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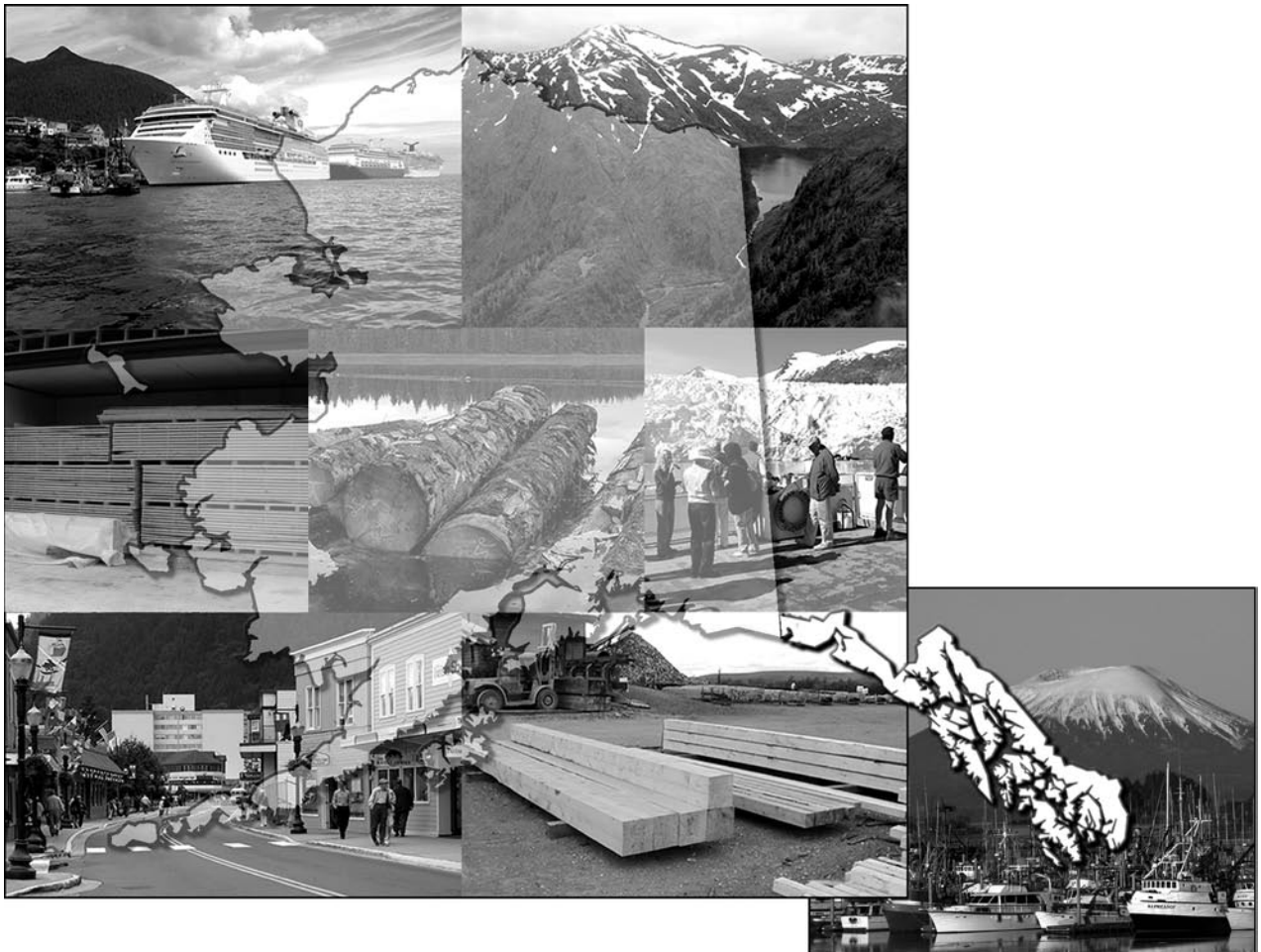
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# An Assessment of Growth and Development Paths for Southeast Alaska

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## **Abstract**

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The intuitive explanation for why an economy grows or develops often involves the ways in which land (resources), labor, and capital interact. Here we review the literature for what is known about the different pathways for economic growth and development in resource-abundant regions. We discuss the effectiveness of the forest products industry as a determinant of economic development and how comparative advantages of different forest goods and services have changed. Much of our discussion is based on southeast Alaska where the development of a forest products industry was seen as offering potential economic opportunities that would increase the stability of local communities. The experience of the last several decades there suggests that a more comprehensive strategy than just the development of a timber industry is required to sustain economic growth.

Keywords: Economic development, southeast Alaska, Tongass National Forest.



## Introduction

One intuitive explanation (sometimes called neo-Malthusian) for why an economy grows or develops describes an interaction among land (resources), labor, and capital. Often the discussion centers on equating economic growth with more outputs based on greater utilization of land (resources), labor, and capital.<sup>1</sup> Economists (see Kindleberger 1965, for an example) view growth and development synonymously, but distinguish a case where more outputs are produced from another case where there are more outputs as well as changes in technical and institutional arrangements by which they are produced. In this paper we generally follow this latter distinction as it is difficult to disentangle the two sources of change. There are different theories about the causes of economic growth, but one enduring theme has been the role that land (or other natural resources) plays in determining the propensity for economic growth. This is the theme that is central to this paper where our focus is on the changing role of forests as a determinant of economic growth in southeast Alaska.

The forestry profession has long been concerned with the role that forests play in the economic development of a region and its associated communities. This is often expressed as a concern about community stability. The early manifestation of this concern was from foresters who argued for forest management, advocating that the sustained flows of timber coming from managed forests would provide a stable level of jobs and income for residents of communities near (or in) managed forests. The events of the 20<sup>th</sup> century have suggested a more ambiguous view where the relations between the management of forest resources and the stability of resource-based communities are described as being both complicated and ever-changing (see SAF 1989 for a discussion). Nevertheless, advocates of increasing or maintaining sawtimber<sup>2</sup> outputs have argued that development of forest resources offers some areas an opportunity for economic growth.

One example of where a forest-based economic development strategy was tried is in southeast Alaska. There policymakers and various publics advocated intensive utilization of timber resources in the Tongass National Forest to promote forest-based economic development in the communities of southeast Alaska (Byers 1960, Crone 2004). A distinguishing characteristic of the southeast Alaska economy is the role of the extractive-resource-dependent industries (forestry, fishing, and mining).

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<sup>1</sup>Land (resources), labor, and capital are the traditional three inputs to the production process. Capital often refers to a capital good that is itself an output of the economy such as wealth. In contemporary usage it also includes human capital.

<sup>2</sup>Sawtimber is defined as trees or logs cut from trees with minimum diameter and length and with stem quality suitable for conversion to lumber.

For the state of Alaska, the petroleum industry recently (1970 to late 1990s) has grown in importance, contributing about 36 percent to GSP<sup>3</sup> in 1996. Non-petroleum industries, commercial fishing, logging, and mining accounted for 10 percent of GSP in 1996 (USDC BEA 2001). Although the nonpetroleum industries generate less GSP than oil does, they tend to employ more people (ISER 1997). As of 1995, resource-dependent industries accounted for 23 percent of total employment in southeast Alaska, whereas employment within the manufacturing sector—net of wood products, mining, and fishing—accounted for only 5 percent of total employment (Allen et al. 1998).

Between 1992 and 1999 Alaska exhibited the second slowest growth in the Nation at 0.5 percent. In earlier decades, per capita income has exceeded the national average by as much as 48 percent. However, Alaska per capita income fell below the national average for the first time in 1998 (Marple's 1999–2000). The same trends can be observed for the rural communities of southeast Alaska. Prior to 1990, the southeast Alaska economy enjoyed relatively stable economic expansion as shown by the upward trend in personal income during the period 1969–1990 in figure 1. However, figure 1 also indicates that personal income stagnated or even slightly declined during the 1990s.

