the corporations as business firms and consider *internal* performance and the evidence for strong management effects. My approach follows that of Cockburn &

¹⁷ Another, complementary explanation for the declining asset allocations to this sector is that the village corporations took over production to meet local demands. There is much anecdotal evidence about village corporation control of fuel dealerships, hardware stores, electric utilities, and other basic services that supports this view.

Henderson (1996), who found persistent and large firm-specific fixed effects among pharmaceutical firms engaged in competitive research races.

In this section I test two broad hypotheses about the importance of management as a scarce factor. First, I test for the extent and magnitude of management fixed effects by allowing firm-specific returns in the statewide sector of the asset allocation model. Second, I test for the effectiveness of the joint venture as a solution to the agency problem of importing scarce management while maintaining Native control of the corporation.

4.1. Management Effects in the Asset Allocation Model

The anecdotal evidence suggests that some corporations -- like Cook Inlet -- did relatively well in many sectors, while others -- like Bering Straits -- did poorly. The broad hypothesis that management matters more than sectoral allocation can be stated as:

H3.(Importance of management). The variation across corporations in rates of return for any one sector greatly exceeds the variation of common returns across sectors.

The simplest way to capture unobserved management effects on returns is to allow a full set of firm-specific returns to each sector.¹⁸ The regression model of equation (3) then becomes a set of 12 seemingly unrelated regressions, one for each corporation. Although this completely unrestricted model could be estimated as a stacked SUR system, there are not enough degrees of freedom in the data to estimate all the parameters with any precision. Economic theory and the accounting data both strongly suggest that the returns to passive investment are not subject to strong management effects, so that the restriction $\alpha_i = \alpha$ is valid.¹⁹ The coefficient β_4 on the local public works "sector" is already unique because only one corporation had access to these contracts. Finally, since the oil and local sectors are relatively homogeneous I assume that there are common returns to these sectors.

These restrictions leave firm-specific returns to the statewide sector as the reflection of fixed management effects and lead to the following modified version of equation (3):

¹⁸ An F-test strongly rejects the hypothesis of a totally pooled model (estimated by OLS) in favor of 12 separate OLS equations.

¹⁹ Most of these passive investments were in relatively conservative, professionally managed portfolios.

$$\begin{aligned}
ROE_{it} = & \alpha + \gamma_1 OIL_{it} \\
& + \sum_i \gamma_{2i} (D_i \times STATEWIDE_{it}) \\
& + \gamma_3 LOCAL_{it} \\
& + \gamma_4 PUBWORKS_{it} + \varepsilon_{it}
\end{aligned} \tag{5}$$

where D_i is a firm-specific dummy variable.

Table 5 shows the estimates of these firm-specific returns from (5). Columns 1-3 all report the same underlying coefficients from the basic model. The dummy variables in these columns are constructed in different ways to emphasize different interpretations and to yield as their estimated standard errors the test statistics for different hypotheses (Suits 1984). Columns 4 and 5 provide the same robustness checks as reported above.

Column 1 shows the common passive return in panel A, the common differential returns from the oil, local, and public works sectors in panel B, and the 12 firm-specific differential returns from the statewide sector in panel C. This is equation (5) "as written." The standard errors from these coefficients allow inference about whether a particular corporation had a large or small differential statewide return. For example, panel C shows that the Bristol Bay corporation earned an estimated return of 3% below passive in the statewide sector, but this differential return was insignificant.

TABLE 5: RETURNS TO SECTORS WITH MANAGEMENT FIXED EFFECTS

	(1)	(2)	(3)	(4)	(5)
	Dependent variable = nonwindfall return on book equity				net income/ assets
	FGLS estimates			IV estimates	FGLS
Investment sector					
<i>A. Absolute Return to Passive Investment</i>	.047* (0.013)	.047* (0.013)	.047* (0.013)	-.004 (0.019)	.054* (0.011)
<i>B. Average Returns (over all firms) to Active Investment in:</i>	Relative to Passive	Relative to Passive	Absolute	Absolute	Absolute
Oil sector	-0.083 (0.043)	-0.083 (0.043)	-0.036 (0.038)	.059 (0.050)	-.093* (0.030)
Statewide sector (Average of all 12 corporations)		-.599* (0.052)	-.552* (.051)	-.425* (0.056)	-.282* (0.033)
Local sector	.306* (0.084)	.306* (0.084)	.353* (0.080)	.349* (0.098)	.051 (0.061)
Local public works	2.04* (0.282)	2.04* (0.282)	2.09* (0.281)	1.99* (0.298)	1.281* (0.202)
<i>C. Firm-Specific Returns to Statewide Sector Investment by:</i>	Relative to Passive	Relative to average of Peers	Absolute	Absolute	Absolute
Ahtna	-0.082 (0.071)	.517* (0.070)	-.035 (0.067)	0.027 (0.052)	-.013 (0.054)
Aleut	-.281* (0.061)	.318* (0.070)	-.234* (0.058)	-.256* (0.120)	-.198* (0.053)
Arctic Slope	-2.74* (0.463)	-2.14* (0.422)	-2.69* (0.464)	-1.84* (0.372)	-1.42* (0.300)
Bering Straits	-1.36* (0.249)	-.759* (0.239)	-1.31* (0.250)	-1.60* (0.440)	-.454* (0.066)
Bristol Bay	-0.030 (0.038)	.569* (0.057)	.017 (0.034)	.0418 (0.062)	-.004 (0.015)
Calista	-.386* (0.091)	.213* (0.095)	-.339* (0.091)	-.434* (0.131)	-.199* (0.033)
Chugach	-.594* (0.107)	0.005 (0.117)	-.547* (0.107)	-.348 (0.207)	-.376* (0.057)
Cook Inlet	0.037 (0.032)	.636* (0.059)	.084* (0.028)	.142* (0.047)	.107* (0.031)
Doyon	-.769* (0.148)	-.170 (0.150)	-.722* (0.146)	-.104 (0.087)	-.409* (0.102)
Koniag	-.700* (0.100)	-.101 (0.089)	-.653* (0.102)	-.489* (0.190)	-.479* (0.074)
Nana	-0.134 (0.088)	.466* (0.089)	-.086 (0.086)	-.073 (0.044)	.128 (0.079)
Sealaska	-.154* (0.039)	0.445* (0.062)	-.107* (0.033)	-.168* (0.080)	-.064* (0.019)

notes: Columns 1,2,3,5 Estimated by feasible GLS with correction for heteroskedasticity & cross-sectional correlation. Column 4 IV estimates use fitted value for fraction of assets in Statewide sector.

Std. Errors in parentheses. N=12 corporations over T=17 years.

* indicates significant at 5% level.

The column 1 estimates show great variation across corporations in their returns from statewide investment, but the overall results from the simple asset allocation model of Table 4 hold up quite well. Only Cook Inlet shows a positive differential return in the statewide sector. All other corporations have negative differential returns, consistent with the previous common estimate. In addition, the common coefficients on the oil and local sectors are relatively stable.²⁰

Column 2 shows the same underlying regression formulated to show an average statewide return plus 12 individual statewide returns whose sum is constrained to equal zero. The standard errors of these deviations allow immediate inference about whether corporation *i* performed significantly better or worse than its peers. Continuing the example, column 2 of panel *C* shows that Bristol Bay earned statewide returns 56.9 percentage points higher than the average differential statewide return of -59.9% (shown in panel *B*.)

The Column 2 estimates emphasize the wide range of performance relative to peers. Ten of the 12 corporations had significantly higher or lower returns relative to the average of -59.9%, and these performance differentials ranged from -76 percentage points for Bering Straits to +64 percentage points for Cook Inlet.

Column 3 shows the estimated absolute returns to each corporation from each sector. In this "bottom line" formulation the coefficient magnitudes are interesting, but the standard errors allow inference about whether accounting profits were positive or negative. These are less economically meaningful but useful for comparison with other results.

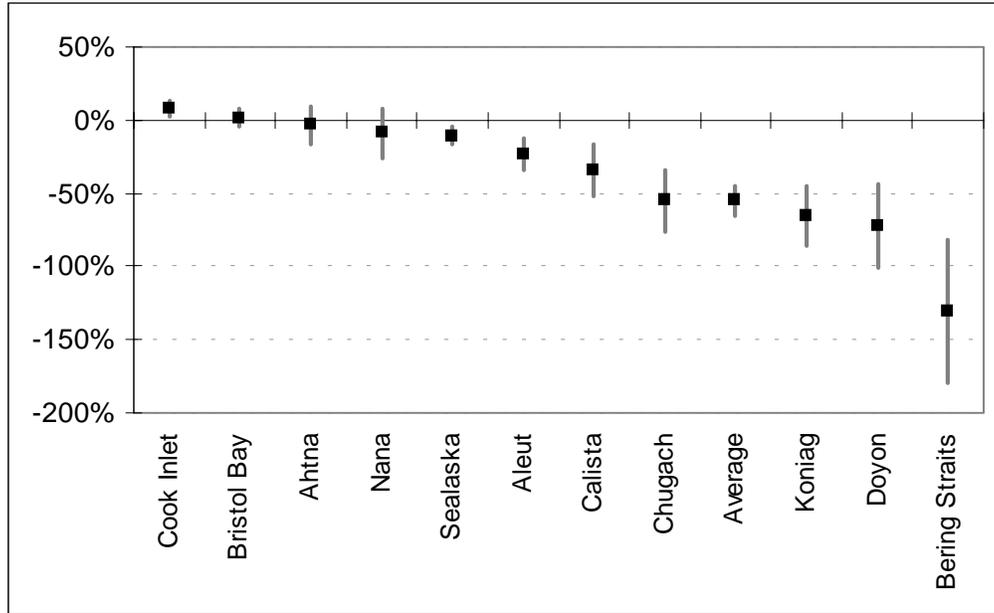
Finally, columns 4 and 5 use the IV estimates and the alternative measure of financial return (net income / assets) to check the robustness of the estimates. With a very few exceptions, the management fixed effects are similar under IV to their basic values in column 3. This suggests that in fact there was little feedback from actual returns on equity to the choice of projects. The column 5 estimates are scaled down as expected, and the coefficient on the *LOCAL* sector again drops dramatically, reinforcing the idea that most of the returns from this sector were earned early when equity was very low.

The results from Table 5 are summarized in Figure 4, which shows the absolute accounting returns to statewide investment. The average absolute return, -55%, is heavily influenced by the Bering Straits and Arctic Slope (not shown) values. Excluding these two, the

²⁰ It is probably a statistical fluke that the returns to Arctic Slope corporation bifurcate into a very large positive return to local public works and a very large negative return to statewide investments.

average of estimated statewide returns is -28%, which is reasonably close to the value of -20% from the pooled model of Table 4.

FIGURE 4: ESTIMATED STATEWIDE SECTOR ABSOLUTE RETURNS
(ARCTIC SLOPE NOT SHOWN)
(bars show 95% confidence intervals)



Pairwise tests of the equality between these estimated statewide sector coefficients and the common values for the oil and local sectors show mostly significant differences (Table 6). The general hypothesis of equal returns across sectors is strongly rejected.

TABLE 6: PAIRWISE TESTS OF EQUALITY BETWEEN SECTOR RETURNS
(Chi-squared values from Wald tests)

returns from:	compared to return from:	
	Oil	Local
Oil Sector		20.0
Statewide sector (average of all corporations):	53.6	70.4
Statewide sector individual coefficients:		
Ahtna	0.0	12.6
Aleut	7.1	37.5
Arctic Slope	32.3	40.2
Bering St	24.5	33.6
Bristol Bay	1.0	13.8
Calista	8.0	32.1
Chugach	19.9	55.3
Cook Inlet	6.1	11.1
Doyon	21.6	40.0
Koniag	34.9	49.2
Nana	0.2	9.5
Sealaska	1.9	28.2

note:
Chi2 critical values are 3.84 (5%) and 6.63 (1%)

4.2. Joint Ventures

While management expertise may have been initially scarce among Native leaders,²¹ it could be purchased in the market. In this section I consider the use of the joint venture organizational form as a way of importing scarce management skill.²² Joint venture partnerships potentially offer instant access to management and production expertise and to rationed contractual opportunities. However, they are fraught with agency problems, particularly selection bias. If a Native corporation has no scarce resources to bring to the partnership, then it is not clear why established firms with good projects would want to share the benefits with them. If the Natives offer nothing but naivete and capital, they will end up with nothing but bad joint ventures or, worse, bad wholly-owned subsidiaries (this seems to be what happened to Bering Straits).

