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	<p>THE CHANGING DYNAMICS OF GRAIN COOPERATIVES IN EASTERN WASHINGTON</p> 	
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# **The Changing Dynamics of Grain Cooperatives in Eastern Washington**

By: Jason Monson, Ken Duft, Ken Casavant, and Eric Jessup

## **Introduction**

Country elevators have served the marketing needs of Washington grain producers for the past century, and today they are in the midst of change. Here in the Pacific Northwest (PNW), grain cooperatives were established in the 1930's and 1940's to take advantage of economies of size in shipping commodities; a benefit that individual farmers could not access individually (Hays, 1986). There are many forces impacting cooperative country elevators such as globalization, industrialization, government policies, changes in technology, types of transportation available, farm populations, customer demands, reduced patron loyalty, and evolving markets.

Consolidation of grain firms are likely to continue as long as gains in efficiency can be made to achieve a higher net price for producers and an increase in profitability for grain merchants. Cooperatives are often burdened with high cost facilities, declining grain volumes, low profit margins and excess storage capacity. How will they position themselves to be economically viable when confronted with the current market structure, conduct, and performance of the industry? Have changes in market structure led to improved economic performance? Is the financial health of the cooperatives indicative of potential consolidations or acquisitions with another firm in the future? The goal of the study was to explain the historical development of grain cooperatives, evaluate consolidation in the grain industry, and construct financial benchmarks on which to evaluate economic performance. The population of the study is defined as all grain cooperatives presently operating in eastern Washington (see Figure 1).

## **History of the Pacific Northwest Grain Industry**

Grain production in the Pacific Northwest (PNW) is a natural part of the economy, culture and its agricultural heritage. The Agriculture Marketing Act of June, 1929 encouraged the organization of producers into corporations subject to their own control. Thus, in the early twentieth century country elevators arose in most every town that railroads accessed. Most grain firms are multiplant firms where they operate several grain-receiving stations or houses located throughout a region. This structure was originally created to provide convenient haul times for producers at the time of harvest. Short haul times were necessary to keep trucks available so that combines would be able to continue harvesting. Over the past century a complete transportation system implying the availability of rail, road, and river transportation has developed in the PNW. Cost efficient transportation increases the competitiveness of commodities and provides access to international markets.

Cooperatives are not only a business, but indicative of a producer philosophy, which is evident by their operating principles. They describe what cooperatives are, not necessarily what they do. Other forms of business do not abide by a standard set of beliefs, but cooperatives adhere to a set of principles that define their role. A cooperative is a user-owned and user-controlled business that distributes benefits on the basis of member use (patronage).

Cooperatives enjoy the special statutory privilege to act and bargain collectively on behalf of their members. The Capper Volstead Act of 1922 recognized cooperatives as a unique form of business. It states that farmers can, subject to minimal restrictions, organize marketing associations without violating antitrust laws.

The history of the PNW grain industry provides the context to understand the current market structure. Economic forces over time, exemplified by a push to gain greater volume, have led to numerous consolidations and partnerships in the PNW grain industry. U.S. regulations and

laws affect cooperative conduct and economic performance. Any public grain warehouse in the state of Washington must comply with merchandising and warehousing laws, the U.S. Grain Standards Act, and U.S. laws governing market concentration.

**Figure 1: Eastern Washington Grain Producing Counties**



### Pacific Northwest Grain Industry Consolidation

Grain cooperatives are gradually vanishing in the Pacific Northwest as they struggle to remain economically viable. Consolidation is occurring at the producer, processing, wholesale and retail level of our food system. The number of grain cooperatives in eastern Washington has decreased by 60% in the past 55 years, but the total cooperative storage capacity has increased 312%. In 1947 seventy percent of the licensed warehouse capacity in Washington was owned by cooperatives or farmer owned stock companies, with the remaining 30% of licensed capacity owned by private corporations. Also, in 1947 there were 54 cooperatives and farmer owned firms, and 57 private grain companies operating in Washington (Jorgens, 1947). In 2001/2002 there were 52 grain companies operating in Washington State, representing a 53% decline in the number of grain firms from 1947. Total 2001/2002 commercial grain storage in eastern

Washington was 211,592,000 bushels in 2002, which is an increase in total commercial storage of 258% since 1947 (see Table 1).

**Table 1: Cooperative and Private Grain Firm Capacity and Consolidation, 1947 and 2002.**

Scenario	1947 (a)	2002 (b)	Percent Change 1997 2002
Total Grain Firms in Washington	111	52	<b>-53.15%</b>
Number of Grain Cooperatives	54	22	<b>-59.26%</b>
Percent of Total Firms That are Cooperatives	48.65%	42.31%	<b>-13.03%</b>
Total Houses for Cooperatives		309	
Total Locations for Cooperatives		204	
Total Storage Capacity for Cooperatives (Bu)	41,615,000	171,395,000	<b>311.86%</b>
Average Volume Per Cooperative (Bu)	770,648	7,790,682	<b>910.93%</b>
Average Storage Capacity Per House for Cooperatives (Bu)		554,676	
Average Number of Locations Per Cooperative		14.05	
Average Number of Houses Per Cooperative		9.27	
Total Commercial Storage Capacity- Cooperatives and Private Firms (Bu)	59,155,000	211,592,000	<b>257.69%</b>
1948 and 1995 Eastern Washington On-Farm Storage Capacity (Bu) (c)	12,000,000	74,552,300	<b>521.27%</b>
<b>Total Commercial Storage Capacity- Cooperatives and Private Firms and On-Farm Storage (Bu)</b>	<b>71,155,000</b>	<b>286,144,300</b>	<b>302.14%</b>
Average Storage Capacity for Cooperatives and Private Firms (Bu)	532,928	4,069,077	<b>663.53%</b>
Total Number of Houses- Cooperatives and Private Firms		413	
<b>Cooperative Market Share of Total Houses</b>		<b>74.82%</b>	
<b>Cooperative Market Share of Total Capacity (Bu)</b>	<b>70.35%</b>	<b>81.00%</b>	<b>15.14%</b>

a= Jorgens, John Robert Stuart. "Grain Handling-Storage Costs of Country Warehouses in Washington." M.A. thesis, Dept. of Agri. Econ., The State College of Washington, 1949.

b= Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

c= Edwards, Richard and Eric L. Jessup. "Eastern Washington On-Farm and Commercial Grain Storage." EWITS Research Report Number 20. Dept. of Agri. Econ., Wash State U., Pullman, WA January 1998. Dooley, Frank J. "Theory and Economics of Multiplant Firms Applied to Washington Grain Elevator Firms." Ph.D. dissertation, Dept. of Agri. Econ., Wash. State U., Pullman, August 1986.



## Analytical Framework

The analytical model of structure, conduct, and performance is used in this study to investigate the grain industry as it evolved to meet the growing and ever-changing demands of a global economy. The justification for using an industrial organization model is its ease of application. It also assists in our ability to see and assess what is happening in an industry. In this section, the conceptual basis for industrial organization is defined, and the elements of industrial organization are discussed, with particular attention paid to economies of size.

Industrialization in agriculture refers to the increasing consolidation of farms and integration of the food and fiber system. *Consolidation focuses on the size of firms and plants, whereas concentration focuses on the number of competing firms.* The goals of industrialization are to be competitive in global markets, more responsive to consumer demands, less dependent on government assistance, and more able to adopt new technologies quickly (Council on Food, Agriculture and Resource Economics, 1994).

Industrial organization is the number, size, and economic power of firms in an industry, such as agriculture. It includes the way firms coordinate production, exchange goods and services, and compete with one another. Concentration is a measure of the relative size of an industry's firms. The four-firm concentration ratio (CR4) measures the share of industry sales held by the four largest firms in an industry. Increase in concentration usually reflects a decline in the number of competing firms in the market, and an increase in market power (Economic Research Service, December 7, 2000). The geographic location of competing firms is also important in assessing the concentration of an industry.

## **Market Structure Findings**

Market structure is the physical environment that influences market power and competition. Elements of market structure include: 1) seller concentration, 2) buyer concentration, 3) product differentiation, and 4) barriers to entry and exit. The data provided here on market structure represents 100% of the 22 cooperatives currently operating in eastern Washington.

### **Seller Concentration**

In 2001/2002, twenty-two cooperatives comprised 42% of the fifty-two grain companies operating warehouses in eastern Washington. Approximately 81% of these licensed warehouses are grain cooperatives. The remaining 19% of grain firms are public or private investor-owned. The 2001/2002 total state and federal licensed capacities of country houses for Washington State was 211,592,000 bushels provided by a total of 413 houses. Of these 413 houses 309, or 74%, are managed by cooperatives. Private companies operate the remaining 104 elevators or 26% of eastern Washington total warehouses capacity (see Table 2).

Licensed storage capacity of cooperatives ranges from 960,000 bushels to 26,606,000 bushels. The average volume per cooperative increased by 911% from 770,648 bushels in 1947 to 7,790,682 bushels in 2001. House capacity ranges from 10,000 to 5,659,000 bushels. The number of houses per cooperative ranges from 1 to 46, and the average volume of each house per cooperative is 554,676 bushels. Houses with less than 500,000 bushels in capacity encompass 68% of cooperative storage facilities. The average number of houses and locations per cooperative is 14.05 and 9.27 respectively.

**Table 2: Eastern Washington Total Licensed Capacity and House Summary, 2001/2002.**

<b>Scenario</b>	<b>Eastern Washington and Pendleton Grain Growers- Prosser, WA Facility Only</b>	<b>Eastern Washington and Total Pendleton Grain Growers</b>	<b>Percent Market Share- WA</b>
Cooperative Grain Firms	22	22	42.31%
Private Grain Firms	30	30	57.69%
<b>Total Firms</b>	<b>52</b>	<b>52</b>	<b>100.00%</b>
Cooperative Grain Capacity (Bu)	171,395,000	184,351,000	81.00%
Private Grain Capacity (Bu)	40,197,000	40,197,000	19.00%
<b>Total Capacity</b>	<b>211,592,000</b>	<b>224,548,000</b>	<b>100.00%</b>
Cooperative Grain Houses	309	336	74.82%
Private Grain Houses	104	104	25.18%
<b>Total Houses</b>	<b>413</b>	<b>440</b>	<b>100.00%</b>
WA Licensed Capacity (Bu)	193,209,000	193,209,000	91.31%
Federal Licensed Capacity (Bu)	18,383,000	31,339,000	8.69%
<b>Total Capacity</b>	<b>211,592,000</b>	<b>224,548,000</b>	<b>100.00%</b>
WA Licensed Houses	389	416	94.19%
Federal Licensed Houses	24	24	5.81%
<b>Total Houses</b>	<b>413</b>	<b>440</b>	<b>100.00%</b>

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

In 1940, twenty seven percent of grain cooperatives operated five or more elevators, and 5% operated 12 or more elevators (Dooley, 1986). In 2002 all of the cooperatives are structured as multiplant firms, except for the two subterminal river elevators (Central Ferry Terminal Association and Farmers Warehouse and Commission Company), which function as put through facilities. Fifty percent of the cooperatives operate at one to five locations, and 64% manage stations at fewer than ten locations. Remarkably, 23% of the cooperatives operate one to five houses, and 23% manage 21 to 46 houses (see Tables 3 and 4).