Like many regions that depend heavily on the production of primary resource exports, and that have experienced stagnant economic growth, Alaska is once again looking to initiate labor-intensive growth of value-added manufactured wood products to promote development, job creation, and economic growth within the region. However, academic studies and past policy failures indicate that there may be limitations to intensive development of resources as a vehicle to promote regional growth and development.

This paper reviews the general literature about the different pathways for economic growth and development in resource-abundant regions. Second, the inferences that emerge from this review will be used to set the context for a discussion of the situation in southeast Alaska, which has been seen as a place where the development of a forest products industry offers potential economic development activities that would increase the stability of local communities. Finally, we examine whether barriers to growth exist in southeast Alaska, thereby limiting resource utilization as a strategy to promote economic activity.

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<sup>3</sup>GSP is analogous to Gross Domestic Product or Gross National Product in that it is a measure of the value of all the goods and services produced in an economy in a given year but differs in that it measures the output of a state rather than the entire nation.

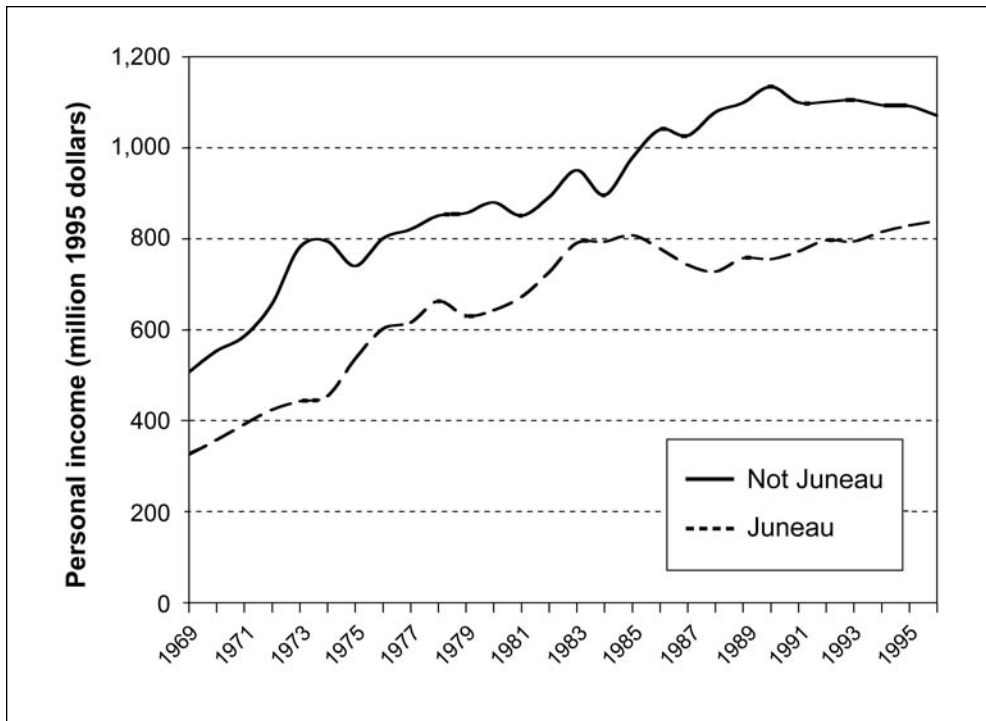


Figure 1—Southeast Alaska personal income, 1969–1996. Note: Nominal values deflated by using the national consumer price index (CPI). Source: USDC BEA 2002.

## Interregional Growth Differentials

Economists have long recognized the existence of interregional inequality in investment, capital accumulation, and economic growth. The persistence of income, production, and growth disparities between developed and undeveloped economies (described both in terms of lower levels of outputs and lower levels of technical and institutional arrangements used in production) is often referred to as the North-South problem.<sup>4</sup> It is important to recognize that many of the characteristics of the underdeveloped regions described in the case of Alaska are simultaneously causes and consequences of being undeveloped. Both Myrdal (1957) and Hirschman (1958) investigated spatial and location development, seeking to discover why some locations prosper and develop while others remain poor and undeveloped. They point out that once a “growth pole” emerges, growth will continue because of circular causation. To minimize transport cost, firms locate near their customers, and individuals prefer to locate near firms and economic

<sup>4</sup>Early researchers noted that interregional growth disparities often occurred between the northern and southern regions of a country, as observed in the United States, Italy, Brazil, and elsewhere. Despite the fact that this generalization does not hold true for all countries in which interregional disparities exist, North is used in the literature to denote the developed region, whereas South denotes the undeveloped region.

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**Avenues of economic growth are essentially the same for both advanced and developing regions.**

opportunities. Myrdal and Hirschman both point to agglomeration economies, defined as the cheapening of production or marketing resulting from firms locating relatively close to one another, as reasons for developed areas to continue growing and attracting firms, investment, and human capital, whereas undeveloped regions continue to stagnate.

Although the mechanisms of interregional growth disparity are not well understood, the avenues of economic growth are essentially the same for both advanced and developing regions. A society can increase real output in two fundamental ways. First, existing supplies of resources must be used more efficiently. This entails eliminating unemployed resources and achieving greater efficiency in the allocation of resources. Next, increasing the supply of productive resources can increase output. By expanding the supplies of raw materials, capital equipment, effective labor, and technological knowledge, a region can increase its production. However, in underdeveloped regions, obstacles often exist to altering the quantities and improving efficiency in the use of natural resources, human resources, capital goods, and technology.

Economists often argue that an important focal point of economic development is the accumulation of capital goods. There are several reasons for emphasizing capital formation as a key factor determining economic growth. All undeveloped regions suffer from a critical shortage of capital goods—factories, machinery and equipment, public utilities, and infrastructure. This lack of capital and the lack of resulting infrastructures contribute to lower levels of productivity of the undeveloped regions. One basic means of increasing labor productivity, for example, is to provide each worker with more tools and equipment. Once initiated, the process of capital formation may be cumulative. If capital accumulation can increase output ahead of population growth, a margin of savings may arise that permits further capital accumulation. Regions accumulate capital through the process of saving and investment. A region must save or refrain from consumption so that resources for the production of consumer goods can be applied to the production of capital goods. However, the impediments to saving and investment tend to be greater in undeveloped regions than in advanced economies. The investment side of the capital formation process often presents obstacles that undermine the rate of capital accumulation even when a sufficient volume of savings is available to finance the needed investment.

Existing firms may lack the incentive or ability to upgrade existing operations, and potential investors may find more attractive investment opportunities to produce manufactured wood products in competing regions. Assuming perfect mobility of capital, a risk-averse firm will choose to invest in a location if the expected



profits in that location exceed the expected profits of all other locations. Many underdeveloped regions simply do not have a sufficient accumulation of the basic social capital (the public utilities) that is prerequisite to private investment of a productive nature. Poor or inadequate transportation systems, limited gas and electricity production, dated communication systems, limited or unsatisfactory housing, and inadequate educational and public health facilities do not provide an inviting environment for investment.

Although capital accumulation and investment are significant in explaining interregional growth disparity, economists seeking a more complete understanding of economic development have expanded their focus by examining the role of natural capital. For example, the origins of modern economic growth and industrial success of the United States from 1879 to 1940 have been strongly linked to the abundance and exploitation of natural resources (Romer 1996, Wright 1990). In 1913, the United States was the world leader in the production of 14 major industrial materials including copper, coal, zinc, iron ore, and lead. The most pronounced disparity in resource endowments between the United States and the rest of the world appeared in the production of natural gas and petroleum, where the United States produced 95 and 65 percent of the world's output of natural gas and petroleum, respectively (Wright 1990). Cheap and well-developed transportation also existed, effectively linking the population of the United States within one large market. Thus, entrepreneurs and inventors were encouraged to develop and invest in specialized machinery, standardized goods, and interchangeable parts necessary for long production runs that exploited natural resources and energy. The high cost to design and set up industrialized production was more than offset by the abundance of inexpensive natural resources and energy and access to a large market composed of consumers with homogenous tastes (Romer 1996, Wright 1990). However, there is no simple generalization with respect to the role of natural resources in the economic development of regions. As Gavin Wright (1990) notes, "There is no iron law associating natural resource abundance with national industrial strength."