²¹ see, e.g., Forker (1996), Richardson (1990), Fuerst (1988). Willie Hensley, former president of Nana Corporation, said: "when the act itself was passed, there was no business experience in the Native communities- literally, from one end of the state to the other. It had been a bartering community." (Forker 1996, p. 58).

²² Of course, management inputs could also be imported simply by hiring non-Native managers. Rigorous analysis of the effects of individual managers is not currently possible with the available data.

In fact, the Native corporations did have some scarce resources to offer to joint ventures. These included their legal status as disadvantaged minorities, which earned official preferences in public contracts. Probably more important was their political and even moral clout. Major resource developers quickly realized that it was very useful to have Native corporation stakeholders on board when pushing politically sensitive projects and agendas. For example, several corporations secured maintenance contracts from the major oil companies for sections of the transalaska oil pipeline that ran through their lands, apparently based on political negotiations and promises made when Congress was considering the project.

Ultimately it is an empirical question whether joint ventures tended to help or hurt performance. To generate a crisp hypothesis I assume that all of the owners of bad projects managed to sell them outright to naive Natives, while those with good projects in need of "Native clout" formed JV partnerships. Under these assumptions JVs are a good option:

H4: Assets allocated to joint ventures earn positive excess returns relative to assets in wholly owned projects in the same sector.

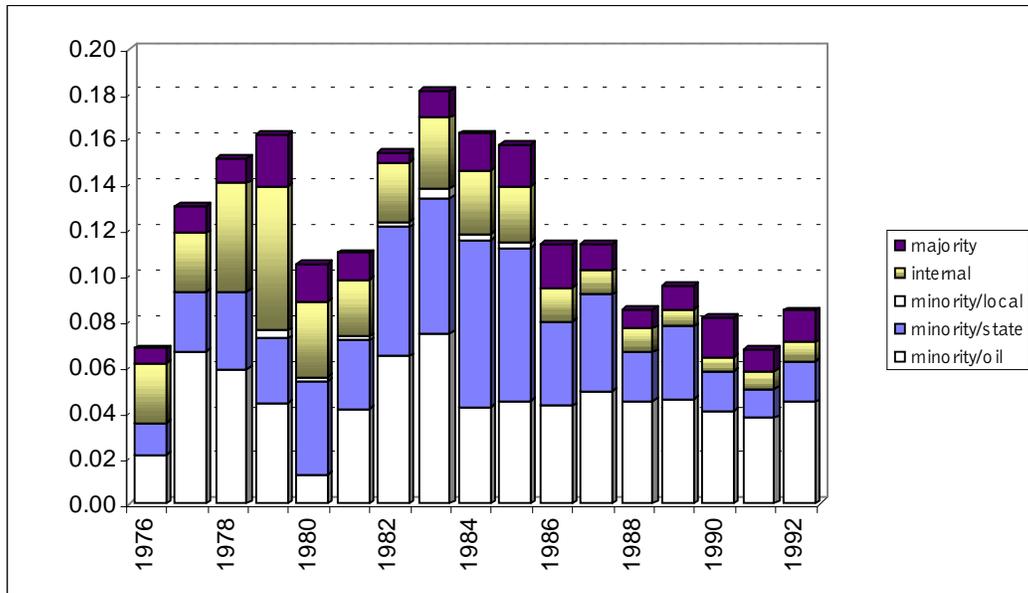
The data on joint ventures

Standard accounting practice shows JV participation in two ways on balance sheets. When the Native corporation is a minority participant, its equity in the JV is typically shown as a specific net asset. This is the equity method of accounting and it is supposed to be reserved for those projects over which the corporation has little management control. When the Native corporation is the majority participant, the entire project is typically listed as an asset and the partner's equity is shown as a liability. This is the standard, or cost method.

To implement the test in **H4** I identified assets allocated to specific joint ventures and coded them as fractions of total assets. I coded separate fractions for minority participation with non-Native partners in the oil, statewide, and local sectors. In addition I coded two allocation fractions that cut across sectors. The fraction JV_INT is the portion of total assets allocated to "internal" JVs: projects run by consortia of ANCSA corporations with no non-Native partners. These ventures by definition could not produce gains from non-Native expertise, and in fact may have offered the worst possible combination of attributes. They likely combined a common pool of at-risk capital, no clear responsibility for failure, no external market in tradable shares, and little or no external monitoring from the bond markets. The premium to internal JVs should be negative.

The fraction JV_LIAB is the portion of total assets allocated to ventures with non-Natives where the Native corporation is the majority partner. Altogether there are five categories of joint venture assets, and they are mutually exclusive. Figure 5 summarizes the data over time and shows that about 10% of assets were consistently allocated to joint ventures.

FIGURE 5: ASSET ALLOCATIONS TO JOINT VENTURES



Joint venture effects: results

Table 7 shows the results from including joint venture asset fractions as additional regressors in equation (5) along with the individual corporation returns to statewide investment. It is useful to think of each panel of the table as showing an additional set of "treatment effects" applied to the assets. Panel A shows the absolute return to passive investment. Passive assets are the "controls." Panel B shows sector effects: the additional returns to a dollar of assets placed in wholly Native owned projects in the oil, statewide or local sectors. The firm-specific returns to statewide investment are not shown in the table; panel B simply shows the constructed average of the 12 coefficients. Panel C shows the further additional treatment effects of importing management by putting assets in joint ventures. The estimated effects are substantial and generally significant. In the oil sector, the additional return from being a minority share JV partner is 16%. In the statewide sector the premium is 36.5% and significant. The 588% JV premium in the local sector is an artifact of the small number of data points in this cell.

TABLE 7: RETURNS TO SECTORS WITH JOINT VENTURE EFFECTS

Investment sector	nonwindfall rate of return on book equity
A. <i>(Baseline). Absolute return to passive investment:</i>	.052* (0.013)
B. <i>(Sector Effects).</i>	additional return
<i>Additional returns (relative to passive) from 100% Native-owned investments in:</i>	
Oil sector	-.440* (0.065)
Statewide sector (Constructed average of 12 corporation coefficients)	-.566* (0.060)
Local sector	.240* (0.094)
Local public works	1.950* (0.325)
C. <i>(Organization Effects).</i>	
<i>Additional returns (relative to 100% Native-owned) from participation in:</i>	
Oil Sector JVs with non-Native majority partners	0.160 (0.092)
Statewide sector JVs with non-Native majority partners	.365* (0.133)
Local sector JVs with non-Native majority partners	5.88* (1.404)
All-Native ("internal") JVs in any sector	-.233 (0.182)
JVs in any sector with minority non-Native partners	1.24* (0.144)
notes: Regression estimated with 12 firm-specific coefficients on statewide sector assets. The average reported above and its std. error are constructed from these estimates. Estimated by feasible GLS with correction for heteroskedasticity & cross-sectional correlation. Std. Errors in parentheses. N=12 corporations over T=17 years. * indicates significant at 5% level.	

Although not significant, the return premium to wholly Native JVs is -23%, consistent with a pool of assets being appropriated rather than invested. (Much of the internal JV data is generated by an "all-Native" bank that failed). Finally, the premium to majority-owned JVs is 124% and significant. Further inspection of the data shows that this coefficient essentially reflects the successful oil drilling business of the Doyon corporation.

Including JV effects does not noticeably change the common sector returns in panel B or the firm-specific returns (not displayed), with the notable exception of the oil sector. There, the return had been unstable and close to zero in previous specifications such as shown in Table 4.

With JV assets separated out, the oil coefficient resolves itself into three quite different returns. The estimated return to 100% Native-owned projects is -44% (panel *B*), while at the opposite extreme the return to majority-owned JVs is +124% and dominated by the single Doyon Drilling enterprise. In the middle are minority-share JVs, where the JV premium of +16% only offsets a part of the estimated average losses.

Summary of management and joint venture tests

In this section I augmented the simple asset allocation model to accommodate firm-specific returns and the effects of joint ventures. Hypothesis **H3**, couched in deliberately strong form, said that sectoral differences are not important and only management matters. The results do not support this hypothesis. Both management within a sector and sectoral choice are important to performance. The differences between sectors in the simple model are not just a proxy for differences in management. They persist when individual returns are introduced. But within the statewide sector the estimated returns (mostly losses) do vary tremendously across corporations - from +8% to -131%²³ The "within-sector" variation in statewide sector returns among corporations exceeds the "between-sector" variation, but the magnitude of the ranges is roughly the same.

The estimated return premia earned through joint ventures with non-Native partners are consistently positive, while the premium on internal consortia is negative. These results support hypothesis **H4**, which predicts that joint ventures with external partners will be good for Natives.

5. Tradeoffs Between Profits and Wages

In this section I broaden the focus to include shareholder employment as a measure of economic success. Persistent unemployment was perceived as the most important economic problem by several ANCSA corporations. If the social opportunity cost of shareholder labor is significantly below market wages, or if there are significant benefits from human capital accumulation or just being able to work with Native peers, then it could be efficient for managers to provide jobs at the expense of profits. Table 3 at the start of this paper shows the tremendous variation in shareholder employment for the year 1991.

²³ excluding Arctic Slope, whose estimated statewide return of -269% is juxtaposed against an estimated return to local public works of +209%.

The analysis of financial returns presented above shows that most corporations made significant financial losses in statewide sector enterprises. The evidence on the oil sector is mixed, and the local sector seems to have provided positive but limited profits. Since participation in the money-losing statewide sector was optional, an efficient asset allocation can only be inferred if there is a marked tradeoff between profits and the quasirents from employment.

Employment quasirents are not the same thing as wages. To count as quasirent, a given wage must exceed the social opportunity cost of the particular shareholder who holds the job. If Native corporation jobs simply attract otherwise employable shareholders and pay roughly market wages, then they are not providing net benefits via employment.

I formulate these notions into the following general null hypothesis:

H5: Native corporations traded off financial profits for payroll quasirents along an efficient frontier within and across economic sectors. Different outcomes across corporations reflect different preferences and trace out a single technical production possibilities frontier.

Of course **H5** is impossible to prove in the affirmative, but it is potentially falsifiable. I now use the asset allocation model to consider the tradeoffs between profits and employment quasirents.

5.1. Generation of Payroll and Quasirent Estimates

There are no consistent data on Native shareholder employment or payroll. I generated estimates of shareholder payroll for each corporation and year from my own mail surveys, several special studies, and a careful reading of the corporation annual reports and the Alaska business trade press. The coding process is discussed in the Data Appendix to this paper.

To convert payroll to quasirents I use the relative shortfall between 1990 Native per capita personal income in each region and the overall (all races) 1990 per capita personal income in Anchorage. Anchorage has a well-developed labor market and the highest per capita income in the state.

$$QUASIRENTS_{it} = PAYROLL_{it} \times (1 - (Native\ per\ capita\ Income_i / Anchorage\ Income))$$

For example, if Alaska Native per capita income in region i is equal to Anchorage per capita income, then there is zero quasirent component within the payroll. If Native per capita income is 60% of Anchorage income, then quasirents equal 40% of payroll. Note that the shortfall going

into this formula takes into account both regional poverty and the Native-white income differential.

Table 8 summarizes the data on shareholder payroll and presents my estimates of quasirents from payroll. It confirms that Arctic Slope and Nana were indeed very successful at generating wages for shareholders. The Ahtna corporation was also a standout, based on its small shareholder base and its early entry into the construction and security businesses. The Anchorage 1990 per capita income used as the benchmark for estimating quasirents is \$22,940, so the average estimated quasirent fraction of payroll is about 50%. It is significantly higher in many of the more remote areas., including the Ahtna and Nana regions.

