

Trends of U.S. Agricultural Cooperatives (1913-2016)

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Abstract:

This report identifies and describes national trends in the progression of agricultural cooperatives since 1913 with an emphasis on 2000s. As the number of agricultural cooperatives in the U.S. has declined, their size, represented by business volume and the number of members, increased. Based on 1976-2016 data, cooperatives' total assets and equity have been increasing and were projected to grow in 2017. On average, 2% of cooperatives in the U.S. merged or were acquired. Average incidence rates of mergers and acquisitions during 2000-2012 (33 incidences) were lower than during 1980-1999 (83 incidences). Over time, the number of grain cooperatives increased; and the number of dairy and fruit and vegetables cooperatives declined.

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Introduction

Agricultural cooperatives provide benefits for their members and local communities. Individual farmers pool resources together to do what they could not alone: achieve the necessary size for the economies of scale; promote and develop a brand; guarantee a market and a competitive price for their products; access a better transportation system; gain access to new markets; and increase income. Like other businesses, cooperatives provide jobs and pay taxes, including property taxes, sales taxes, employment taxes, gasoline and diesel fuel taxes in their communities. Cooperatives play a key role in supplying petroleum products to rural communities.

Consumers enjoy many national food brands produced and distributed by agricultural cooperatives including Sunkist, Blue Diamond, Florida's Natural, Dakota Growers, Welch's, Ocean Spray, Sunmaid, and Land O' Lakes. In 2016, Dairy Farmers of America, a dairy marketing cooperative, sold 62.6 billion pounds of milk, which represented almost 30% of the U.S. total milk production (DFA, 2017). In 2001, 38% of grains in the United States were processed and marketed by cooperatives. Cooperatives' market share for cotton and cottonseed was 42%; for fruits and vegetables – 19% (Kraenzle and Eversull, 2001).

Agricultural cooperatives are also important to the state of Ohio. Four century-old cooperatives in the state started marketing

In this report, long-run trends are discussed, based on general information on cooperatives beginning in 1913 and using financial and consolidation data beginning in 1979 to date. Using this data, projections are made for the values of business volume, total assets, liabilities and equity for U.S. agricultural co-ops in 2017. Hotspots and coldspots of cooperatives' activities are identified. Financial performance of cooperatives is assessed using the equity-toasset and the assets-to-liabilities ratios. Changes in the numbers of grain, fruit and vegetable, cotton and dairy cooperatives during 1913-2015 period are highlighted. This report utilizes national data from USDA Cooperative Programs.¹ The data includes businesses that are incorporated as cooperatives and follow cooperative principles. It does not include limited liability companies with outside investors who are not producers.

Figure 1 depicts the locations of headquarters for 1,479 cooperatives in USDA's Directory of Rural Farmer, Rancher, and Fishery Cooperatives in October 2017. The Directory represents nearly 75% of all agricultural cooperatives. The Directory lists contact information with zip-code, type of

grain and oilseeds in the early 1910's. Also, in 2015, Ohio had four of the nation's largest cooperatives listed in the Top 100 agricultural cooperatives ranked by USDA. In September 2016, two of these co-ops merged into the largest agricultural cooperative in the state and one of the top three in the Midwest.

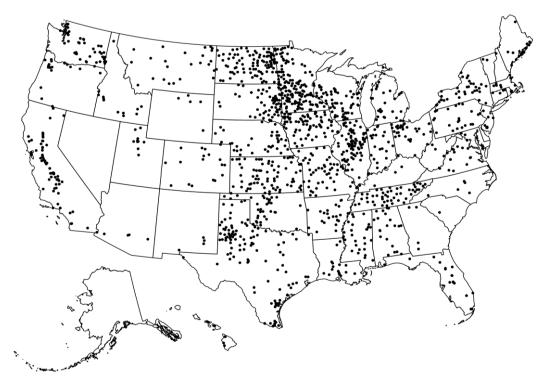
¹ Thanks to the USDA Cooperative Programs statistics team for providing data support with this report.

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cooperative, and products sold. Minnesota, Texas and North Dakota have the highest number of cooperative headquarters per state: 146, 127, and 109 respectively. In 2016, there agricultural cooperatives were 178 headquartered in Minnesota, 166 in Texas, and 134 in North Dakota according to the latest

Agricultural Cooperative Statistics report by the USDA Rural Cooperative Program. Note that many cooperatives operate branches, not listed in the Directory, to better serve their members. In 2015, 2,047 cooperatives in the U.S. operated 5,768 branches (USDA, 2017a).

