Reindeer, Resilience and Indigenous Communities – Alaska 1940

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Introduction

European involvement in Alaska began in the aftermath of Vitus Bering's second Kamchatka Expedition in 1741/42 with Russians sailing along the coast trading for sea otters and other pelts from native Alaskan hunters. While isolated, Alaskan communities were not autarkic. That long-distance trade and markets predate the arrival of Europeans is attested by archaeological remains (Historical Atlas of Canada). We also know that reindeer skins were traded across the Bering Sea into Alaska and Eulachon (Oolichan) fish fat/grease moved from the Yukon south to northern California and as far east as Montana and Alberta. It was the scale of the new maritime trades that was new. Sea otters prized for their thick waterproof pelts were destined for sale in China. Such was the demand that the trade grew quickly with American and English traders competing with Russian. Although this was essentially a coastal ship-based trade, the Russian-American company set up posts along the coast of Alaska and further south allowing the Russian government to claim jurisdiction over Alaskan waters and territory. Over the course of a century, the decimation of the sea otter population and decreasing profitability of the Russian American Company, in conjunction with domestic retrenchment, led to an offer of sale of the territory to the United States culminating in 1867.

The second half of the nineteenth century saw the rise of commercial whaling/walrus hunting, sealing, and fishing in the Bering Sea, followed by the introduction of commercial canneries along the coast and gold discoveries in the Klondike and Nome. Commercial whaling and sealing led, as with the sea otter, to over harvesting and dramatically reduced populations (Allen, Paterson), while mining allowed some to become very rich while most were left with nothing. Yet the impact of these incursions on the lives of the indigenous populations of the regions is less well understood. Some whaling captains believed that declining whale, walrus, and seal populations were causing food insecurity for coastal communities whose lifeways were closely tied to maritime resources (Bockstock). Shifts in the Caribou migration patterns, over this same period, especially on the Seward Peninsula, further reduced hunting stocks. Indeed, it was fear of starvation among the Inuit and Indigenous communities that led the then Agent General, Sheldon Jackson, to import reindeer to Alaska in the hope they would be a local food source as they were in Siberia.

A focus on commercial whaling, canneries and mining in the economic history of Alaska has to a large extent rendered invisible the indigenous peoples of the region. Yet, it is not unreasonable to assume that the increasing penetration of US commercial economic activities and an expanding missionary presence would impact the local environments on which the traditional economies were based. Our knowledge of indigenous communities in Alaska is limited, in large measure due to a lack of accessible written source

material. This paper utilizes a previously unknown set of surveys of Indigenous households and communities conducted between 1938-1940. These surveys combine demographic structure, economic variables - both stocks and flows – and probate-level detail on the property and livestock in each household in a community.

We hope to contribute an understanding of how Inuit and Indigenous communities organized their subsistence economy in the face of ongoing shocks to their local economies, with a particular focus on the role reindeer herding played for those communities that chose to participate in the program. Martin and Sunley (2015: 12) argue that any study of resiliency is enmeshed in a four-part question: resilience of what; to what; by what means; and with what outcome. We frame our discussion of indigenous economic activity and the strength of the traditional economy around these questions. We use these household surveys to analyze both the structure of the local economies at the end of the 1930s and the extent of penetration of commercial activities on the part of these households. We pay particular attention to the role of reindeer herding and the extent to which households and communities that chose to incorporate reindeer into their subsistence economy differed from those communities that chose not to do so.[1] Because the surveys document all sources of income, they chronicle differences in local labor market opportunities in different regions of Alaska. They also document the role played by local market access; both the extent to which reindeer-owning households were able to monetize their asset either through sale of meat, hides or calves or to use that asset as basis for loans, and the extent to which other labor market opportunities such as canning, fishing, mining or sale of artisan products provided non-reindeer villagers with other sources of wage income that could be used to support traditional lifeways.

This paper thus contributes to an understanding of indigenous economic development among native communities in Alaska, a region often ignored.[2] Indeed, understanding the native economy in Alaska where indigenous communities had substantial agency and choice provides an important counterpoint to indigenous economies in the contiguous United States where agency and choice was more limited due to the Dawes Act, reservations and allotments, which were not implemented in Alaska.[3] Recent work by Bandiera et al. (2017) and Banerjee et al. 2015) have demonstrated the efficacy of livestock programs in raising the economic prospects from those at the bottom of the income distribution. We contribute to this literature in our focus on a historical livestock program in a remote environment. Finally, this paper adds to the body of knowledge on the economic history of Alaska in the first half of the twentieth century.

[1] A small literature on the reindeer program exists largely by historians (Demuth 2019; Willis 2006) and anthropologists (Anderson 1959; Burch 2012; Hawkes 1913; Schneider et al 2005).
[2] A search in Journal of Economic History returned zero papers relating or touching on Alaska; two papers in Explorations in Economic History touch on Alaska: Paterson 1977 and Massey 2016.
[3] For the contiguous US, see Leonard Carlson (1978, 1981); Anderson et al. for example (1992a, 1992b, 1994, 2004, 2008); Dippel 2014; Feir, 2016.

We begin with a description of the Alaskan economy in the first half of the nineteenth century to provide a context for understanding the community and household surveys. Section 3 provides a detailed discussion of the data followed by an empirical assessment of the role played by the commercial activities and reindeer herding. The final section incorporates concluding remarks and suggestions for further research.

2. The Changing Landscape of Native Alaskan Policy and Culture

Despite the sale of Alaska by the Czar and its purchase by the United States, neither country had legal title to the land in question. What was sold by Russia and purchased by the United States was not so much a property right over land but the right to treat with the sovereign Indigenous nations whose land had now been defined to lie within the borders of the United States. By 1867, however, US relations with its Indigenous peoples was fraught. In the early 19th century, the Supreme Court had ruled that Indigenous peoples were not sovereign foreign nations but rather domestic dependent nations who had occupation not ownership rights to land.[4] Yet, any removal from the land or cession of land required a signed treaty between both parties. But, in 1871, the Federal government unilaterally declared the end of the treaty making with Indigenous nations and communities. By this time much of the land in the contiguous United States had been ceded by indigenous nations but it left unresolved Alaskan native claims to their property in land; an issue only resolved in 1971 with the Alaska Native Claims Settlement Act.

Politically, Alaska was integrated into the United States through a series of Acts. With the first Organic Act, in 1884, Alaska became a civil and judicial district of the United States under the authority of an Agent General for Education, Sheldon Jackson.[5] Despite the end of treaty making, this Act stated that "the Indians … 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 people may acquire title to such lands is reserved for future" deliberation.[6] What was left unstated was a discussion of the role of outside influences on indigenous communities such as mining or fishing. With the second Organic Act in 1912, Alaska became a Territory with a territorial governor and a territorial legislature with its capital in Juneau. Fishing, mining and game, however, remained under the purview of the federal Government. Eligibility to vote either for the Alaskan legislate or the Federal Congress required a person to have been seven years a citizen, have lived in the district for two years and be older than twenty-four. This disenfranchised all native Alaskans and indeed, all Indigenous peoples. Congress passed the Indian Citizenship Act (also known as the Snyder Act) in 1924.[7] Alaska became a state in 1959.

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[4] These rulings came in a set of Supreme Court cases known as the 'Marshall Trilogy.'
[5] Jackson had been the Rocky Mountain superintendent of missions for the Presbyterian church. (Willis, 280).
[6] 23 Stat.24 – May 17, 1884, section 8.
[7] 43 Stat. 253, June 2, 1924: An Act to authorize the Secretary of the Interior to issue certificates of citizenship to Indians.

Alaska, then as now, was remote (depending on one's starting point) and rural, with a large land area, a challenging climate and a low population density. There was a large number of Indigenous nations differing linguistically and politically. Eyak, Haida, Tsimshian and Tlingit nations or communities lived along the panhandle, Unangax and Alutiiq on the Aleutian Island chain, Yup'ik and Cup'ik and Inupiaq and St Laurence Island Yupik along the coast and various communities of Athabascan speaking communities in the interior. This was and is a diverse, multi-ethnic environment.