TABLE 8: SUMMARY OF SHAREHOLDER PAYROLL AND ESTIMATED QUASIRENTS

Corporation	Average Annual Shareholder Payroll \$000	Average Annual Shareholder Payroll per Shareholder \$	Average Shareholder Payroll return on equity %	per capita Native Income in 1990 \$	Average Annual Payroll Quasirents per Shareholder \$
Ahtna	1,600	1,455	15.5%	9,388	859
Aleut	353	109	3.1%	14,179	42
Arctic Slope	9,450	2,528	32.1%	12,120	1,192
Bering Straits	266	43	5.7%	6,373	31
Bristol Bay	177	34	0.6%	9,273	20
Calista	994	75	4.6%	5,589	56
Chugach Natives	869	412	4.0%	15,637	131
Cook Inlet	1,410	215	1.2%	10,682	115
Doyon	1,924	212	3.2%	7,605	142
Koniag	245	66	3.8%	12,237	31
NANA	8,115	1,623	20.3%	7,236	1,111
Sealaska	5,251	334	5.2%	11,723	164
Unweighted Average	2,555	592	8.3%	10,170	325

5.2. Quasirents in the Asset Allocation Model

The estimates of "payroll return on equity" and "quasirent return on equity" can be used as alternative measures of economic return in the asset allocation model. These variables are clearly endogenous. Because of the causal link between actual payroll and the amount of assets allocated to the statewide sector, I keep the measures of returns from payroll on the left side of the regression and use the fitted value *STATEHAT* as an instrument for the fraction of assets in

the statewide sector. As an initial test for the presence of an efficient wage-profit tradeoff, I simply regress different measures of the "return on equity" on the asset shares. I consider wages (payroll), quasirents, and combinations of profits and payroll. Table 9 reports the results.

TABLE 9: WAGES AND QUASIRENTS IN THE ASSET ALLOCATION MODEL

	(1)	(2)	(3)	(4)	(5)
	dependent variable = returns on equity in the form of:				
Investment sector	Profits	Wages	Quasirents	Profits plus Wages	Profits plus Quasirents
<i>A. Absolute Return to Passive Investment:</i>					
	.043*	.021*	.003*	.058*	.033*
	(0.016)	(0.001)	(0.0004)	(0.014)	(0.017)
<i>B. Absolute Returns to Active Investment in:</i>					
Oil sector (OIL)	.130*	.288*	.164*	.434*	.354*
	(0.038)	(0.010)	(0.006)	(0.049)	(0.049)
Statewide sector (STATEHAT)	-.128*	-.005*	.003*	-.142*	-.137*
	(0.030)	(0.001)	(0.001)	(0.027)	(0.032)
Local sector (LOCAL)	.089	.025*	.007*	.443*	.404*
	.100	(0.001)	(0.001)	(0.098)	(0.097)
Local public works (PUBWORKS)	.629*	.758*	.332*	1.35*	.900*
	(0.158)	(0.050)	(0.027)	(0.149)	(0.157)
notes: Estimated by feasible GLS, using fitted values for the fraction of assets in the statewide sector. Std. Errors in parentheses. N=12 corporations over T=17 years. * indicates significant at 5% level.					

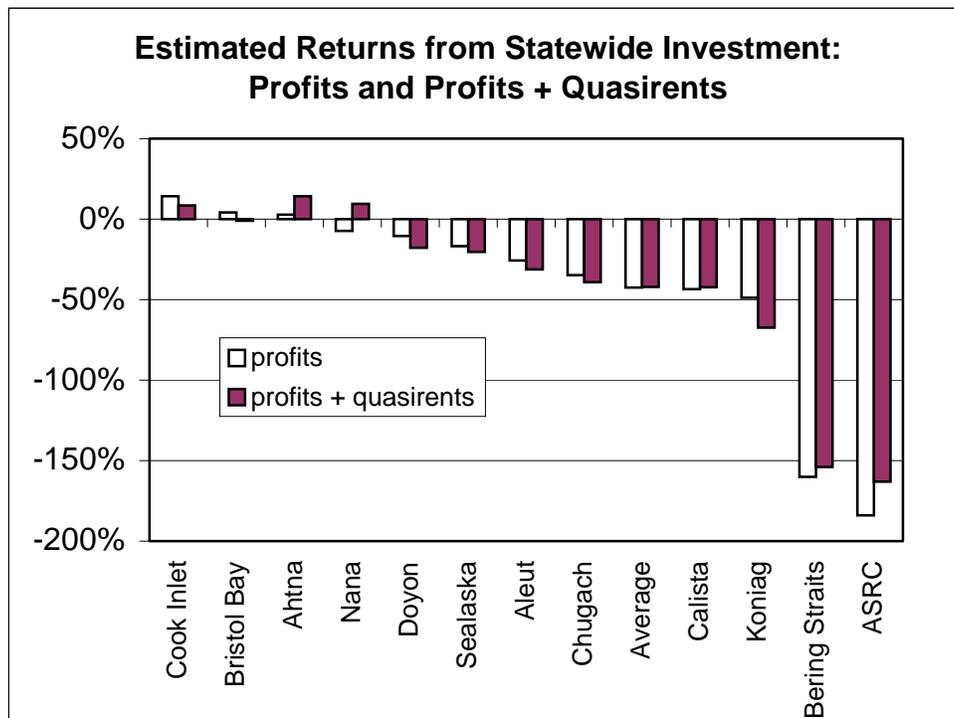
There appear to be clear and large payroll payoffs to investment in the oil, local, and local public works sectors. Surprisingly, however, the estimated wages return on equity in the statewide sector is *minus* 0.5% and significant. The quasirent statewide sector return (column 3) is barely positive, and in any case completely insufficient to offset the negative profits from this sector, as shown in columns 4 and 5. Overall, these simple estimates cast immediate doubt on the hypothesis of an efficient wage-profits tradeoff.

Table 10 adds firm fixed effects to the specification. Column 1 repeats the previous IV estimates of profit return on equity from section 3 above. Columns 2 and 3 show that with firm fixed effects, the average statewide sector wage and quasirent returns on equity are positive and significant. However, they are still far too small to keep the combined returns from profits and

payroll from being strongly negative. The oil sector combined return from profits and quasirents jumps to about 14% and the local sector appears to provide very large combined returns.

Inspection of the firm-specific returns to statewide investment confirms that Ahtna, Arctic Slope, and Nana earned large positive quasirent returns. For these three firms, the change in economic performance when estimated quasirents are counted is dramatic.²⁴ The tiny Ahtna corporation has the highest combined return on statewide investment, and Nana moves from -7% to +10%. Figure 6 summarizes these changes to firms' individual returns. The major message of these results is that with the exceptions just noted, most corporations generated little or zero quasirent offset to their negative profits from statewide investment. For these firms, the evidence strongly rejects the hypothesis (**H5**) of an efficient wage-profit tradeoff.

FIGURE 6: ESTIMATED STATEWIDE SECTOR ABSOLUTE RETURNS WITH AND WITHOUT PAYROLL QUASIRENTS INCLUDED AS "PROFIT"



²⁴ As noted above, Arctic Slope's very negative statewide return is probably a statistical fluke mirroring their similarly large positive coefficient on the local public works sector. The important thing to note here is the positive *change* in return from including labor income in their statewide sector return.

TABLE 10: PAYROLL RETURNS WITH FIXED MANAGEMENT EFFECTS

	(1)	(2)	(3)	(4)	(5)
dependent variable = absolute returns on equity in the form of:					
Investment sector	Profits	Wages	Quasirents	Profits plus Wages	Profits plus Quasirents
<i>A. Absolute Return to Passive Investment</i>	-.004 (0.019)	.013* (0.001)	.004* (0.000)	.059* (0.016)	.038* (0.018)
<i>B. Average Absolute Returns (over all firms) to Active Investment in:</i>					
Oil sector	.059 (0.050)	.099* (0.006)	.058* (0.003)	.200* (0.065)	.141* (0.061)
Statewide sector (Average of all 12 corporations)	-.425* (0.056)	.134* (0.012)	.068* (0.006)	-.372* (0.061)	-.421* (0.059)
Local sector	.349* (0.098)	.016* (0.002)	.006* (0.001)	.583* (0.114)	.566* (0.107)
Local public works	1.99* (0.298)	.267* (0.074)	.131* (0.034)	2.31* (0.258)	2.15* (0.277)
<i>C. Firm-Specific Absolute Returns to Statewide Sector Investment by:</i>					
Ahtna	0.027 (0.052)	.293* (0.034)	.176* (0.020)	.248* (0.063)	.143* (0.055)
Aleut	-.256* (0.120)	-.006 (0.005)	-.001 (0.002)	-.330* (0.119)	-.314* (0.120)
Arctic Slope	-1.84* (0.372)	.746* (0.093)	.337* (0.044)	-.131* (0.354)	-1.634* (0.365)
Bering Straits	-1.60* (0.440)	-.011* (0.001)	-.003 (0.001)	-.152* (0.432)	-1.54* (0.438)
Bristol Bay	.042 (0.062)	-.019* (0.003)	-0.007* (0.001)	-.032 (0.061)	-.010 (0.061)
Calista	-.434* (0.131)	.028* (0.007)	.025* (0.005)	-.412* (0.128)	-.423* (0.128)
Chugach	-.348 (0.207)	.201* (0.096)	.031 (0.034)	-.246 (0.242)	-.391 (0.219)
Cook Inlet	.142* (0.047)	-.011* (0.003)	-.004* (0.002)	.065 (0.053)	.085 (0.052)
Doyon	-.104 (0.087)	-.005 (0.005)	.005 (0.003)	-.215* (0.091)	-.179* (0.091)
Koniag	-.489* (0.190)	-.020* (0.002)	-.007* (0.001)	-.721* (0.186)	-.674* (0.189)
Nana	-.073 (0.044)	.295* (0.035)	.208* (0.024)	.176* (0.061)	.095 (0.053)
Sealaska	-.168* (0.080)	.114* (0.017)	.067* (0.009)	-.175* (0.071)	-.203* (0.075)

notes: Estimated by FGLS with correction for heteroskedasticity & cross-sectional correlation.

All regressions use fitted values for fraction of assets in Statewide sector.

Std. Errors in parentheses. N=12 corporations over T=17 years.

* indicates significant at 5% level.

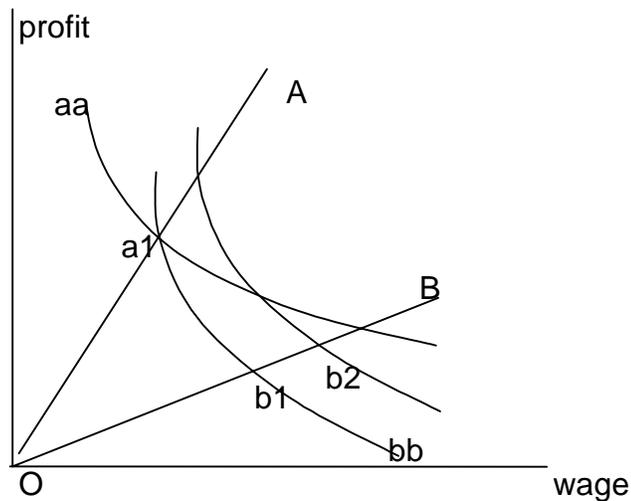
5.3. Using Grouped Data to Test for Efficient Wage-Profit Tradeoffs

Although it is not possible to directly identify the "tradeoff coefficient" in a regression of profits on quasirents, it is possible to use grouped data to generate an alternative test of the efficient tradeoff hypothesis. In a simple regression of the form

$$PROFITS_{it} = \alpha + \beta \times QUASIRENTS_{it},$$

the coefficient on quasirents is unidentified because the desired wages-profits combination is an endogenous outcome of maximization over preferences subject to the constraints provided by the menu of available projects. The observed profit-wage combination is also a function of luck. Figure 7 helps clarify this point. Suppose corporation A prefers profits and has an optimal expansion path OA, while corporation B prefers wages and tries to expand along OB. Relative to point a1, corporation B is better off at b2 while corporation A is worse off. If we observe a collection of points like a1 and b2, we cannot tell whether profits are being efficiently traded off for wages across firms. If, however, we observe points b1 and b2 *and* each of those points is an estimate of a different firm's average returns, with shocks removed, then it would be possible to conclude that some firms are simply more productive than others.

