The Economic Impact and Logistics of the Port of Anchorage

Dr. Darren Prokop

Department of Logistics
College of Business & Public Policy
University of Alaska Anchorage

Rasmuson Hall
3211 Providence Drive
Anchorage, Alaska 99508
tel. 907-786-1992
fax. 907-786-4115
e-mail: afdjp1@cbpp.uaa.alaska.edu
website: http://logistics.alaska.edu

Abstract

The Port of Anchorage is currently undergoing an expansion project expected to increase its land size by more than double and its dock length by nearly triple. The project, to be completed by 2012, will be funded by federal and state grants as well as port equity. As Alaska's regional port it serves 80% of the state's maritime trade and 90% of its population. The strategic locale of the port has been put to use through several military deployments and, most recently, the Stryker Brigade Combat Team. It is also homeport for the U.S. Coast Guard Marine Safety and Security Team.

This paper outlines the economic impact of the Port of Anchorage in the midst of this $375.9 million project and in anticipation of the issuance of a new revenue bond. Previous research

in 1999 estimated the total annual economic impact of the port to be about $750 million per year. New estimates for the total impact as well as its breakdown for direct, indirect, induced and employment impacts will be estimated.

The Port of Anchorage

Overview

As the northernmost U.S. deep draft port the Port of Anchorage began operations in 1961 with one berth.[1] Today it has five berths. Geographically it serves 90% of Alaska's population and the major military installations via road, rail and air cargo connections. About 80% of Alaska's maritime trade (and 90% of all its consumer imports) arrive through the port.

Adjacent is a 128.96 acre industrial park with 63% of that area leased by various port users. The two major carriers using the port are Horizon Lines, Inc. and Totem Ocean Trailer Express, Inc. The former operates a standard cargo container operation while the latter operates trailer roll-on, roll-off (RO/RO). Both are "Jones Act" carriers.[2] Four to five vessels arrive on a weekly basis. The port also supports rapid deployment of U.S. combat forces (particularly the Stryker Brigade Combat Team).

In order to position itself for increased U.S.-Asia economic integration the Port of Anchorage embarked on a $375.9 million expansion program. The project consists of three parts: (1) road and rail extension to improve cargo flow; (2) develop a north terminal to accommodate and coordinate an increase in barge shipments and container traffic; and (3) dock expansion to accommodate 1,000 foot ships and berth vessels requiring greater depth. The project runs from 2005-2012 and will develop 135 acres of land and 8,880 feet of waterfront structures. Dredging to a depth of 45 feet will also be undertaken beyond the current 35 feet. The number of berth accommodations will be: one cement, two petroleum, two container, two barge and one military RO-RO.

The ocean travel time between Anchorage and Asian ports is faster than those to/from West Coast Ports. When factoring in total clearance affected by congestion delays, off-loading, customs clearance and intermodal transfer the Port of Anchorage has a strategic advantage often overlooked by players in U.S.-Asia trade.[3] Table 1 compares delivery lead times from selected Asian ports to St. Louis, Missouri.

Table 1: Ocean Vessel-Motor Carrier Lead Times in Asia-U.S. Trade

Asia Port Origin	Sail Time (Days)	U.S. Port of Entry; with Customs clearance and transfer time (Days)		Motor Carrier Transit Time (Days)	U.S. Dest.	Total Lead Time (Days)
Yokohama	7	Anchorage	1.5	7	St. Louis	15.5
	8	Seattle	4	7		19
	10	Oakland	8	5		23
	11	Long Beach	15	5		31
Pusan	7	Anchorage	1.5	7	St. Louis	15.5
	8	Seattle	4	7		19
	10	Oakland	8	5		23
	11	Long Beach	15	5		31
Guangzhou	11	Anchorage	1.5	7	St. Louis	19.5
	12	Seattle	4	7		23
	13	Oakland	8	5		26
	15	Long Beach	15	5		35

If the transfer were to rail instead of motor carrier the port's advantage remains but becomes somewhat muted in that Seattle would have a shorter lead time. In table 1 it would be reasonable to

adjust the transfer times at the ports, along with transfer and modal lead times such that the total lead times may rise or fall by a day; but for Anchorage the total would rise to about 22 days (26 from Guangzhou) with all of it due to the absence of direct rail connections between Alaska and Canada. Basically, after clearing customs in Anchorage, the shipment would proceed about 70 miles by road or rail to the coastal port in Whittier, Alaska. From there it would be taken by rail barge though Prince William Sound to the CN rail connection in British Columbia.