Indigenous subsistence economy

The Indigenous subsistence economy depended on the land/water and its seasons much as it did for any farmer. This subsistence economy was socially embedded and part of indigenous culture (Sloan 2017). As farmers tilled, planted, cropped and harvested crops and animals on a given area of land, native Alaskans moved across the land in various seasons. Often described as a seasonal round moving from hunting to fishing, to collecting eggs, berries, greens as the resources and seasons permitted. Sloan (2017) describes the extensive food resources used through the seasons for the Quinhagak who live in the region of the surveys but were not one of the villages surveyed. Mammals, birds, and fish were the major food resources which was both eaten fresh or salted, smoked or frozen for the winter months when hunting could be more difficult. Berries and greens were collected during the summer months. Living in an Arctic or subarctic environment imposed high caloric demands on the body and adult males need over four thousand calories a day (Carlos and Lewis, 2010). Too much snow, too little snow, early freeze, late freeze or early spring thaw could each change the dynamic of the food provisioning system.[8] In such an environment, the introduction of reindeer could provide insurance against shortfalls in other resources.

These resources provide more than just clothing. Mammal skins and hides provides clothing and tent material. Bones were used to create sewing needles and sled runners; seal oil and blubber for cooking oil and light; wood was used for heating and spears and arrow shafts; stone was crafted into hatchets, cutting blades and awls; sinews were used for cords and sewing thread; while flint and obsidian were used for arrow heads. To the extent that resources such as flint or obsidian were not locally available, archaeological remains shows they could be obtained through trade (Historical Atlas of Canada Plate 1983). Neither stone or bone tools nor traditional hunting with traditional spears disappeared with European contact. Indeed, they remained part of local lifeways into the twentieth century.[9]

European contact with Indigenous peoples on the east and west coasts made available to them a range of new commodities and a range of new diseases. European commodities did not immediately displace native commodities because Indigenous consumers were fastidious in their choices. Nonetheless,

[8] Climate change in Alaska is already posing a major problem especially for maritime communities.
[9] Archaeological digs in southwestern Ontario and in Colorado and Utah.

contact provided commodities both utilitarian, such as metal -pots, needles, awls - and luxury - beads, lace and mirrors (Carlos and Lewis paper and 2010). Guns, shot and powder were also purchased but until the late nineteenth century guns handled poorly in arctic and sub-arctic climates and powder was difficult to keep dry.[10] Interior or remote communities acquired goods through a documented second-hand trade (Ray). Iron tools, needles, awls and pots must have an impact on household productivity reducing the time needed for tasks; just as today, four-wheelers, snow machines, boats, and motors increase accessibility to resources (Sloan 2017: 245). Acquisition, however, required barter trade or purchase. Thus, with European contact, indigenous communities had to make decisions about the extent of that contact, the extent of reliance on non-household made commodities, and with those decisions came potential changes in indigenous lifeways.

Intrusions from Outside

The first census in 1880 estimated a population of about 33,000 with fewer than 2% white.[11] However, Alaskan inclusion in the territorial domain of the United States increased the non-indigenous population. In 1890, the overall population remained essentially unchanged but with growth in the non-native population to 10%. With the gold rushes in the 1890s, the census population in 1900 doubled to 63,500 of which half were white; it fell to 55,000 in 1920, increasing by 4,000 in 1930 and reaching 72,524 in the 1940 census; again half native and half non-native. The population per square mile in 1940 was 0.1 relative to 44.2 in the contiguous states. Given the population size, most communities were rural and small; the largest city in 1940 was Juneau with a population of only 5,729. Even today, Alaska with an estimated population of just over 700,000 remains rural and low density and village communities small.[12]

Manufacturing in the first decades of the twentieth century was dominated by fish canning and processing. Of the 222 establishments listed in the Statistical Abstract for 1940, fish canning and processing dominated with 139; the next largest number were in bread and other bakery products (24 establishments) and lumber and timber products (18 establishments).[13] Across all industries, the number of wage earners for the year was 4,810 out of a population of 72,000, most of whom not surprisingly worked in fish canning and processing. The manufacturing sector was dominated by resource based, small scale plants with the average number employed in a fish canning and processing establishment being 39. The number and size of these establishments might suggest minimal impact on local economies by 1940, though the seasonal nature of activities might also have been attractive.

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[10] A flaw in a metal product left it open to frost wedging resulting in hatchets shatters on impact and guns on firing.
[11] https://live.laborstats.alaska.gov/cen/histpdfs/1880Census.pdf Special agent Ivan Petroff conducted the survey and is unusual in that he tabulated, white, creole, Eskimo, Aleut, Athabascan, Tlingit, Hiada and other groups specific to particular regions. The 1940 census tabulates indigenous population only as Aleut, Eskimo and Indian.
[12] In 1940, Anchorage had a population of 3,495; Sitka 1,987; Nome 1,559. In 2020, the largest city population was in Anchorage with 298,595 followed Juneau with 32,756.
[13] Statistical Abstract of the United States 1940 www2.census.gov/publications/1941/compendia/statab/62ed/1940-02

Another new industry introduced to Alaska in the 1890s was reindeer herding. Reindeer are domesticated Caribou and the same species.[14] Believing indigenous communities to be facing food insecurity due to falling whaling, walrus, and seal populations, combined with shifts in the Caribou migration patterns (Burch; Demuth), Jackson petitioned Congress for funds to import reindeer arguing that rather than simply feeding people it would be better and cheaper "to introduce into northern Alaska the domesticated reindeer of Siberia, and train the Eskimo young men in their management, care, and propagation."[15] When denied, Jackson crowd-sourced his request, placing advertisements in major Eastern newspapers asking for donations, receiving over $2000.[16] In the face of this support, he was granted permission to use the US Revenue Cutter *Bear* to import reindeer and establish the Teller Reindeer Station on the Seward Peninsula. In 1893, Congress allocated $6000 for the project and more in subsequent years. In 1894 small numbers of reindeer were distributed among four other missions along the coast and the Yukon River delta.[17] Reindeer continued to be imported annually until 1902 when the Czarist government forbade the export of reindeer, by which time, there were an estimated 6000 reindeer on the Seward peninsula.[18]

The Program was initially organized through missionary schools where indigenous men and youth who wanted to learn reindeer herding could choose to participate (Demuth, 2019; ch 5). Jackson set out a five-year apprenticeship, at the end of which, each person would receive five to ten reindeer for each year of the apprenticeship plus a loan of 50 reindeer (Olson, 1969). However, anger among Indigenous communities about the slow dispersion of reindeer caused the Department of Interior to investigate in 1905. Two years later Jackson was removed from his post and control of the program shifting to the newly formed U.S. Reindeer Service under the Bureau of Education. The 1905 report also required that reindeer be transferred to Inupiat, Yupik on St. Lawrence Island and other indigenous communities who desired to participate (Demuth 2019; Willis 2006).[19]

By 1910, reindeer herds were owned by Inupiat, Aleut, Tlingit and Native American communities, the Saami (on completion of their contracts), and mission apprentices.[20] Alaskan natives were prohibited from selling reindeer to non-natives.[21] That prohibition did not extend to Saami, and, in 1914, one sold his

[14] Caribou and Reindeer both are *Rangifer tarnadus*.
[15] Quoted in Anderson from Jackson's Report (1889-90:1292), p. 96.
[16] He asked people for funding to save the starving Eskimos. The $2000 received is over $53,400in 2020 (www.measuringworth.com/calculators/uscompare/relativevalue.php)
[17] 100 reindeer were given to each of the following stations: The Congregationalist at Cape Prince of Wales; the Swedish Evangelical Church, at Golovin Bay; the Roman Catholic Church, on the Yukon River; and the Presbyterian Church, at St. Lawrence Island (Jackson, 1894).
[18] For a complete description of the organization of the program see Stern et al (1980) and Willis (2006).
[19] No community or household was forced to participate in the program.
[20] In 1906 there were 31 apprentices supported by missions and 14 supported directly by the Bureau of Education (Jackson, 1907). See also Willis (2006: 292).
[21] There some also some prohibitions on selling female calves but Native Alaskans could cull male calves.

herd of 1,200 reindeer to Carl Lomen, a Nome businessman, who formed Lomen and Company. It is estimated that the Lomen herd grew to over two hundred and fifty thousand animals by the middle of the 1930s.[22] Perhaps to minimize stress on range land, to minimize labor requirements in herding, or to reduce competition between families, native owners who began to amalgamate herds, creating local stock companies at the village level.[23] By 1933, Olson (1969) says there were 78 such companies with 5,878 members, whereas the report of the Government of the Territory of Alaska for the years 1937, lists 51 associations with 3,734 members.[24] We begin our analysis of resilience with a discussion of the survey data examining the structure of indigenous communities by 1940.