**Table 3: Number of Locations Per Cooperative.**

<b>Number of Locations/ Co-op</b>	<b>Number of Co-ops</b>	<b>Percent of Co-ops</b>	<b>Cumulative Percent</b>
1-5	11	50.00%	50.00%
6-10	3	13.64%	63.64%
11-15	4	18.18%	81.82%
15-26	4	18.18%	100.00%
<b>Total</b>	<b>22</b>	<b>100.00%</b>	

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

**Table 4: Number of Houses Per Cooperative.**

<b>Number of Houses/ Co-op</b>	<b>Number of Co-ops</b>	<b>Percent of Co-ops</b>	<b>Cumulative Percent</b>
1	2	9.09%	9.09%
2- 5	5	22.73%	31.82%
6- 8	4	18.18%	50.00%
9- 11	1	4.55%	54.55%
12- 14	4	18.18%	72.73%
15- 17	0	0.00%	72.73%
18- 20	1	4.55%	77.27%
21- 46	5	22.73%	100.00%
<b>Total</b>	<b>22</b>	<b>100.00%</b>	

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

Country elevators comprise a service industry. The service they provide to producers appears in the form of the storage and handling of commodities. Seller concentration encompasses the number of firms, capacity, and geographic dispersion of firms. Comparatively speaking, the cooperative capacity is highly concentrated with the top four firms controlling 47% of the volume and 49% of the cooperative houses. The largest eight cooperatives operate 71% of

licensed capacity and 72% of cooperative houses. This reveals the existence of several large cooperatives structured as multiplants (see Table 5).

**Table 5: 2002 Concentration of Cooperatives and Private Grain Companies by Licensed Capacity and Houses.**

<b>Number of Co-ops</b>	<b>Licensed Capacity (Bu)</b>	<b>Percent of Co-op Capacity</b>	<b>Number of Co-op Houses</b>	<b>Percent of Co-op Houses</b>
Largest 4	79,851,000	46.6%	152	49.2%
Largest 8	121,668,000	71.0%	221	71.5%
Largest 12	148,785,000	86.8%	268	86.7%
<b>Total 22</b>	<b>171,395,000</b>	<b>100.0%</b>	<b>309</b>	<b>100.0%</b>

SOURCE: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

A county-based analysis was used to reveal market regions and competitive structures of different geographic regions. The number of cooperatives and houses per county is directly correlated to productivity of the land and the total volume of annual crop production. Whitman County has the highest grain crop production in the state and therefore has the largest cooperative capacity, number of houses, and on-farm storage. The least concentrated counties are Franklin, Lincoln and Whitman with market shares of the largest cooperative of 45%, 30.25% and 18% respectively. A majority of counties are comprised of numerous small houses and very few larger houses (see Table 6).

**Table 6: 2002 Concentration of Cooperatives and Houses by County.**

County	Number of Co-ops	Number of Houses	Percent of Co-op Houses	Co-op County Capacity (Bu)	Percent of Co-op Capacity	Largest Co-ops Percent of Capacity	
						1	2
Adams	3	26	8.41%	12,047,000	7.03%	73.57%	91.57%
Benton	2	2	0.65%	5,703,000	3.33%	99.23%	100.00%
Chelan	1	1	0.32%	506,000	0.30%	100.00%	
Columbia	2	15	4.85%	9,497,000	5.54%	92.70%	100.00%
Douglas	1	12	3.88%	6,890,000	4.02%	100.00%	
Franklin	3	9	2.91%	5,194,000	3.03%	44.88%	85.64%
Garfield	1	6	1.94%	1,610,000	0.94%	100.00%	
Grant	6	28	9.06%	15,039,000	8.77%	54.34%	70.12%
Klickitat	2	3	0.97%	2,123,000	1.24%	52.99%	100.00%
Lincoln	5	57	18.45%	28,300,000	16.51%	30.25%	51.22%
Okanogan	1	1	0.32%	412,000	0.24%	100.00%	
Spokane	3	27	8.74%	14,229,000	8.30%	49.12%	76.59%
Stevens	2	2	0.65%	116,000	0.07%	51.72%	100.00%
Walla Walla	1	30	9.71%	23,182,000	13.53%	100.00%	
Whitman	10	87	28.16%	44,462,000	25.94%	17.83%	34.87%
Yakima	1	1	0.32%	378,000	0.22%	100.00%	
Idaho (a)	1	2	0.65%	1,707,000	1.00%		
<b>Total</b>	<b>45</b>	<b>309</b>	<b>100.00%</b>	<b>171,395,000</b>	<b>100.00%</b>		

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

NOTE: The total number of cooperatives is greater than 22 due to multicounty operations.  
a= CHS- Rockford Grain Growers operates six houses in Spokane County and two houses at Worley and Setters, Idaho.

### **Buyer Concentration**

The volume of production, total number of producers, and amount of on-farm storage represent measures of buyer concentration. Producers are the source of demand for warehouse merchandising services, but they are also competitors with themselves through their on-farm storage. Plus, farmers serve on the boards of directors of cooperatives with which their farm-stored grain may be in competition. The total number of farms greater than 1,000 acres in size, as

extracted from the 1997 Census of Agriculture, is used to estimate the seller concentration of eastern Washington. The USDA defines a farm as “a place that would sell or would normally sell \$1,000 of agriculture products.” Using the total number of farms would greatly overstate seller concentration in the PNW industry, because of such a broad and all-encompassing definition of a farm.

There were 3,014 one thousand acre or greater farms in the 20 grain producing counties of eastern Washington, and 47% of these are located in Adams, Grant, Lincoln and Whitman counties. Their farms provide 63% of on-farm storage, and 58% of cooperative storage capacity is located in these same four counties. Whitman and Lincoln counties have the greatest number of 1,000 acre or larger farms with 481 and 419 respectively. Forty-seven percent of 1,000 acre or larger farms in the four county concentration, corresponds to the top four cooperative capacity concentration ratio of 47% (see Table 7).

**Table 7: Four County Concentration of 1,000 Acre Farms, Farm Storage, and Cooperative Capacity.**

<b>County</b>	<b>Farms 1,000 Acres or More (a)</b>	<b>Percent of Total 1,000 Acre Farms</b>	<b>On- Farm Storage (Bu) (b)</b>	<b>Percent of On-Farm Storage</b>	<b>Co-op Capacity (Bu)</b>	<b>Percent of Total Co-op Capacity</b>
Adams	267	8.86%	7,261,000	9.74%	12,047,000	7.03%
Grant	250	8.29%	8,807,000	11.81%	15,039,000	8.77%
Lincoln	419	13.90%	8,048,000	10.80%	28,300,000	16.51%
Whitman	481	15.96%	23,034,000	30.90%	44,462,000	25.94%
<b>Total</b>	<b>1,417</b>	<b>47.01%</b>	<b>47,150,000</b>	<b>63.24%</b>	<b>99,848,000</b>	<b>58.26%</b>

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

a= U.S. Department of Commerce, Bureau of the Census. Census of Agriculture, 1997, 1997. Downloaded from <http://www.nass.usda.gov/census/census97/highlights/wa/>.

b= Edwards, Richard and Eric L. Jessup. “Eastern Washington On-Farm and Commercial Grain Storage.” EWITS Research Report Number 20. Dept. of Agri. Econ., Wash State U., Pullman, WA January 1998.

In 1948 there was 12 million bushels of on-farm storage, compared to 59 million bushels of total production capacity (Dooley, 1986). The most current data on farm storage shows that the total eastern Washington on-farm storage capacity is 74,552,300 bushels (Edwards and Jessup, 1998). Thus, on-farm storage has increased 521% since 1948. This represents a considerable variation in on-farm storage between the counties, and also suggests that there are large variations in degree of buyer control. The largest volume of on-farm storage is found in Whitman, Grant, and Lincoln counties with 23,034,000, 8,807,000 and 8,048,000 bushels respectively (see Table 7).

### **Product Differentiation**

Handling, storing and merchandising grain are the primary functions conducted by grain marketing firms. Cooperatives seek to differentiate themselves from competitors by offering additional products and services or a higher net effective grain price to producers. Grain firms can function as storage warehouses, merchandising facilities, or provide sideline activities to increase total revenue. Cooperatives are historically service orientated and distinguish themselves through nonprice competition as evidenced by the product mix they provide to their patrons. The commodities handled, fees for warehouse activities, secondary products, transportation alternatives, and cooperative management qualities can distinguish the products and services of individual grain cooperatives. These aspects, discussed below, reflect the level of competition in the grain industry and ultimate performance and long-term survival of the cooperative.

The cropping pattern, weather, and soil type in the region are key determinates in determining the volume and diversity of commodities handled by a cooperative. Not surprisingly, every cooperative in Whitman and Spokane County handles wheat and stores or



processes legumes due to the common rotation of spring peas or lentils followed by winter wheat. These regions are well suited to lentil and pea production due to high rainfall and fertile loam soils. Likewise, corn is an atypical crop for the Palouse, but a part of the normal crop rotation in central Washington. Central Washington is a corn deficit region due to many cattle feedlots in the region. Cooperatives operating in these regions handle, store and dry grain corn for local livestock producers. Similarly, white club wheat is well suited for central Washington, such as Lincoln County (see Table 8).

**Table 8: Commodities Handled by Cooperatives, 2001/2002.**

<b>Commodity</b>	<b>Number of Co-ops</b>	<b>Percent of Co-ops</b>
Wheat	22	100.00%
Barley	22	100.00%
Oats and Triticale	20	13.60%
Corn	7	50.00%
Legumes, Brassicas, and Composites	13	13.60%

SOURCE: Washington State Department of Agriculture, Commodity Inspection Division, Washington Bonded Warehouse Rates and Charges, July 1, 2002.

Seed sales are the main sideline activity for grain cooperatives as is evident by 68.2% of cooperatives selling seed to producers. Marketing services are provided by 63.6% of cooperatives, and feed retailing by 50%. Of the 22 cooperatives, three sell fertilizer, pesticides, petroleum products, and farm supplies. Marketing services includes futures and options brokerage, marketing pools and/or hedging services. Surprisingly, 72.7% of cooperatives provide a website. Offering a website might be viewed as a sign of progressiveness and provides a valuable information source to producers (see Table 9).

**Table 9: Secondary Products and Services Provided by Cooperatives.**

<b>Product or Service</b>	<b>Number of Co-ops</b>	<b>Percent of Co-ops</b>
Agriculture Chemicals	3	13.60%
Agriculture Fertilizer	3	13.60%
Farm Supplies	3	13.60%
Feed	11	50.00%
Fuel	3	13.60%
Marketing Services	14	63.60%
Seed	15	68.20%
Website	16	72.70%

SOURCE: Products and services provided by cooperatives were gathered from interviewing the present management.

The importance of the availability of barge transportation is illustrated by the fact that 86% of cooperatives own an interest in a river terminal facility regardless of their size. In contrast, the ability to load unit trains or 110 car shuttle trains is clearly related to the total licensed capacity of a firm. The smallest cooperative with a 26-car siding has a licensed capacity of 5,616,000 bushels, and 64% of cooperatives have the ability to load unit trains. It is interesting to note that the same cooperatives that own river and rail subterminals also own semi trucks (see Table 10).

**Table 10: Transportation Modes Owned by Cooperatives.**

<b>Transportation Alternatives</b>	<b>Number of Co-ops</b>	<b>Percent of Co-ops</b>
River Terminal	19	86%
Owned Trucks	7	32%
Unit Train (26 Cars) Siding	14	64%
River Terminal, Trucks, and Unit Trains	7	32%

SOURCE: Transportation alternatives owned by cooperatives were gathered from interviewing the present management.