Finally, if the transfer were to aircraft instead of motor carrier it is reasonable to reduce the modal transit time to 0.5 days from all ports of entry. This means the Anchorage and Seattle lead times would fall 6.5 days (i.e., from 7 to 0.5); and the Oakland and Long Beach times would fall 4.5 days (i.e., from 5 to 0.5). Thus, with a total lead time of 9 days (13 from Guangzhou) the Port of Anchorage maintains the shortest lead time in the fashion shown with motor carriers in table 1.

Economic Activity

From 1996 to 2005 the Port of Anchorage experienced shipping activity as shown in table 2. Inbound and outbound TEUs are approximately evenly split over the time period.

Table 2: TEUs and Tonnage 1996 - 2005

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total TEU (thousands)		338	337	358	368	425	361	472	522	544	557
Total Tons (mil.)		3.09	3.32	2.95	3.53	3.83	4.00	3.95	4.41	4.63	4.83
Commodity Shares (% of total tons)	Petroleum, Bulk	49.5	51.7	43.4	26.9	27.9	30.1	30.0	28.1	26.3	0.59
	Vans/Flats/ Containers	49.0	45.4	53.2	45.3	41.9	41.0	40.8	38.0	38.0	n.a.
	Cement, Bulk	2.6	2.8	3.3	2.7	2.8	3.1	2.3	3.3	2.7	n.a.

Source: Port of Anchorage.

Economic Impact Methodology

Several ingredients are required in order to provide a sound economic impact analysis. The first is the defined spatial area which has important consequences for economic multipliers and leakages. It is within the spatial area that the economic impacts are estimated. The Municipality of Anchorage is well-defined spatially.

The total economic impact of increased trade in the market area may be broken down to three sub-impacts.

1) a) Direct economic impacts are created through the goods required at various points served by the port in the market area. The first round of expenditures comes from getting the goods to where the market requires them to be;

   b) Direct economic impacts also arise though capital expenditures. The income earned by construction workers and spent in the market area is a first round expenditure;

2) Indirect economic impacts are created through the support services which help to induce the first round of expenditures. Port maintenance and transient population support (hotels, restaurants, etc.) are examples of these. They facilitate the critical transportation services which are necessary business within the market area;

3) Induced economic impacts are created through the subsequent rounds of expenditures which occur in the market area as a result of the income earned from the direct impacts.

Of course, indirect impacts can be functionally co-dependent thus making it difficult to separate out the various impacts. For example, a carrier's purchase of fuel and the port's maintenance of

the infrastructure are common costs necessary for the trip to take place. It is very difficult to allocate the precise revenues induced to the market area from each of these cost centers.

Direct Impact

The port, itself, does provide a direct benefit to those whose revenue is directly traceable to its use. Thus, the ocean vessel carriers and any intermodal support services are the direct recipients of the port's benefits.

Indirect Impact

The indirect benefits of the port accrue to those whose revenue is traceable to activities induced *after* the mooring of the vessel. Thus, ground transportation and manufacturing and/or retail services related to the ocean vessel cargo are secondary recipients. For transient crews it is the service sector, ground transportation and the hospitality industry which receive the secondary benefits. The excess of revenues earned by these parties over and above costs are the profits. These profits may be reinvested in their businesses in order to enhance them. This is an example of the indirect economic impact. More jobs are created and further labor income induces yet further rounds of spending in the market area.

Induced Impact: Multiplier Analysis

When a vessel laden with cargo is loaded or unloaded revenues are generated to various parties as a result. For example, the cargo's value-added will generate further demands for goods and services. The extra rounds of spending generated indicate a multiplier effect. If revenues accrue to parties outside of the market area the multiplier effect in the area is diminished--- as such this is called a leakage.

Multipliers are convenient because they are a substitute for surveying all induced impact recipients in the market area--- of which there may be hundreds or even thousands. Technically, multipliers are

derived from input-output analysis of economic interdependences defined over the market area of study.[4] Simply put, the multiplier is the ratio of the change in total economic impact relative to the change in the induced impact which brought it about.

The multipliers for the market area, however, are expected to be relatively smaller than first thought for two important reasons.