3. Data

The data come from economic surveys of Native Alaskan villages conducted by the Credit Section of the Alaska Extension Division of the Bureau of Indian Affairs.[25] These surveys were part of a seven record series commissioned by the Bureau of Indian Affairs - the Household Economic Survey is one of the earliest in this series. [26] It is likely that the surveys were conducted by the Bureau when it took over the operation of the reindeer program in 1936 under the Alaska Reorganization Act (which encouraged the formation of village governments as opposed to traditional governing practices, with the enticement of federal loans for native economic activities). The surveys cover thirteen communities with 367 Native Alaskan households and 1,833 individuals, which constitutes a 5.6% sample of Native Alaskans.[27] As shown in Map 1, there is substantial variation in the geographic location of the chosen villages. Although mainly located on the coast, three villages are located inland, two in Central Alaska up the Yukon River and one up the Kwethluk River. The villages communities are diverse, not just in terms of location but also by race and language: Inupiat, Aleut, Tlingit, and Athabaskan-speaking communities.

The data represent a survey of native households only. In Table 1, we document village populations across the twentieth century; the survey population relative to the 1940 census populations, and to the size of the indigenous population in these villages in 2010. In eleven of the thirteen villages, the survey population was at least 70% of the 1940 census population and, in five villages, the survey population constituted over 90% of the 1940 census population. These are representative communities. Only the

[22] Lomen and Company looked to the contiguous states as a market and invested in refrigeration, storage and some shipping. In 1936, they sold their herd (counted at 150,000 animals) to the Federal Government for $500,000.
[23] Records of stock ownership were kept in a journal. Taxes collected from the members went into a treasury to pay for equipment and groceries. See Schnieder, Kielland, Finstad, 2005 and Arobio, Naylor, and Thomas, 1980.
[24] These data are included at the end of the economic survey for Kwethluk 1939.
[25] To the best of our knowledge, these data have never been examined or utilized.
[26] National Archives and Records Administration, "American Indians: A Select Catalog of National Archives Microfilm Publications," Washington DC, 1998.
[27] The 1940 census gives the indigenous population as 32,485 of which 5,599 Aleut, 15,576 Eskimo, and 11, 283 Indian (Native American).

three communities located in the panhandle, Hoonah, Kasaan, and Ketchikan, have large non-native populations in 2010, and only Hoonah and Ketchikan had a significant non-native presence in 1940.

Each village was surveyed once between 1938 and 1941, although not in the same month for all villages.[28] Because the survey was conducted at the household level, it provides a unique and, we would argue, a representative cross-sectional glimpse into the economic activities and quality of life of indigenous communities in Alaska at the end of the Great Depression and on the eve of World War II.[29]

The survey instrument used is impressive in its detail with fifteen higher level component sections and extensive detail on the constituent elements in each component. The variables, given in Appendix Table A1 (available from the authors) document demographic and economic structure at the household level and economic activity and flows of production for home consumption and sale, and local employment opportunities.

Family Composition

Each survey begins by listing, for each household, the total number of people, gender breakdown, household members by age bracket, but not gender by age, and degree of race for members of the village. Age is given in ten-year intervals from 10 to 59. There is a 60+ grouping and, at the lower end, under age 5 and 5-10. Summary statistics on household composition are given in Table 2. Although the villages vary in size, none were large, which is standard for communities in Alaska even today. Average household size was larger than the United States average of 3.76 individuals with the exception of Kasaan (3.5) and Taitlek (3.8) respectively. Elim has the largest average household size with 6.3 individuals.

Perhaps not surprisingly as a mining and pelagic fishing center, the gender ratio in Alaska in the 1940 census was 55% male. What is perhaps surprising is that across these villages, the ratio of men to women is 52.8% and as high as 61.2% male in Stevens Village.[30] Relative to the age composition given in the 1940 US census, individuals in the sample of villages are less represented in all age categories over 30 years of age than in the country as a whole. In other words, these villages were younger than the average for the US population perhaps only because they had fewer older inhabitants.[31]

The survey reported on race and the degree to which a person was considered to be wholly indigenous: Inupiat, Aleut or Native American. In two villages, Elim with 70 persons and Ketchikan with

[28] Kasaan was surveyed some time in 1938 and Stebbins August 1938: In 1939 Kwethluk January, Tatitlek February, Ketchikan April, Unalakleet June, White Mountain and Venetie July, Stevens Village August, Elim and Hoonah were also in 1939; Karluk in November 1940 and Mekoryuk in February 1941.
[29] WWII saw a strong military and coastguard presence in Alaska and now Joint Base Elmendorf-Richardson.
[30] Unfortunately, we do not know relationship among individuals in a household. Although connection to head of household is in the 1940 census, unfortunately, Alaska is not in the digitally available full count 1940 census.
[31] Speculatively, this may result, in part, from the 1900 measles and influenza epidemic and then 1918 Spanish Influenza, which had higher mortality rates for those in the middle decades rather than the very young or very old. It could also just reflect lower life expectancy.

183, the survey taker left this section blank. For Karluk on Kodiak Island, the surveyor (who was the local teacher) noted that there were no fully indigenous Aleuts rather all were mixed race. One white and two Filipinos were noted in Hoonan households and two whites in Kasaan, both villages on the Alaskan panhandle and closer to the main urban areas. While not noted by household, the surveyors wrote that Kwethluk, Mekoryuk and Stebbins as wholly Eskimo (Inupiat) and Tatilek as wholly Aleut.[32]

Durable Assets by class

There is detailed information on durable assets which are categorized as housing, outbuildings, livestock, equipment for fishing, hunting and garden, household goods and chattels and mining claims. For each, the survey gives the item by number and value and then a total value within each category for each household. We hand entered the survey and checked the row and column totals against the row and column totals given by the survey. The level of accuracy was very high with few differences between the originals and the summations on our spreadsheet.[33] Rather than present the data in each asset class at the household level, we show, in Table 3, the average household durable asset value by village. Obviously, the village average hides the variation across households but it does allow for comparison across durable goods holding by village/location.

For most households, housing is a major asset. The survey reports on the type, quality and value of the housing stock and outbuildings. It covers construction material, dimensions of the house, number of rooms, value of the house, as well as its condition as determined by the survey taker. The survey then reported on the number of outbuildings, their purpose and value, the size of the garden and the sanitary condition of the grounds. Houses are owner-occupied. Renters were noted and sometimes it gives the third party, such as two houses in Tatitlek owned by a church.[34] However, renting was uncommon. In total, three of fifty-five households in Hoonah are listed as renting and one household as living on a boat, while in Ketchikan, ten of thirty-four households rented, which may reflect its location at the end of the panhandle. The survey included a column for second houses owned, but this occurred only in Hoonah where seven of the 55 families owned a second house, three in Hoonah, one in Juneau, and one in Sitka. Population dynamics in the panhandle no doubt provided a transitory population of renters.[35]

Houses were very small, comprising one to two rooms on average, running in total to about 400 square feet but with variance both within and across villages. Hoonah has the largest average square footage at 567 and Mekoryuk the smallest at 270 square feet. Taking Karluk as an example, one house was very

[32] The surveyor for Tatitlek noted that the villagers stated they were all full-blood Aleuts, which conforms to modern linguistic maps. The survey taker also wrote that "according to the Rev. A.P. Kashevaroff, a Russian priest, in charge of the Territorial Museum, a recognized authority on Alaska and who lived in Tatitlek, the people are Eskimo not Aleuts."

[33] When the totals differed we rechecked and if no entry errors were found, we took the total from the spreadsheet.