The success of the United States notwithstanding, it has been observed that resource-abundant regions tend to lag behind resource-poor regions in terms of economic growth, development, and industrialization. Neary and Van Wijnbergen (1986) note:

A striking feature of the world economy in the 1970s and 1980s has been the frequency and magnitude of the shocks to many economies as a result of changes in the price or availability of natural resources.

Resource-poor countries have suffered of course, but, paradoxically, resource-rich countries have not been immune. Resource-based booms have frequently been blamed for a tendency towards “deindustrialization,” while the macroeconomic performance of many countries with large resource sectors has been less than satisfactory.

The following section is a review of the literature that examines the role of natural resources in economic development.

## **Natural Resources, Geography, Economic Growth, and Development**

### **Dutch Disease, Comparative Advantage, and Trade**

There is no simple explanation for the role of natural resources in the economic development of regions. Murphy et al. (1989) explore the possibility in which some sort of “big push” or large shift in demand<sup>5</sup> can expand the size of the market so that entrepreneurs will find it profitable to incur the fixed costs of industrialization; this big push is often lacking in underdeveloped regions. For entrepreneurs to be willing to make this transition, they must expect that other entrepreneurs will also want to industrialize so that increasing returns can accrue owing to agglomeration effects. Increased public spending, foreign aid, discovery of minerals, or a rise in world prices of natural resources may all provide the big push needed to stimulate demand and investment and serve as a catalyst for development in poorer economies. Some undeveloped regions have been able to use their natural resource endowments to achieve rapid growth. Sachs and Warner (1998, 1999) note that an important factor in development is the transition from cottage industry to factory production. After controlling for other factors that affect growth, Sachs and Warner (1998, 1999) show that natural resource booms can stimulate industrialization. However, a strong resource base does not always ensure economic growth to a region; it can also impede or reverse industrialization.

Evidence from 23 case studies, collected by Collier and Willem (1999), in which developing countries in Africa, Asia, and Latin America experienced a resource boom across a wide spectrum of resource commodities in both the agriculture and mining sectors, suggests that external trade shocks tend to be

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<sup>5</sup> Murphy et al. explore the Rosenstein-Rodan (1943, 1961) notion that if various sectors of the economy adopted increasing returns-to-scale technology simultaneously, they could each create income that becomes a source of demand for goods in other sectors, and so enlarge their markets and make industrialization profitable.

problematic. The theory of Dutch disease<sup>6</sup> is used to describe the boom-and-bust phenomenon associated with trade shocks that stem from a temporary increase in the price of natural resources or a new discovery of natural resources. Output is enhanced during the trade shock, but output decreases in the postshock period often leading to financial crisis within a country. The Dutch disease can be generalized as follows: in an economy with a tradable manufacturing sector, a tradable natural resource sector, and a nontraded (service) sector, the extra income generated by a boom in the resource sector results in an increase in consumption. The extra income leads to an increase in demand for the nontraded service sector, increasing the price in the nontraded service sector relative to the traded manufacturing sector, thus leading to resources being reallocated from the manufacturing sector to the service sector. The crux of the argument requires that agents with imperfect information react as if the gain in income from the resource shock is permanent rather than temporary, resulting in excessive consumption and inadequate saving and investment. However, there is a growing body of Dutch disease research in which the mechanism that draws resources from the traded manufacturing sector to the nontraded service sector is based on applied learning or other technological or pecuniary economies-of-scale arguments rather than the misinterpretation of the temporal nature of the resource shock.

Sachs and Warner (1999) conclude that the timing of the natural resource booms as well as the sectoral distribution of increasing returns may determine whether a big push in the natural resource sector is effective in stimulating the economy. In an economy with a tradable natural resource sector, a tradable manufacturing sector, and a nontraded (service) sector, Sachs and Warner (1999) derive results that show that the greater the natural resource endowment, the higher the demand for nontradable goods and services and the smaller the allocation of labor and capital to the manufacturing industry. Tradable production is concentrated in the primary production of natural resource goods rather than the production of secondary or manufactured goods. Capital and labor that otherwise may be employed in the manufacturing sector, assumed by the authors to exhibit increasing returns to scale, are devoted to the production of the nontraded service goods sector that is assumed to be characterized by constant returns to scale. Because resource booms stimulate nonincreasing returns-to-scale service sectors rather than increasing-returns-to-scale manufacturing sectors, resource-abundant regions should

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<sup>6</sup>The term Dutch disease originated in Holland when it was observed that the deindustrialization of the nation's economy occurred when the discovery of North Sea gas raised the value of that nation's currency, making Holland's manufactured goods less competitive with those of other nations, increasing imports, and decreasing exports.

achieve slower economic growth than resource-poor countries. Sachs and Warner present evidence that natural-resource-abundant countries tend to have a larger service sector, smaller manufacturing sectors, and slower growth than resource-poor countries.

Edward Leamer (1987) and Bowen et al. (1987) similarly conclude that resource-abundant regions may never develop diverse economies. Leamer (1987) examines the relation between resource abundance and the paths of development within a general equilibrium (GE) economic model. General equilibrium models are widely used, and they are designed to examine many industries and many consumers simultaneously. Typically, the consumers own two factors of production including human-made capital and their own labor, and they sell these factors to the industries, which use them to produce consumer goods. The consumers purchase these goods by using the incomes they obtained by selling their factors of production. Thus the economy is a circular flow of goods and factors in one direction and money in the other direction. The outputs from a GE model include the prices of the factors of production—that is, wages for labor and rents for capital, the prices of the consumer goods, the allocation of the factors across industries, the consumers' incomes, and the industries' profits. By including resources as a third factor of production, which is not typically done in the more traditional GE models that use capital and labor only, Leamer (1987) shows the possibility of many different paths of development. Within the Leamer model, capital accumulation is shown to induce changes in goods, trade, and the returns to factors that depend on the abundance of resources relative to labor, thereby resulting in development paths of resource-abundant countries that will be quite different from resource-scarce countries. Resource-abundant countries may never produce manufactured or value-added products. Complete specialization in land-intensive products occurs, and if capital accumulation takes place at all, development paths will show a shift away from labor-intensive to capital-intensive production of primary resource goods.

## **Geography—Agglomeration, Climate, and Firm Location**

Agglomeration economies may be either internal or external economies. One centrally located firm may achieve economies of scale that could not be achieved by many smaller, dispersed producers. As many firms agglomerate, as a group they may be able to realize lower input prices that may shift or lower cost curves. This is because when many firms within an industry locate within a concentrated area, it is advantageous for other firms to specialize in providing services to the concentrated industry and to locate near the concentrated industry. Interdependency between

the industry and intermediate or input firms may develop. Concentration of several firms within an industry also offers a pooled market of workers with industry-specific skills. Finally, a developed area may provide vital infrastructure and utilities to firms that may not be available in undeveloped regions.

In a series of work, Krugman (1991a, 1991b, 1992) reemphasized the importance and role of geography in economics. Krugman attempted to formally model and explain the role of increasing returns to scale in location decisions of firms. Krugman models a two-region, two-product economy. Agricultural products are produced with constant returns to scale, whereas manufactured production achieves increasing returns to scale. All individuals are assumed to possess identical utility functions for both the agricultural and manufactured goods. Krugman concluded that the tendency of geographical concentration and divergence between the two regions depends on the fraction of population within the manufacturing and agriculture sectors, the degree of economies of scale, and transportation costs. With lower transportation costs, a higher manufacturing share, or stronger economies of scale, circular causation sets in, and manufacturing will concentrate in whichever region gets a headstart.

Krugman (1991a, 1991b, 1992) emphasizes that equilibrium conditions may be stable for long periods, but that they can change rapidly if key conditions or parameters change. For example, Krugman believes that an individual's expectations of employment and economic opportunities may lead to shifts of population from one region to another. This is sometimes called the job-first strategy. This shift in population may create a growth pole in which employers, development, and prosperity follow the migration of workers expecting better opportunities in previously undeveloped regions.