1) Since the Port of Anchorage, located in south central Alaska, is a gateway for ocean vessel based imports, one would expect the leakage effect to be pronounced. In this way the multipliers would be lower than those regions with their own gateway ports and mature industries;

2) Intra-market sources of value-added are not prevalent in Anchorage. The magnitude of the multiplier is a positive function of the strength of industries in the market area and their linkages.

Thus, no matter how large the expenditures are within the market area the rounds of spending induced, net of leakages, are likely to be few.

Empirical Analysis

To give an idea of the impact of ocean vessel transportation in Anchorage, Alaska table 3 shows the multiplier effects[5] on labor income and employment in the market area. These are also compared to the southwest region and state-wide; and to alternative modes of transport.[6]

Starting with labor income, the multipliers for Anchorage are consistently higher than those for the southwest and the state as a whole. The water transport multiplier of 3.71 means that for every $1 of labor income generated to the ocean vessel employees in Anchorage a further $3.71 is created in the market area. In 2006 the Port of Anchorage paid $1.8 million in labor income (inclusive of

wages and benefits) which implies a further $6.7 million in labor income in Anchorage as a result.

Table 3: IMPLAN Regional Multipliers (2001)

		Transport Mode			
Region	**Multiplier (2001)**	**Air Transport**	**Water Transport**	**Truck Transport**	**Ground Passenger**
Southwest	**Labor Income**	1.60	2.40	1.36	1.26
	Employment	1.60	3.31	1.35	1.13
Anchorage	**Labor Income**	1.80	3.71	1.67	1.49
	Employment	2.28	5.21	1.82	1.22
State-Wide	**Labor Income**	1.79	3.65	1.62	1.43
	Employment	2.22	5.06	1.80	1.22

As to employment, the multiplier for Anchorage is higher than those for the southwest and the state as a whole. For every 1 job created as a result of increased ocean vessel activity in Anchorage a further 5.21 jobs are created in the market area. Another way to look at this is: the typical job in the ocean vessel sector creates enough economic activity in the market area to warrant the hiring of more than five other people in other sectors of the economy. In 2006 the Port of Anchorage employed 22 people which, therefore, implies a further 115 jobs were created in Anchorage as a result.

Another set of multipliers comes from a model known as the Regional Input-Output Modeling System (known as RIMS II). This model calculates regional economic impacts for 2001 using the U.S. Census Areas. Table 4 shows the results for the Anchorage market area as compared to two other south central Alaskan cities (i.e., Bethel and Dillingham).[7]

Table 4: RIMS II Multipliers (2001); Anchorage, Bethel and Dillingham

		Transport Mode			
Anchorage	**Multiplier (2001)**	**Air Transport**	**Water Transport**	**Truck Transport**	**Ground Passenger**
Final Demand	**Output**	1.99	1.99	1.89	1.92
	Earnings	0.53	0.41	0.48	0.66
	Employment	16.35	12.44	14.44	36.89
Direct Demand	**Earnings**	2.21	3.73	2.05	1.67
	Employment	2.98	5.82	2.38	1.34

		Transport Mode			
Bethel	**Multiplier (2001)**	**Air Transport**	**Water Transport**	**Truck Transport**	**Ground Passenger**
Final Demand	**Output**	1.35	1.44	1.28	1.25
	Earnings	0.36	0.28	0.35	0.46
	Employment	9.77	7.37	9.70	30.15
Direct Demand	**Earnings**	1.36	1.94	1.26	1.15
	Employment	1.62	2.73	1.38	1.09

		Transport Mode			
Dillingham	**Multiplier (2001)**	**Air Transport**	**Water Transport**	**Truck Transport**	**Ground Passenger**
Final Demand	**Output**	1.27	1.00	1.00	1.27
	Earnings	0.34	0	0	0.47
	Employment	9.22	0	0	30.90
Direct Demand	**Earnings**	1.29	0	0	1.18
	Employment	1.52	0	0	1.12

An examination of the final demand yields estimates of the total economic impact of water transport on dollars of output, dollars of household earnings and employment. For every extra $1 of water

transport generated in the Anchorage market area a further $1.99 of market area output is produced as a result. This is compared to the $1.00 to $1.44 of regional output produced in Dillingham and Bethel, respectively. Also, each extra $1 is responsible for a further $0.41 in household earnings being generated; compared to $0.00 to $0.28 in Dillingham and Bethel, respectively. The employment figures, by RIMS II construction, show that approximately 12 jobs will be created in Anchorage for every $1 million of extra output generated by the ocean carriers.[8] In Dillingham and Bethel only 0 to 7 jobs, respectively, would be created. Because of the greater diversification of the Anchorage area it should not be a surprise that the earnings and employment multipliers are larger than those for Bethel and Dillingham.