[34] A further notation stated that one household was renting but planned to build.

[35] The survey is silent on the occupancy of these houses.

small at 168 square feet but another in the community was 800 square feet. There is a positive correlation between the number of household members and the size of the dwelling.[36] Commensurate with their size and location, house values are low, column 2 of Table 3, and especially so relative to the median US house value which in 1940 was $2,938 ($42,700 in 2020 dollars). The average in all but two villages was below $500. The average housing value for Hoonan was $762.70. For Ketchikan, no doubt due to its location and the size of the urban market, the average house value was $1,945.80 ($28,300 in 2020 dollars).[37] Most households had at least one outbuilding whose use was given as toilet, smokehouse, boathouse, shed, cache or fish cache, or barn; respective values of outbuildings is given in column 3 Table 3. Outbuildings predominantly comprised toilets, storage, and smoking sheds.

In detail that one generally sees only in a probate inventory, the surveys give an itemized list of the number and value of household goods: stoves, sewing machines, radios and phonographs, washing machines, tables, chairs, benches, beds, cupboards, bedding, rugs, pictures, clothing, jewelry, rugs, dishes, silverware. The average value by village is given in column 4 Table 3. The village with the highest average value per household was Ketchikan with $1,102.70 per household. Stevens Village had the lowest average value reflecting, we would argue, its location in the interior of Alaska and access to markets.[38] Items such as stoves, washing machines, sewing machines, radios and phonographs, for example, would all have had to be purchased commercially.

Analogous to the household durables and personal property category is outdoor equipment. The average value of equipment per village is listed in column 5 of Table 3. Equipment reflects durables goods such as engines and chargers, saws, boats (sail, power, rowing), sleds, rifles and shotguns, other hunting equipment, animal traps, fishnets, fishing tackle, seines, tents, boots and snow shoes.[39] For many villages the average value of outdoor equipment exceeded buildings, household durables or personal property. Average value was highest in Hoonah at $1557.71 and lowest in Karluk with $161.62 and Stevens with $289.88. This category represented the largest asset by source over all communities and reflected the work tools for this population for fishing, hunting and trapping. As with household durables, animal traps, rifles, or engines would have been purchased commercially or on the second-hand market.

Reindeer ownership is captured in the livestock questions. The survey breaks livestock into four separate categories by number and value: reindeer, dogs, chickens and geese. The categories belie the reality. Only one household in Hoonah owned some chickens and one goose, in Karluk there were a few

[36] Houses may have been extended necessary. They also had to be heated in the winter.
[37] Measuring Worth. https://www.measuringworth.com/calculators/uscompare/relativevalue.php accessed June 29, 2020.
[38] Stevens Village has lower valuations across all categories.
[39] For the complete list of items see Appendix Table A1.

cows and in Venetie, one moose.[40] Thus livestock reflected ownership of reindeer and dogs. Dogs were and are valuable assets. Households could supply transportation services or sell trained sled-dogs. Dogs were owned in Stebbins, Stevens Village, Unalekleet and White Mountain. Male dogs in Kwethluk were valued between $10 and $20 per dog, $10 to $25 in Stebbins and $10 to $15 per animal in Unalekleet.[41] In Mekoryuk both male and female dogs had a uniform value of $5 per animal and $10 per animal in Stevens Village. Reindeer are valued between $5 to $10 per animal and are listed in Elim, Kwethluk, Mekoryuk, Unalekleet and White Mountain, but not all families within a community owned reindeer. Reindeer could also be used for transportation if the animal was trained from an early age to pull a sled. They were also a source of hides for clothing, such as parkas, and meat for families and dogs.[42] The average value for communities with reindeer and dogs is given in column 7, Table 3.[43]

Value of income flows

Durable goods tell us what these households owned. In order to acquire these items, households had to have some income flow. What makes the surveys particularly important is that that they asked about income by source, whether from home production/consumption, the sale of assets or consumer durables, wages earned from market work, or income from pensions and relief. The survey also distinguished between the value of goods on hand (for future consumption or sale. The categories for home production/sale were listed as arts & crafts and pelts, garden produce, fish & seafood.

In no village was there zero income earned but the source of that income differed from one village to another. Average income by village by source is given in Table 4, which needs to be read very carefully. The entries represent not the average across all households in the village but rather the average for only those households reporting a positive value in that particular category. The community average would be lower, and considerably lower in some villages as some households had zero income. Using the village average gives a misleading view of the potential value of market interaction. We do note if only one or two households reported income or goods on hand. Regardless Table 4 shows that, by and large, little income was earned from market sales. The value lies in the home consumption.[44]

Arts, crafts and pelts combines two very different activities and although we can disentangle arts and crafts from pelts in a number of the surveys, but not all. So, we report the data as given on the survey. The items noted in this category are parkas, moccasins, gloves, baskets, ivory carving, boots, totems,

[40] Winter feed for cows is expensive winter feed where the winters are very long.
[41] No female dogs were listed.
[42] Reindeer, as did dogs, had to be carefully trained to accept a sled which was more difficult if reindeer are out on the range and not domesticated living within the community as they were in Siberia.
[43] There is a statistically insignificant but positive relationship between the number of dogs and number of reindeer within reindeer-owning villages.
[44] The survey asks for food on hand. The data underestimate the true value of home consumption because we do not know when food was caught or stored and the survey was conducted in different months for communities.

pottery, rugs and blankets (see Appendix Table A1). Clothing items had value both for home consumption and for sale. Pelts could be sold as pelts or transformed into clothing items. Venetie is the one village where the sale of pelts comprised a large income source from trapping with the total value of pelts sold comprising $10,207 across 15 families.

Columns 3 and 4 report on garden produce, and fish and seafood. To be clear, what is shown is the value of goods on hand and income from items sold. Very few households sold garden produce or fish and seafood and what the table ignores is the value of total production of these items to household welfare. Fish and seafood, meat, and garden produce were all items that were caught and processed in the household for annual consumption. The survey asks for total production in each category and the amount on hand on the date of the survey which occurred at different times of the year across the villages. The range of seafood consumed was enormous, though again it differed across villages and locations. Salmon dominated in most villages with large levels of harvest: fresh, smoked, dried, salted, canned. Households also consumed cod, crabs, herring, seal, halibut, fish eggs, clams, mussels, and, in Stebbins, whale.[45] In Mekoryuk, dried seal dominated the catch at 126,600 lbs. At the time of the survey, the village had 20,420 lbs on hand. Although one family lists caribou meat, reindeer does not appear as a protein source for these households. It could serve, however, as a meat source for dogs. Not shown in Table 4, two villages had income from the sale of livestock; Elim earned an average of $3.18 from the sale of reindeer, while Stebbins earned an average income of $138 from the sale of dogs.

The survey also asks about garden produce. Families also collected berries and dock leaves. The survey taker for Stebbins notes that "nineteen of the twenty-two families of Stebbins gathered greens (willow leaves, buds and some species of wild rhubarb) and berries, another indication of the fine energetic character of these Eskimo people." He went on to write: "It is fully believed that with some instruction, seed supply, a pressure cooker and encouragement, the people would grow vegetables and gather other foods for home use."[46] It would appear more wishful thinking because in reality, the climate circumscribed what would grow in the short growing season to turnips, potatoes and lettuce.

A major source of outside income came from wages earned in commercial activities given in column 5 of Table 4. Wages from canning and fishing are largest in Hoonah, Kasaan and Ketchikan, the three communities on the panhandle, with an average $435, $677 and $918 respectively. Wages also came from boat building, transportation services, carrying mail, and cutting wood. Five villages had income from pensions or relief but unfortunately the source was generally not described except for ten of thirteen families in Tatitlek who worked during 1938 for the Credit Conservation Corps (CCC) for an average income of

[45] The survey taker noted that "every family in Stebbins caught and processed fish and seafoods for use of themselves and their sled dogs during the winter". In Kwethluk, salmon was used as food for sled dogs.
[46] Found noted under column for Lettuce but with no mention of the length of the growing season.

$385.[47] The seasonal nature of much of this work would be more compatible with traditional hunting and fishing practices than annual factory work (for example). The income earned from sales of commodities and from wage labor could be used to buy the durable goods needed for hunting and fishing activities and for household goods.