FIGURE 7: PREFERENCES FOR PROFITS AND WAGES

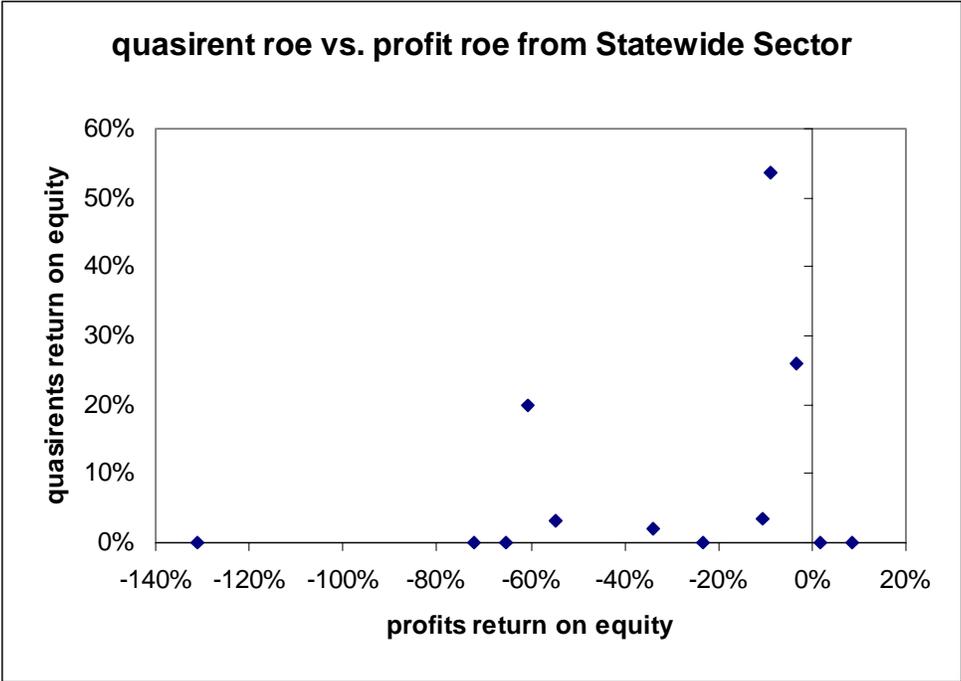


Using grouped data provides a way to carry out this test. Assuming each firm has fixed preferences, then the combination of the average profit rate of return and the average quasirent rate of return for firm *i* provides an estimate of firm *i*'s position on its own technical frontier. Each pair of estimated returns for firm *i* is for a given set of preferences and averages out the lucky and unlucky realized returns. In order to be tracing out an efficient production possibilities

frontier that trades off profits for wages across firms, the points must have a generally negative correlation. If the some points lie strictly below and to the left of others, then some firms are inefficient relative to their peers. They have lower profits *and* lower quasirents.

Figure 8 shows the set of combinations of profit return on equity and quasirent return on equity for the 12 corporations' statewide sector operations. The returns are estimates from separate equations such as those in column 1 and column 3 of Table 10. The scatterplot has a generally positive slope. The simple correlation coefficient between profits and quasirents is 0.28. In particular, Ahtna and Nana show very high rates of quasirent return on equity without making great sacrifices of profits.

FIGURE 8: AVERAGE PROFIT-QUASIRENT COMBINATIONS (ACROSS FIRMS) FROM STATEWIDE SECTOR INVESTMENT



Summary of Evidence on Profit-Wage Tradeoffs

Several regional corporations generated large amounts of payroll paid to their shareholders. The returns on equity in the form of payroll or quasirents are high in the oil and local sectors and in the statewide sector for certain firms. Ahtna, Nana, and Arctic Slope have significantly higher rates of return from statewide investment when quasirents are added to profits. Overall, however, the evidence is not consistent with an efficient tradeoff of profits for

wages. Most corporations made huge losses in the statewide sector even when the entire shareholder payroll is counted as part of the return on equity. Furthermore, grouped data show a generally positive correlation between average realized profits and average realized quasirents across firms. This test rejects the hypothesis (**H5**) of a single efficient profit-payroll frontier. As a rule, the firms that lost the most money provided the fewest jobs.

6. Persistent Fixed Effects, Internal Incentives, and Preferences

The results presented above show that persistent firm-specific factors explain a significant proportion of the variation in performance after controlling for natural resource endowments, asset allocations, employment benefits, and the use of joint ventures as a direct substitute for internal management skill.²⁵ These fixed effects could be the expression of deeper causes that are hard to quantify or to embed in an individual optimizing framework (Cockburn & Henderson 1996). Notwithstanding this ambiguity, the historical record gives the strong impression that some Native corporations ran smoothly in spite of external shocks while others seemed to be caught in a perpetual quagmire of bad projects, management turnover, litigation, and internal discord.

In this section I briefly consider the roles of individual incentives and heterogeneous preferences as possible sources of these fixed effects. This approach to variable performance moves the focus from outside to inside the firm, toward the amorphous concepts of shared norms, culture as a public good, and concepts of "social capability" and culture.²⁶ I provide some evidence in support of the importance of internal factors and draw connections between the exogenous attributes of some Native groups, the internal political economy of their corporations, and the resulting economic performance. Unfortunately the small sample size and lack of data make it hard to test these propositions beyond confronting them with case histories.

6.1. Agency Problems and Preference Aggregation Problems Within ANCSA Corporations

It has long been recognized that the structure of property rights within the firm and the incentives they generate can greatly affect the actual achievable output (Shapley and Shubik

²⁵ In OLS versions of the asset allocation regressions presented in sections 4 and 5 above, the adjusted R^2 rises from .13 to .37 when firm-specific returns from the statewide sector are introduced.

²⁶ Abramovitz (1986) borrows the term "social capability" from Ohkawa (1973).

1967, Jensen and Meckling 1979). On the outside, a Native corporation may appear to be a unified business firm. But on the inside, the structure of inalienable and permanently diffuse control rights makes the organization more like an American Indian tribe or very small country. To be successful, such groups must confront and solve two related internal problems. There is an agency problem and a preference aggregation problem.

Agency problems in Native corporations

Like other firms, ANCSA corporations face standard governance problems stemming from the separation of ownership and control. These agency problems are exacerbated by the fact that stock cannot be traded and by the lack of good monitoring skills among the all-Native boards of directors. The shareholders' inability to use "exit" as a discipline mechanism (Hirschmann 1972) clearly gives management, employees, and outside parasites more leeway to pursue their rent-seeking objectives, including shirking, empire-building, or nepotism. (Karpoff and Rice 1989, Milgrom and Roberts 1988, Buchanan, Tollison & Tullock 1967).

The huge financial losses of many Native corporations show that these problems were real and important. Given the ease with which dissipation could occur, the interesting question is why some corporations managed to *avoid* financial disaster. Since the law imposed the same formal corporate structure on all 12 Native groups, it is not possible to explain relative success stories without considering the *match* between this formal structure and the pre-existing collection of norms, rules, and beliefs that each group brought to their new corporation (Cornell and Kalt 1995). This shifts the focus of inquiry to the preference aggregation problem.

The preference aggregation problem

Even if all agents act as perfect instruments of the principals' wishes, there remains the problem of multiple principals with multiple objectives and conflicting preferences. Should the corporation maximize current dividends, future dividends, or jobs? In neoclassical competitive theory, this problem is solved by a version of the Fisher separation theorem, which guarantees that shareholders can divorce their optimal consumption plans from any one firm's production plans. These shareholders can unanimously support the maximization of market value as the firm's sole objective (Milne 1974). But with no trading in shares and a fixed communal land base as their chief asset, the Alaska Natives could not separate wealth maximization from optimal consumption.

With fixed, diffuse stock ownership, the shareholder preference aggregation problem closely resembles that of a small country choosing among economic plans. Under these circumstances, Boylan, Ledyard and McKelvey (1996) recently demonstrated that even if complete commitment to a multiperiod economic plan is possible, a majority-rule equilibrium will not exist. Under different commitment assumptions, political business cycles are also possible, as are median-voter outcomes. In short, anything can happen when consumption and investment plans are politically determined as a joint bundle. This indeterminacy echoes Bates' (1990) assertion that the aggregation of preferences by means other than markets is the central -- and least understood -- feature of developing societies.

An Alaska Native corporation will have serious problems choosing strategies and projects when shareholder preferences are highly heterogeneous. One problem is timing. Many Natives were illiquid and, *ceteris paribus*, would seem to favor dividend distributions over reinvestment, even to the point of partial liquidation of the firm. A second problem is that the returns from some projects accrued as high wages to a few lucky shareholder-workers rather than as dividends. The gains might also accrue solely to top managers as inflated salaries, human capital, prestige, or power. In this environment, a board of directors faced with strong tradeoffs between shareholder wages, human capital, and cash returns must choose whether to maximize measured accounting profits by sending resources outside the region to earn safe but low returns or whether to maximize long-run "Native GDP" by investing locally.

The internal political economy of the group is a source of potentially serious constraints on these choices and, hence, on *ex post* profitability. Specifically, if the group has social mechanisms in place to redistribute income and wealth across time and individuals, then a socially productive investment can be chosen without regard for the distribution of the benefits. If, on the other hand, the group consists of narrowly selfish individuals, many projects may not be politically feasible and the strictly egalitarian alternative of external investment must be used to achieve a constrained maximum.

In strong form, the basic premise underlying the internal incentives approach to differential performance is that beneficial projects do exist. These projects could come from all quarters -- the sector doesn't matter. The successful corporations somehow align their preferences and internal incentives to solve two problems. First, they check outright dissipation from opportunism and ineptitude. Second, they manage to efficiently take the returns from these

projects in one of three forms: accounting profits, payroll quasirents, or additions to human capital. The unsuccessful corporations dissipate the returns outright or simply avoid projects because they can't internalize the social benefits of jobs and human capital formation.

I now consider two potentially observable means by which these internal problems might be overcome. The first is the use of external investment and debt finance as a discipline device to check rent seeking. The second is a fortuitous pre-existing tendency toward cooperation, which may be fostered by group size, geographic proximity, or more inscrutable aspects of the group's traditional culture.

6.2. *Using External Investment and Debt to Check Rent Seeking*

Tornell and Velasco (1993, TV) provide a formal model where capital flight from countries is rational because external returns are secure while internal investments are subject to appropriation, driving the private return below the social. In what TV call an internal equilibrium, the private (post-appropriation) return to internal investment is equated by a no-arbitrage condition to the safe but low external return. What TV call extreme equilibria are also possible. In these cases the appropriation rates can be arbitrarily high or arbitrarily low. The model admits both a pure Hobbesian struggle and a utopian cooperative solution arbitrarily close to the first best.

The main insight of the TV model in this context is that the option of external investment provides a source of discipline which can help check internal appropriation. First, the Native corporation board (acting as subprincipal) can restrain management from empire building and nepotism by periodically removing resources from their control. (As always, the credible threat need not be carried out to be effective in equilibrium.) Second, the board (as agent) can bond itself to the shareholder body by establishing restricted passive investment funds.

External investment takes current cash holdings out of agents' hands. In a dynamic analogue of this concept, Jensen and Meckling (1976) argue that debt finance serves the same purpose by taking future cash flows out of management's hands. The use of debt also induces external monitoring by bondholders. The theory of external investment as discipline suggests the following proposition:

H6(a): Corporations that have successful active business operations will also have some funds invested passively and some outstanding debt, while the biggest failures at active business will have all their assets committed to it with little associated debt.