Radelet and Sachs (1998) investigate the role of geographic location for countries wishing to initiate labor-intensive, export-led growth in manufactured goods as a strategy for economic growth and development. They examine the relations among shipping costs, wages, and competitiveness in international trade to determine the possible relation between geography and long-run economic growth. Shipping costs differ widely across countries because some countries are located farther from major markets, incur extra costs of transferring between modes of transportation, and have poor port capacity, infrastructure, and administration. Radelet and Sachs (1998) also point out that the most important consequence of high shipping costs is the detrimental impact on firms' competitiveness in international markets:

For small countries that exert little impact on world prices, the higher the shipping costs, the more that firms will have to pay for imported intermediate goods, and the less they will receive for their

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**Equilibrium conditions may be stable for long periods but change rapidly if key conditions change.**

exports. More specifically, if a country faces a perfectly elastic supply of imports or a perfectly elastic demand for its exports (approximately the case for most developing-country manufactured exports), changes in shipping costs will be translated one-for-one into changes in domestic prices. In competitive global markets, higher transport costs would have to be offset either by lower wages or by reduced costs somewhere else in the production process to allow firms to compete. In most labor intensive manufactured export activities, where profit margins are thin, and imported inputs constitute a high proportion of total output value, small differences in shipping costs can spell the difference between profitability and loss in export markets.

In a simple numerical example comparing a prototypical firm producing labor-intensive manufactured exports in a low-transport-cost coastal region to a high-transport-cost landlocked economy, Radelet and Sachs show that a 6-percent differential in shipping costs would offset one-third of domestic value added for export products. Assuming that domestic value added represents substantially wage costs, the wage rate must be reduced by about two-thirds for these products to be competitive with low-transport-cost regions in competitive world markets. Given that shipping costs can have a huge impact on value-added export markets and profitability when considering labor-intensive manufactured exports, Radelet and Sachs (1998) conclude that high-transport-cost regions will have difficulty promoting value-added export products/industries. They test the hypothesis that countries with higher shipping costs are less likely to attract investment in export activities, and thus their domestic firms would tend to be less competitive in international markets. By testing the relation between the explanatory variables of geography, government policy, shipping costs, and net natural resource exports, and the dependent variable, annual average growth of total exports as a share of gross domestic product, Radelet and Sachs (1998) form a basic conclusion that geographic isolation and higher shipping costs may make it more difficult, if not impossible, for relatively isolated, developing countries to succeed in promoting labor-intensive manufactured exports. Firms from such countries will likely have to pay lower wages to workers and accept smaller returns for higher shipping costs.

Extreme climates and geography may also present significant obstacles to harvesting, extraction, and production of resources. Sedjo et al. (1998)<sup>7</sup> note that

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<sup>7</sup>Sedjo et al. made a distinction between old growth (inaccessible, difficult terrain, and accessible flat terrain) and second growth (managed and unmanaged).

timber and logging practices differ depending on the species, tree size, location, and terrain. As access to native or old-growth forests has become more difficult, many regions have relied on second-growth managed forest and exotic plantations. Second-growth managed forests and exotic plantation forests typically involve harvesting relatively large volumes of small- to medium-sized homogeneous trees on accessible sites that commonly have transportation, mechanized planting, and harvesting in place. Because second-growth forests and native or old-growth forests differ in terrain, stand homogeneity, volumes of timber per unit of land, and logging approaches, it follows that logging costs will differ across alternative site conditions. Figure 2, reproduced from Sedjo et al. (1998), provides a schematic of alternative logging situations and the corresponding logging and transportation costs. Figure 2 shows that logging and transportation costs for difficult-to-access or inaccessible areas, or for larger pieces (or logs) associated with native or old-growth forests are significantly higher than costs realized on second-growth managed and unmanaged sites, high-yield plantations, and fiber farm sites.

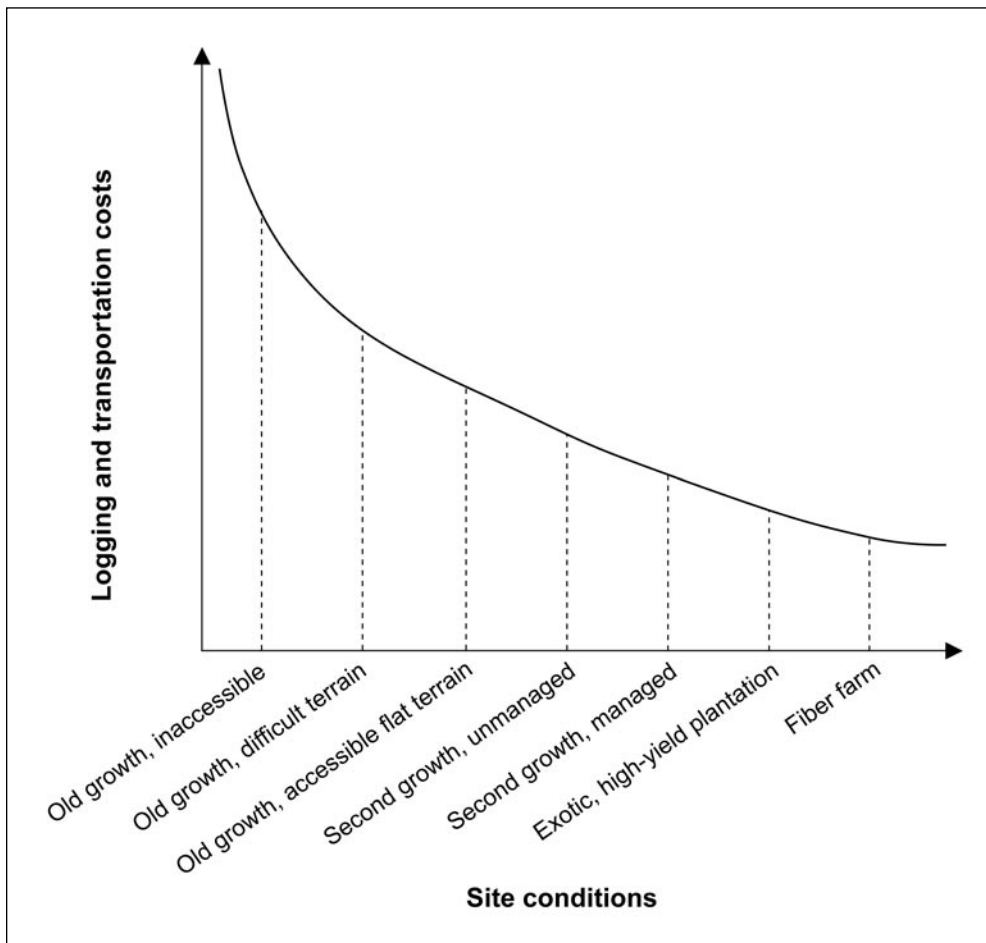


Figure 2—Logging and transportation costs across various forest site conditions (Sedjo et al. 1998).

Many studies have investigated the relation between state characteristics and the location of foreign direct investment (Coughlin et al. 1991, Friedman et al. 1993, Woodward 1992). Like all firms, it is assumed that foreign national corporations seek branch locations with the highest payoffs. These authors share a common approach in which the probability of selecting a specific state for foreign direct investment depends on the levels of the characteristics that affect profits relative to the levels of these characteristics in other states. In summarizing the research on the location of foreign direct investment by using the conditional logit framework, Friedman et al. (1993) identify market size, manufacturing wage rate, transportation infrastructure, and state promotional activities as the most important factors that influence investment location. Friedman et al. (1993) further elaborate:

Domestic (U.S.A.) market potential and access to foreign markets are positive and important influences on foreign location. States with large market potential offer well-developed infrastructure, transportation facilities, agglomeration economies, and access to important customer markets. Regions benefiting from market potential and an influx of foreign manufacturing plants are the Middle Atlantic, Pacific, and East North Central. Higher manufacturing wages relative to other states were a significant detriment to attracting foreign direct investment. Although states cannot affect their market size and wage structure in the short run, they can still improve their chances by promoting themselves to foreign multinational corporations. Labor productivity, although included in only two of the papers, was a positive and significant influence on the location of foreign direct investment.