Figure 1: Agricultural Cooperative Headquarters in the U.S., October 2017







Number of Cooperative Headquarters	Frequency	Percent	Cumulative
per County			
0	1,938	61.66	61.66
1	678	21.57	83.23
2	295	9.39	92.62
3	118	3.75	96.37
4	56	1.78	98.15
5	25	0.80	98.95
6	13	0.41	99.36
7	10	0.32	99.68
8	2	0.06	99.75
9	5	0.16	99.90
10	1	0.03	99.94
12	2	0.06	100.00
Total	3,143	100.00	

Figure 2: Number of Agricultural Cooperative Headquarters per County, 2016

Figure 2 shows that in 2016, agricultural cooperatives were headquartered in 1,205 counties or 38% of all counties in the U.S.² Most counties in the U.S. had one cooperative-headquarter, 678 out of 1,205. 295 counties had 2 cooperatives and 118 counties had 3 cooperatives headquartered in the county. 10 counties had more than 8 cooperatives. On average, a county with cooperatives had 2 cooperatives per county.

Farmers in the counties with cooperative headquarters reported higher cash receipts and earnings in comparison to farmers in the counties with no cooperative headquarters (Figure 3). On average, counties with cooperative headquarters tend to receive more government payments and have higher value of agricultural land.



² Note that participation in the Directory of Rural Farmer, Rancher, and Fishery Cooperatives is voluntary.

Figure 3: U.S. counties with Agricultural Cooperative Headquarters Compared to Counties Without Agricultural Cooperative Headquarters, 2016

	Counties with cooperative headquarter		Counties without cooperative headquarter		
		Standard	Mean	Standard	
	Mean	Deviation		Deviation	
Cash Receipts in 2016, thousands of	\$188,066	\$326,821	\$73,713	\$132,939	
dollars					
Farm Earnings in 2016, thousands of	\$36,750	\$110,811	\$13,268	\$57,175	
dollars					
Ag Land Value in 2012	\$367,674	\$343,455	\$245,44	\$405,700	
			4		
Government Payments in 2016,	\$6,553	\$6,523	\$2,881	\$3,634	
thousands of dollars					
Metro Counties	0.36	0.48	0.38	0.49	
Metro-Adjacent Counties	0.33	0.47	0.33	0.47	
Remote Rural Counties	0.31	0.46	0.30	0.46	
New England	0.02	0.13	0.02	0.16	
Mideast	0.05	0.22	0.06	0.24	
Great Lakes	0.17	0.37	0.13	0.33	
Plains	0.34	0.48	0.11	0.31	
South West	0.11	0.31	0.13	0.34	
South East	0.19	0.39	0.41	0.49	
Rocky Mountain	0.07	0.25	0.07	0.26	
Far West	0.06	0.24	0.06	0.23	
Number of counties	1,205		1,938		

Note: Data from the Bureau of Economic Analysis: *Government Payments; Cash Receipts; Farm Earnings;* Data from USDA-National Agricultural Statistics Service-Quick Stats: *Agricultural Land Value; Metro Counties* and *Metro Adjacent Counties* are identified based on the 2013 Rural-Urban Continuum Code (RUCC); *Mideast, Great Lakes, Plains, South West, Rocky Mountain, Far West* define U.S. regions as in the Bureau of Economic Analysis.

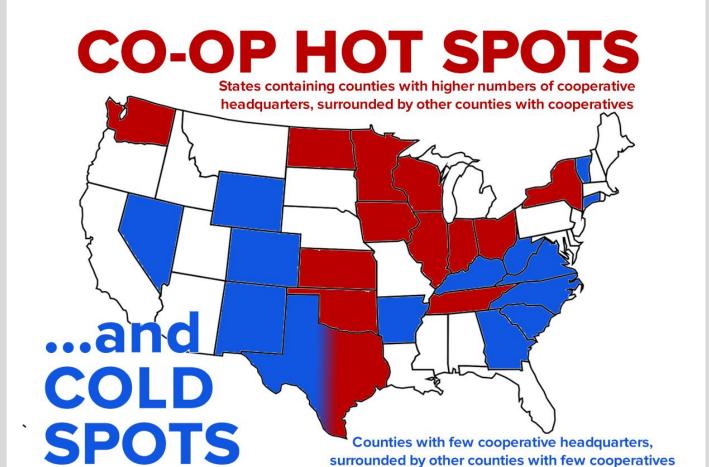
Major Themes and Highlights

1. Decrease in the Number of Cooperatives over Time:

- From the 1940s to 1990s, the number of agricultural cooperatives in the U.S. dropped by 70%. Between 2000 and 2016, the number of agricultural cooperatives declined further by 1,385: from 3,338 in 2000 to 1,953 in 2016. There are similar trends in the number of farms; USDA shows the number of farms in the U.S. was roughly cut in half between 1950 and 1970. During the 2000-2016 period, the number of farms declined from 2.17 million to 2.1 million, by 5%.
- Over time, supply cooperatives as a percentage of all agricultural cooperatives have increased. In 2016, 42% of agricultural cooperatives supply cooperatives, 53% were marketing cooperatives, and 5% were service cooperatives.