Unfortunately this is a very weak test, since there are other good reasons for passive external investment and issuing debt. The establishment of permanent shareholder trust funds restricted to passive investment is a stronger sign that the board or the shareholder body is trying to control internal dissipation. A weak test for this is:

H6(b): The establishment of restricted passive investment funds is highly correlated with recent business losses and the receipt of windfall cash flows.

6.3. Externalities, Social Accounting and Social Capability

Tornell and Velasco demonstrate extreme equilibria featuring either a Hobbesian free-for-all or near perfect cooperation. These demonstrations provide formal backing for the elusive concept of social capability (Okhawa, 1973). As Abramovitz (1986) argues, "Tenacious societal characteristics normally account for a portion, perhaps a substantial portion, of a country's past failure to achieve as high a level of productivity as economically more advanced countries." (p. 387).

One measure of social capability is the ability of the group to aggregate preferences by internalizing positive externalities. For Alaska Natives, two possible externalities from active business ventures are private human capital accumulation and high wages.²⁷ The evidence presented in section 5 above shows that payroll quasirents were indeed very important to several corporations. If the human capital acquired by managers and employees remains with the corporation, measured profits may eventually go up. If it stays with a Native shareholder that goes elsewhere, it nonetheless benefits total Native income. But other shareholders may revolt if a few get all the benefits in the form of new skills and high wages. Because of long gestation times, effective human capital formation could require a significant intergenerational transfer from the old to the young. In the same way, high wages paid to shareholder-workers with low opportunity costs are transfer payments that contribute to total Native income but do not show up as measured corporate profits.

The President of the Nana corporation summed up these dilemmas in a statewide 1977 speech:

²⁷ Agglomeration economies from increased local economic activity have also been mentioned by Native leaders.

Getting jobs for your Native stockholders is a costly proposition. You give up profits for this type of objective. I'm not saying that's wrong. We're doing it. Not making much of a profit but we're doing it. But is this what we want our regional corporations to do?²⁸

A willingness to accept income to others as income to the group is one possible attribute of social capability. Driving this willingness could be actual or perceived sharing mechanisms such as the kin-based networks historically used by many Alaska Natives to buffer uncertainty in subsistence harvests. Another source of this internalizing capability could simply be small group size or proximity to one another.

Whatever the deep sources, I hypothesize that smaller or more historically cohesive Native groups are better able to choose the cooperative equilibrium in an appropriation game. Due to the proximity and repeated interactions of their members, they have more social capital per capita, such as internal sharing and disciplining networks, and they can monitor and control internal rent seeking at lower cost. As a result, they can take advantage of projects with high social returns that may be unequally distributed, outside the accounting boundaries of the company's books, or susceptible to outright appropriation. This general proposition can be narrowed into a series of weak tests:

H7: Ceteris paribus, smaller corporations will be more profitable.
Controlling for size, village corporations will be more successful at active business than regional corporations, due to their physical coherence.
Regions with continued high reliance on traditional subsistence activities will have higher employment at the expense of profits.

6.4. Evidence on Internal Incentives, Employment, and Success

Evidence on external investment and debt as a discipline device (H10)

Table 11 reports the results of several simple cross-section regressions using the estimated active business ROE in the statewide sector from Table 5 above.²⁹ Proposition **H6(a)** says that the best performers have significant debt and passive assets in their portfolios. The regression of ROE on the share of debt in total assets does not support this directly; the estimated coefficient of return on debt fraction is -1.12, which has the wrong sign. Evidently the worst

²⁸ John Shaeffer, President, Nana Corporation, speech to Alaska Federation of Natives Convention, November 11, 1977. Mimeo, available from the author.

²⁹ I assigned a return of zero to Arctic Slope, which had the unlikely combination of -270% (statewide) and +209% (local public works).

performers also carried high debt loads. The second result in panel A is weakly consistent with **H6(a)**. Corporations that held back a higher share of their assets in passive investment during the early decade 1977-86 had slightly higher returns. This estimate is not significant, however. In panel B there is modest support for **H6(b)**, which said that high losses would lead the board or shareholders to check dissipation by formally setting aside resources in restricted passive investment funds. The regression in panel B uses the change in the passive share of total assets as the dependent variable and the estimated coefficient is negative and significant, indicating that the worst performers between 1977 and 1986 did have the largest subsequent jumps in their passive asset shares.

Anecdotal evidence also supports the proposition that alert shareholders acted to take resources out of management's hands, especially when large sums of cash from tax loss sales became noticeable on the corporate books (Bauman 1991, Associated Press 1994a). It is also instructive to note that although it ended up with debt finance for its hotel, the Calista corporation initially sank *all* of its own equity into the project with very little external debt. Only when cost overruns began accruing did they seek major external finance. At that point they required a government loan guarantee from the federal Bureau of Indian Affairs in order to complete the project.

TABLE 11: ACTIVE BUSINESS RETURNS, DEBT, AND PASSIVE INVESTMENT

Independent variable	(1) statewide sector ROE	(2) dependent variable change in passive share of total assets between (1977-86) and (1987-92)
<i>A. ROE as a function of:</i>		
share of debt in total assets	-1.124 (0.600)	
Early (1977-86) share of passive assets in total assets	0.125 (0.951)	
<i>B. Change in passive share of total assets between (1977-86) and (1987-92)</i>		
Statewide sector ROE		-0.437 (0.138)
notes: 1 cross section of 12 corporations		

Evidence on size and success

Hypothesis **H7** states that smaller corporations (measured in terms of shareholders) and village corporations would have better performance due to the lower costs of monitoring agents and aggregating preferences. A simple regression testing this claim is:

$$ROE = -.083 - .00000174 (SIZE) + .061 (VILLAGE)$$

(.00000861) (.066)

where *SIZE* is the number of shareholders in a mixed sample of regional and village corporations and *VILLAGE* is a dummy variable for village corporations. Although extremely imprecise, these estimates support the proposition that size and geographic dispersion across a region do hinder performance. The magnitude of the *SIZE* effect is trivial, but the village corporation effect is a substantial 6-percentage point increase in ROE.

Evidence on social capability

The most financially successful corporation, Cook Inlet, took a hands-off approach to broader social goals. They focused solely on profits and took advantage of their location in the "big city" of Anchorage to pursue active business without regard for jobs. President Roy Huhndorf once said, "we hire shareholders, but we don't overburden ourselves. If we fail in business we are worthless."³⁰ One reason they succeeded may have been that their shareholder base was already well assimilated into the market economy and knew what to expect and look for from their ANCSA corporation. In particular, Cook Inlet appears to have had an effective board that was able to monitor both Native management and a large number of non-Native technocrats that were hired in to run specific operations.

In contrast to Cook Inlet and its embrace of financial profits, the evidence in section 5 above confirms that both Nana and Arctic Slope provided large numbers of jobs to their shareholders even though located in very remote areas. A third corporation (Ahtna) achieved the highest overall return from active statewide investments when payroll quasirents are added to profits. But the rest of the group was largely unable to balance business losses with shareholder payroll.

³⁰ Roy Huhndorf, President, Cook Inlet Incorporated, quoted in Strohmeier (1993, p. 185)

The distinguishing feature of the successful employment-oriented groups is their relative isolation from the white majority society and their internal political and social cohesion. The same political elite that emerged as the Arctic Slope management demonstrated its prowess early on by organizing a new borough (county) on the North Slope in order to usurp for themselves the property taxing power over the Prudhoe Bay oil field. They took the tax money and funneled it sideways to their regional corporation, mostly in the form of high-paying construction contracts. Because their traditional (and still intact) subsistence economy was based on offshore whaling, it required a strictly hierarchical division of labor coupled with widespread kin-based sharing of the catch. When the Arctic Slope Corporation was formed, all of the senior management were whaling captains and one leader called the corporation "the new harpoon."³¹

Nana's approach to its role as a Native corporation is equally striking. In 1976 Nana's president John Shaeffer told an interviewer that the mission of the corporation was to "provide people with an opportunity to participate in western culture at whatever pace and degree they feel is possible for them."³² In other words, Nana saw itself as a bridge to western society which no one had to cross if they did not wish to.

From this basic self-conception followed a number of operating practices that appear to be unique among all regional corporations. These include the early and consistent separation of ceremonial leadership from day to day operations, a continuing emphasis on pride in culture, and an almost fanatical pursuit of employment on terms compatible with traditional Eskimo subsistence. Nana was the first (and Ahtna the only other) regional corporation to merge with its villages, and when the question arose in 1991 of whether to issue new stock to the young Natives not originally included in ANCSA, the Nana shareholders quickly changed their bylaws to grant new shares to all descendants of original shareholders, forever. Only two other corporations have voted to grant any inclusion to succeeding generations, and one of these was Arctic Slope (Associated Press 1994b).

Ironically, further evidence of the importance to Nana's success of a tightly integrated shareholder group comes from recent changes to that group. Recently, Nana has started offering its shareholder-employees that work at the zinc mine free transportation between the mine and

³¹ Edwardsen 1974.

³² John Shaeffer, personal interview with Victor Fischer, 1975. Recorded as part of Fischer's "ANCSA Regional Corporations Study." Notes on file at: Institute of Social and Economic Research, Anchorage AK.

Anchorage. According to a senior Nana executive, many young workers have left their villages and moved to the city, and they do not share cash wages in the same way that they share housing and food within the village. The resulting stress on social networks has led to increased calls (from non-employees) for dividends instead of jobs and special benefits for elders.³³ The mine, in fact, has been run at a loss since startup but provides almost 200 jobs.

Evidence on social discord

The Bering Straits debacle stands in stark contrast to the Nana outcome. The Bering Straits regional leadership co-mingled the village and regional assets without informing the villages, then tried to merge when the ploy was discovered. The merger attempt backfired and degenerated into a series of legal battles between Bering Straits and its own village corporations, all of whom shared the same putative owners. After one of several management shakeups, the 1981 annual report revealed that there had been 108 separate lawsuits pending against the company in January 1978 --only two years after business operations started up in earnest.

As early as 1978, a new non-Native vice president was planning a full retreat from the initial money-losing business ventures that had already brought the company to the brink of bankruptcy. But this passive investment strategy was not good enough for the regional political leadership. The outside manager was soon forced to resign as part of a plan to return the company to all-Native management and to embark on speculative oil investments in the Bering Sea.³⁴

Eventually the regional corporation went formally bankrupt but its chief creditors were its own village corporations, and as a result, the regional corporation signed over much of its subsurface land rights to the villages that already owned the surface³⁵.

Bering Straits was not the only group to exhaust itself through internecine legal warfare. The Koniag corporation experienced similar problems when it attempted a merger with its villages. After the merger was initially complete, one village sued to overturn it, claiming that Koniag was expropriating its timber resources, which was technically true. The courts ordered a "demerger" that returned half of the village corporations to independent status. While this

³³ Sarah Scanlan, Nana director of human resources, personal interview, January 3 1996.

³⁴ Bering Straits Corporation *Annual Reports*, 1978-81.

³⁵ Alaska Superior Court, Case 3AN-80-6815 (Civ).

wrangling went on the entire ANCSA cash settlement was lost in failed business ventures. The saga -- but not the losses -- ended when the entire board and management were overthrown.

Both Bering Straits and Koniag had active subsistence activities going on in their regions when ANCSA was passed, but neither region was economically or socially connected through kin-based sharing networks. The Koniag people had interacted extensively with the Russian colonists and many had adopted the Russian Orthodox faith. Their subsistence activities were oriented outward, to the sea. And in the Bering Straits region, one detailed field report suggests that the area was balkanized into strictly defined hunting areas defended by individual tribes, sometimes in shifting alliances with one another (Ray 1967).

7. Conclusions

In this paper I have considered the large variation in economic performance among 12 Alaska Native corporations that were established by fiat in 1971 and charged with improving the lives of a poor indigenous people living in a remote, harsh region. The average performance of the group was poor, but several relative success stories stand out against the backdrop of several hundred million dollars in business losses.