Zhang (1997) also investigates inward and outward foreign direct investment for the U.S. forest industry. For the period 1981 to 1995, Zhang found that foreign direct investment in the U.S. forest industry increased by 54 percent while U.S. direct investment abroad increased nearly 100 percent. Furthermore, the U.S. forest industry only attracted 25 percent of the amount of foreign direct investment in the Canadian forest industry despite the fact that the U.S. industry is six times as large as the Canadian forest industry. Foreign investors in the United States and other countries are more likely to invest in the paper and allied products sector rather than in the wood products sector because of (a) a greater ability for product differentiation relative to lumber, (b) economies of scale, (c) imperfect competition, (d) unfamiliarity with U.S. softwood lumber and panel products, and (e) preference for capital-intensive investments because income and other benefits of large plants



offset disadvantages of operation in foreign countries. Zhang (1997) assumes that in making investment decisions, both foreign and domestic investors are guided primarily by the expected financial performance of the industry relative to other possible investments. Zhang hypothesizes that foreign investors are attracted to invest in the United States because of relatively stable political and economic systems and large U.S. markets. On the other hand, Zhang believes that U.S. firms invest abroad because of the continuing decline in domestic timber availability. More specifically, Zhang states that the listing of several endangered species such as the northern spotted owl (*Strix occidentalis caurina*) has had a negative impact on timber supply and has sent investors to other countries.

## Policy of Resource Utilization and Regional Growth

Historically, federal, state, and local governments, regional planners, and academics alike have held that intensive utilization of resources is a means to establish economic growth in relatively underdeveloped areas that are rich in resources. In the early 1960s, Westoby (1978) promoted the notion that sustained utilization of forest resources in the wood products industry could directly and indirectly provide significant contributions to the economic development of a region.<sup>8</sup> Westoby (1978) hypothesized that establishing a wood products industry would not only directly benefit a region by creating jobs, providing income, and expanding infrastructure within the local community but that the positive impacts would be multiplied by the complex system of backward and forward linkages<sup>9</sup> that would also follow. Backward linkages and additional economic activity would occur as the forest products industry demands for raw materials and manufactured goods and services that serve as inputs to production were supplied by local producers. Furthermore, forward linkages would be established as downstream producers demanded wood product inputs in the production of final goods and service. Additional multiplier effects<sup>10</sup> would take place as additional income was created by employees of the wood products industry purchasing local goods and services from businesses unrelated to the forest products industry. However, the evidence from decades of

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<sup>8</sup> Westoby's definition of sustainability in the sense of sustained flows of forest products is now considered only a subset of the broader set of criteria and indicators for sustainable forest management being used in various international agreements that guide forest management.

<sup>9</sup> In contemporary usage, this refers to the contributions of an individual industry to the complexity of an economy. Those industries that have extensive connections (or dependencies) to other economic sectors are thought of as being more advantageous.

<sup>10</sup> Economists consider two types of multiplier effects. In the first type, they consider the direct job and income impacts associated with a specific economic activity. In the second type, they consider the indirect (or induced) job and income impacts. The size and existence of the latter types of impacts have been hotly debated within the economics literature.

promoting sustained forest utilization suggests that a strong resource base does not always ensure economic growth to a region, but it can also impede or reverse industrialization.

In the 1960s and 1970s, the World Bank, among other institutions, was heavily influenced by the prevailing notion that intense utilization of resources could improve the economic well-being of undeveloped countries. During this time, the World Bank's role in forestry was providing loans for resource-utilization projects such as the establishment of fast-growing industrial plantations; providing credit for planting by private tree farmers, log extraction operations, pulp and paper mills; providing technical assistance for species/provenance trials; and strengthening forestry institutions (World Bank 1978). By the early 1990s, the World Bank had concluded that a strategy of resource utilization was not suitable for all regions. Important factors that influence suitable forest development include resource endowment, climate, population density and urbanization, predominant type of agriculture, forest ownership, level of development, forestry management practices, and the major source of household fuel. Forestry investment has often failed to promote economic activity and social welfare in overpopulated and undeveloped countries where there is immense pressure to overexploit wood-deficient or marginal lands for fuelwood, grazing, or agriculture, often resulting in adverse environmental impacts.

The realization that forest resource utilization programs did not create the desired economic activity, regional development, and nonmarket benefits led Westoby (1978), the World Bank (1978), and others to recant the position of industry-oriented resource utilization as a means to promote economic activity (Haynes 1993). Surmising that continued uncontrolled forest exploitation could lead to serious environmental disruption and increased rural poverty, the World Bank now places a higher priority on promoting "people-oriented" social forestry programs. These programs are aimed at protecting forests, biodiversity, and ecosystems. Many attempts have been made to maintain microclimates, conserve soil in environmentally sensitive areas, and reforest eroded or destabilized areas. The goal of these activities is to promote rural development by establishing woodlots for fuelwood and small-scale industries that use wood; planting fruit, fodder, and fiber-producing trees; and building institutions that relate to the combined efforts of agroforestry and crop combinations.

The limitations of natural resource utilization in promoting economic activities in relatively wood-abundant, undeveloped regions of a highly industrialized country such as the United States have also been noted. Kromm (1972) examined the regional economy in northern Michigan and concluded that the contributions of forest resources to the local economy were less than anticipated by advocates of intensive

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**The limitations of using forests in promoting economic development have long been recognized.**

use of forest resources. Kromm notes that regional infrastructure development and improvement such as highway building, powerplant construction, and other structural additions important in attracting investment rarely result from the expansion of forestry activity, given the modest structural requirements of most forest product industries. Furthermore, as wood processing plants become more capital intensive, the labor needed declines, potentially resulting in economic instability in the timber-dependent regions.

Kromm (1972) also concludes that opportunities for forward and backward linkages are limited for the forest products industry in sparsely populated timber-dependent communities lacking commercial development. These limitations will weaken the multiplier effect. Forward linkages are not fully developed because few sizable forest product operations are locally owned. Much of the income is leaked out of the region rather than circulated throughout the local community. Further leaks occur as employees travel to distant commercial centers to purchase goods and services unavailable locally. Rural communities also provide limited market opportunities for local wood producers. Most products are exported from the region rather than serving as inputs into local downstream markets. Local inputs to production also are inadequately available to the forest product industry and typically account for a small percentage of the cost of production. Thus the possibility of establishing backward links is fairly limited. Some of these same issues will be associated with the development of alternative industries such as tourism and recreation that also depend on forest conditions. For example, the cruise ship industry in southeast Alaska is internationally owned and is provisioned in the ports (Vancouver, British Columbia or Seattle, Washington) where they originate.

## **Implications for Southeast Alaska**

The literature on natural resources, geography, economic growth, and development provides several lessons relevant to examining the relation between forestry and the economic situation of southeast Alaska. With the region's economic well-being now closely tied to tourism and resource-dependent industries (fishing, forestry, and mining), it is not surprising that the periods of economic growth and stagnation closely correlate to the boom and decline in economic activity in these sectors. In this paper we look only at the forest sector. This is a sector that has dominated the manufacturing and service sectors in the southeast Alaska economy, lending additional support to Dutch disease and comparative advantage arguments. Earned income by industry in real terms and as a percentage of total economic activity and the growth rates for each sector for the 1969–89 and 1990–96 periods are reported in table 1. The changes in industry shares of total earned income are also summarized in figure 3. Table

**Table 1—Earned income by industry in rural southeast Alaska (by place of work)**

Sector	1969		1990		1996		Annual growth	
	Value	Share	Value	Share	Value	Share	1969–89	1990–96
	<i>Thousand dollars</i>	<i>Percent</i>	<i>Thousand dollars</i>	<i>Percent</i>	<i>Thousand dollars</i>	<i>Percent</i>	--	<i>Percent</i> --
Government	111,689	23	205,689	23	207,554	26	3	0
Manufacturing	162,997	34	251,200	29	136,104	17	1	-9
Services	37,892	8	103,062	12	127,507	16	5	4
Retail trade	38,491	8	74,533	8	86,229	11	2	3
Construction	50,909	11	53,406	6	76,072	10	1	5
T.P.U. <sup>a</sup>	39,023	8	68,075	8	68,303	9	1	1
Forestry and fishing	16,256	3	82,968	9	52,610	7	8	-7
F.I.R.E. <sup>b</sup>	7,459	2	20,117	2	20,905	3	4	3
Wholesale trade	10,228	2	17,172	2	11,096	1	-1	-6
Mining	1,975	0	662	0	1,468	0	3	12
Total	476,918	100	876,884	100	787,848	100	2	-1

Note: All dollar figures converted to 1995 dollars by using U.S. aggregate consumer price index.