Storage rates are approximately the same for all grains, and vary little among the cooperatives. The average storage charge for wheat and barley is \$0.022 and \$0.024 per bushel

per month, respectively for the 22 eastern Washington cooperatives. The cost of storing oats and triticale is less expensive at \$0.021 per bushel per month. Legumes, brassicas and composites, as well as corn have the highest storage costs per bushel per month at \$0.032 and \$0.026 respectively (see Tables 11 and 12). The storage costs for wheat, barley, oats and triticale range over the cooperatives from \$0.015 to \$0.03 per bushel per month. In contrast, legumes, brassicas, and composites have a four cent range in storage costs between \$0.02 and \$0.06 per bushel per month.

Handling (receiving and loading) fees are in proportion to their relative weights per bushel. Surprisingly, firms with a licensed capacity between 3 and 8.5 million bushels have the lowest handling charge, followed by cooperatives with less than 3 million in capacity. Cooperatives with a licensed capacity in excess of 8.5 million bushels have an average handling charge of \$0.19, \$0.20, and \$0.63 per bushel for wheat, barley, and legumes, brassicas and composites, respectively. In comparison, firms with a licensed capacity of 3 to 8.5 million bushels have an average handling charge of \$0.16 per bushel for wheat and barley, and \$0.20 per bushel for brassicas, composites, and legumes. Corn has a higher average handling charge of \$0.204 per bushel, because of the added cost of drying the grain (see Tables 11 and 13). The greatest range in handling expenses is legumes, brassicas, and composites with a \$0.505 per bushel difference in handling costs from \$0.14 to \$0.645 per bushel.

**Table 11: Average Tariff Rates Per Bushel for Cooperatives, 2001/2002.**

<b>Tariff Classification</b>	<b>Wheat</b>	<b>Barley</b>	<b>Oats &amp; Triticale</b>	<b>Corn</b>	<b>Legumes, Brassicas, Composites</b>
<b>Average Storage Rates/ Bushel/ Month</b>	<b>\$0.022</b>	<b>\$0.024</b>	<b>\$0.021</b>	<b>\$0.026</b>	<b>\$0.032</b>
Average Receiving Rates/ Bushel	\$0.087	\$0.090	\$0.079	\$0.097	\$0.176
Average Loading Out Rates/ Bushel	\$0.092	\$0.093	\$0.081	\$0.106	\$0.285
<b>Average Handling Charges/ Bushel</b>	<b>\$0.180</b>	<b>\$0.182</b>	<b>\$0.160</b>	<b>\$0.204</b>	<b>\$0.438</b>

SOURCE: Washington State Department of Agriculture, Commodity Inspection Division, Washington Bonded Warehouse Rates and Charges, July 1, 2002.

NOTE: The published tariff rates of each cooperative are assumed to apply to all houses operated by the firm. Pendleton Grain Growers is a federally licensed warehouse, and posts tariff rates, which apply to all of their houses. They do not publish a separate tariff for their Prosser, Washington facilities.

**Table 12: Average Storage Charges Per Bushel According to Cooperative Size, 2001/2002.**

<b>Size Category (1,000 Bu)</b>	<b>Average Licensed Capacity/ Co-op (Bu)</b>	<b>Average Number of Houses/ Co-op</b>	<b>Wheat</b>	<b>Barley</b>	<b>Oats &amp; Triticale</b>	<b>Legumes, Brassicas, Composites</b>
0- 3,000	1,517,333	3	\$0.02	\$0.02	\$0.02	\$0.03
3,001- 8,500	5,797,000	10	\$0.02	\$0.02	\$0.02	\$0.03
8,501- 26,500	14,963,111	28	\$0.02	\$0.02	\$0.02	\$0.03

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

SOURCE: Washington State Department of Agriculture, Commodity Inspection Division, Washington Bonded Warehouse Rates and Charges July 1, 2002

**Table 13: Average Handling Charges Per Bushel According to Cooperative Size, 2001/2002.**

<b>Size Category (1,000 Bu)</b>	<b>Average Licensed Capacity/ Co-op (Bu)</b>	<b>Average Number of Houses/ Co-op</b>	<b>Wheat</b>	<b>Barley</b>	<b>Oats &amp; Triticale</b>	<b>Legumes, Brassicas, Composites</b>
0- 3,000	1,517,333	3	\$0.18	\$0.18	\$0.15	\$0.23
3,001- 8,500	5,797,000	10	\$0.16	\$0.16	\$0.15	\$0.20
8,501- 26,500	14,963,111	28	\$0.19	\$0.20	\$0.17	\$0.63

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

SOURCE: Washington State Department of Agriculture, Commodity Inspection Division, Washington Bonded Warehouse Rates and Charges July 1, 2002

### **Barriers to Entry and Exit**

Barriers to entry or exit include high investment costs, limited grain production, inability to comply with government regulations, and economies of size. A grain elevator has little other functional uses besides storing grain and is expensive to construct and maintain. Mergers, consolidations and acquisitions are, historically, the most common reasons for a cooperative to exit the industry. No new or additional cooperatives entered the eastern Washington grain industry during the analysis time line from 1997 to 2002. Cooperatives that exited were consolidated by larger cooperatives. Therefore, the licensed capacity of the eastern Washington did not contract, but merely shifted ownership. Most cooperatives ceased operations due to financial difficulties, and inability to achieve an economy of size and because of capital constraints (Richards and Manfredo, 2003).

## **Market Performance Analysis**

Market performance is the end result of market adjustments made by buyers and sellers. Performance tools used to evaluate the PNW grain cooperatives include financial ratios and cost functions. Also, the impact of three U.S. government policies on cooperative revenue, cost structure and capital investment decisions were analyzed relative to performance.

### **Financial Performance**

Financial statements provide a map for understanding the financial position and historical performance of a business. Three common financial statements are the balance sheet, income statement (profit and loss statement or statement of operations) and the cash flow statement. These measures report the past financial performance of each cooperative and its current financial position. Financial statements provide the information, while financial ratios are the tools with which to guide management in its decision-making. Ultimately the financial strength of cooperatives largely determines their ability to provide products and services to members, as well as determining their ability to redeem equity and pursue necessary capital investments.

Accounting data provide the information with which to analyze the financial performance of the cooperative. Financial ratios allow cooperatives to put accounting data to work and provide a framework to analyze the strengths and weaknesses of the business. Many different financial ratios can be selected to analyze the performance of a business. A ratio looks at one segment of a business, so no single ratio can measure the total performance of the cooperative. Therefore, a group of financial ratios is necessary and used here to analyze the three general areas of a business: liquidity, profitability, and solvency (Wissman, June 2001). The annual changes in liquidity, profitability and solvency need to be understood in light of the commodity market situation, weather conditions, and the economic state of the agriculture economy.

Financial ratios and cost analysis for the grain industry were constructed from 1997-2002 financial statements of grain cooperatives. Responses were received from 20 of 22 cooperatives in eastern Washington in 2001/2002, corresponding to 94.1% of cooperative capacity and 76% of all capacity in eastern Washington. The cooperatives were grouped into three size categories according to licensed capacity (see Table 14), allowing for the comparison of liquidity, profitability and solvency to be made between the three groups. (The term “profitability” actually refers to cooperative net operating margin as cooperatives are not profit-maximizing entities.) Comparing firms of similar size and function to its peers creates economic standards upon which to assess economic performance individually, and for the grain industry as a whole.

**Table 14: Cooperative Size Categories According to Licensed Capacity.**

<b>Size Category (1,000 Bu)</b>	<b>Number of Co-ops</b>	<b>Percent of Total Co-ops</b>	<b>Total Co-op Capacity (Bu)</b>	<b>Percent of Co-op Total Capacity</b>	<b>Total Co-op Locations</b>	<b>Percent of Co-op Total Locations</b>	<b>Total Co-op Houses</b>	<b>Percent of Total Co-op Houses</b>
<b>Small,</b> 0- 3,000	5	25.00%	7,979,000	4.584%	11	5.73%	18	6.14%
<b>Medium</b> 3,001- 8,500	7	35.00%	49,383,000	28.374%	53	27.60%	80	27.30%
<b>Large</b> 8,501- 26,500	8	40.00%	116,684,000	67.042%	128	66.67%	195	66.55%
<b>Total</b>	<b>20</b>	<b>100.00%</b>	<b>174,046,000</b>	<b>100.000%</b>	<b>192</b>	<b>100.00%</b>	<b>293</b>	<b>100.00%</b>

Pacific Northwest grain cooperatives have a strong liquidity position. Liquidity is essential for cooperatives to provide quality service and products to patrons. Current assets are more than sufficient to meet the short-term claims against the business. Large cooperatives maintained their current assets over the study period with only a 2% decline in the current asset values. However, for small and medium sized cooperatives, current asset values were reduced by 50% over the study period. Fortunately, the current liabilities of small and medium cooperatives decreased by a greater percentage of 80% and 60%, respectively. Medium sized cooperatives

maintained the highest average current ratio of 7.2, followed by small and large cooperatives at 6.0 and 2.0, respectively. It is economically reassuring to see the high current ratio, because the recent market price volatility brings into the question the value of grain stocks. Also, the strong current ratio adds a margin of safety to the industry. Inventories may be viewed as a buffer against any unexpected loss or business misfortunes.

The acid test ratio measures current assets above current liabilities, after removing the value for inventories. The value of grain inventories, of course, fluctuates daily with the market. By removing this market volatility, a clearer picture of liquidity is presented. Also, grain is subject to deterioration in quality as the duration of the storage period increases. The acid test ratio follows a similar trend as the current ratios by remaining above one over the study period. The exception was large cooperatives whose acid test ratio dipped below one in 2000 and 2001. This may be due to larger grain inventories of Commodity Credit Corporation owned commodities. Once again small and medium sized cooperatives maintained a significantly higher acid test ratio. In 2000 small and medium cooperatives had an acid test ratio of 5.8 and 3.7 respectively, while large cooperatives had a ratio of 1.7 (see Tables 15 and 16).

The advantage of increased size is seen in the working capital ratio. Large cooperatives were the least capital intensive of cooperative groups when viewed from a per bushel perspective. From 1997-2002 large cooperatives required an average of \$0.21/bushel of grain received. In comparison, small and medium cooperatives required an average \$0.26 and \$0.27 per bushel received respectively (see Table 16). In 1998, large cooperatives required \$0.178 cents of working capital per volume handled, while medium and small cooperatives required \$0.315 and \$0.245 per bushel. This may result, in part, from large cooperatives being better able to finance grain-handling activities from sideline activities or nonmember businesses. Also, large



cooperatives became less capital-intensive with the working capital to total intake ratio declining by 9%, while medium and small cooperatives increased 7% and 45% respectively (see Tables 15 and 16).