2. Increase in the Size of Cooperatives:

- Nominal and inflation-adjusted business volumes of agricultural cooperatives followed the increasing trend and were similarly affected by economic conditions.
- Gross and net business volumes of agricultural cooperatives were expected to increase in 2017.
- From 1926 through 1950, U.S. cooperatives had an average of 371 members; from 1951-1999, the average increased to 832, and from 2000-2016, increased to 936 members.
- In 2016, cooperatives had an average of 973 members.
- Hotspots (counties with high levels of cooperative activities surrounded by other counties
 with high levels of cooperative activities) are located in Washington, Minnesota, North
 Dakota, Wisconsin, Iowa, Illinois, Indiana, Ohio, Kansas, Oklahoma, Texas, Tennessee, and
 New York.
- Coldspots (counties with low levels of cooperative activities surrounded by other counties with low levels of cooperative activities) are located in Texas, Arkansas, New Mexico, Colorado, Nevada, Wyoming, South Carolina, North Carolina, Virginia, West Virginia, Georgia, Kentucky, Vermont, and Connecticut.



3. Consolidation and Restructuring:

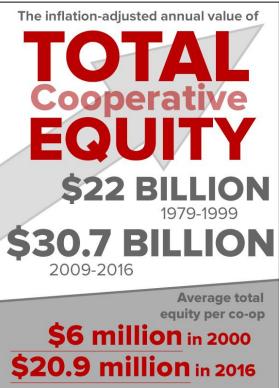
- USDA Cooperatives Program data reported 2,080 cooperative mergers and acquisitions for the period from 1980 to 2012 at an average of 66 per year. Average incidence rates of mergers and acquisitions during 2000-2012 was lower than during 1980-1999, with 33 incidences versus 83.
- From 1980 through 2012, on average 2% of agricultural cooperatives in the U.S. merged or were acquired, in comparison to 5% of U.S. public firms in a typical year (Bennett and Dam, 2017).
- In Ohio in 2016, two grain cooperatives, Sunrise Cooperative and Trupointe Cooperative, merged into the largest agricultural cooperative in the state and one of the top three in the Midwest.
- Average annual exit rate from cooperative business remained stable at 2% between the 2000-2012 and 1980-1999 periods.

4. Increase in Assets and Equity:

- Corresponding with an increase in the size of cooperatives and the need to finance their growth, nominal and inflation-adjusted total assets and total equity have increased.
- The average total assets per cooperative have grown from \$14.64 million in 2000 to \$47.14 million in 2016.
- The average total equity (net worth) per cooperative has grown from \$6 million in 2000 to \$20.9 million in 2016.
- Total assets and total equity of cooperatives were expected to grow in 2017.

5. Trends by Product Type:

- Grain cooperatives have increased as a percentage of all agricultural marketing cooperatives: from 33% on average during 1913-1950, to 45% during 1951-1999, and to 54% during 2000-2015.
- Fruit and vegetable cooperatives, as a percentage of all marketing cooperatives, have declined from 13% on average between 1913-1950, to 11% during 1951-1999, and to 5% between 2000 and 2015.
- Fruit and vegetable cooperatives have shown the highest rate of discontinuing operations, due to exiting business or a merger, showing an average of 23 incidences per year, or 2.4%.
- Dairy cooperatives have declined as a percentage of all agricultural marketing cooperatives: from 28% on average between 1913-1950, to 18% during 1951-1999, and to 8% between 2000 and 2015.



Trend 1: Decrease in the Number of Cooperatives over Time

The number of U.S. agricultural cooperatives has been declining since 1930 (Figure 4). From the 1940s to 1990s, the number of agricultural cooperatives has dropped by 70% in the U.S. In 2000, there were 3,338 agricultural cooperatives and by 2016, the number declined by 1,385. This decrease reflects several factors, including economic restructuring in agriculture, consolidating of cooperatives, and a declining number of farmers in the population. USDA shows the number of farms in the U.S. was roughly cut in half between 1950 and 1970. During the 2000-2016 period, the number of farms declined from 2.17 million to 2.1 million, by 5%.