<sup>a</sup> T.P.U. = transportation and public utilities.

<sup>b</sup> F.I.R.E = finance, insurance, and real estate.

Source: USDC BEA 2002.

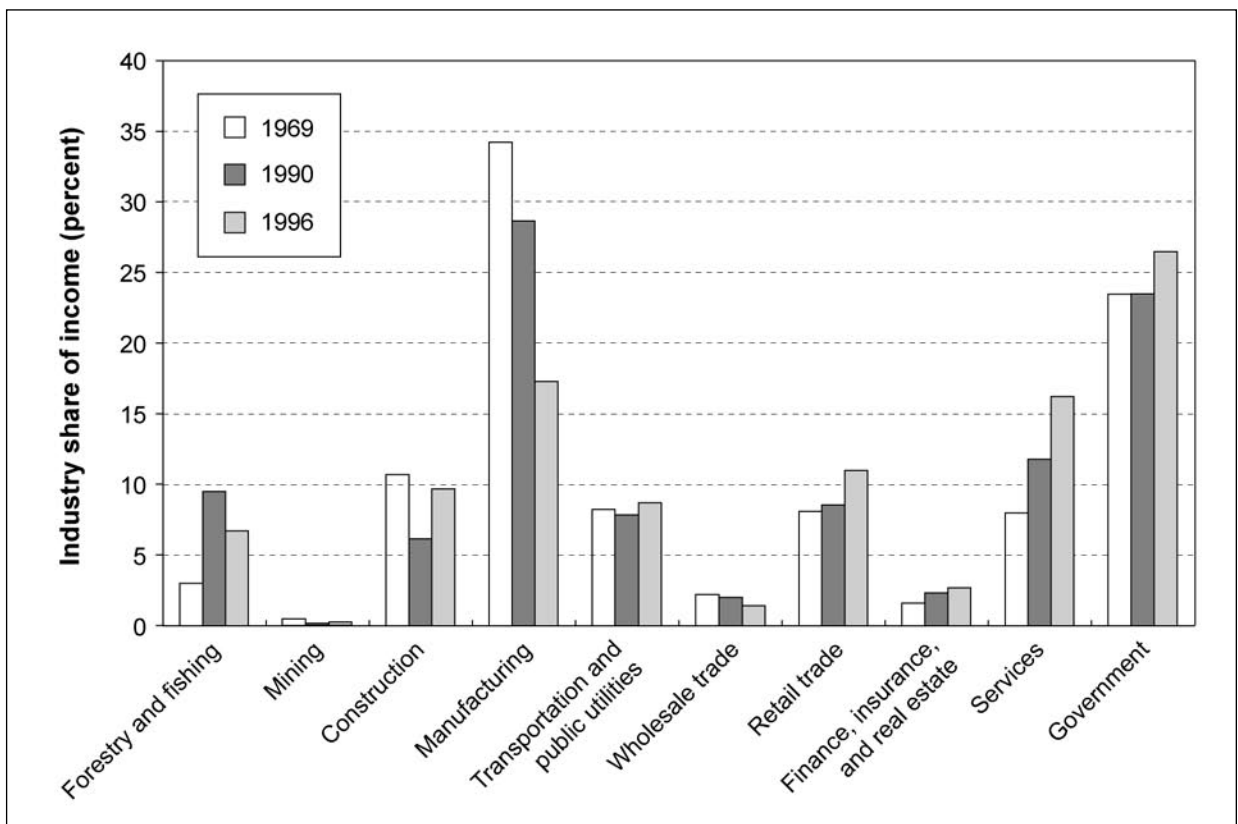


Figure 3—Industry shares in total earned income (by place of work). (Source: USDC BEA 2002.)

1 and figure 3 indicate that the manufacturing sector was the most important sector in the southeast Alaska economy, accounting for 34 percent of total earned income in 1969. From 1969 to 1989, the annual growth for the manufacturing industry was 1 percent, and the southeast Alaska economy as a whole grew at an annual rate of 2 percent. While the manufacturing sector remained the second largest sector in terms of earned income in 1996, the total real value and share of total economic activity both declined sharply between 1969–1990.<sup>11</sup> From 1990 to 1996, the manufacturing sector, dominated by the wood products industry, contracted 9 percent annually, while the forestry-and-fishing sector declined by 7 percent annually.

Many changes in the forest sector in southeast Alaska have contributed to this dramatic decline. A decline in demand resulting from reductions in economic activity and housing starts in Japan is one change. Increased competition from relatively low-cost high-productivity producers of both lumber and dissolving pulp in various competing regions is another. Third, changes in the ownership patterns of timberlands in southeast Alaska changed stumpage markets by reducing the impact of log export restrictions. The combination of these factors led to a decrease in demand for Tongass National Forest products, closure of the two pulp mills and associated sawmills, and a decline and downsizing of the primary wood products industry. At the same time, a nonresource manufacturing base has never established itself in southeast Alaska to offset production in the contracting resource-manufacturing sector. Declines in the manufacturing and forestry-and-fishing sectors in southeast Alaska offset the modest gains in the service-related sectors and led to contraction in total economic activity at the annual rate of 1 percent during 1990–96. The service sector now closely follows manufacturing as the most important private sector in the southeast Alaska economy.

The closure of the two pulp mills is particularly notable. These mills were established to serve as the catalyst for forest-based economic development through intensive utilization of timber resources in the Tongass National Forest. In the 1950s, advocates like Byers (1960) believed that establishing the two large dissolving mills would be the push needed to develop the potential of a timber industry in southeast Alaska. Crone (2004) also notes:

Because only 50 percent of the region's over-mature forest would meet sawmill standards, most believed a viable wood products

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<sup>11</sup> Alaska's economy also differs sharply from other states in that it has a much smaller agricultural sector. In Washington in 2001, agriculture accounted for roughly \$10.7 billion or 5.3 percent of the state's output, whereas Oregon produced \$7 billion accounting for 5.6 percent of total output. On the other hand, Alaska agriculture is 3.4 percent of total output (\$839 million). This figure, however, includes fishing and forestry, which far outweigh farming and agriculture services.

industry hinged on the development of a regional pulp industry. Champions of this development strategy for rural southeast Alaska included the [Forest Service's] Regional Forester B. Frank Heintzleman, statehood proponents, both the U.S. State Department and the Department of Defense, and President Truman.

In 1951, the Ketchikan Pulp Company (KPC) established a pulp mill in Ketchikan, Alaska, and a Japanese-owned company, Alaska Lumber and Pulp Company (APC), built a pulp mill in Sitka, Alaska, in 1957. Although optimistic about the potential of establishing industrial forestry in Alaska, Byers (1960) also noted that many within and outside Alaska expressed concern about whether industrial timber production in southeast Alaska could be sustained, citing high wages, sparse population spread over a tremendous area, high taxes, and distance and high transportation costs to export markets as unfavorable conditions for attracting investment to the region. Pulp mills were granted a 50-year supply of subsidized timber and were exempt from state and local taxes to insure the viability of the pulp mill operations in a region of relatively high labor costs (Crone 2004). These incentives led to the establishment of two pulp mills and associated sawmills in southeast Alaska. These large sawmills competed with an active set of smaller, independent mills. Until the late 1970s, these sawmills produced both lumber (mostly baby squares [full sawn 4 by 4 for the export market]) and cants that were exported to Japan. At that time Alaska was a leading west coast producer in the export market (see fig. 4, drawn from data in Warren 2003). This situation changed as harvesting started on timberlands belonging to Alaska Native corporations (established following the passage of the Alaska Native Claims Settlement Act in 1971). Much of this harvested timber was exported in log form (see fig. 5, drawn from data in Warren 2003), and the markets for cants and baby squares rapidly disappeared (see fig. 4). During the 1990s, changes in ownership patterns, production in competing regions, and market conditions led to the closure of the pulp mills and a loss of utilization opportunities for lower quality logs common on sales in the Tongass National Forest. At the same time, declining private timber as well as weak markets in Japan led to declines in log exports (fig. 5).