**Table 15: 1997-2002 Average Trend of Liquidity Ratios for Cooperatives by Size.**

**Small, Less Than 3 Million Bushels in Licensed Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<b>Current Ratio</b>	6.319	5.778	5.455	5.822	5.706	7.055	<b>11.657%</b>
<b>Acid Test Ratio</b>	5.473	4.555	4.874	4.755	4.897	5.234	<b>-4.371%</b>
<b><u>Working Capital</u> Total Intake (Bu)</b>	0.246	0.245	0.187	0.287	0.241	0.356	<b>44.783%</b>

**Medium, 3-8.5 Million Bushels in Licensed Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<b>Current Ratio</b>	5.434	5.915	3.320	3.668	4.266	25.082	<b>361.585%</b>
<b>Acid Test Ratio</b>	4.805	4.287	4.495	2.766	3.573	23.478	<b>388.596%</b>
<b><u>Working Capital</u> Total Intake (Bu)</b>	0.273	0.315	0.358	0.211	0.198	0.292	<b>6.944%</b>

**Large, Greater Than 8.5 Million Bushels Million in Licensed Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<b>Current Ratio</b>	2.268	2.007	2.010	1.720	1.739	2.345	<b>3.383%</b>
<b>Acid Test Ratio</b>	1.126	1.357	1.130	0.822	0.842	1.334	<b>18.504%</b>
<b><u>Working Capital</u> Total Intake (Bu)</b>	0.235	0.178	0.235	0.225	0.183	0.214	<b>-9.174%</b>

ADAPTED FROM: 1997-2002 cooperative financial statements.

**Table 16: 1997-2002 Time Series Average Liquidity Ratios According to Cooperative Size.**

<b>Ratio</b>	<b>Small Co-op</b>	<b>Medium Co-op</b>	<b>Large Co-op</b>
<b>Current Ratio</b>	6.022	7.947	2.015
<b>Acid Test Ratio</b>	4.965	7.234	1.102
<b><u>Working Capital</u></b>			
<b>Total Intake (Bu)</b>	0.260	0.274	0.212

ADAPTED FROM: 1997-2002 cooperative financial statements.

The profitability of grain cooperatives declined significantly between 1997 and 2002 as seen by the decline in gross revenue, net operating income, and total intake. Medium cooperatives suffered the greatest decrease in net income at 106%, followed by large and small cooperatives at 81% and 73%, respectively. Gross revenue and volume handled followed a similar pattern, which suggests that grain firm profitability is positively correlated to the volume of grain received. Large cooperatives experienced the smallest decrease in gross revenues at 26%.

The average profit margins among the cooperative groups were similar. The average profit margins for small, medium, and large cooperatives were \$0.017, \$0.013 and \$0.014 per dollar of gross revenue. Interestingly, medium and small cooperatives had the same average total costs over the analysis period of \$0.31 per bushel handled. Large cooperatives incurred much higher average total costs at \$0.50 per bushel handled. Similarly, medium and small cooperatives had a higher average turnover than large cooperatives at 1.4 and 1.2, respectively. The average grain turnover of large cooperatives was 0.8 (see Tables 17 and 18). From 1997 to 2002, the total intake of small and medium cooperatives declined 78% and 42%, respectively. Large cooperatives are able to receive grain from a larger geographical region, and only experienced

0.2% decline in total intake. Small cooperatives received an average of one-third the volume of large cooperatives: 19,614,629 versus 71,382,354 bushels, respectively.

Asset productivity is measured as gross revenue divided by total assets. It represents the average payoff resulting from investing an additional dollar of assets in the business. For example, if one invested \$1.00 in small cooperatives in 1997, \$4.45 was generated in gross revenue. Likewise, if one invested \$1.00 in medium and large cooperatives in 1997, \$4.39 and \$4.74 was earned in gross revenue. Asset productivity was highest on average of medium cooperatives followed by small and large cooperatives at \$3.50, \$3.18 and \$3.36 in gross revenue per dollar of asset. Medium cooperatives had the smallest decline in asset turnover at 23% and generated greater than \$2.51 in gross revenue per dollar of asset for 1997-2002 (see Tables 17 and 18).

Return on assets measures the number of dollars of net income earned per dollar of asset employed. This ratio examines the return to both debt and equity to see how effectively assets are being utilized to generate revenue. Medium sized cooperatives provide the greatest average return to total assets followed by large and small cooperatives at \$0.06, \$0.05 and \$0.04 in net income per dollar of assets. Finally, as licensed capacity increases, so do the ratios of net income and total intake to licensed capacity. Small cooperatives generated an average of \$0.03 in net income per bushel of licensed capacity, while large cooperatives were able to earn \$0.04 (see Tables 17 and 18).

As licensed capacity increases, so does the ratio of net income and total intake to licensed capacity. Small cooperatives generated an average of \$0.03 in net income per bushel of licensed capacity, while large cooperatives were able to earn \$0.04. The two ratios were found to be similar among the cooperatives. In 1999 medium cooperatives generated \$0.08 and \$0.086 in net

income per bushel of licensed capacity and total intake, respectfully. Likewise, in 1997 small cooperatives earned \$0.047 and \$0.045 in net income per bushel of licensed capacity and total intake, respectfully. Medium cooperatives experienced a severe decline in the ratio of net income to licensed capacity and total intake over the time period at 110% and 117% respectfully. Also, they were the only cooperative groups to have a negative return on these ratios in 2002. The net income to total intake and licensed capacity demonstrate the improved net income potential with increased cooperative size (see Tables 17 and 18).

The effective turnover measures how quickly grain is sold and replaced each year. The effective turnover includes outside and inside storage capacity and, the total storage volume the grain firm has chosen to be operational and potentially utilized. Interestingly, medium and small cooperatives had a higher average turnover than large cooperatives at 1.4 and 1.2 respectively. The average turnover of large cooperatives was 0.8. Large cooperatives often have numerous houses, which may not all be fully utilized. Between 1997 and 2002 small sized cooperatives had an average licensed capacity of 12,053,167 bushels and conducted business with an average of 26 houses. In comparison, large cooperatives maintained an average licensed capacity of 94,675,167 bushels with an average of 181 houses. Medium cooperatives sustained the highest grain turnover ratio with a range from 0.75 to 2 (see Tables 17 and 18). Also, the small and medium cooperative groups each have a cooperative, which functions as a subterminal elevator. These two cooperatives have limited storage capacity and receive large volumes of grain.

**Table 17: 1997-2002 Average Trend of Profitability Ratios By Cooperative Size.**

<b>Small, Less Than 3 Million Bushels in Capacity</b>							
<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<u>Net Income</u> <b>Gross Revenue</b>	0.044	0.049	0.023	0.042	0.031	-0.086	<b>-296.609%</b>
<u>Net Income</u> <b>Licensed Capacity (Bu)</b>	0.047	0.037	0.046	0.057	0.003	0.010	<b>-78.928%</b>
<u>Net Income</u> <b>Total Intake (Bu)</b>	0.045	0.019	0.036	0.054	0.026	0.025	<b>-44.429%</b>
<u>Total Cost</u> <b>Total Intake (Bu)</b>	0.271	0.266	0.276	0.313	0.344	0.399	<b>47.033%</b>
<u>Net Income</u> <b>Total Assets</b>	0.054	0.004	0.053	0.068	0.042	0.031	<b>-42.342%</b>
<u>Gross Revenue</u> <b>Total Assets</b>	4.447	3.913	2.709	2.454	3.041	2.511	<b>-43.524%</b>
<u>Total Intake (Bu)</u> <b>Licensed Capacity (Bu)</b>	1.331	1.313	1.332	1.228	1.331	0.864	<b>-35.085%</b>
<b>Medium, 3-8.5 Million Bushels in Capacity</b>							
<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<u>Net Income</u> <b>Gross Revenue</b>	0.050	0.059	0.053	0.043	0.058	-0.185	<b>-470.444%</b>
<u>Net Income</u> <b>Licensed Capacity (Bu)</b>	0.052	0.066	0.080	0.031	0.056	-0.005	<b>-110.208%</b>
<u>Net Income</u> <b>Total Intake (Bu)</b>	0.049	0.034	0.086	0.053	0.038	-0.009	<b>-117.305%</b>
<u>Total Cost</u> <b>Total Intake (Bu)</b>	0.333	0.301	0.417	0.232	0.255	0.332	<b>-0.086%</b>
<u>Net Income</u> <b>Total Assets</b>	0.063	0.064	0.078	0.051	0.084	0.006	<b>-89.954%</b>
<u>Gross Revenue</u> <b>Total Assets</b>	4.386	3.519	3.388	2.510	3.839	3.360	<b>-23.395%</b>
<u>Total Intake (Bu)</u> <b>Licensed Capacity (Bu)</b>	1.568	1.608	2.035	1.209	1.417	0.754	<b>-51.903%</b>

**Large, 8.5-26 Bushels Million in Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<u>Net Income</u> <b>Gross Revenue</b>	0.020	0.023	0.021	0.019	0.003	0.001	<b>-96.212%</b>
<u>Net Income</u> <b>Licensed Capacity (Bu)</b>	0.083	0.070	0.043	0.039	0.005	0.003	<b>-96.631%</b>
<u>Net Income</u> <b>Total Intake (Bu)</b>	0.100	0.081	0.053	0.062	0.003	0.004	<b>-96.345%</b>
<u>Total Cost</u> <b>Total Intake (Bu)</b>	0.489	0.473	0.551	0.496	0.532	0.435	<b>-10.953%</b>
<u>Net Income</u> <b>Total Assets</b>	0.100	0.087	0.061	0.046	0.006	-0.001	<b>-100.929%</b>
<u>Gross Revenue</u> <b>Total Assets</b>	4.744	3.655	2.660	2.281	2.780	2.822	<b>-40.514%</b>
<u>Total Intake (Bu)</u> <b>Licensed Capacity (Bu)</b>	0.843	0.902	0.774	0.681	0.740	0.593	<b>-29.641%</b>

ADAPTED FROM: 1997-2002 cooperative financial statements.

**Table 18: 1997-2002 Time Series Average Profitability Ratios According to Cooperative Size.**

<b>Ratio</b>	<b>Small Co-op</b>	<b>Medium Co-op</b>	<b>Large Co-op</b>
<u>Net Income</u> <b>Gross Revenue</b>	0.017	0.013	0.014
<u>Net Income</u> <b>Licensed Capacity (Bu)</b>	0.033	0.046	0.041
<u>Net Income</u> <b>Total Intake (Bu)</b>	0.034	0.042	0.051
<u>Total Cost</u> <b>Total Intake (Bu)</b>	0.312	0.312	0.496
<u>Net Income</u> <b>Total Assets</b>	0.042	0.058	0.050
<u>Gross Revenue</u> <b>Total Assets</b>	3.179	3.500	3.157
<u>Total Intake (Bu)</u> <b>Licensed Capacity (Bu)</b>	1.233	1.432	0.755

ADAPTED FROM: 1997-2002 cooperative financial statements.

Solvency improved for small cooperatives from 1997-2002 with a 58% reduction in the ratio of total debts to patron equity along with a 41% decrease in the debt ratio. Corresponding to this reduction of debt, owners percent of equity improved 11%, which implies the increased reliance on member capital over borrowed funds. Similarly, the medium sized cooperative ratio of total debt to patron equity decreased 17% along with the debt ratio by 18%. Consequently, owner percent of equity also improved 6%. A reverse trend is observed with large cooperatives with a 28% increase in the debt ratio and an increase in the ratio of total debts to patron equity by 62%. Large cooperatives became less solvent over the study period by increasing the use of borrowed capital, so owner percent of equity decreased 11% (see Table 19).