Liabilities

In the previous sections we implied that the capital goods were purchased from income earned from market activities. But the finance of durable goods could have occurred through borrowing to be repaid from future income. The survey does provide information on liabilities but in contrast to other components, the delineation is sparse with only three sources of indebtedness listed: indebtedness for capital goods; indebtedness for clothing and food; and "other" indebtedness. In a few surveys, the survey taker listed only the total liabilities for the household and, in one case, the total liabilities for the village. What we know of the structure of liabilities is shown in Table 5 where we give average liabilities owed by village, again measured for only those households with debts owing. The village average over all households would be quite low at $61.70 for capital goods and $49.35 for clothing and food. Indebtedness for capital goods is extremely high in Kasaan but this was due to one family.

The issue, of course, is not so much that the particular amounts owed were low or high but the extent to which households were able to finance their liabilities. Because we know nothing about the maturity of the debts, whether they were all due over the coming year or had a longer maturity, we can say little about liquidity per se, but we can ask about solvency. We know the asset, income and wages for each family in the survey year in addition to their liabilities and so we ask whether families could cover their debts from either assets or income and wages. Selling assets to cover liabilities would mean selling equipment and tools which were used to provide for home production and consumption and so, while covering debts in the short term, had longer term consequences on future income streams.

Comparing the value of average asset holdings in Table 3 with liabilities in Table 5 suggests that most families had assets large enough to cover liabilities. More reasonable, we think is to compare average income and wages to average liabilities and ask if families were solvent in this sense. This is shown in column 6 of Table 5. In all but four villages, for those families with liabilities, average income and wages covered liabilities. It was not the case in Karluk or Mekoryuk, where across those families with liabilities, had negative net worth of -$177.67 and -$3.92. In Kasaan, the liabilities are basically held by one family with capital indebtedness of $6,000, wages and income of $1,200, and assets valued at $12,175 (most in equipment assets).[48] With an interest rate of 5%, income and wages for this family would cover the interest

[47] The survey notes that the "the sources of cash income during the eleven months recorded were limited to wages received from cannery and fishing activities, and from a CCC trail and bridge project carried on during the period covered January to November 1938 inclusive." Noted on survey under the column on wages.

[48] The large equipment value included the value of the capital debt for a power boat.

charge of $300. In the fourth case, Stebbins, the survey taker only listed the total indebtedness across all households and not by household, so we cannot look at average income and wages relative to liabilities at the household level. Overall, however, it would appear that households were solvent and able to manage any debts owing from annual earnings and these communities were able to use the market sectors to support the traditional economy.

The survey gives some information on the ways in which the market economy and the traditional intersected. What we now want to explore is whether the household/community choice to incorporate reindeer into their economies in 1900 distinguished those household/communities by 1940.

4. Methodology

We begin by comparing income, assets, and liabilities of individuals in villages that owned reindeer to income, assets, and liabilities of individuals in villages that did not have reindeer estimating of equation (1):

$$y_i = \beta X_i + \alpha 1(Presence\ of\ reindeer)_v + \varepsilon_i \qquad (1)$$

where i indicates a household within village v. The term X_i contains household-level characteristics such as the number of working age adults, sex distribution, and number of family members. The coefficient of interest is α, which indicates the effect of living in a village in which there are reindeer herders, and $1(Presence\ of\ reindeer)$ is an indicator function equal to one if there are any reindeer-owning households in a village, and zero otherwise. We run separate specifications in which the dependent variable is household income, household assets, household assets net livestock assets, or household liabilities, with errors clustered at the village level.[49] Construction of a dummy variable equal to one if the village herds reindeer (instead of at the household level) reflects the village-wide benefits from belonging to a herding village such as a sharing of meat and employment opportunities. Indeed, the sharing of food, or an ethic of generosity, is very important in indigenous culture.

Identification of α is achieved from variation in whether or not households in the village owned reindeer. We use distance from the first mission as an instrumental variable to tease out random variation in the indicator variable for presence of reindeer in a village. Use of this instrument requires a strong first stage that satisfies the exclusion restriction. We find that reindeer herding was more concentrated closer to the first mission with a Montiel-Pflueger robust weak instrument test F-stat of 442.8 for our first stage (see Table 8). Distance to the first mission satisfies the exclusion restriction if placement of the first mission had no effect on income except through the introduction of reindeer. Given this region had been on caribou migration routes, the environment was also suitable for reindeer.

[49] We cluster the error term at the village level to account for unobservables affecting our outcome measures that may be correlated within a village.

We also examine whether households with reindeer have different outcomes than those without by estimating equation (2):

$$y_i = \beta X_i + \alpha 1(Household\ has\ Reindeer)_v + \varepsilon_i. \quad (2)$$

In this specification, the indicator function $1(Household\ has\ Reindeer)_v$ is equal to one if a household reports ownership of any reindeer, or zero is they report no ownership of reindeer. We again cluster the standard errors at the village level.

To determine the extent to which the number of reindeer present in a village affects economic outcomes, we estimate the following specification:

$$y_i = \beta X_i + \alpha 1(Per\ Capita\ Number\ of\ Reindeer)_v + \varepsilon_i. \quad (3)$$

In this specification, α captures the effect of having more reindeer per capita on household economic outcomes. We present results with robust and clustered errors at the village level. Unlike the first specification, the issue of endogeneity is less clear in the use of a household and a per capita measure of reindeer as in equations 2 and 3. It might be the case that reindeer ownership and herd size is dependent on unobserved family traits, such as motivation, that concurrently determine household income and other outcomes. Additionally, because growth of reindeer herds depended on the number of fawns produced within the herd, the amount of time a herder spent with the reindeer could affect the size of the herd. On the other hand, reindeer herd size is arguably more a function of weather, predation, and the subsistence needs of the village (which is largely a function of village population). Therefore, variation in per capita reindeer may be plausibly exogenous.

We cluster our standard errors in all specifications due to within-village dependence of errors that arise when variation in reindeer occurs at the village-level. If we assume independence, we will likely underestimate the OLS standard errors and over-reject the null hypotheses of no significant relationship. A standard correction for within-group dependence is to cluster by group.

5. Results

We present the OLS and IV estimation for each equation looking at the impact of the dependent variable on wages, total assets, assets net of reindeer, and total liabilities. Table 7 reports the estimation results from the first regression specification (equation 1) on the presence of reindeer in a village or the extensive margin. The OLS estimation says that the presence of reindeer in a village is associated with higher assets, which we would expect given the number of reindeer are a direct input into total assets. However, we also observe lower wages, lower assets net of reindeer, and lower total liabilities, on average, for villages where reindeer herding is practiced. In terms of assets, our OLS estimates reveal that reindeer herding in a village is associated with $1,209 more in total assets (including the value of reindeer) but $583 less in assets net the value of reindeer on average but the results are not statistically significant. Both asset

variables are related to the number of working age household members. However, in essence none of these results are significantly significant implying no difference between villages with reindeer and those without.

When we use distance to the first mission as an instrument, the effects become larger and in three of the four variables, significant. The first stage of the IV regressions is presented in Table 8. The first stage is strongest for whether there are reindeer present in a village; the relationship between distance to the first mission and per capita reindeer is weak. We cautiously present instrumented per capita reindeer results in Table 10. Once we instrument, the presence of reindeer in a village implies significantly lower wages by $364 and significantly lower assets net of reindeer by $1,950. (See Table 7). These villages also have lower total assets by about $232, although this is not significant. But equally important, these villages have significantly lower total liabilities of $158 per household. Now the number of working age members in the household has a strong and significant impact on wages, assets, and assets net reindeer values. Working-age members, although increasing total liabilities, do not have a significant effect.

In tables available on demand, we run the same regression but taking the natural log of wages, assets, and liabilities, which reduce the sample size to those households with a nonzero wage, asset and liability values. We also report results from a Poisson model that allows for zero wages, assets, and liabilities. These models produce results that are statistically insignificant, but again suggest that villages with reindeer have less income, more assets, less assets net reindeer, and less liabilities.