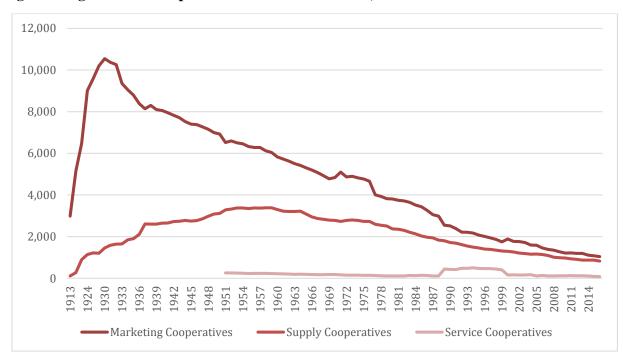


Figure 4: Agricultural Cooperatives in the United States, 1913-2016

Of the 1,953 agricultural cooperatives in 2016, 1,040 (53%) were marketing cooperatives³. Marketing cooperatives derive most of their total dollar volume from the sale of members' agricultural products. Marketing cooperatives are classified into a commodity group depending on the commodity that accounts for most of its business volume (Cotton and Cotton Products; Dairy Products; Fruits and Vegetables; Grains and Oilseeds, Rice, Dry Beans and Peas; Livestock and Livestock Products; Nuts;

³ Cooperatives are classified by predominant activity, as indicated by their business volume. Given this criteria, a cooperative can be classified as marketing one year but supply in another year if it conducts pretty much an even amount of marketing and supply business.

Poultry and Poultry Products; Tobacco; Other Products including specialty crops, sugar and sugar products, wool and mohair).

Supply cooperatives represented 42% of the total number of agricultural cooperatives in 2016. Farm supply cooperatives derive most of their business volume from the sale of farm production supplies. They handle supplies of feed, seed, petroleum, crop fertilizer. protectants, gasoline, appliances, and other production goods. Over time, the share of supply cooperatives in the total number of cooperatives increased. On average, during the 1913-1950 period, the percentage of all cooperatives that were supply



cooperatives was 20%; from 1951 to 1999, the share of supply cooperatives was on average 36%; and between 2000 and 2016 it was 41%. This shift is related to the broader role and scope of supply cooperatives, which serve a growing population of non-farmers, especially in rural communities, by providing petroleum, gasoline, garden appliances and even operating groceries, convenience stores, and restaurants.

Service cooperatives represented 5% of agricultural cooperatives in 2016. Service cooperatives deal solely or primarily in the rendering of services (such as livestock shipping, crop storage, grinding and/or dying, and artificial breeding) as distinguished from handling commodities. They accounted for 3% of agricultural cooperatives in 1950. Between 1994 and 1999, service cooperatives accounted for 12% of agricultural cooperatives. The share of service cooperatives has decreased to an average 5% during the 2000-2016 period, which might be due to changes in data collection methods.

Many cooperatives handle multiple commodities and provide both marketing and supply services, as well as the facilities and equipment used to provide these services. Of 1,479 agricultural cooperatives in the 2017 USDA Directory, 708 (48%) cooperatives from 45 states had marketing activities. Cooperatives headquartered in Minnesota, Illinois, and Texas accounted for 25% of these cooperatives. 872 (59%) cooperatives from 40 states in the U.S. participated in the supply of farm products. Minnesota, North Dakota, and Kansas accounted for 30% of all supply cooperative headquarters in 2017. Service cooperatives represented 236 (16%) of all cooperatives and were headquartered in 34 states, of which 38% came from Texas, California, Illinois, and North Dakota.

Trend 2: Increase in the Size of Cooperatives

Cooperative Business Volume

Business volume of agricultural cooperatives generally exhibits an increasing trend. Business volume includes revenues from marketing plus the value of products bargained for or handled on a commission basis, supply sales, service receipts, and other income. As shown in Figure 5, gross business volume of agricultural cooperatives has increased from \$2.4 billion in 1926 to \$92.5 billion in 1980. The average value during this period was \$18 billion. The economic crisis of 1980 led to a decrease to \$73 billion by 1984. After recovery, the growth of business volume slowed down again from 1997-1999. From 1981 through 1999, the average annual gross business volume was \$98.3 billion, almost \$80 billion more than from 1926 through 1980 despite two recessions.

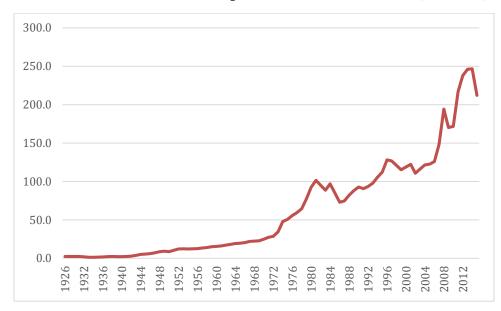


Figure 5: Gross Business Volume of the Cooperatives in the United States, \$ billion, 1926-2015

Figure 6 provides more details on dynamics of business volume in the 2000s. Business volume dropped by \$23.9 billion due to the Great Recession in 2008, recovered during 2009 and 2010, and reached \$217 billion in 2011. The average gross business volume for the 2009-2016 period exceeds the average business volume for the 2000-2008 period — \$211.6 billion versus \$131.2 billion.