Large cooperatives had an average return on equity of \$0.07 net income per dollar of patron equity. In contrast, small cooperatives were only able to generate \$0.04 of net dollar of patron equity. Large cooperatives are able to generate more net income with less patron capital invested in their storage facilities. The average dollar of patron equity per bushel of licensed capacity for small and large cooperatives is \$0.78 and \$0.66, respectively. Increased licensed capacity allows a firm to draw grain from a larger area and enhance net income (see Table 20).

There is a positive correlation between increasing firm size and need for additional capital. It is logical to hypothesize that as licensed capacity increases, so does debt and most leverage ratios. Along with increased capacity, member ownership in the cooperative may decrease and the return on equity may increase. For example, in 1999, small and large cooperatives had \$0.23 and \$0.35 debt per dollar of assets. Patron equity per volume of licensed capacity for small and medium cooperatives was \$0.85 and \$0.68 respectfully. Small and large cooperatives earned a return on investment of \$0.05 and \$0.08 per dollar of patron equity. Large cooperatives appear better able to efficiently utilize patron equity to generate net income. It is

interesting to note that both medium and large cooperatives, on average, achieved a return on investment of \$0.07 per dollar of patron equity (see Tables 19 and 20).

Large cooperatives have the highest debt, which means they have the largest spread between their return on assets and equity. In 2002, large cooperatives had \$0.74 of debt per dollar of patron equity. In comparison, small and medium cooperatives had a debt level of \$0.16 and \$0.32 per dollar of patron equity (Table 5.10). Large cooperatives are making interest payments, which is a direct expense reducing net income and thus the return on equity. Small and medium sized cooperatives are relying on equity financing, so their return on investment is not exposed to interest rate risk and payment. Consequently, members own an average of \$0.82 and \$0.76 per dollar of assets of small and medium sized cooperatives (see Tables 19 and 20).

Cooperatives may forego expansion plans or other business opportunities while avoiding debt. Borrowing is beneficial when the cost of borrowed capital is less than the profit earned from the borrowed funds. Large cooperatives had an average return on equity of \$0.07 net income per dollar of patron equity. In contrast, small cooperatives were only able to generate of \$0.04 of net dollar of patron equity. Large cooperatives are able to generate more net income with less patron capital invested in the storage facilities. The average dollar of patron equity per bushel of licensed capacity for small and large cooperatives is \$0.78 and \$0.67 respectively (see Tables 19 and 20). Increased licensed capacity allows a firm to draw grain from a larger area and enhance net income.

Pyramiding of equity capital is where the equity of a local cooperative is comprised in large part of a regional or super regional cooperative. The chance of failure of local cooperatives rises as the level of equity in regional cooperative increases. The local cooperative does not have direct control of the business of the regional cooperative, except through the election of directors



to their Board. Thus a failure at the regional level may cause a collapse of the entire system. Cooperatives need to be cautious of allowing equity held in regional cooperatives to exceed locally member-contributed capital. Likewise, cooperatives need to reevaluate their business when a patronage refund of regional cooperatives comprises a large percentage of net income. Some cooperatives are consistently not profitable at the local level and thus patronage refunds from other cooperatives comprise much if not all of their reported net income. Thus a failure or operating loss at the regional level may cause the same at the local level (Duft, 2002d).

Other assets are primarily composed of patronage refunds received from other cooperatives. This comprises a form of financial leverage by interlocking the performance of cooperatives and leveraging its equity capital. A high percentage of other assets imply that the local cooperative is exposed to another firm's performance. The end result would be financial disaster at the local level if the regional cooperatives failed. The loss at the top is magnified at the bottom, and may ultimately reduce patron equity to zero. Brueckner proved that some cooperatives would show a net operating loss without the patronage received from other cooperatives. Seven of 65 cooperatives in 1998 would have reported a net loss, but for receiving regional patronage. A firm's ability to remain solvent is decreased as the investment in other cooperative accounts rises (Brueckner, 2000).

Small and large cooperatives experienced a decrease in the ratio of other assets to total assets of 19% and 32% respectively. These cooperatives decreased their equity leverage, while medium cooperatives increased theirs by 6%. On average, medium cooperatives had the least dependence on other assets, at \$0.068 per dollar of assets. Large cooperatives maintained an average equity base of \$61,864, 512, which is a 4% increase over the study period. But, they increased their equity pool over the period by 4% and maintained an average equity base of

\$61,864,512. In contrast, small and medium cooperatives suffered a decrease in their equity pool of 54% and 40% respectively (see Tables 19 and 20). This demonstrates the reliance on equity financing by small and medium cooperatives.

**Table 19: 1997-2002 Average Trend of Solvency Ratios By Cooperative Size.**

<b>Small, Less Than 3 Million Bushels in Licensed Capacity</b>							<b>Percent Change 1997- 2002</b>
<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	
<b><u>Total Debt</u></b>							
<b>Patron Equity</b>	0.366	0.249	0.462	0.325	0.371	0.156	<b>-57.528%</b>
<b><u>Patron Equity</u></b>							
<b>Total Assets</b>	0.789	0.838	0.773	0.821	0.802	0.876	<b>11.034%</b>
<b><u>Patron Equity</u></b>							
<b>Licensed Capacity (Bu)</b>	0.777	0.758	0.722	0.846	0.813	0.768	<b>-1.072%</b>
<b><u>Total Debts</u></b>							
<b>Total Assets</b>	0.211	0.162	0.227	0.179	0.198	0.124	<b>-41.318%</b>
<b><u>Net Income</u></b>							
<b>Patron Equity</b>	0.065	-0.012	0.045	0.080	0.014	0.029	<b>-54.412%</b>
<b><u>Other Assets</u></b>							
<b>Total Assets</b>	0.087	0.093	0.085	0.079	0.083	0.070	<b>-19.319%</b>
<b>Medium, 3-8.5 Million Bushels in Licensed Capacity</b>							<b>Percent Change 1997- 2002</b>
<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	
<b><u>Total Debt</u></b>							
<b>Patron Equity</b>	0.383	0.323	0.413	0.548	0.351	0.316	<b>-17.462%</b>
<b><u>Patron Equity</u></b>							
<b>Total Assets</b>	0.754	0.802	0.747	0.707	0.774	0.799	<b>5.927%</b>
<b><u>Patron Equity</u></b>							
<b>Licensed Capacity (Bu)</b>	0.750	0.848	0.866	0.798	0.666	0.553	<b>-26.348%</b>
<b><u>Total Debts</u></b>							
<b>Total Assets</b>	0.246	0.198	0.253	0.293	0.226	0.201	<b>-18.152%</b>
<b><u>Net Income</u></b>							
<b>Patron Equity</b>	0.084	0.080	0.104	0.044	0.108	0.006	<b>-92.697%</b>
<b><u>Other Assets</u></b>							
<b>Total Assets</b>	0.068	0.063	0.060	0.069	0.074	0.072	<b>6.255%</b>

**Large, Greater Than 8.5 Million Bushels Million in Licensed Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997- 2002</b>
<b><u>Total Debt</u></b>							
<b>Patron Equity</b>	0.457	0.507	0.651	0.791	0.784	0.742	<b>62.119%</b>
<b><u>Patron Equity</u></b>							
<b>Total Assets</b>	0.723	0.704	0.647	0.605	0.593	0.647	<b>-10.548%</b>
<b><u>Patron Equity</u></b>							
<b>Licensed Capacity (Bu)</b>	0.713	0.733	0.692	0.682	0.645	0.524	<b>-26.478%</b>
<b><u>Total Debts</u></b>							
<b>Total Assets</b>	0.277	0.296	0.353	0.395	0.407	0.353	<b>27.509%</b>
<b><u>Net Income</u></b>							
<b>Patron Equity</b>	0.130	0.116	0.082	0.068	0.001	0.001	<b>-99.036%</b>
<b><u>Other Assets</u></b>							
<b>Total Assets</b>	0.112	0.085	0.091	0.114	0.097	0.077	<b>-31.500%</b>

ADAPTED FROM: 1997-2002 cooperative financial statements.

**Table 20: 1997-2002 Time Series Average of Solvency Ratios According to Cooperative Size.**

<b>Ratio</b>	<b>Small Co-op</b>	<b>Medium Co-op</b>	<b>Large Co-op</b>
<b><u>Total Debt</u></b>			
<b>Patron Equity</b>	0.321	0.389	0.655
<b><u>Patron Equity</u></b>			
<b>Total Assets</b>	0.817	0.764	0.653
<b><u>Patron Equity</u></b>			
<b>Licensed Capacity (Bu)</b>	0.781	0.747	0.665
<b><u>Total Debts</u></b>			
<b>Total Assets</b>	0.183	0.236	0.347
<b><u>Net Income</u></b>			
<b>Patron Equity</b>	0.037	0.071	0.066
<b><u>Other Assets</u></b>			
<b>Total Assets</b>	0.083	0.068	0.096

ADAPTED FROM: 1997-2002 cooperative financial statements.

**Table 21: 1997-2002 Average Trend of Solvency Ratios By Cooperative Size.**

**Small, Less Than 3 Million Bushels in Licensed Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997- 2002</b>
<u>Total Debt</u> Patron Equity	0.366	0.249	0.462	0.325	0.371	0.156	-57.528%
<u>Patron Equity</u> Total Assets	0.789	0.838	0.773	0.821	0.802	0.876	11.034%
<u>Patron Equity</u> Licensed Capacity (Bu)	0.777	0.758	0.722	0.846	0.813	0.768	-1.072%
<u>Total Debts</u> Total Assets	0.211	0.162	0.227	0.179	0.198	0.124	-41.318%
<u>Net Income</u> Patron Equity	0.065	-0.012	0.045	0.080	0.014	0.029	-54.412%
<u>Other Assets</u> Total Assets	0.087	0.093	0.085	0.079	0.083	0.070	-19.319%

**Medium, 3-8.5 Million Bus hels in Licensed Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<u>Total Debt</u> Patron Equity	0.383	0.323	0.413	0.548	0.351	0.316	-17.462%
<u>Patron Equity</u> Total Assets	0.754	0.802	0.747	0.707	0.774	0.799	5.927%
<u>Patron Equity</u> Licensed Capacity (Bu)	0.750	0.848	0.866	0.798	0.666	0.553	-26.348%
<u>Total Debts</u> Total Assets	0.246	0.198	0.253	0.293	0.226	0.201	-18.152%
<u>Net Income</u> Patron Equity	0.084	0.080	0.104	0.044	0.108	0.006	-92.697%
<u>Other Assets</u> Total Assets	0.068	0.063	0.060	0.069	0.074	0.072	6.255%

**Large, Greater Than 8.5 Million Bushels Million in Licensed Capacity**

<b>Ratio</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997- 2002</b>
<b><u>Total Debt</u> Patron Equity</b>	0.457	0.507	0.651	0.791	0.784	0.742	<b>62.119%</b>
<b><u>Patron Equity</u> Total Assets</b>	0.723	0.704	0.647	0.605	0.593	0.647	<b>-10.548%</b>
<b><u>Patron Equity</u> Licensed Capacity (Bu)</b>	0.713	0.733	0.692	0.682	0.645	0.524	<b>-26.478%</b>
<b><u>Total Debts</u> Total Assets</b>	0.277	0.296	0.353	0.395	0.407	0.353	<b>27.509%</b>
<b><u>Net Income</u> Patron Equity</b>	0.130	0.116	0.082	0.068	0.001	0.001	<b>-99.036%</b>
<b><u>Other Assets</u> Total Assets</b>	0.112	0.085	0.091	0.114	0.097	0.077	<b>-31.500%</b>

ADAPTED FROM: 1997-2002 cooperative financial statements.