According to the *2002 Commodity Flow Survey* the value of deep draft shipments into Alaska (about 80% of which arrives at Anchorage) was $417 million. Taking $333 million injected into the Anchorage market area and the RIMS II multipliers this leads to a total output of $663 million; $137 million in household earnings; and 4,142 jobs created. These are the total economic impacts of the trade activities at the Port of Anchorage.

An examination of the direct demand yields the impact of the water transport sector without consideration for any leakages in earnings from the region. Thus, the earnings multipliers are larger than they are for the final demand. For every $1 in extra earnings payable to water transport employees in the Anchorage market area a further $3.73 is earned by *all* households in the area. This is compared to $0.00 to $1.94 for Dillingham and Bethel, respectively. Compared to Anchorage, however, the leakages are not as pronounced when comparing the final and direct earnings multipliers. Finally, the employment figures show that for every 1 job created in the water transport sector a further 6 jobs (approximately) are directly created compared to 0 to 3 in Dillingham and Bethel, respectively. Thus, the $333 million of freight activity in 2002 would lead to $1.2 billion in household earnings and 1,998 jobs directly resulting from this activity.

Conclusions

This study found that activity at the Port of Anchorage had a total economic impact of $663 million using 2002 data; about 90% the size of the impact estimated in 1999. However, the estimates here are further broken down. Freight activity at the port contributed to $137 million in household earnings and 4,142 jobs (even when accounting for leakages out of the market area). The port facility itself contributed a further $6.7 million to the labor income earned in Anchorage; and furthermore another 115 jobs were created as a result.

In addition to the five berths currently available, a capital expenditure of $375.9 million spent over 2005-2012 will contribute to eight more. This will allow more operational flexibility and add to the attractiveness of the Port of Anchorage. As the new berths become operational further research opportunities will be offered in tracking the change in impacts as measured in this paper.

Endnotes

[1] Nearby deep draft ports in Alaska include: Seward and Whittier to the south and Valdez to the southwest. Valdez is the U.S.'s northernmost, *ice-free* port and lies at the southern tip of the Trans-Alaska Pipeline.

[2] Operating exclusively between U.S. ports mean both carriers face empty backhauls from the port back to the contiguous U.S. and repositioning their containers and trailers. Since both carriers have strong relationships with the Port of Tacoma, cargo movements out of Puget Sound up to Anchorage face few delays. Of course, empty backhauls are indeed a cost to be passed onto fronthaul shippers.

[3] U.S. Customs and Border Protection maintains officers on call 24 hours a day and 7 days a week at the port. In terms of labor relations it should be noted that the Port of Anchorage was the only West Coast Port which remained open during the dockworker lock-out in October 2002.

[4] An input-output model identifies what each business sector in the region must purchase from every other business sector in that region in order to produce $1 in goods or services. These purchases may be traced forward or backward. Forward spending generates employee wages which induce further spending while backward spending on inputs generates income to those producers who, in turn, make purchases to create more inputs. In both cases, there are multiplier effects.

[5] Technically, these are known as SAM multipliers as derived from an IMPLAN computer-based input-output model. I am grateful *Northern Economics, Inc.* of Anchorage for generating the numbers for 2001.

[6] One may notice that the water transport multipliers are significantly higher than those for air, trucking and ground passenger transport. This should not be interpreted as a more productive form of

transport. Simply put, this fact arises because the typical shipments in water transport are bulk and low value-added commodities. In other words, because there is more opportunity (or necessity) to perform value-added activity in the recipient region more jobs and rounds of spending are induced; hence the larger multiplier.

[7] The RIMS II multipliers are available from the *Regional Economic Analysis Division, Bureau of Economic Analysis, U.S. Department of Commerce*. Empirical tests have shown that estimates of impacts based on RIMS II multipliers have been very close to those generated by more formal and expensive surveys (see **Brucker *et al.* 1990**).

[8] The relatively large employment multipliers for final demand in the ground transport sector are attributable to a peculiarity of the tourism sub-sector: labor intensiveness in the form of a relatively low driver to revenue-passenger ratio.

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