Asset allocation to different sectors was a significant determinant of overall returns (measured net of windfalls). Surprisingly, the only positive profit returns to active investment were in local enterprises, where the small size of the market limited the scope of activity in a way that was probably observable to all. The Native corporations' losses were spread among many statewide enterprises outside the oil industry, such as fishing, construction, real estate, and hotels. In the statewide sector, the estimated average annual return on equity is -20% in a pooled regression and ranges between -130% and + 8% when individual corporation returns are allowed to vary. Contrary to popular belief, the estimated average return in the oil sector was zero -- or negative if the project had no joint venture partner.

The use of the joint venture offered a mechanism for importing scarce management and production expertise and securing rationed contracts with the oil industry. Joint ventures with established non-Native firms lost slightly less money than wholly owned operations, while the few wholly Native joint ventures returned a significant negative premium.

The evidence strongly rejects the hypothesis of an efficient wage-profit tradeoff across firms. Shareholder employment provided significant benefits to only three corporations. For these three, however, the economic returns in the form of payroll quasirents were quite large. When profits are augmented by quasirents, the top two employment generators had the highest economic returns from active statewide investment. The two most successful job creators, Nana and Arctic Slope, appear to have high levels of social cohesion, political capacity, and subsistence-based sharing. These mechanisms, however, may be under stress as economic and social integration with non-Native society proceeds.

The pattern of profits and losses provides mixed support for the concept of economic dualism in a remote resource-dependent region such as Alaska. Modern sector enterprises connected to the existing oil industry provided jobs and sometimes profits, but were limited to a fixed pool of opportunities. In some cases the Natives managed to tap existing contractual opportunities with joint venture partners, but the evidence on wholly-owned investments suggests that attempts to create new opportunities on their own generally failed.

Both the persistence of business losses through time and the wide range of firm-specific returns to statewide investment suggest that in some cases profitability was simply ignored or submerged in a sea of ineptitude and dissipation. Because shareholders could not sell their shares and had poorly developed monitoring skills, a large amount of rent seeking undoubtedly occurred. In the Bering Straits case in particular, the data suggest that the Natives simply paid inflated prices for nonperforming business entities. They suffered huge capital losses to outside opportunists even before operations began.

There are no easy answers to the question of what made some Alaska Native corporations respectable performers while most lost millions in repeated business failures. Capital was not the scarce factor limiting the Natives' economic advancement. Instead, they were stymied by rapidly diminishing returns to that capital. Some corporations dealt with this problem adroitly, but for lack of good management most did not. Firm-specific fixed effects are statistically important but have few easily observable causes. The search for these deeper sources of success remains an intriguing and important challenge for future research.

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Appendix A

A Brief History of Alaska Native Land Claims

The legislative settlement of Native land claims was one of four major milestones in the evolution of property rights, resource scarcity, and political power in the territory that forms Alaska.³⁶ To appreciate this evolution and to understand the initial conditions facing the Alaska Native people, it is useful to briefly review the history of the occupation and settlement of Alaska and the land claims process.

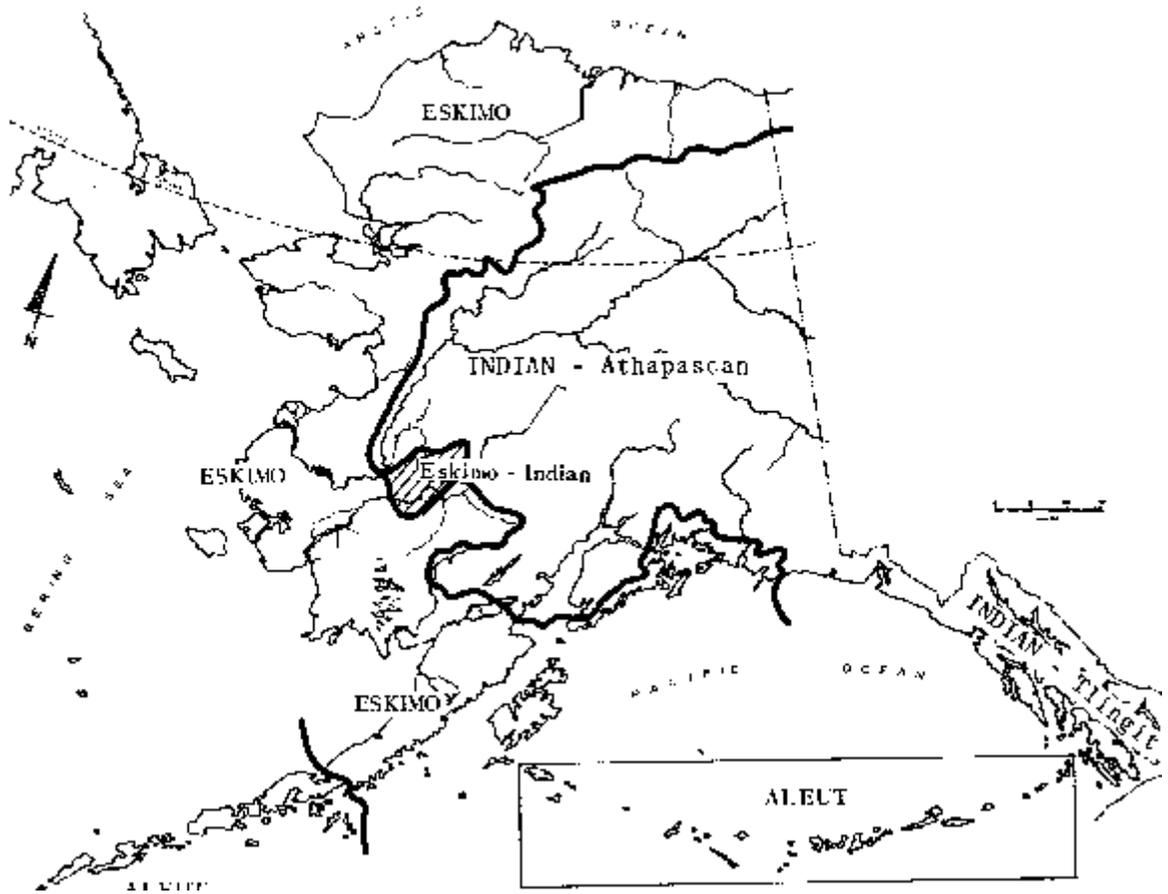
A.1. Alaska's Native Peoples

Alaska's indigenous peoples -- the Aleuts, Eskimos, and Indians-- have continuously occupied and used the entire territory for about 8 to 10 thousand years. According to Chance (1990), the Aleuts and Eskimos are closely related linguistically and appear to be the most recent aboriginal arrivals from Asia, while the Indians moved up the Pacific coast of North America and share linguistic ties with continental North American groups ranging from Canadian Athapaskans to the Apache and Navajo of the U.S. Southwest. At the time of European contact, there were about 70,000 Natives living in the territory (Arnold 1976, p. 8). Figure 9 shows the approximate distribution of these peoples.

Between 15,000 and 20,000 Aleuts lived in coastal villages on the lower Alaska Peninsula and Aleutian Island chain. They hunted marine mammals and gathered eggs, roots, and berries. In the 1700s Russian fur traders enslaved the Aleuts and exploited their labor in the harvesting of the rich populations of fur seals. This contact decimated the Aleut population. Through direct execution and the spread of infectious disease, their population had by the time of Russian departure in 1867 shrunk to only 2,000 people (Federal Field Committee 1968, pp.236-238).

³⁶The purchase of Alaska from Russia in 1867, the Statehood Act of 1959, and the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 are the other major milestones in this evolution.

FIGURE 9: GENERAL DISTRIBUTION OF ALASKA NATIVE PEOPLES



Source: Federal Field Committee 1968

The Eskimos numbered about 40,000 and occupied the western and northern coastal mainland. The Inupiat occupied the north and were highly dependent on hunting marine mammals, especially whales. The Yup'iks lived in the coastal and upriver lowlands and based their subsistence economy on Salmon.

In the middle 1800s the New Bedford Whaling fleet ranged into the Arctic Ocean in search of dwindling whale stocks and established a physical and cultural presence among the Inupiat (northern) Eskimo. At Barrow and other northern villages, relations with whites were cordial, with substantial intermarriage between whalers and Inupiat women that is reflected in today's family names. Apparently there were enough whales to go around for all, even though the Inupiat were highly dependent on the Bowhead for food, fuel, and ritual.

Finally, there were the Indians. Several thousand Athapaskans occupied the vast Alaska interior with a hunting and fishing society that included limited copper smelting technology. Their contact with Europeans was highly limited until the gold rush of the 1890s. In marked contrast, white traders had contacted the 12,000 Tlingit and Haida Indians along the coast of Southeast Alaska as early as 1780. These wealthy clans lived in an exceptionally resource-rich, temperate environment, and their trading savvy was widely known. Because they had traded with earlier Europeans for guns, they were able to fend off enslavement by the Russian-American Company when it established its monopoly trading position (and government) at Sitka in 1800.

A.2. Emerging Land Use Conflicts: 1867-1960

The Natives made heavy use of marine and fish resources as their staple foods, supplemented by roots and berries. Arriving Caucasians exploited fur seals, whales, and gold by 1900. Notably absent from the list of economic opportunities in the Alaska territories were agriculture and manufacturing. Settlement was not a desired goal; there were only 550 Russians living in the territory when it was sold in 1867. Because the resources were either marine or (in the case of placer gold) widely scattered, and their extraction was extensive rather than intensive in land, there were few major conflicts between whalers or miners and Natives. With Southeast coastal salmon things were different as the Tlingits sought to defend some of their valuable salmon runs, with limited success. Other Salmon runs were not exploited by the Seattle-based commercial salmon industry until the early 20th century.

In short, throughout the 19th and early 20th centuries, there seemed to be plenty of land and (with some exceptions) resources for all. This lack of perceived scarcity was reflected several times in the federal laws governing the territory of Alaska. At the time of purchase from Russia (1867), the Treaty of Cession simply lumped Alaska Natives in with the rest of the Indigenous U.S. Population.³⁷ The Organic act of 1884³⁸ (setting out the governance structure for the territory) contained much stronger language protecting Native rights:

The indians or other persons in said district shall not be disturbed in the possession of any lands actually in their use or occupation or now claimed by them but the terms under which such persons may acquire title to such lands is reserved for future legislation by Congress.

Almost immediately, this language began to acquire economic and legal meaning, as the gold rush and then the commercial “salmon rush” led to serious encroachment on Native lands and food supplies. The Tlingit Indians bore the brunt of this new exploitation and organized legal protests and political action that culminated in the Tlingit and Haida lawsuit of 1936. This suit sought compensation for millions of acres of lands withdrawn by the federal government for the Tongass National Forest.

While the Tlingit-Haida claim was being adjudicated, the Alaska Statehood Act of 1958 further renewed a bland claim of continuing respect for Native rights established by use and occupancy³⁹. But far more important was the Act’s direct assignment of more than 100 million acres in property rights to the new state. The Statehood Act required the State of Alaska to select, survey, and patent fully one third of the land base, and to select the most valuable lands it could discern for mineral leasing, agriculture, tourism, and other export industries. The theory was that devolving a secure resource base to the struggling State of Alaska would lead to its fiscal and economic autonomy and growth.⁴⁰ This imminent hardening of property rights in an area with essentially zero existing private property signaled a major and rapid foreclosure of possible Native rights to these lands.

Shortly after statehood the Court of Claims finally decided the Tlingit-Haida case. The court held that the land withdrawal did in fact constitute a taking of formerly occupied lands and

³⁷The Treaty of Cession stated: “The uncivilized tribes will be subject to such laws and regulations as the United States may, from time to time, adopt in regard to aboriginal tribes in that country.” (quoted in Arnold 1976, p. 26)

³⁸ Act of May 17, 1884, 23 Stat. 24, section 8, quoted in Arnold 1976, p. 68.