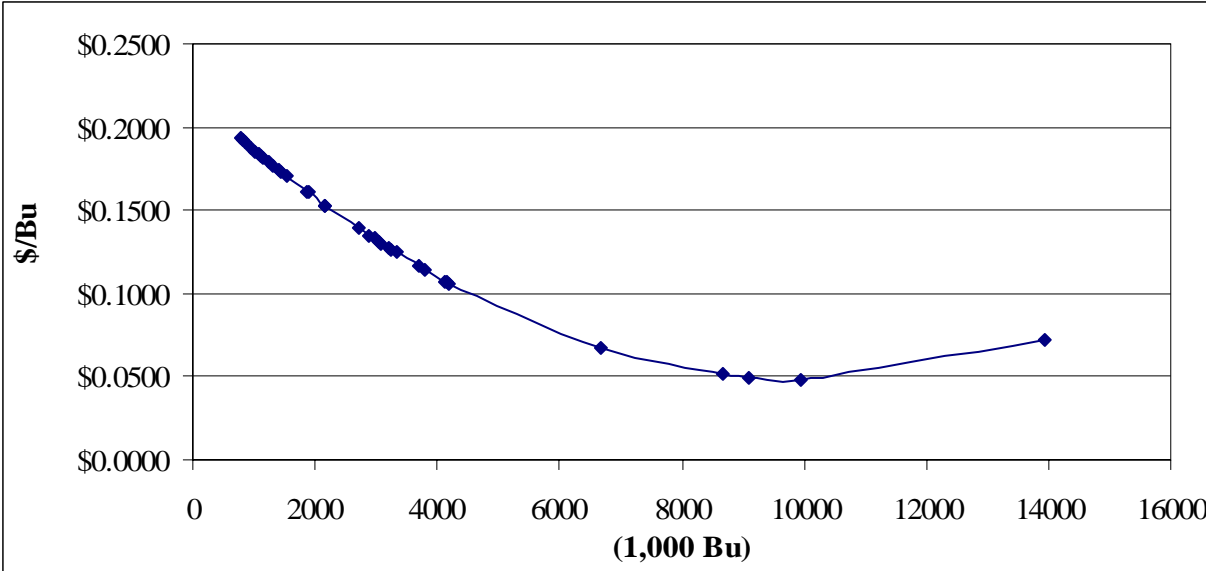
### **Cooperative Efficiency**

A frontier function was fitted to the bottom of cost-volume data points to determine the existence of economies of size in the PNW grain industry. Economies of size exist when average costs fall as output increases with some fixed inputs. Economies of scale imply that all inputs are varied in constant proportions, but economies of size are not restricted to proportional changes in all inputs. This more accurately reflects the structure of the grain industry. The cost curve shows that operating costs decrease as volume handled increases. The level of grain volume corresponding to the minimum point for concentrated grain firms is 10,119,976 bushels at an average total cost per bushel of \$0.0478 (see Figure 2). The long run average cost curve reflects the current technology, operating costs, and capital investment of the cooperatives.

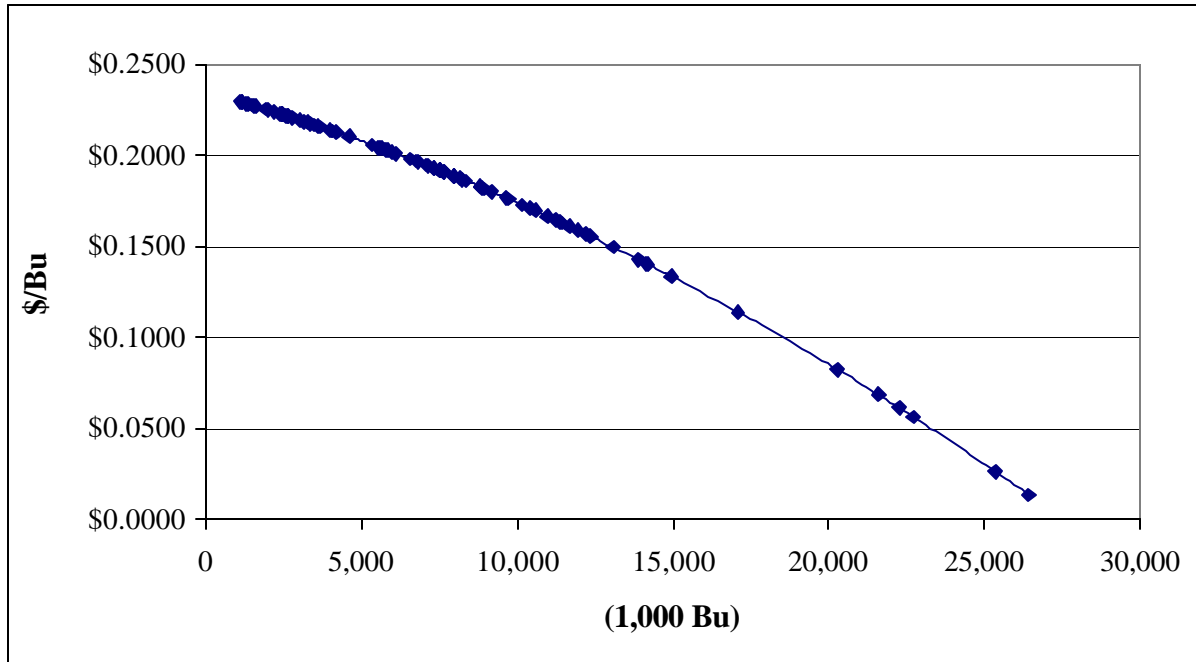
The resulting U-shaped average total cost curve shows that economies of size do exist in the PNW grain industry for concentrated grain firms. **Concentrated** grain cooperatives refer to

grain operations that provide no extra services besides grain marketing. **Diversified** grain cooperatives provide a wide array of products and service to their members beyond marketing, storage and handling of grain. The average total cost curve for diversified grain firms did not result in the normal U shape, but was nearly linear and negatively sloped (see Figure 3). No minimum point was reached, but average total cost continued to decrease as volume of intake increased.

**Figure 2: Long-Run Average Total Cost Curve for Concentrated Grain Cooperatives.**



**Figure 3: Long - Run Average Total Cost Curve for Diversified Grain Cooperatives.**



### **The Influence of U.S. Government Policy on Industry Performance**

Government laws, policies and regulations impact the structure and conduct of cooperatives and thus, their performance. The U.S. government influences both the grain volume received and financial performance of cooperatives through warehousing laws, the Conservation Reserve Program (CRP), and actions by the Commodity Credit Corporation (CCC).

Grain owners who store grain in public warehouses need to be assured that their investment is protected against loss. In the state of Washington, warehouse operators and grain dealers are required to be licensed and bonded either with the Washington State Warehouse Audit Program or with the Commodity Operations under the USDA. Cooperatives must be financially sound so that they can obtain surety for the bond. Licensing fees are a direct expense to cooperatives, but also provide valuable insurance against possible damage to stored commodities.

CRP is a voluntary program where farmers receive annual rental payments in exchange for removing the land from crop production. As of September 2002, there were 1,280,706 total acres of CRP, 9,537 contracts, and 3,925 farms enrolled in the program in Washington State. To show the impact of CRP on grain farm profitability, the ratio of net income to total intake was selected. This ratio was multiplied by the 2002 CRP acres and corresponding yields. The annual CRP linked cost to the PNW grain industry is \$3,821,477.70. This is assuming the thirteen-year average state wheat yield of 58 bushels per acre is produced and a ratio of \$0.05 of net income per bushel received is earned. On average, the hypothetical example suggests that between \$1,878,893.20 and \$3,131,488.67 (assuming a ratio of \$0.03, \$0.04 and \$0.05 income to total intake) of net income is foregone by the PNW grain elevator industry as a result of CRP (see Table 22).

**Table 22: 2002 CRP Payments Sensitivity Analysis on Annual Net Income Per Bushel of Total Intake (\$0.01-\$0.05/ Bushel).**

Yield/ Acre (Bu)	Net Income/ Total Intake (Bu)				
	\$0.01	\$0.02	\$0.03	\$0.04	\$0.05
20	\$254,765.18	\$509,530.36	\$764,295.54	\$1,019,060.72	\$1,273,825.90
25	\$318,456.48	\$636,912.95	\$955,369.43	\$1,273,825.90	\$1,592,282.38
30	\$382,147.77	\$764,295.54	\$1,146,443.31	\$1,528,591.08	\$1,910,738.85
35	\$445,839.07	\$891,678.13	\$1,337,517.20	\$1,783,356.26	\$2,229,195.33
40	\$509,530.36	\$1,019,060.72	\$1,528,591.08	\$2,038,121.44	\$2,547,651.80
45	\$573,221.66	\$1,146,443.31	\$1,719,664.97	\$2,292,886.62	\$2,866,108.28
50	\$636,912.95	\$1,273,825.90	\$1,910,738.85	\$2,547,651.80	\$3,184,564.75
55	\$700,604.25	\$1,401,208.49	\$2,101,812.74	\$2,802,416.98	\$3,503,021.23
60	\$764,295.54	\$1,528,591.08	\$2,292,886.62	\$3,057,182.16	\$3,821,477.70
65	\$827,986.84	\$1,655,973.67	\$2,483,960.51	\$3,311,947.34	\$4,139,934.18
70	\$891,678.13	\$1,783,356.26	\$2,675,034.39	\$3,566,712.52	\$4,458,390.65
75	\$955,369.43	\$1,910,738.85	\$2,866,108.28	\$3,821,477.70	\$4,776,847.13
80	\$1,019,060.72	\$2,038,121.44	\$3,057,182.16	\$4,076,242.88	\$5,095,303.60
<b>Average</b>	<b>\$626,297.73</b>	<b>\$1,252,595.47</b>	<b>\$1,878,893.20</b>	<b>\$2,505,190.94</b>	<b>\$3,131,488.67</b>



In 1996 Congress passed the Bill Emerson Good Samaritan Act. This law established the Bill Emerson Humanitarian Trust (BEHT). The purpose of the BEHT is to meet emergency food needs in developing countries. Up to four million tons of wheat, corn, sorghum and rice can be stored in the trust. The Secretary of Agriculture determines the quantity of the reserves and authorizes sales from the trust. Between June and December of 2002, 26.7 million bushels of wheat was sold from the BEHT, of which 9.7 million bushels was soft wheat (64%). The sales were in response to requests from the U.S. Agency for International Aid seeking money to finance food aid for South Africa.

It appears the U.S. government is shifting its focus from physical storage of commodities to cash reserves. As a result, grain firms are progressing from storage to a merchandising function. They are no longer able to rely on predominantly CCC owned grain revenue for a large percentage of annual income. CCC storage revenue worked as a bank for many cooperatives providing stable cash flows. From 1998 to 2002 sixteen cooperatives in eastern Washington received a total of \$31,135,683 from storing CCC owned commodities. The average annual government storage payment made to these cooperatives was \$6,227,136.60. Between 1998 and 2002, small and medium cooperatives experienced a reduction in government storage revenue payments of 1,023% and 12% respectively. In contrast, large cooperatives enjoyed a 1,559% increase in grain storage payments (see Table 23).