In Table 9 we report results for income, assets, and liabilities regressed on an indicator for whether a household rather than a village owns reindeer. From the OLS estimates households that owned reindeer had higher income, higher assets, but lower assets net of reindeer and lower liabilities. However, only the estimate on total assets and total liabilities was significant. The OLS estimates show that households with reindeer had nearly $3,000 more in assets than household without but were not significantly different in assets net the value of reindeer than households without reindeer. At the same time, households with reindeer had $165 less liabilities than households without. The instrumented results show no difference in assets but a large, negative difference in the value of assets net reindeer of $3,602. The instrument result on liabilities has these households holding even fewer liabilities, minus $290 versus minus $165. Estimates using per capita reindeer instead of an indicator variable are provided in Table 10. Because we are using per-capita reindeer, the point estimates are smaller, but we continue to find that reindeer are negatively associated with income and net assets as well as lower liabilities. These results are robust to our log-linear and Poisson estimations, available on demand.

6. Discussion

Traditional hunter-gatherer communities are often implicitly or even explicitly considered in the context of economic development where they are seen as less developed or less modern. A classic example would be Rostow's stages of growth. What such models do is to remove choice from indigenous

communities. They do not allow that those communities might not want to transition from their lifeways to something other or not allow those communities to choose which aspects they wish to incorporate. With the incorporation of Alaska into the United States in 1867, the territory provided economic opportunities for American commercial whaling, fishing, and mining and thus for the migration of non-native people seeking wealth or jobs. The surveys conducted by the Credit Bureau at the end of the 1930s provide unparalleled insight into the choices made by these thirteen representative communities with respect to these more commercial opportunities and to the introduction of new livestock herding.

Traditional lifeways not only provide food and shelter but also support and re-confirm the cultural and spiritual beliefs of those communities. The surveys show that hunting, gathering and fishing were central to the food security of each of the communities surveyed. Hunting, fishing, egg collecting would each have taken place in the appropriate season and the food smoked, dried, or frozen to last over the coming months of winter scarcity. But what these surveys show is, we argue is that these communities made use of the new opportunities available to them to reduce the physical labor involved in these activities and to enhance productivity. Guns, metal traps, outboard motors would all have made hunting and fishing less physically onerous, just as snow mobiles and four-wheelers do in today's Alaskan communities. But it is also very clear that women took equal advantage of the opportunities to reduce the physical toil of home production with stoves for food preparation, washing machine for laundry, sewing machines for making garments. Reducing hours needed for such labor would increase time for leisure, of course, but the time freed up could also be used to produce arts and crafts for market sale.

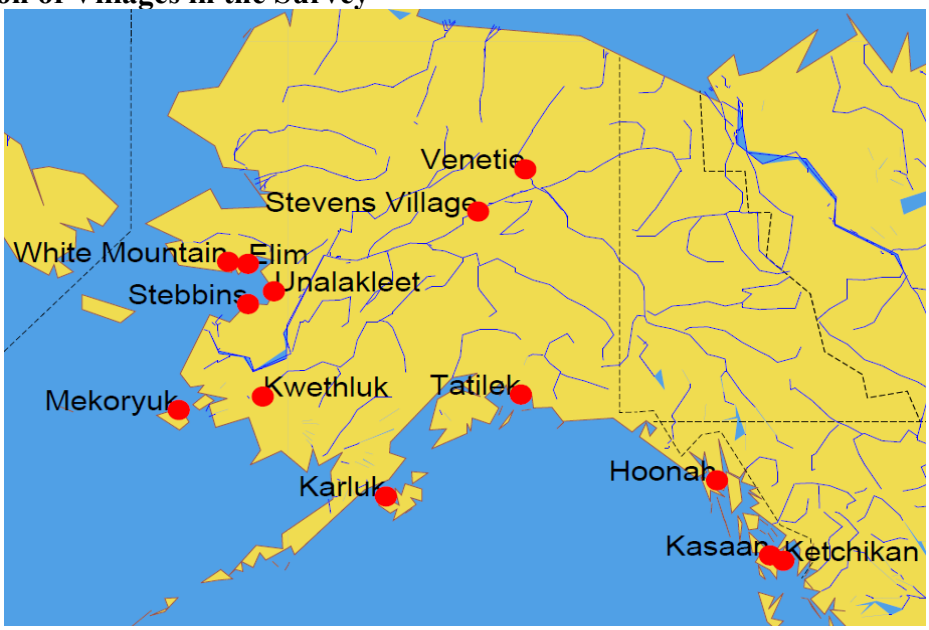
The surveys document the interactions between the traditional and the commercial. This is evident in the sale of pelts, arts and crafts, clothing or fish. The surveys also document the provision of labor in fishing, canning, mining and in transportation services. As Frank Tough (2013) has documented for northern Ontario and northern Manitoba, these activities are compatible with the time demands of the traditional lifeways. But perhaps the more important finding from the descriptive statistics and the estimation are those relating to financial solvency on the part of these households and villages. These households and communities used the market for the income needed to purchase household and work durables. At the same time, none of these households were living beyond their means. None were insolvent and none were illiquid. Their future actions were not dictated by their debt levels.

Of interest, also, are the subtle differences between the communities that chose to incorporate reindeer holdings in the early nineteenth century. Of course, we do not know if some of the villages without reindeer had had reindeer and those reindeer died but at least some of the non-reindeer villages may have done so by choice. The estimation suggests that reindeer holding villages had higher assets but lower liabilities than non-reindeer owning villages. These villages also had lower assets net of reindeer than non-reindeer villages. The surveys do not show how the reindeer might be monetized, nonetheless, their

presence reduced indebtedness of households. They did, of course, provide meat and hides and animals for sale, although very few sales are noted. Unlike more recent livestock programs, this program was unsuccessful at generating increased income for Native Alaskan households but it did lower debt levels. Today, debt is a particular problem for many in the bottom deciles of the income distribution. Debt restricts households and possibly closes off other opportunities. Debt can also mean having to work multiple jobs in order to pay off car loans, credit cards, medical bills or payday loans. Less debt may have meant less need for income or wages for these particular households and this is an important finding.

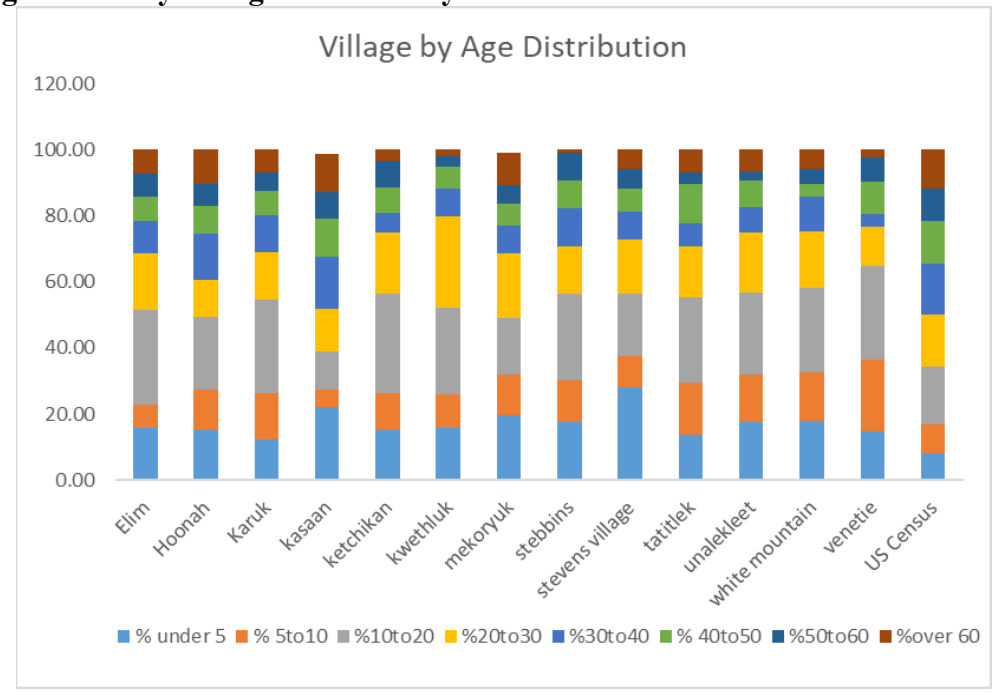
The surveys are a unique window on indigenous households and communities. There are commonalities across all the households surveyed. These were not wealthy households. In monetary terms, the value of assets is lower than in the more densely populated contiguous states and houses are smaller and many without indoor plumbing. Food supplies, however, were plentiful and the product of the local environment, seen in the pounds of fish caught and cached for the winter months. The surveys also show Indigenous households that operated within a subsistence world and a market economy. These communities had the luxury to choose the aspects of each that worked for their households and communities and with the seasonality of the year. They were not constrained as were many indigenous households who lived on reservations or trust lands in the contiguous United States. Due to its location, World War II would change Alaska's connection and importance to the greater Unites States.