³⁹The Act disclaimed the State’s rights to lands “the right or title to which may be held by Eskimos, Indians, or Aleuts.” (Arnold 1976 p. 91)

⁴⁰At the time, some scholars questioned this theory of economic determinism (Rogers 1962).

required compensation. But the compensation was finally established (8 years later) at only 50 cents per acre based on nominal values as of the purchase from Russia in 1867. The decision shocked many Natives into the realization that established judicial channels would not bring meaningful amounts of land or even cash assets into Native hands. Yet it also provided an important legal precedent by accepting the link between traditional subsistence use and occupancy of vast land areas -- as opposed to fixed agricultural settlement -- and the lawful claim to that land. By this standard, the Natives had a valid claim to all of Alaska.

A.3. The Land Claims Struggle: 1960-1970

During the early 1960s the encroachments on traditional Native lands accelerated. World War II had brought a large influx of white people into the territory and established white settlement -- and hunting and fishing pressure -- at many heretofore-unoccupied places. However, it was the grand development schemes and increased enforcement of federal hunting restrictions that really alarmed the Natives. In 1961 the Atomic Energy Commission proposed using atomic weapons to blast a harbor out of the bluffs at Cape Krusenstern on the Northwest coast. Shortly thereafter, the Bureau of Reclamation and Army Corps of Engineers developed plans to build a huge dam on the Yukon river that would have flooded out many villages and subsistence habitats.

Three Important Shocks. These regional conflicts might have remained isolated pockets of ineffective Native complaints in a vast territory but for three events that qualify as exogenous shocks to the Alaska economy. Two were technological, while the third was legal.

The first innovation was a dramatic increase in the human capital and communications technology available to the Natives. During the mid-1960s a new generation of college-educated leaders was just emerging from school. They had shared the high school experience together at the Bureau of Indian Affairs' Mt. Edgumbe Boarding School in Sitka -- a sort of educational boot camp that took the best and the brightest and instilled in them both self-confidence and a sober realization of the Alaska Natives' lot in life. This experience created an instant and unprecedented leadership class and a statewide network of personal relationships among these leaders.

Equally important, these leaders found a sympathetic source of private funding⁴¹ to support a statewide, Native-controlled newspaper, the *Tundra Times*. This newspaper was the first means of mass communication available to Alaska Natives, since at the time there was essentially no television reception, radio was dominated by localized commercial am broadcasters, and telephone connections were tenuous or nonexistent. Even this innovation would have been pointless were it not for the increasing literacy among the Native population generally. It is hard to underestimate the importance of this innovation in galvanizing the awareness and subsequent statewide political organization of the Native population in a land of scattered roadless villages.

The second shock to the system was an administrative legal action taken in 1966 by Interior Secretary Stuart Udall. Concerned that the 1884 Organic act had sidestepped the legitimate rights of the Natives, Udall placed a freeze on all transfers of disputed land. This action effectively halted *all* transfers to the State of Alaska and created immediate pressure for Congress to resolve the Native land claims issue. Although an administrative action, the freeze was extended past 1968 when Senator Henry Jackson agreed to give the Alaska Federation of Natives (AFN) veto power over President Nixon's appointment of Walter Hickel as the new Interior Secretary. Hickel extended the land freeze as the price of his approval by AFN.

By 1968, then, the bargaining over Native land claims was finally shifted to Congress, the only body that could dispose of the issue at relatively low cost. Still, the terms would have been poorer and the resolution far slower had it not been for the third, decisive shock to the system. This was the discovery of the supergiant oil field at Prudhoe Bay. Located on land owned by the State of Alaska, the field was immediately estimated to contain more than 10 billion barrels of recoverable reserves, producible at a rate equal to about 20% of existing U.S. oil production.

The Importance of Prudhoe Bay. The petroleum shock dramatically raised the stakes of the bargaining game for all parties. Although the Natives never asserted title to the oilfield itself, the oil required transportation across 700 miles of contested federal lands to reach the ice-free port of Valdez.⁴² With daily production of 2 million barrels at stake, the discovery created an

⁴¹ Dr. Henry Forbes of Cambridge, Massachusetts (Arnold p. 99).

⁴² Other pipeline routes were considered. The leading candidate was an overland route through Canada to the Midwest. However, this option was ultimately judged too expensive and politically difficult. The consideration of

effective opportunity cost in lost rents of about \$6 million per day. Because the field was located on state land, it promised billions of dollars in royalties as well as oil company profits.

Equally important, the Prudhoe discovery changed the perceptions of what a claims settlement could accomplish. Alaska, which had been poor, would now be rich. If there were additional sources of such huge rents lurking in everyone's backyard, then the economic development problem was reduced to distributing endowments. The Natives could get rich too. Seeing the coming speculative boom fueled by such a huge discovery, many prescient businesspeople realized that putting land into Native hands was a far faster route to exploitation than leaving it in federal public domain or even passing it to the State. Business opposition to a settlement began to soften.

Most important, it was the oil shock that allowed the Native *land claims* movement to be merged, in the eyes of Congress, with the Native *economic development* problem. Alaska Native underdevelopment in 1968 was severe by any standard. Native unemployment ranged between 50 and 60 percent in the fall and winter (Federal Field Committee 1968). The 1960 Census reported median per capita income for rural Natives at about \$1,200, or only 25 percent of urban white income. Half of all Native children had not completed more than 6th grade, and only 8 percent had completed high school (U.S. Census 1960). In 1960 Native life expectancy at birth averaged 60 years, ten years less than the U.S. average of 70 years (U.S. Public Health Service 1967). In the socially tumultuous climate of the late 1960s, the Alaska Native land claims issue presented Congress and the nation with a chance to make more enlightened, or at least more compassionate, Indian policy than had been imposed on the tribes of the lower 48 states.

These three shocks-- new political technology, the land freeze, and huge but sterilized resource rents -- served to make Coasian bargaining over Native land claims possible. The legislative story has been well told by several authors.⁴³ Most of the bargaining revolved around two questions: how much land, and how much money? Both quantities were decided through simple political assessments, proposals, and compromise. Of greater interest to economists, the *structure* of the settlement was hardly debated at all, although there were many major changes made to this structure throughout the process. In fact, major structural changes were introduced

this option, which would have avoided dealing with Native land claims, probably explains why oil company support for settling the issue was lukewarm at best until 1971.

⁴³Arnold (1976), Berry (1975), and Groh (1981) provide good accounts from different perspectives.

at the last minute to appease various interests and create compromise on what were perceived to be the larger issues.

A.4. The Settlement Act

ANCSA transferred 44 million acres of land and \$962.5 million in cash to business corporations owned exclusively by Alaska Natives. The act established 12 regional corporations and approximately 200 village corporations. Each Alaska Native alive at the time of the act (December 17, 1971) was allowed to enroll in a village corporation, which choice automatically enrolled them in the corresponding regional corporation. Table 12 shows the wide variation in land areas and number of shareholders across regions.

TABLE 12: ALASKA NATIVE REGIONAL CORPORATIONS

Name	Number of Shareholders	Regional and Village Land Area (million acres)	Initial ANCSA Cash (\$ million)	Major Natural Resource Endowments
Ahtna	1,100	1.7	6.4	
Aleut	3,249	1.6	19.5	
Arctic Slope	3,738	5.1	22.5	potential oil and gas
Bristol Bay	5,200	3.0	32.5	
Bering Straits	6,200	2.2	38.1	
Calista	13,306	7.0	80.1	
Chugach Natives	2,109	1.0	11.5	timber
Cook Inlet	6,553	2.5	34.4	known oil and gas
Doyon	9,061	12.5	53.4	potential minerals
Koniag	3,731	1.7	20.0	
NANA	5,000	2.2	28.9	zinc-lead deposits
Sealaska	15,700	0.3	92.5	old-growth timber
Total	74,947	40.8	439.9	

The corporations were given substantial freedom in choosing and using their new endowments, consistent with Alaska corporation law. However, the Native shareholders could not sell their shares and the regional corporations had to share a portion of their natural resource rents with all other Native corporations on an equal per capita basis.

The land transfer was straightforward. Village corporations received selection rights to 26 million acres of proximate lands. The intent was to formally convey ancestral heritage and subsistence lands. It was widely recognized that 26 million acres was not enough land to provide for subsistence needs and that no fishing rights were included in the deal.⁴⁴ Regional corporations received all of the subsurface under village lands plus an additional 16 million acres in fee simple (surface and subsurface).

The Tlingit-Haida decision had established the principle of money compensation for lands taken. Secretary Udall came up with the idea of tying the money settlement to future federal petroleum leasing revenues from outer continental shelf (OCS) lands off the Alaska coast as a way of making the compensation politically palatable. The Prudhoe Bay discovery probably made this tapping of prospective new revenues seem like a painless proposition. The final figure of \$962.5 million was a last-minute compromise; the basic amount of \$1 billion appears to have been pulled out of thin air as a "nice round number"⁴⁵ Everyone recognized that working capital would be needed for functioning business corporations.⁴⁶

The regional corporations were required to incorporate as for-profits, while the village corporations had the option of incorporating as nonprofits. Almost none did.⁴⁷ The regional and village corporations each received 45 percent of the money settlement. The remaining 10 percent went to each individual enrolled Native. (Among other things, this immediate payment to individuals can be interpreted as a "sign-up bonus" to encourage people to enroll in a corporation.)

A.5. The Corporation as the Settlement Institution

One Inupiat Eskimo called them the "new Harpoon."⁴⁸ Why was the alien institution of the profit-making business corporation chosen as the principal repository for the Natives' new

⁴⁴ Subsistence rights were the subject of continuing bargaining culminating in additional rights in 1980. The Alaska National Interest Lands Conservation Act of 1980 granted subsistence rights to *rural* (not Native) residents. The allocation of subsistence rights remains bitterly contested and unresolved. (Morehouse & Holleman 1994)

⁴⁵ Weinberg, Ed, Interview with Victor Fischer, 7/13/77, recorded in Fischer's unpublished mimeo "Legislative History: Structuring the Settlement." (page "r," available from the author). Weinberg was a lead attorney for the Natives.

⁴⁶ The \$1 billion dollar amount was first broached in the Federal Field Committee's (1968) report to Senator Jackson, *Alaska Natives and the Land*. The corporation concept was already well-established at the time.

⁴⁷ Flanders (1996, personal communication, May 13) cites his own interviews in which Native leaders said that the for-profit structure offered more flexibility even if a nonprofit mission was to be embraced.

⁴⁸ Charlie Edwardsen, in Edwardsen (1974).

property rights? The use of the corporation as the settlement vehicle was a direct recommendation of the State of Alaska's Land Claims Task Force. One legal scholar noted in a subsequent review that

The legislative history of ANCSA does not contain any significant discussion of the use of corporations to implement the settlement. The 1968 report of the Federal Field Commission recommended use of corporations, and all subsequent legislative proposals followed that model. (Bass, 1984, p. 4)

Recent research by Mitchell (forthcoming), based on extensive interviews with primary actors, traces the corporation concept to Barry Jackson, a staff attorney for the Alaska Federation of Natives, who drafted the Natives' proposed bill for the Task Force. Jackson claims he adopted the concept based on a widespread distaste for other alternatives -- especially IRA⁴⁹ corporations and other entities controlled by the BIA -- and based on the formally egalitarian structure of shareholders' rights. But the deliberate vagueness that the corporate form offered was clearly a reason why it was embraced by all sides.

Assimilationists saw in corporations business dealings and modern capitalism. Tribalists saw more real autonomy and, in any event, an improvement over the reservation system. New Native political leaders saw the opportunity for economic and political self-determination, not to mention the promise of management positions for themselves. The corporation offered a beguilingly simple vehicle for settling the thorny land claims issue. It allowed all parties to feel comfortable with their vision of the legislation.