Diversified grain cooperatives received a majority of CCC grain storage payments over the past five years. In 2000 concentrated grain cooperatives earned only \$162,150 in storage revenue, while diversified grain cooperatives received \$6,542,887. Table 24 lists the CCC storage payments by increasing licensed capacity and shows the disparity of these revenues by cooperative size. For example, in 1998 the smallest firm received \$261.04 while one of the

largest cooperatives earned \$1.9 million dollars. Concentrated grain cooperatives are the small firms with limited licensed capacity and number of houses operated. Therefore, they do not have the capacity to store large volumes of government owned grain and still receive grain from their patrons.

The most accurate measure of the importance of CCC revenue would be net income received from storing CCC grain minus the costs associated with storing this grain. The objective is to show the relative importance of CCC storage payments to the operating viability of the firm. CCC revenue as a percentage of net income is the best (but still distorted) way to show the magnitude of these annual storage payments, keeping in mind that it is impossible to determine the actual costs of storing CCC grain. Costs incurred from storing government grain are not separable from those of storing patron grain. Therefore, CCC storage payments as a percentage of net income are the best indicator of the significance of CCC storage payments to cooperative profitability.

Small and medium cooperatives experienced a reduction in government storage revenue payments between 1998 and 2002, by -1,023% and 12% respectfully. In contrast, large cooperatives enjoyed a 1,559% increase in grain storage payments. The inequality is also seen on an annual basis. In 2000, CCC storage payments comprised 143% of large cooperative revenues. In comparison, small and medium cooperatives received 66% and 20% of their net income from storing government owned grain (see Table 25).

Despite the influence of CCC revenue, a negative net income was generated by many cooperatives in 2002. A high percentage of CCC revenue means there was a large CCC revenue payment or very small (or negative) net income. This is evident with small cooperatives whose CCC storage payments represented -182% their net income in 2002. The operating loss would

have been much greater without the CCC storage payments. Also, most small cooperatives do not offer secondary products and services to augment their income. Large cooperatives consistently received a greater percentage of their net income from CCC grain revenues than the other cooperative groups with a range of 78% to 1,298% (see Table 24).

The future of CCC grain storage payments is uncertain, but its importance to the profitability of the PNW grain industry is clear. Without these annual revenues, some cooperatives may cease to exist and further grain firm consolidations may occur. U.S. grain reserves serve a valuable purpose in meeting humanitarian needs, and strengthen the financial position of grain cooperatives. Finally, CCC grain reserves are useful for both the continued economic viability of grain cooperatives, and for meeting the needs of people in times of despair. The approximate annual impact of the three government programs discussed above is \$10.3 million dollars.

**Table 23: Average CCC Grain Storage Payments as a Percentage of Net Income.**

<b>Co-op Size Category</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
Small, Less Than 3 Million Bu	19.678%	38.952%	66.055%	138.038%	-181.705%	<b>-1023.372%</b>
Medium 3-8.5 Million Bu	79.324%	33.965%	19.971%	22.957%	69.447%	<b>-12.452%</b>
Large, Greater than 8.5 Million Bu	78.272%	137.511%	142.581%	82.354%	1298.422%	<b>1558.864%</b>

ADAPTED FROM: Kansas City Commodity Office. Annual grain storage revenue received by grain cooperatives in Washington State, 1998-2002. Kansas City, KS, 2002

**Table 24: 1998-2002 CCC Grain Storage Payments Received by Cooperatives According to Increasing Size.**

<b>Co-op #</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Total</b>
4	\$261.04	\$2,890.86	\$0	\$0	\$0	<b>\$3,151.90</b>
6	\$6,381.18	\$22,687.16	\$16,862.17	\$10,725.90	\$10,422.98	<b>\$67,079.39</b>
14	\$4,078.65	\$4,715.41	\$4,262.13	\$3,348.46	\$3,278.98	<b>\$19,683.63</b>
5	\$68,857.02	\$134,773.62	\$63,449.38	\$63,496.43	\$61,224.75	<b>\$391,801.20</b>
25	\$37,854.40	\$44,450.88	\$156,148.50	\$312,616.50	\$222,731.44	<b>\$773,801.72</b>
7	\$73,868.36	\$73,705.40	\$81,838.27	\$87,322.98	\$84,603.59	<b>\$401,338.60</b>
12	\$74,313.89	\$219,886.08	\$132,694.06	\$209,271.28	\$208,549.63	<b>\$844,714.94</b>
21	\$7,631.04	\$13,467.79	\$7,530.84	\$8,869.86	\$10,124.02	<b>\$47,623.55</b>
27	\$0.00	\$720.53	\$0.00	\$2,707.09	\$6,278.71	<b>\$9,706.33</b>
24	\$63,203.37	\$149,865.63	\$46,781.27	\$41,514.35	\$33,085.51	<b>\$334,450.13</b>
11	\$424,930.94	\$455,706.40	\$530,558.48	\$534,111.28	\$510,889.74	<b>\$2,456,196.84</b>
19	\$412,090.51	\$553,173.88	\$407,361.09	\$444,932.71	\$437,305.09	<b>\$2,254,863.28</b>
10	\$437,865.70	\$621,098.68	\$578,234.70	\$643,444.48	\$468,770.08	<b>\$2,749,413.64</b>
22	\$606,626.52	\$741,183.57	\$676,923.10	\$826,321.50	\$648,274.60	<b>\$3,499,329.29</b>
9	\$1,910,632.94	\$3,338,947.69	\$3,464,214.39	\$3,002,700.34	\$2,841,967.91	<b>\$14,558,463.27</b>
16	\$473,965.02	\$638,223.81	\$538,178.13	\$565,301.43	\$508,397.13	<b>\$2,724,065.52</b>
<b>Total</b>	<b>\$4,602,560.58</b>	<b>\$7,015,497.39</b>	<b>\$6,705,036.51</b>	<b>\$6,756,684.59</b>	<b>\$6,055,904.16</b>	<b>\$31,135,683.23</b>
<b>Average</b>	<b>\$306,837.37</b>	<b>\$438,468.59</b>	<b>\$478,931.18</b>	<b>\$450,445.64</b>	<b>\$403,726.94</b>	

SOURCE: Kansas City Commodity Office. Annual grain storage revenue received by grain cooperatives in Washington State, 1998-2002. Kansas City, KS, 2002.

**Table 25: Average CCC Grain Storage Payments as a Percentage of Net Income.**

<b>Co-op Size Category</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>Percent Change 1997-2002</b>
<b>Small, Less Than 3 Million Bu</b>	19.678%	38.952%	66.055%	138.038%	-181.705%	<b>-1023.372%</b>
<b>Medium 3-8.5 Million Bu</b>	79.324%	33.965%	19.971%	22.957%	69.447%	<b>-12.452%</b>
<b>Large, Greater than 8.5 Million Bu</b>	78.272%	137.511%	142.581%	82.354%	1298.422%	<b>1558.864%</b>

ADAPTED FROM: Kansas City Commodity Office. Annual grain storage revenue received by grain cooperatives in Washington State, 1998-2002. Kansas City, KS, 2002

## **Summary and Conclusions**

Grain cooperatives have a rich heritage in the Pacific Northwest, but today they are struggling to remain viable and provide a valuable service to their patrons. The industrialization and globalization of agriculture has led cooperatives to a crossroads. Cooperatives must evaluate their strengths and weaknesses and determine their comparative and competitive role in the grain marketing system. Cooperatives are more than a unique form of business structure. They represent a producer marketing philosophy based on the fair and equitable treatment of all members. From their early beginnings, cooperatives have persevered through low crop yields, producer bankruptcies, changing U.S. farm policy, dwindling farm numbers, declining patron loyalty, increasing operating costs, fluctuating crop prices, and a rapidly evolving agricultural industry. Their existence today is testimony to the endurance of the cooperative system and the foresight by its managers, directors, and member-patrons.

Grain cooperatives are vanishing in the Pacific Northwest as they struggle to remain economically viable. The number of grain cooperatives in eastern Washington has decreased by 59% in the past 55 years, but the total cooperative storage capacity has increased 312%. There are many forces impacting cooperative-owned country elevators operations such as globalization, industrialization, excess storage capacity, government policies, high fixed costs, and reduced patron loyalty. The analytical model of structure, conduct, and performance is used to investigate the grain industry as it evolves to meet the demands of the global economy. The purpose of the research is to explain the historical importance of grain cooperatives and to identify structural changes in the grain industry and impacts on financial performance.

In 2002, twenty-two cooperatives comprised 42% of the 52 grain companies operating warehouses in eastern Washington. Total 2002 commercial grain storage in eastern Washington was 211,592,000 bushels in 2002, which is an increase in total commercial storage of 258%

since 1947. Cooperatives represent 81% of Washington's licensed storage capacity, which marks a 15% increase in their market share since 1947. Similarly, cooperatives operate 309 houses (75%) of the 413 total commercial houses in eastern Washington. The average number of houses and locations per cooperative is 14.05 and 9.27 respectively. Cooperative storage capacity is highly concentrated, with the top four firms controlling 47% of the volume and 49% of the houses.

Financial ratios and cost analysis for the grain industry were constructed from 1997-2002 financial statements of grain cooperatives. Responses were received from 20 of 22 cooperatives in eastern Washington in 2001/2002, corresponding to 94.1% of cooperative capacity and 76% of all capacity in eastern Washington. Medium sized cooperatives maintained the highest average current ratio of 7.2, followed by small and large cooperatives at 6.0 and 2.0 respectively. The average profit margins for small, medium and large cooperatives were \$0.017, \$0.013 and \$0.014 per dollar of gross revenue. (From this point forward profitability refers to net operating margin). Solvency improved for small and medium cooperatives with a reduction in the ratio of total debts to patron equity by 57% and 17% respectively. Large cooperatives became less solvent with a 28% increase in the debt ratio and 62% increase in the ratio of total debt to patron's equity.

The average total cost curve shows the existence of economies and diseconomies of size in the eastern Washington grain industry. The level of grain volume corresponding to the minimum point for concentrated grain firms is 10,119,976 bushels, at an average total cost per bushel of \$0.0478. Finally, the U.S. government influences the economic and financial performance of cooperatives through warehousing laws, the Conservation Reserve Program, and

actions by the Commodity Credit Corporation. The approximate annual impact of these three programs is \$10.3 million dollars.

Cooperatives are consolidating to achieve economies of size by securing an ever-greater volume of grain. A competitive grain industry exists, and is comprised of cooperative and private firms. Cooperatives depend on local producer support and must not be taken for granted. They add value to rural areas, provide high quality service to their members, and most importantly, guarantee healthy competition. Farmers benefit when competing firms bid for their grain and a few organized buyers do not control prices. A strong independent system of cooperatives can be maintained and encouraged by producers. With government policies of support, a cooperative's role is still to provide high quality products and services to its members and patrons. Remaining economically viable is essential to providing those benefits and opportunities to members.

Cooperatives continue to play a critical role in marketing grains, legumes and oilseeds and in providing producers with inputs and supplies. The function of storing grain does not afford management many options to alter their cost structure, and there is a limit to operational efficiency. The agriculture industry continues to change and innovate. Cooperatives have succeeded by conquering the economic and social challenges of the past and are poised to reap the opportunities of tomorrow. Cooperatives cannot wait to see what the future will bring, but must be aggressive in serving their members. They must be dedicated to leadership in the field of agricultural opportunities.