Figure 6: Agricultural Cooperative Gross and Net Business Volume, 2000-2016

Year	Gross Busi	Gross Business Volume		t Business Volume
	Billion \$	Inflation- Adjusted Billion \$	Billion \$	Inflation-Adjusted Billion \$
2000	118.90	145.20	99.90	122.00
2001	122.40	146.14	104.00	124.17
2002	110.70	130.18	97.20	114.30
2003	116.40	134.20	101.50	117.02
2004	121.50	136.33	107.00	120.06
2005	122.50	133.17	109.20	118.71
2006	125.90	132.79	109.50	115.49
2007	148.10	152.15	128.60	132.12
2008	194.20	195.68	168.00	169.28
2009	170.30	170.30	146.70	146.70
2010	171.80	169.73	147.80	146.02
2011	217.00	210.05	187.10	181.10
2012	237.80	226.02	202.60	192.56
2013	246.10	230.19	208.60	195.11
2014	246.67	226.66	210.29	193.23
2015	212.06	192.78	179.89	163.54
2016	191.10	171.15	165.60	148.36
Estimate for 2017	202.40		174.11	

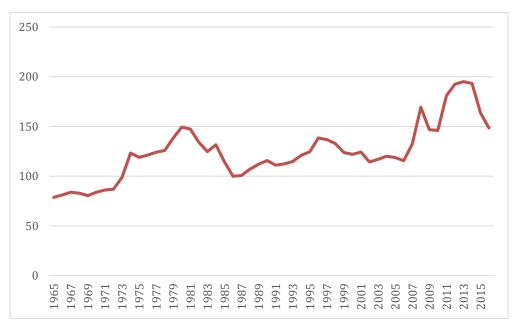
Note: Gross Business Volume predictions are based on the 1926-2016 period, and the annual estimated growth rate was 5.9%. Net Business Volume predictions are based on the 1951-2016 period, and the annual estimated growth rate was 5.1%.

Figure 7 presents cooperative business volume over the 1965-2015 period adjusted for inflation.⁴ From 1965 to 1980, real business volume increased from \$104.8 billion to \$208.4 billion; the average for this period was \$140.1 billion. After declining from 1982-1987 due to recession,

⁴ Index numbers for GDP implicit price deflator, 2009=100, Council of Economic Advisors (2017)

business volume values only started to recover in 1988. By 1996, real business volume reached \$167 billion, falling short \$42.2 billion from the 1981 pre-recession value. The average real business volume for the 1981-1999 period was \$150.5 billion. A declining trend followed after 1996 and lasted until 2007. In 2007 and 2013, real business volume peaked at \$152.2 billion and \$230.2 billion, respectively. The 2013 value was the highest among all previous and following years.

Figure 7: Gross Business Volume of Agricultural Cooperatives in the United States, Inflation-Adjusted billion \$, 1965-2015



Although nominal gross business volume has been increasing faster than inflation-adjusted gross business volumes, both values followed an increasing trend and were similarly affected by economic conditions. Real gross business volume has recovered after the Great Recession in 2008 as the average business volume for the 2009-2016 period exceeds the average for the 2000-2008 period — \$199.6 billion versus \$145.1 billion.

Gross and net business volumes of agricultural cooperatives were expected to increase in 2017. It is assumed that when business volume grows each year, that growth compounds. Using the 1926-2016 period, the model is estimated to obtain an exponential curve that best fits the gross business volume cooperatives data (Jaenicke and Demko, 2015). The parameter estimate is the average annual growth rate, which is the key variable of interest. A statistically significant estimate of a 5.9% is interpreted as an annual growth rate. The corresponding projected value of gross business volume in 2017 is \$202.4 billion. Net business volume annual growth rate was estimated to be 5.1% using data from the 1951-2016 period; with the corresponding projected value in 2017 at \$174.11 billion.

Cooperative Members

Figure 8 shows a significant increase in the number of members per agricultural cooperative in the U.S. since 1913. During the 1926-1950 period, cooperatives had an average of 371 members. During the 1951-1999 period, the average number of cooperative members increased to 832 members. In 2000, agricultural cooperatives averaged 929 members. In 2011, membership peaked at 1,003. For the 2000-2016 period, the average number of members per cooperative was 936 members, 104 members more than for the 1951-1999 period. In 2016, cooperatives averaged 973 members. Note that the number of members does not translate to the number of farmers because one farmer may be a member of more than one cooperative.