Although the overall corporation concept was adopted early in the game, there was significant debate about how the corporations would be structured. Many early versions of the claims bill called for a statewide investment corporation to own the subsurface and control much of the working capital. The Alaska Federation of Natives early on opposed this concept and fought vigorously for regional corporations. They had learned from bitter experience how hard it was to hold together a statewide political coalition among disparate Native groups. Native leaders had invested heavily in region-specific political capital.

⁴⁹ Indian Reorganization Act (of 1934)

A.6. Special Features of the ANCSA Corporations

In many ways the ANCSA bundle of property rights was quite straightforward. However, three special features of ANCSA were highly unconventional, with potentially serious implications for economic efficiency.

First, shareholders could not sell their stock for at least 20 years. This prohibition removed the threat of takeover as a powerful discipline mechanism and eliminated the actual takeover as a corrective mechanism. With no takeover threat and no information feedback from a market in shares, finance theory suggests that shareholders would be forced to substitute a host of higher-cost and less effective monitoring activities. Inalienability also blocks individuals' attempts to diversify which creates artificial demand for corporate diversification (Karpoff and Rice 1989) and stifles productive but risky investment (Fama & Jensen 1985). It creates problems for shareholders facing liquidity constraints, a condition that certainly applied to many poor Alaska Natives.

The second potentially serious feature of ANCSA was the requirement of section 7(i) that regional corporations share 70 percent of the "net revenue" from subsurface and timber resource sales with all other corporations, both regional and village. This provision created standard incentives to shelter resource rent income. It was also poorly drafted and invited costly litigation during implementation.⁵⁰

Third, corporate management was given complete control over an essentially public good -- the land -- that was highly valued by individual shareholders. This tied the security of the land base to the control of the Board of Directors and ultimately to the voting power of the stock. Under this structure, allowing stock sales would invite free riding on the communally owned land and increase the incentives for individual Natives to sell out. Fearing this outcome, few would vote to allow stock sales.

A.7. Other Initial Conditions Faced by the Natives

Section 2 of ANCSA specified that the settlement was to address the "real social and economic needs" of Alaska Natives. Those needs in 1971 were compelling. The Natives at the time were poor and illiquid. This created pressure for early dividends. They had little formal

⁵⁰ The definition of "net revenue" was litigated for 10 years before being settled out of court.

education. This lack of human capital meant that internal management talent was scarce and the Board's monitoring ability low. The Native people lived on the economic periphery of a peripheral region.

Countering these pessimistic conditions as the corporations were formed in 1972 was Alaska's new-found oil wealth. The Transalaska Pipeline System (TAPS) was finally approved in 1973 after the first OPEC oil shock. The resulting increase in oil prices fueled a speculative resource exploration boom throughout the State just as the Native corporations began to select their lands. Also of great importance was the continuing flow of federal money from the rest of the United States. Alaska Natives retained their specific eligibility for federal Indian programs and their status as U.S. citizens gave them access to all the social programs and infrastructure subsidies of the world's richest nation. This favorable economic climate allowed the ANCSA corporations substantial freedom to concentrate on profitable investments without facing overwhelming pressure for immediate distribution of wealth.

Appendix B

Data Appendix

The regional corporation data form a complete panel for 12 corporations over the 18 years from 1976 to 1993. The starting year of 1977 is the first year of useful data on assets allocations, because the asset allocations from the end-of-year balance sheet are used in the regressions as beginning-of-year allocations for the following year.

Financial performance data

I developed the data on financial performance directly from the corporation annual reports. The data were adjusted to remove windfall transfers and the sales of natural resource assets, as described in detail in Essay #1. The basic data series that results from these adjustments is a set of annual returns on book equity resulting from business and passive financial investment. This I call nonwindfall income

Allocation of assets to sectors

Using the assets side of the corporate balance sheet as a starting point, I first excluded trade receivables, which are usually balanced on the liability side by trade payables, and other general assets such as the corporate headquarters building, if owned. I then allocated all invested assets to specific identifiable business ventures, such as "fishing vessels," "equity in oilfield catering venture," or "inventory at local hardware store." To minimize potential coding bias, I made no

attempt at this stage to aggregate the allocated assets into the broad categories used in the regressions. After all the assets had been allocated to specific businesses for all corporations and all years, I returned to the top of the dataset and classified each business venture as primarily serving one of the following sectors:

Oil Sector. The Oil sector includes existing oil operations and enterprises dependent on the flow of oil and cash from the large and profitable North Slope fields. These include activities such as contract drilling, oilfield services, running the electric power plant or the sewage plant at Prudhoe Bay, security services along the pipeline, and pipeline or construction camp catering. It does not include speculative investment in unproven leases or investment in infrastructure to serve speculative demand in an unexplored area. These ventures were be coded as "statewide."

Statewide Sector. The business ventures coded as statewide span a wide potential range of industries that actually included everything from mobile home sales to dog food manufacturing. They are distinguished from the "local" sector by the geographic dispersion of demand. For example, a fish processing venture confined to one plant in one town is still a statewide venture, because the product is sold into external markets. Heavily represented statewide industries include construction, real estate, fish processing, active logging (value added beyond stumpage), and tourism (hotels). Also included is speculative entry into unproven oil and gas operations, eg, a venture not dependent on the cash flow generated by the Prudhoe Bay field and funneled through the major oil companies. Generally, construction was coded as a statewide business.

Local Sector. The local sector is distinguished by the local and largely private sources of demand. It would include such ventures as renting apartments or offices, retail trade, or strictly local tourism services, such as a small hotel in a village. The local sector offers a potentially higher degree of monopoly power (in part because of small market size, locally increasing returns, and cultural loyalty to the Native provider). Competition is minimal in most cases, but the truly local market is also limited because almost by their nature any business activities supported by exogenous demand will face statewide competition.

Local Public Works. I created a separate sector called local public works to reflect construction (and some other services such as fuel distribution) for which the source of demand is local government and competitive bidding is either not used or is attenuated by local preferences that vastly favored the Native corporation. In practice, this sector only applied to the Arctic Slope Regional Corporation, which was favored by the demands of the regional Native-controlled government of the North Slope Borough. Throughout the study period, the Borough controlled essentially unlimited wealth due to its property taxing authority over the North Slope oil fields.

Passive Financial. This sector includes investments in broad portfolios of stocks and bonds, as well as long-term interest-bearing notes receivable. There is an unfortunate grey zone that arises in the numerous cases where physical business assets were sold on payment terms, and were thus converted to a note receivable. In many cases these assets had been losing money, and in some cases the new buyer was similarly unable to make them perform, thus defaulting on the associated debt. For the most part, however, the notes from these asset sales paid interest at competitive rates, and thus performed similarly to low-grade bonds purchased through the market.

The resulting mean values (across corporations) of the allocation fractions are shown in Table A-1.

Asset allocation to joint ventures

Data limitations. Standard accounting practice shows JV participation in two ways. When the Native corporation is a minority participant, its equity in the JV is typically shown as a specific net asset. This is the *equity method* of accounting and it is supposed to be reserved for those projects over which the corporation has little management control. When the Native corporation is the majority participant, the entire project is typically listed as an asset and the partner's equity is shown as a liability. This is the standard, or *cost method*. In both cases the data are biased downward compared to the true measure of the fraction of assets that is under some form of joint management. In the minority case, the use of a pure equity stake as a measure excludes the associated debt and thus understates the "size" of the project. In the majority case, the minority participant's equity stake similarly understates the size of the project. Furthermore, the accounting data give no indication of which partner is actually managing the project, although generally accepted accounting principles urge that projects over which the corporation has substantial management control be carried at cost.

Minority-share joint ventures. I coded individual assets in minority-stake joint ventures from information in the notes to the financial statements. Almost all annual reports contain summary balance sheet and income data for assets invested in joint ventures and affiliates. I allocated each asset into the JV_OIL, JV_STATE, or JV_LOCAL "sectors". according to the rules described above for allocating total assets.

TABLE B-1: MEANS OF ASSET ALLOCATION FRACTIONS

year	sector				
	passive investment (PASSIVE)	established oil sector (OIL)	non-oil statewide (STATEWIDE)	local enterprise (LOCAL)	local public works (PUBWORKS)
1976	0.29	0.05	0.50	0.11	0.05
	[.20]	[.08]	[.33]	[.15]	[.16]
1977	0.27	0.05	0.50	0.14	0.04
	[.19]	[.09]	[.27]	[.16]	[.14]
1978	0.25	0.08	0.54	0.11	0.02
	[.20]	[.13]	[.30]	[.15]	[.07]
1979	0.27	0.08	0.55	0.09	0.01
	[.19]	[.16]	[.29]	[.12]	[.05]
1980	0.50	0.06	0.39	0.04	0.01
	[.21]	[.14]	[.25]	[.05]	[.02]
1981	0.44	0.08	0.44	0.03	0.01
	[.19]	[.15]	[.22]	[.04]	[.04]
1982	0.34	0.11	0.50	0.03	0.02
	[.21]	[.15]	[.26]	[.04]	[.05]
1983	0.38	0.10	0.47	0.04	0.01
	[.21]	[.14]	[.25]	[.06]	[.04]
1984	0.39	0.09	0.46	0.05	0.01
	[.21]	[.14]	[.26]	[.09]	[.05]
1985	0.29	0.11	0.54	0.04	0.02
	[.17]	[.17]	[.29]	[.07]	[.07]
1986	0.38	0.12	0.46	0.02	0.02
	[.25]	[.19]	[.31]	[.02]	[.07]
1987	0.48	0.11	0.38	0.01	0.02
	[.24]	[.15]	[.28]	[.02]	[.06]
1988	0.56	0.10	0.31	0.01	0.02
	[.26]	[.12]	[.26]	[.01]	[.07]
1989	0.54	0.11	0.31	0.01	0.02
	[.25]	[.13]	[.26]	[.01]	[.08]
1990	0.58	0.10	0.28	0.01	0.02
	[.25]	[.13]	[.24]	[.01]	[.07]
1991	0.61	0.10	0.26	0.01	0.02
	[.24]	[.11]	[.23]	[.03]	[.05]
1992	0.58	0.10	0.29	0.01	0.02
	[.25]	[.10]	[.25]	[.03]	[.05]

notes: standard deviations in square brackets. Each mean is over 12 corporations.

Internal (all-Native) joint ventures. There were not many of these operations. The most important was a statewide bank owned by a group of regional corporations. Another consortium bought and held speculative oil leases.

Majority-share joint ventures. To conserve degrees of freedom, I lumped all majority-share JV assets into one category without regard for the underlying sector. The Doyon corporation's oil drilling operation was a majority-stake JV for many years and the data from these assets form a large part of the total in this category.

Estimates of Native Corporation Shareholder Payroll

Published data on shareholder employment and wages are available only incidentally and from a variety of scattered sources including annual reports, special studies (Waring 1989, McDowell 1985), and the business trade press. (*Alaska Business Monthly* 1986-1993, *Alaska Business and Industry*, 1976-1982) To buttress these data I conducted a mail survey soliciting employment data for 1991, 1984, and 1976. I filled in the remaining gaps using a variety of proxies, trends, and extrapolations. These can be characterized as variations on the "jobs method" and the "payroll method."

The "jobs method" consists of estimating numbers of jobs and then earnings per job. The chief challenges are (1) imputing seasonality to the many jobs that are clearly not full-time and (2) imputing an appropriate wage. I used rules of thumb to impute seasonality (chiefly in the construction and fishing industries) and published data on wage levels by industry and year to impute monthly wages.

The "payroll method" uses payroll data directly. These data are available less often. The major challenge here is to impute the correct fraction of a firm's *total* payroll to its shareholder-workers. This is complicated by the fact that many shareholders appear to work fewer months per year than their nonshareholder peers within the same company. For example, certain corporation fish-processing operations employed more than one hundred shareholders, but only for several weeks. Variations on the payroll method were sometimes available. Some corporations report contributions to defined-contribution pension plans. In other cases anecdotal data points on payroll could be tied to accounting data on expenses. The accounting data could then be extrapolated through time until another firm estimate was available.