Map 1: Location of Villages in the Survey



Source: Statistical Records and Reports of the Alaska Division of the Bureau of Indian Affairs, 1912-1941. Economic Surveys of Cities and Towns by the Credit Section, Alaska Extension Division, 1938-1941. No. 819A, Elim to White Mountain.

Figure 1 – Age Profile by Village from Survey Bins and US Census 1940



Source: see Map 1 and US Census 1940. The bins from the US Census were reformatted to agree with the Survey bins with people being uniformly allocated across the age range.

Table 1: Village Populations in Census Years

Census Population	Elim	Hoonah	Karluk	Kasaan	Ketchikan	Kwelthluk	Mekoryuk *	Stebbins	Stevens Village	Tatitlek	Unalakleet	Venetie	White Mountain
1880			302	172		75				73	100		
1890			1,123		40		400			90	175		
1900		447	470		495					149	541		
1910		462	549	129	1,613		127		100	156	247		
1920	162	402	99	126	2,458		189		103	187	285		198
1930	97	514	192	112	3,796		191		48	70	261		205
1940	100	715	189	85	4,695	186	225	98	54	75	239	89	199
1950	154	563	144	47	5,305	242	156	115	84	89	469	91	129
1960	145	648	129	36	6,483	325	242	158	102	96	574	107	151
1970	174	748	98	30	6,994	408	249	231	74	111	434	112	87
1980	211	680	96	25	7,198	454	160	331	96	68	632	132	125
1990	264	795	71	54	8,263	558	177	400	102	119	714	182	180
2000	314	860	27	39	7,922	713	210	547	87	107	747	202	230
2010	330	760	37	49	8,289	721	191	571	78	88	688	166	190
% Village Indigenous in 2010	92.7 %	60.6%	96.3% (2000)	38.5% (2000)	16.7%	92.6%	90.5%	93.97%	95.4%	84.1%	77.3%	92.1%	83.7%
1940 Census Population #	100	716	189	85	4,695	189	225	98	54	75	239	86	199
Survey Population #	70	280	145	77	183	150	222	96	85	58	211	82	174
% 1940 Census	70%	39.1%	71.72 %	90.59%	3.95	80.7%	98.7%	98.0%	157.4%	77.4%	88.3	95.35%	87.4%

Source: The data come from the United States Census Populations given by each town in its Wiki page and from the Survey (see Map 1). Lack of data at the end of the nineteenth century and early twentieth does not imply no community but one that was not visited by a census taker. The very high population in Karluk in 1890 represents the presence of a cannery and a plurality of Chinese working there. The cannery closed and moved before 1900.

*- Reported as the entire Island of Nunivak 1910-194

Table 2: Household Composition by Village

Village	Household Units #	Individuals #	Average Size of Household	# Male per Household (%)	# under 5 (% of household)
Elim	11	70	6.3	37 (52.9%)	11 (15.7!5)
Hoonah	55	280	5.1	142 (50.7%)	42 (15.0%)
Karluk	34	145	4.3	77 (53.1%)	18 (12.4%)
Kasaan	22	77	3.5	43 (55.8%)	17 (22.7%)
Ketchikan	34	183	5.4	96 (52.5%)	28 (15.3%)
Kwethluk	31	150	4.8	79 (52.7%)	24 (16.0%)
Mekoryuk	39	222	5.7	129 (58.1%)	44 (19.8%)
Stebbins	22	96	4.2	52 (54.2%)	17 (17.7%)
Stevens Village	17	85	5.0	52 (61.2%)	24 (28.2%)
Taitlek	13	58	3.8	29 (50.0%)	8 (13.7%)
Unalekleet	38	211	5.6	118 (55.9%)	37 (17.5%)
Venetie	18	82	4.5	42 (51.2%)	12 (14.6%)
White Mountain	33	174	5.3	93 (53.4%)	31 (17.8%)

Source: Statistical Records and Reports of the Alaska Division of Bureau of Indian Affairs, 1912-1941: Economic Surveys of Cities and Towns 1939-41: Elim-White Mountain

The average family size according to the 1940 Census of Population was 3.76 people.

Villages with reindeer are highlighted in gray.

Table 3: Average Asset Value by Class and Village

Village	House ($)	Out Building ($)	House: Goods and Chattels ($)	Equipment: Fishing, Hunting, Garden ($)	Mining Claims ($)	Livestock Reindeer and/or Dogs ($)
Elim	231.82	38.64	464.27	480.30		1,281.91
Hoonah	762.70	99.05	805.15	1,565.51		n/a
Karluk	342.79	32.96	252.76	132.26		n/a
Kasaan	437.50	46.92	276.14	1,534.59		n/a
Ketchikan	1,945.8	531.66	1,102.7	768.66		n/a
Kwethluk	170.96	37.41	331.00	297.97	2,550.0++	4,783.47
Mekoryuk	161.31	191.00	356.79	1,116.82		416.49++
Stebbins	54.32	23.14	120.18	374.77		207.39
Stevens Village	175.00	168.75*	25.08	348.47		66.15
Tatitlek	510.00	97.00	484.38	422.38		n/a
Unalekleet	243.49	66.61	240.45	**		143.05
Venetie	120.31	117.92	312.72	393.67		67.94+
White Mountain	236.36	74.19	512.03	405.79		2004.89

Source: See Map 1 and text

Households without an entry are not included in the denominator; the value given represents the mean only for those households for whom the survey notes a value. An average across all households would be lower.

Ketchikan has one property (house and outbuildings) valued three times higher than next highest valued property.

+Dogs only

++ Two families in Mekoryuk own reindeer; Two families in Kwethluk declared three high valued mining claims which the surveyor who said that he was leaving them out of his tabulation.

*No value given for outbuildings for over half of the families in Stevens Village

**No equipment figures available for Unalekleet

Villages with reindeer are highlighted in gray.

Table 4: Average Village Value of Goods on Hand and Income from Market Sales and Wages Earned

Village	Arts & Crafts and Pelts		Garden Produce		Fish & Seafood		Wages Earned	Pensions & Relief & CCC
	On Hand * $	Sold $	On Hand * $	Sold $	On Hand * $	Sold $	$	
Elim	367.82	113.57	42.00	17.50++	123.75	67.00	*298.27*	-
Hoonah	27.00	-	55.48	55.00+++	53.57	16.00+++	*434.74*	262.50
Karluk	8.20	30.54	20.66+++	-	44.25	-	-	-
Kasaan	-	+	-	-	46.67+++	+	*677.48*	-
Ketchikan	85.50	54.00	33.80	-	74.40	34.50	*918.18*	-
Kwethluk	117.75	297.76	-	-	162.34	13.20	92.21	13.20
Mekoryuk	484.47	126.26	15.16	31.50++	-	-	320.33	-
Stebbins	18.90	179.68	4.71	-	89.77	12.00	-	-
Stevens Village	-	-	+		250.00++	-	43.50++	180.00+++
Tatitlek	4.00	-	11.20	-	54.66	-	229.38	384.90 CCC
Unalekleet	73.75	-	141.95	-	291.24	-	*190.02*	49.54
Venetie	-	706.13	22.43	-	46.25	+	210.50	
White Mountain	96.72	338.71	26.77	-	154.08	83.75	*567.62*	+