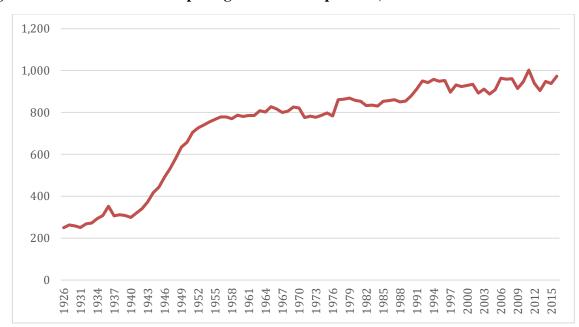


Figure 8: Number of Members per Agricultural Cooperative, 1913-2016

These findings suggest that the cooperative business model creates value for members. Pooling resources together can help farmers benefit from economies of scale as they adopt new technologies, deal with capital constraints, develop processing facilities, and gain information about markets. Agricultural marketing cooperatives may increase their market share by producing more value-added products. New Generation Cooperatives (NGC) are one of the business structures for producers to use as they invest in value-added activities. Service cooperatives may increase their income by providing expertise in financial management and analytics. Cooperatives have unique knowledge of their members and can likely serve the needs of their members better than other investor-oriented businesses.

Cooperative Hotspots and Coldspots

Figures 9 and 10 emphasize the presence of spatial dependence in the distribution of agricultural cooperative headquarters in the U.S. Spatial clusters are identified, such as *hotspots* and *coldspots*, based on local indicators of spatial association (LISA), (Anselin, 1995; Marasteanu and Jaenicke, 2016). Hotspots and coldspots allow for systematic identification of counties having statistically significant "high levels" and "low levels" of agricultural cooperatives activities. Hotspots have been shown to benefit firms and industries by providing higher availability and specialization of inputs, knowledge spillovers, investment growth, and increases in entrepreneurial activities, employment and wages.

On Figure 9, the levels of cooperative activities are identified based on the presence of cooperative headquarters in a county (Figure 2). Of all counties in the U.S., 1,205 counties had cooperatives headquarters. Also, most counties (56%) had one cooperative headquarter. Based on LISA estimation results, 344 counties were located in cooperative hotspots (red areas on Figure 9) and 253 counties in cooperative coldspots (blue areas on Figure 9).

Figure 10 identifies hotspots and coldspots based on the number of cooperatives per county (Figure 2). Of the 1,205 counties with cooperatives headquarters, 527 counties had more than one cooperative per county. LISA estimation results based on the number of cooperatives per county in Figure 2 show that 288 counties were located in cooperative hotspots (red areas on Figure 10) and 228 counties in cooperative coldspots (blue areas on Figure 10).

Figures 9 and 10 show similar results for the geographical location of cooperative hotspots and coldspots. Counties in cooperative hotspots (red areas on both maps) were located in Washington, Minnesota, North Dakota, Wisconsin, Iowa, Illinois, Indiana, Ohio, Kansas, Oklahoma, Texas, Tennessee, and New York. Blue areas on Figures 9 and 10 show counties in cooperative coldspots were located in: Texas, Arkansas, New Mexico, Colorado, Nevada, Wyoming, South Carolina, North Carolina, Virginia, West Virginia, Georgia, Kentucky, Vermont, and Connecticut.

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⁵ Figures 9 and 10 also show outliers: Pink outliers represent counties with high levels of cooperative activities surrounded by counties with low levels of cooperative activities. Purple outliers show counties that have low levels of cooperative activities surrounded by counties with high levels.

Figure 9: U.S. Counties in Hot and Cold Spots of Cooperatives' Headquarters, LISA Estimation Results

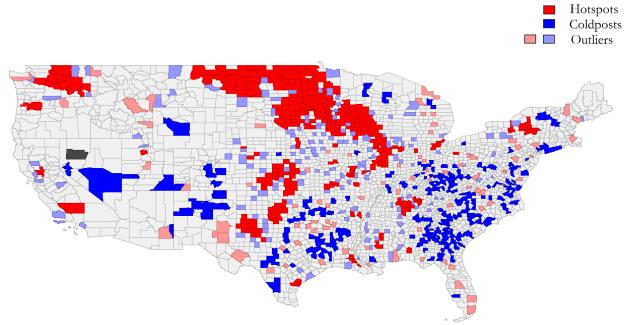


Figure 10: U.S. Counties in Hot and Cold Spots, by the Number of Cooperative Headquarters per County, LISA Estimation Results