Historically, timber industry employment in southeast Alaska was strongly tied to the macroeconomic fluctuations in its primary market, Japan, and to a lesser degree fluctuations in the U.S. economy. Prices, production, employment, and trade would rise during periods of economic expansion in Japan and fall during periods of economic contraction. The two pulp mill operators were able to offset losses during periods of unfavorable conditions in the pulp market with the higher revenues received when markets improved. However, Crone (in press) noted that by the early

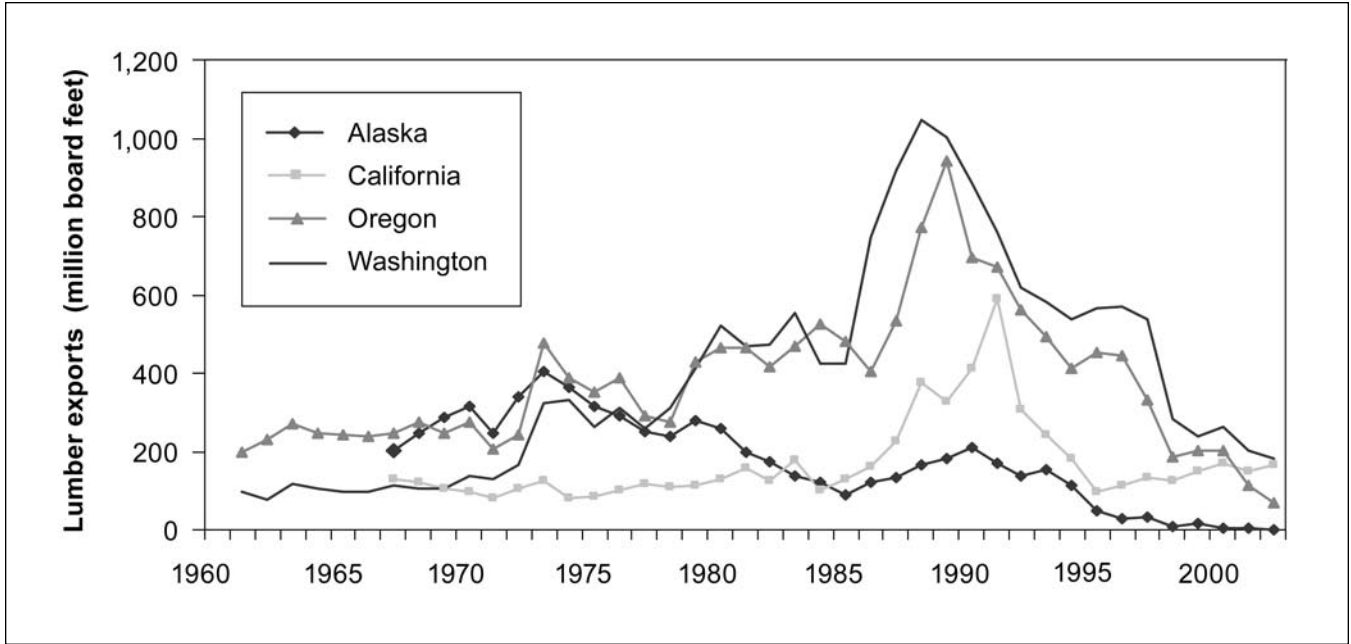


Figure 4—Volume of lumber exports from the west coast and Alaska (Warren 2003).

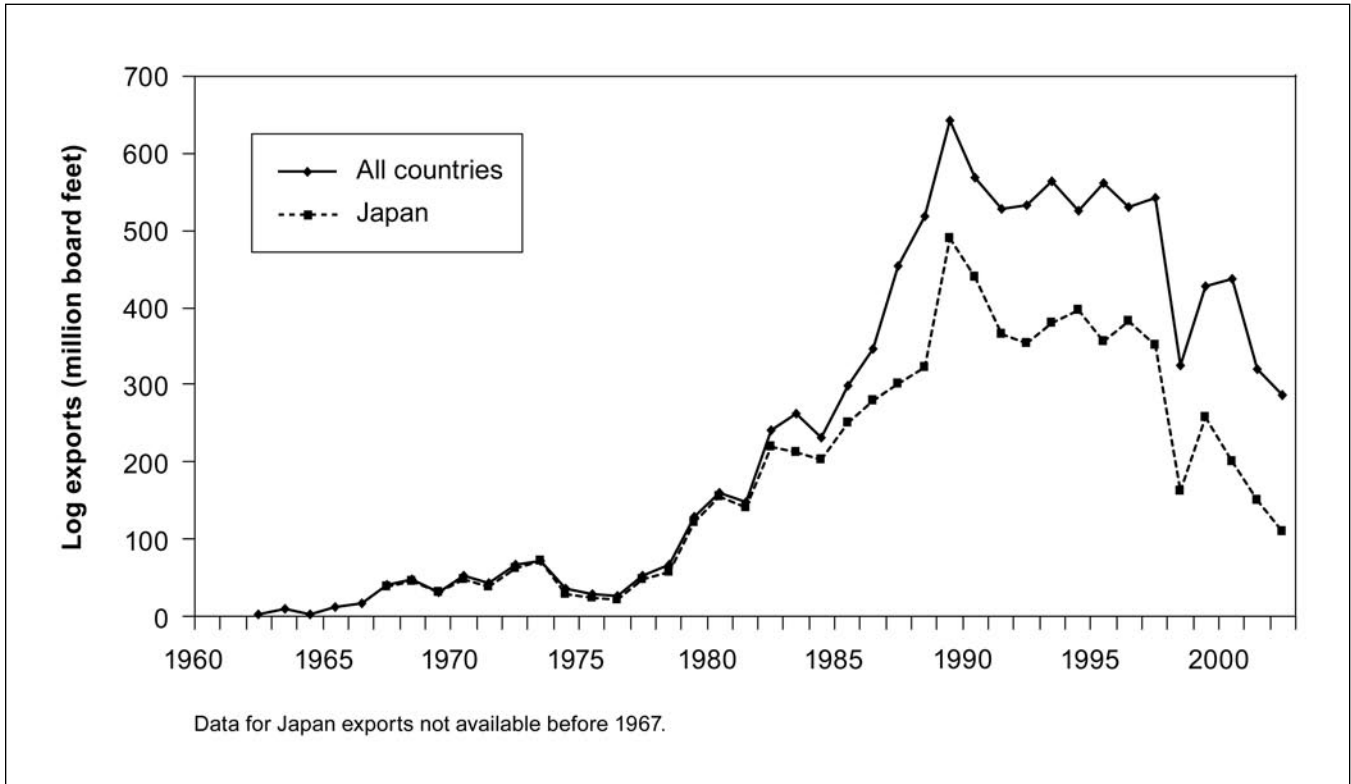


Figure 5—Volume of log exports to all countries and to Japan from Alaska (Warren 2003).

1990s, upturns in the pulp market were no longer enough to insure viability of the southeast Alaska pulp industry for several reasons: the Tongass Timber Reform Act (1990) revised the long-term contracts between the pulp mills and USDA Forest Service, essentially eliminating the subsidized or below-cost timber sales and thus increasing the cost of production; increased competition from petroleum-based synthetic fiber depressed the demand for dissolving pulp; and pulp production costs were also increasing because of increased environmental monitoring and regulation owing to concerns over dioxin released during the chlorinated pulp bleaching processes. Falling pulp prices, increasing production costs, and sustained losses eventually led to the closure of the Sitka APC mill in 1993 followed by the closure of the KPC mill in Ketchikan in 1997.