Source: See Map 1 and Appendix for detailed listing of items. Includes **only** those households in a village with a positive value. For Wages Earned, villages in italics over 95% of households had positive values. Villages with reindeer are highlighted in gray.
*On hand gives value of items made for both sale and home consumption
+One household is listed as receiving $18 for sale of Arts & Crafts and pelts; One household with $24 in garden assets; One household with $50 in fish and seafood assets; One household with $120 in fish & seafood sales; One household with $50 in pension income
++ Two households only; +++ three households

Table 5: Average Village Liabilities by Source for only those households with Liabilities

Village	Indebtedness for Capital Goods ($)	Indebtedness for Clothing and Food ($)	Indebtedness Other ($)	Average Liability by Household ($)	Average Village Income/Wages less Liabilities for households with liabilities ($)
Elim	*	*	*	22.80	923.40
Hoonah	377.83	75.43	56.33	266.40	538.00
Karluk		218.16		218.16	-177.67
Kasaan	3,050.00+	100.00++		3,100.00+	======
Ketchikan	725.18	38.50	201.56	664.08	273.58
Kwethluk	51.67			51.67	405.00
Mekoryuk	*	*	*	205.39	- 3.92
Stebbins		7.45	12.5	19.95	=======
Stevens Village		441.31		441.31	131.62
Tatitlek		26.39		26.39	209.00
Unalekleet		99.86	213.33	148.78	84.95
Venetie	*	*	*	257.07	547.23
White Mountain	129.74	21.33	222.14	101.86	443.14

Source: See Map 1 and text, Villages with reindeer are highlighted in gray. These averages Include only those households with liabilities.
*Only total liabilities are given in the village survey
+ Only two households – but only household is insolvent in terms of cash flow
++ Only one household

Table 6: Total Assets, Income, LIabilites, and Livestock by Village

Village (# households)	Total Assets ($)	Total Wages* and Income from Sales ($)	Total Liabilities ($)	Total Reindeer (#)	Total Dogs (#)
Elim (11)	31,948.00	4,617.00	114.00	1,235	132
Hoonah (55)	182.462.00	32,315.00	2,964.00		
Karluk (34)	26,098.00	672.00	5,454.00		
Kasaan (22)	48,686.00	14,296.00	6,200.00		
Ketchikan (34)	109,788.00	31,518.00	15,938.00		
Kwethluk (31)	178,221.00	10,204.00	155.00	28,227	224
Mekoryuk (39)	114,644.00	7,837.00	7,805.00	2,900[+]	202
Stebbins (22)	18,979.00	6,983.00	439.00		219
Stevens Village (17)	11,542.00	9,503.00	5,737.00		77
Tatitlek (13)	18,464.00	5,632.00	343.00		
Unalekleet (38)	35,462.00	8,418.00	2,198.00	60[++]	220
Venetie (18)	17,643.00	12,817.00	3,599.00		64
White Mountain (33)	113,766.00	26,109.00	2,139.00	8,788	297

Source: See Map 1 and Appendix

*Wages include pension, relief and CCC income
+owned by two families; ++owned by one family

Table 7: Presence of Reindeer in a Village on Household Income, Assets, and Liabilities

	Wages		Total Assets		Assets Net Reindeer Value		Total Liabilities	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Reindeer Present in Village	-172.6	-364.1***	1,209	-231.5	-582.9	-1,950***	-36.31	-158.4**
	(161.8)	(66.62)	(889.1)	(476.3)	(522.8)	(298.0)	(92.65)	(71.87)
HH Members	26.99	32.57*	-153.1	-111.2	-120.9	-81.11	12.28	15.83
	(22.70)	(17.30)	(88.63)	(123.7)	(82.35)	(77.39)	(9.065)	(18.66)
Male HH Members	165.9	196.5*	444.1	674.0	-110.1	108.1	102.8	122.3
	(106.2)	(115.8)	(928.8)	(827.9)	(406.5)	(518.1)	(69.45)	(124.9)
Working Age HH Members	46.61	47.89**	711.5***	721.2***	516.4***	525.6***	19.89	20.71
	(45.85)	(23.80)	(142.1)	(170.2)	(154.9)	(106.5)	(23.24)	(25.68)
Constant	155.7	185.5*	155.2	379.0	932.8*	1,145***	-15.52	3.454
	(118.5)	(94.94)	(822.6)	(678.8)	(521.7)	(424.8)	(71.19)	(102.4)
Observations	367		367		367		367	
R-square	0.109		0.128		0.130		0.016	

Clustered Errors in Parentheses

Table 8: First Stage Results - The Relationship Between Distance to Teller Station and Reindeer

	Reindeer Present in Village	Household Owns Reindeer	Per Capita Reindeer
Distance to Steller Station	-0.000500***	-0.000273*	-0.0235
	(0.000105)	(0.000129)	(0.0139)
HH Members	0.00274	-0.0131	-2.200
	(0.0124)	(0.0125)	(2.184)
Male HH Members	-0.00534	-0.000815	-2.645
	(0.0556)	(0.0383)	(3.765)
Working Age HH Members	0.0250	0.0328	3.124
	(0.0150)	(0.0197)	(2.797)
Constant	0.811***	0.428*	46.80
	(0.223)	(0.239)	(30.21)
Observations	367	367	367
Adjusted R-Square	0.537	0.236	0.105

Clustered Errors in Parentheses

Table 9: Household Reindeer Ownership and Household Income, Assets, and Liabilities

	Wages		Total Assets		Assets Net Reindeer Value		Total Liabilities	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Household Owns Reindeer	84.64	-666.6***	2,993***	-424.0	-402.6	-3,571***	-165.0**	-290.0**
	(182.7)	(146.4)	(898.3)	(884.6)	(424.5)	(624.1)	(61.90)	(130.2)
HH Members	21.86	22.84	-121.8	-117.4	-137.4	-133.2	11.43	11.60
	(25.06)	(20.63)	(99.88)	(124.7)	(90.38)	(87.96)	(8.899)	(18.34)
Male HH Members	130.8	197.8	369.8	674.9	-167.2	115.6	111.7	122.9
	(108.1)	(139.0)	(981.8)	(839.9)	(418.7)	(592.6)	(75.97)	(123.6)
Working Age HH Members	43.52	60.68**	651.3***	729.3***	521.7***	594.0***	23.42	26.27
	(49.53)	(28.76)	(137.0)	(173.8)	(163.0)	(122.6)	(23.16)	(25.57)
Constant	123.0	175.7	133.2	372.8	870.4*	1,093**	-9.597	-0.833
	(104.2)	(113.8)	(818.3)	(687.2)	(486.5)	(484.9)	(62.66)	(101.1)
Observations	367		367		367		367	
R-square	0.081		0.227		0.117		0.034	

Clustered Errors in Parentheses

Table 10: Per Capita Reindeer and Household Income, Assets, and Liabilities

	Wages		Total Assets		Assets Net Reindeer Value		Total Liabilities	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Per Capita Reindeer	-0.559	-7.759***	19.91***	-4.935	-4.441	-41.57***	-1.112**	-3.375**
	(0.792)	(1.833)	(2.744)	(10.37)	(2.535)	(8.521)	(0.400)	(1.555)
HH Members	21.43	14.50	-98.75	-122.7	-142.2	-177.9*	10.15	7.970
	(25.90)	(22.26)	(106.6)	(125.9)	(90.86)	(103.5)	(8.946)	(18.88)
Male HH Members	141.2	177.9	535.6	662.2	-180.6	8.552	102.7	114.2
	(99.32)	(149.2)	(983.3)	(843.4)	(423.8)	(693.4)	(75.43)	(126.5)
Working Age HH Members	46.72	63.04**	674.5***	730.8***	522.6***	606.7***	22.17	27.30
	(47.09)	(31.01)	(136.2)	(175.3)	(159.4)	(144.1)	(23.45)	(26.29)
Constant	137.9	253.5**	23.42	422.3	913.5*	1,509***	-3.312	33.02
	(108.7)	(125.3)	(858.4)	(708.8)	(486.8)	(582.7)	(63.10)	(106.3)
Observations	367		367		367		367	
R-square	0.080		0.190		0.123		0.029	

Clustered Errors in Parentheses

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