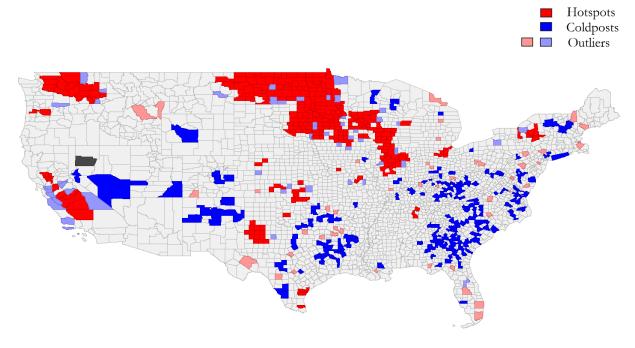


Figure 11: Percentage of Removals from USDA Cooperative Directory as Percent of Total Number of Agricultural Cooperatives

Year	Mergers and Acquisitions/Total Number of Cooperatives	Cooperatives Out of Business/Total Number of Cooperatives	Total Removals from USDA data/Total Number of Cooperatives
1980	1%	1%	3%
1981	1%	1%	3%
1982	2%	1%	4%
1983	1%	1%	4%
1984	2%	1%	4%
1985	1%	2%	4%
1986	2%	3%	5%
1987	2%	2%	5%
1988	1%	2%	4%
1989	2%	2%	5%
1990	1%	3%	5%
1991	3%	1%	5%
1992	2%	2%	6%
1993	2%	2%	4%
1994	1%	2%	4%
1995	2%	2%	5%
1996	2%	1%	3%
1997	2%	2%	3%
1998	3%	2%	5%
1999	3%	3%	6%
2000	1%	3%	5%
2001	1%	3%	4%
2002	1%	2%	3%
2003	1%	1%	2%
2004	0%	5%	5%
2005	1%	2%	4%
2006	1%	4%	6%
2007	2%	3%	6%
2008	1%	3%	6%
2009	2%	1%	4%
2010	1%	2%	4%
2011	1%	1%	2%
2012	1%	1%	3%
Average for 1980-2012			
period	2%	2%	4%

Trend 3: Consolidation and Restructuring

Mergers and Acquisitions

USDA Cooperative Programs data report 2,080 cooperative mergers and acquisitions for the period from 1980 to 2012 at an average of 66 per year. From a legal point of view, a merger is a consolidation of two cooperatives into one entity. An acquisition refers to the takeover of one cooperative by another. There is no monetary exchange when two cooperatives combine. The members end up with the same value of member equity they had prior to the transaction. Member equity can be adjusted as a part of negotiation process (Halvorsen, 2016).

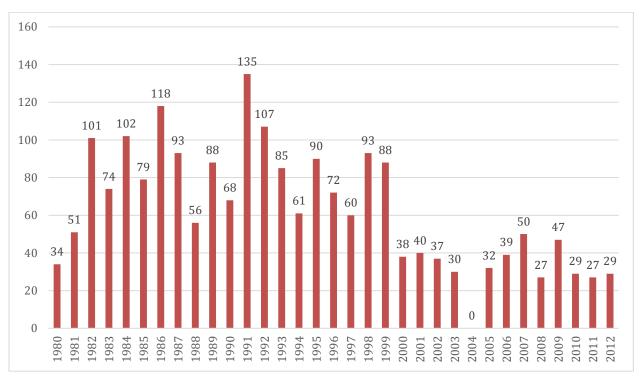
Figure 11 presents mergers and acquisitions as a percentage of the total number of cooperatives. During the 1980-2012 period, on average 2% of agricultural cooperatives in the U.S. merged or were acquired, compared to 5% of U.S. public firms in a typical year (Bennett and Dam, 2017).

Trends for mergers and acquisitions can be seen in Figure 12, which shows more than 100 incidences of mergers and acquisitions per year in 1982, 1984, 1986, 1991, and 1992. Mergers in the 1980s followed the farm financial crisis and allowed farmers to survive during a low commodity price period, while mergers in the mid- and late-1990s helped farmers to support their growth (Jacobs, 2017). USDA recorded lower average incidence rates of mergers and acquisitions from 2000 to 2012 than from 1980 to 1999: 33 incidences versus 83. Significantly lower rates may be associated with differences in methods used to identify a merger or an acquisition.



⁶ Eversull (2014) reported 685 cooperative mergers and acquisitions during the 2000-2013 period, resulting in 53 incidences per year, which is still lower than the average, 83 incidences, during the 1980-1999 period.