## References

- Brueckner, Erica Christine. "Patron Demand Deposit Account and Regional Patronage Financing Activities of Washington Agribusiness Cooperatives." M.A. thesis, Dept. of Agri. Econ., Wash. State U., Pullman, May 2000.
- Council on Food, Agriculture and Resource Economics. "The Industrialization of Agriculture: Policy, Research, and Education Needs." Symposium, Washington D.C., July 12 1994. Downloaded from <http://www.cfare.org/publications/syposium94.shtml>.
- Dooley, Frank J. "Theory and Economics of Multiplant Firms Applied to Washington Grain Elevator Firms". Ph.D. dissertation, Dept. of Agri. Econ., Wash State U., Pullman, WA 1986.
- Duft, Ken. Personal Communication. Professor of Agriculture Economics, Washington State University, November 2002 (d).
- Economic Research Service. "Food Market Structures: Glossary." USDA Economic Research Service, Washington D.C., December 7, 2000. Downloaded from <http://www.ers.usda.gov/briefing/foodmarketstructures/glossary.htm>.
- Edwards, Richard and Eric L. Jessup. "Eastern Washington On-Farm and Commercial Grain Storage." EWITS Research Report Number 20. Dept. of Agri. Econ., Wash State U., Pullman, WA January 1998.
- Farm Service Agency. "Summary for Active Contracts for all Program Years (1987-2004)." USDA, Farm Service Agency. Washington D.C., 2002. Downloaded from <http://www.fsa.usda.gov/crpstorpt/12approved/r1sumyr/wa.htm>.
- Hays, John Joseph. "Structure, Conduct, and Performance of Grain Handling Firms in the Country Elevator Industry in Washington." M.A. thesis, Dept. of Agri. Econ., Wash. State U., Pullman, May 1986.
- Jorgens, John Robert Stuart. "Grain Handling-Storage Costs of Country Warehouses in Washington." M.A. thesis, Dept. of Agri. Econ., The State College of Washington, 1949.
- Kansas City Commodity Office. Annual grain storage revenue received by grain cooperatives in Washington State, 1998-2002. Kansas City, KS 2002.
- Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002.
- Richards, Timothy J. and Mark R. Manfredo. "Cooperative Mergers and Acquisitions: The Role of Capital Constraints." J. Agri. And Resour. Econ., 28(1): 152-168, 2003.
- Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2002.



Washington State Department of Agriculture, Commodity Inspection Division, Washington Bonded Warehouse Rates and Charges, July 1, 2002.

Wissman, Roger A. Working With Financial Statements, Guide for Cooperative Member. Cooperative Information Report 43, Washington, D.C., June 2001.

## **Appendix I**

**Table A-1: Washington State Cooperatives Date of Incorporation, Licensed Capacity, Number of Locations and Houses per Cooperative.**

<b>Co-op Name</b>	<b>Date Inc. (a)</b>	<b>Age as of 2002</b>	<b>2001/2002 Washington Licensed Capacity (Bu)</b>	<b>Number of Locations/ Co-op</b>	<b>Number of Houses/ Co-op</b>
Pendleton Grain Growers, Prosser	1930	72	44,000	1	1
Palouse Grain Growers	1930	73	960,000	1	4
Farmers Warehouse & Com.	1922	81	998,000	1	1
Klickitat Valley Grain Growers			1,125,000	2	2
Johnson Union Warehouse Co.	1909	93	1,563,000	4	6
Lamont Grain Growers	1930	72	1,791,000	3	3
Uniontown Co-Op Assn.	1916	86	2,667,000	2	4
Central Ferry Terminal Ass.	1980	22	3,865,000	1	2
Wheat Growers of Endicott	1930	72	4,022,000	3	7
Davenport Union Warehouse Co.	1909	93	5,575,000	5	11
CHS-Rockford Grain Growers			5,616,000	8	8
Pomeroy Grain Growers	1932	70	5,757,000	3	7
Whitman County Grain Growers	1972	30	7,577,000	13	18
St. John Grain Growers	1929	73	8,167,000	8	14
Columbia County Grain Growers	1929	73	8,804,000	12	13
Reardan Grain Growers			9,180,000	10	14
CHS-Marketing Group	1938	64	11,642,000	13	14
Odessa Union Warehouse Co-Op	1909	93	12,191,000	15	28
Cooperative Agriculture Producers	1998	4	14,196,000	23	41
Ritzville Warehouse Company	1893	109	17,537,000	30	46
Central WA Grain Growers	1972	30	21,912,000	20	32
Northwest Grain Growers	1929	73	26,206,000	26	33
<b>Total</b>			<b>171,395,000</b>	<b>204</b>	<b>309</b>

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

a= Date of incorporation was obtained from notes to financial statements of the cooperatives.

**Table A-2: Cooperative Size Categories by Licensed Capacity and Number of Houses.**

<b>Size Category (1,000 Bu)</b>	<b>Number of Co-ops</b>	<b>Percent of Total Co-ops</b>	<b>Total Capacity Co-op (Bu)</b>	<b>Percent of Co-op Capacity</b>	<b>Total Co-Op Houses</b>	<b>Percent of Co-op Houses</b>
0- 3,000	7	31.82%%	9,148,000	5.337%	21	6.80%
3,001- 8,500	7	31.82%%	40,579,000	23.676%	67	21.68%
8,501- 26,500	8	36.36%	121,668,000	70.987%	221	71.52%
<b>Total</b>	<b>22</b>	<b>100%</b>	<b>171,395,000</b>	<b>100.00%</b>	<b>309</b>	<b>100.00%</b>

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

**Table A-3: Licensed Capacity Distribution by Number of Cooperatives.**

<b>Licensed Capacity (1,000 Bu)</b>	<b>Number of Co-ops</b>	<b>Percent of Co-ops</b>	<b>Cumulative Percent</b>
0- 1,000	3	13.64%	13.64%
1,001- 3,000	4	18.18%	31.82%
3,001- 5,000	2	9.09%	40.91%
5,001- 7,000	3	13.64%	54.55%
7,001- 9,000	3	13.64%	68.18%
9,001- 11,000	1	4.55%	72.73%
11,001- 13,000	2	9.09%	81.82%
13,001- 26,500	4	18.18%	100.00%
<b>Total</b>	<b>22</b>	<b>100.00%</b>	

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

**Table A-3: Licensed Capacity Distribution by Number of Locations.**

Licensed Capacity (1,000 Bu)	Number of Co-op Locations	Percent of Co-op Locations	Cumulative Percent
0- 1,000	3	1.47%	1.47%
1,001- 3,000	11	5.39%	6.86%
3,001- 5,000	4	1.96%	8.82%
5,001- 7,000	16	7.84%	16.67%
7,001- 9,000	33	16.18%	32.84%
9,001- 11,000	10	4.90%	37.75%
11,001- 13,000	28	13.73%	51.47%
13,001- 26,500	99	48.53%	100.00%
<b>Total</b>	<b>204</b>	<b>100.00%</b>	

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

**Table A-4: Licensed Capacity Distribution by Number of Houses.**

Licensed Capacity (1,000 Bu)	Number of Co-op Houses	Percent of Co-op Houses	Cumulative Percent
0- 1,000	6	1.94%	1.94%
1,001- 3,000	15	4.85%	6.80%
3,001- 5,000	9	2.91%	9.71%
5,001- 7,000	26	8.41%	18.12%
7,001- 9,000	45	14.56%	32.69%
9,001- 11,000	14	4.53%	37.22%
11,001-13,000	42	13.59%	50.81%
13,001-26,500	152	49.19%	100.00%
<b>Total</b>	<b>309</b>	<b>100.00%</b>	

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

**Table A-5: 2002 Distribution of Producers, On-farm Storage, Cooperative Capacity and Storage Ratios by County.**

<b>County</b>	<b>Farms 1,000 Acres or More (a)</b>	<b>Percent of Total 1,000 Acre Farms</b>	<b>Total Cropland Acres (a)</b>	<b>On- Farm Storage (Bu) (b)</b>	<b>Percent of On-Farm Storage</b>	<b>Average On- Farm Storage/ 1,000 Acre Farm</b>	<b>Co-op Capacity (Bu)</b>	<b>Percent of Co-op Capacity</b>	<b>Co-op/ On-Farm Storage Ratio</b>
Adams	267	8.86%	808,651	7,261,000	9.74%	27,195	12,047,000	7.03%	1.659
Asotin	73	2.42%	87,282	1,377,000	1.85%	18,863			
Benton	90	2.99%	440,291	4,845,000	6.50%	53,833	5,703,000	3.33%	1.177
Chelan	19	0.63%	41,046	50,300	0.07%	2,647	506,000	0.30%	10.060
Columbia	72	2.39%	177,982	754,000	1.01%	10,472	9,497,000	5.54%	12.595
Douglas	199	6.60%	532,757	4,284,000	5.75%	21,528	6,890,000	4.02%	1.608
Ferry	40	1.33%	22,447	84,500	0.11%	2,113			
Franklin	130	4.31%	457,795	1,191,000	1.60%	9,162	5,194,000	3.03%	4.361
Garfield	96	3.19%	192,220	3,154,000	4.23%	32,854	1,610,000	0.94%	0.510
Grant	250	8.29%	786,332	8,807,000	11.81%	35,228	15,039,000	8.77%	1.708
Kittitas	43	1.43%	87,299	543,000	0.73%	12,628			
Klickitat	110	3.65%	186,136	1,839,000	2.47%	16,718	2,123,000	1.24%	1.154
Lincoln	419	13.90%	876,196	8,048,000	10.80%	19,208	28,300,000	16.51%	3.516
Okanogan	147	4.88%	142,145	55,000	0.07%	374	412,000	0.24%	7.491
Pend									
Oreille	16	0.53%	26,763	31,500	0.04%	1,969			
Spokane	167	5.54%	398,064	3,910,000	5.24%	23,413	14,229,000	8.30%	3.639
Stevens	78	2.59%	123,434	510,000	0.68%	6,538	116,000	0.07%	0.227
Walla									
Walla	214	7.10%	597,738	4,529,000	6.07%	21,164	23,182,000	13.53%	5.119
Whitman	481	15.96%	1,066,676	23,034,000	30.90%	47,888	44,462,000	25.94%	1.930
Yakima	103	3.42%	363,289	245,000	0.33%	2,379	378,000	0.22%	1.543
Idaho							1,707,000	1.00%	
<b>Total</b>	<b>3,014</b>	<b>100%</b>	<b>7,414,543</b>	<b>74,552,300</b>	<b>100%</b>		<b>171,395,000</b>	<b>100%</b>	

ADAPTED FROM: Kansas City Commodity Office. Grain Warehouse Data Report. Kansas City, KS September 24, 2002. Washington State Department of Agriculture, Commodity Inspection Division. Public Grain Warehouses. Olympia, WA, various issues, 1990-2001.

.a= U.S. Department of Commerce, Bureau of the Census. Census of Agriculture, 1997, 1997. Downloaded from <http://www.nass.usda.gov/census/census97/highlights/wa/>.

b= Edwards, Richard and Eric L. Jessup. "Eastern Washington On-Farm and Commercial Grain Storage." EWITS Research Report Number 20. Dept. of Agri. Econ., Wash State U., Pullman, WA January 1998.

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