Because Japan was the primary market for Alaska wood products and pulp, production and employment within the wood products industry fluctuated with the economic activity of Japan. Even during the peak of timber harvest in the late 1980s, little progress was made toward developing a value-added industry in southeast Alaska. The lack of forward integration into value-added lumber products can partly be attributed to the old-growth characteristics of the Tongass National Forest. Some of the old-growth timber was of low quality, better suited to the production of pulp rather than lumber products. Furthermore, the closure of the pulp mills only compounded the problem for local lumber producers attempting to use or dispose of utility grade timber because pulp mills served as the primary outlet for low-grade logs (Crone, in press).

However, the poor quality of some of the old-growth timber has not been the only obstacle deterring firms and potential investors from investing in value-added manufacturing plants. Evidence suggests that the current level and makeup of capital investment within the Alaska wood products industry may be inadequate for producers to be competitive in global markets for value-added products, despite efforts by both federal and state governments to promote timber-related industrialization since the 1950s.

Kilborn (2000) states that there are only 30 sawmills actively producing lumber, despite the fact that over 200 mills exist in Alaska. The remaining mills are not competitive given the current plant equipment and market conditions. The 30 active sawmills in Alaska can be grouped into three categories: (a) mills producing about 250 thousand board feet (MBF) of lumber annually, employing 1 to 2 employees with \$120,000 in capital investment; (b) mills producing about 1,000 MBF of lumber products annually with 3 to 5 employees and about a \$300,000 investment; (c) mills producing 10,000 MBF or greater annually, 10 or more employees, and with over a \$2,500,000 investment. Although the 30 active sawmills have more than

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**Even during the peak of timber harvest in the late 1980s, little progress was made toward developing a value-added industry in southeast Alaska.**



adequate capacity to supply the existing markets within Alaska, Kilborn (2000) elaborates that many of the firms possess inadequate, dated, and underused equipment, which prevents the firms from producing acceptable lumber for the Alaska commodity market. The investment requirement for a sawmill to meet the Uniform Building Code specifications starts at roughly \$120,000 for a small operation and increases to \$300,000 and \$2,500,000, respectively, for the medium and large firms. To justify such an investment, annual production for a small firm would need to meet or exceed production of 250 MBF; a medium firm would require 1,000 MBF of production; and a large firm would need 10,000 MBF to achieve modest profit margins (Kilborn 2000).

Other disadvantages in attracting investment are distance from large markets, harsh climate, high costs, lack of human capital, and inadequate infrastructure (Marple's 1999–2000). In the late 1990s, both Oregon and Washington experienced a sharp rise in the level of venture-capital investments. During that time a Price-waterhouseCoopers survey reported that investors poured \$145 million and \$907 million into Oregon and Washington, respectively, for various venture-capital investments, while venture investments in the state of Alaska were too small or informal to show up in standard surveys of venture capitalists (Marple's 1999–2000).

Braden et al. (2000) concluded that interregional productivity and economies-of-scale differentials between Alaska and its closest competitors in the U.S. Pacific Northwest (PNW) and British Columbia, Canada, can be partially attributed to dated, underequipped sawmills. To be competitive in local commodity markets and global value-added manufactured product markets, the Alaska wood products industry must upgrade current facilities with additional capital investment of either their own money or money from venture capitalists, and business startups must be attracted into the state. Existing sawmills may lack the incentive or the ability to obtain capital to update current operations.

The assessment of Braden et al. (2000) is supported by recent findings of Robertson and Brooks (2001) who showed that mills in Alaska used an average of 3.6 hours of production worker labor per MBF of lumber output over the 1987–94 period, while mills in the PNW used 2.7 hours. Brooks and Robertson believe that the most likely explanations for the higher labor intensity in logging production for Alaska are its remoteness and more difficult terrain that precludes the use of certain mechanized harvest operations. Furthermore, Robertson and Brooks show that logging production wages are higher in Alaska relative to the PNW. These high wages and low productivity mean costs of \$24 more in labor to produce a MBF of lumber in Alaska than in the PNW.

In addition, because of cost advantages, a growing portion of the world's industrial wood is coming from nontraditional wood regions such as Brazil, Chile, Venezuela, Uruguay, Argentina, New Zealand, Australia, South Africa, Spain, Portugal, Indonesia, and China. Many of these countries have become major producers in international markets and meet the demand of their own local economies. Not only do many of these regions enjoy cost advantages in logging activities, many of the regions enjoy labor cost, transportation cost, and foreign exchange rate advantages that are difficult to overcome in international markets.

The conclusion of Radelet and Sachs (1998) that regions with high transport costs have difficulty promoting value-added export industries has strong implications in promoting an export-based, value-added manufacturing strategy in southeast Alaska. Wisdom (1990) showed that the transportation costs for forest products from Alaska to Pacific Rim markets tend to be three to four times higher than shipping of similar products from the Puget Sound area. Furthermore, Robertson and Brooks (2001) showed that Alaska also has greater manufacturing costs relative to competitors in the PNW owing to higher hourly wages and lower productivity. Given that it is not possible to compensate for higher transportation costs with lower wages and manufacturing costs, Alaska may have difficulty attracting investment and promoting value-added manufacturing.

## **Conclusion**

In this paper we have reviewed the general literature about the different pathways for economic growth and development in resource-abundant regions. We highlighted the change in thinking regarding the effectiveness of the forest products industry as a determinant of economic development. This does not mean that a more comprehensive strategy of forest-based development would not be beneficial to a region in the long run. If such a strategy rests on the goods and services for which a region has a comparative advantage, we can expect sustained development. Southeast Alaska illustrates one of the key hidden issues in this case—the transitory nature of the conditions that define comparative advantage. For example, southeast Alaska possessed comparative advantage for the production of some forest products in the 1950s, but by the 1990s conditions had changed in forest product markets costing it that comparative advantage. At the same time, southeast Alaska gained a comparative advantage in cruise-ship-based tourism, raising expectations about sustainable development tied to tourism rather than the forest products industry.

This last point has several inferences for evolving discussion about community stability and transitions. First, southeast Alaska was seen as a place where the development of a forest products industry offered potential economic opportunities

that would increase the stability of local communities. The experience of the last several decades suggests that a more comprehensive strategy than just the development of a timber industry is required. Such a strategy requires a broad array of participants. Second, while there have been painful transitions in these communities, the communities themselves have survived although some prosper and others struggle. This emphasis on considering the propensity of communities to deal with transitions is consistent with contemporary concerns about sustainable development. In this context, the concern is about the viability and adaptability of communities. For example, indicator 46 used in the Montreal Process for assessing progress toward sustainable forest management deals with the viability and adaptability to changing economic conditions of forest-dependent communities (see Donoghue and Haynes 2002). This emphasis on the ability of communities to deal with transitions shifts the research questions to those that attempt to explain the dynamics of communities, changes in community functions, and the development of indicators for broad-scale socioeconomic changes observed at the community level.

Finally, we infer a need for future research that improves our understanding of the relation among forest resources, management activities, and local communities. This need has long been of interest to the forestry profession, which is concerned with the role of forests in the economic development of a region and its associated communities. In the past, advocates of forest management undertaken for economic goals argued that development of forest resources offered some areas an opportunity for economic growth. Today, many suggest that the role of forest management on public (or commonly held) timberlands should be guided by a broad set of goals consistent with maintaining the social well-being of various stakeholders and users. This challenges us to consider different ways of measuring the contributions of forests to economic prosperity. In deciding which management goals to use and the method of implementing them, we are challenged to consider notions of social justice and eventual impacts on environmental conditions.

## **Metric Equivalents**

1,000 board feet (MBF) (log scale) = 5.67 cubic meters

1,000 board feet (MBF) (lumber scale) = 2.36 cubic meters

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