Figure 12: Mergers and Acquisitions in U.S. Cooperatives, 1980-2012



Agricultural cooperatives expand their operations to keep pace with their large-scale farmers, and consolidation through mergers and acquisitions is the fastest way to grow a cooperative. In September 2016, two of the largest grain marketing cooperatives in Ohio, Sunrise Cooperative and Trupointe Cooperative, merged into the largest agricultural cooperative in Ohio and one of the top three in the Midwest. The new Sunrise Cooperative has 40 facilities in the state and is visible to the major seed companies and chemical manufacturers (Brooks, 2016).

Going out of Business

From 1980 to 2012, 2,580 U.S. agricultural cooperatives closed operations at an average rate of 86 cooperatives per year. As seen in Figure 14, two periods (1986-1992 and 2000-2006) had high incidence rates of business exits of at least 100 exits per year. During 2000-2012, the average incidence rate was lower than during 1980-1999: 68 versus 85. In 2012, USDA recorded 24 cases of cooperatives going out of business.

Figure 13 shows exit rates for agricultural cooperatives as a percentage of the total number of agricultural cooperatives. The average annual exit rate was 2% for the period from 1980 to 2012. In 2004, exit rates peaked at 5%. The average annual exit rate did not differ between the 2000-2012 and 1980-1999 periods and was equal to 2%.



⁷ Eversull (2014) reported 496 incidences of cooperatives going out of business from 2000 to 2013 versus 886 incidences recorded in USDA Cooperatives Program data for the same period.

Figure 13: Going out of Business as Percentage of Total Number of Agricultural Cooperatives, 1980-2012

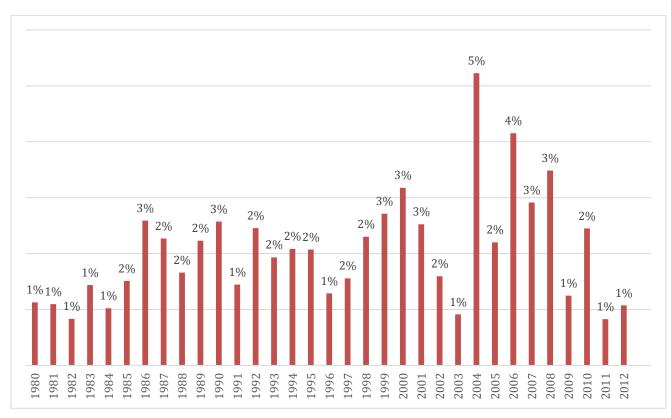


Figure 14 also reports other removals from USDA's data list. In these cases, the cooperative was no longer in business, but no reason for removal from the list was given (such as merger or bankruptcy). This group accounted for 986 cases during 1980-2012 period, or 31 cases per year. The average incidence rate from 2000-2012 was 16, lower than the average incidence rate from 1980-1999 of 39. In 2012, 6 cooperatives exited USDA's list for unknown reasons.

⁸ Presumably the cooperative could still have been in business without reporting their existence to USDA.

Figure 14: Reasons for Removal from USDA Cooperative Directory, 1980-2012

Year	Mergers and Acquisitions		Out of	Business	0	ther	Total Removals
	Number	Percentage of Total Removals	Number	Percentage of Total Removals	Number	Percentage of Total Removals	
1980	34	17%	71	35%	98	48%	203
1981	51	25%	68	33%	86	42%	205
1982	101	44%	51	22%	77	34%	229
1983	74	35%	86	40%	54	25%	214
1984	102	47%	59	27%	56	26%	217
1985	79	36%	85	39%	53	24%	217
1986	118	42%	139	50%	23	8%	280
1987	93	33%	116	41%	71	25%	280
1988	56	30%	82	43%	51	27%	189
1989	88	38%	107	46%	36	16%	231
1990	68	31%	120	54%	34	15%	222
1991	135	56%	65	27%	39	16%	239
1992	107	45%	106	45%	25	11%	238
1993	85	49%	82	47%	7	4%	174
1994	61	37%	87	53%	17	10%	165
1995	90	48%	83	44%	14	7%	187
1996	72	54%	50	38%	11	8%	133
1997	60	47%	59	46%	9	7%	128
1998	93	51%	84	46%	5	3%	182
1999	88	46%	94	49%	11	6%	193
2000	38	22%	106	62%	27	16%	171
2001	40	29%	81	58%	18	13%	139
2002	37	38%	50	51%	11	11%	98
2003	30	42%	28	39%	13	18%	71
2004	0	0%	153	97%	4	3%	157
2005	32	28%	63	54%	21	18%	116
2006	39	23%	112	65%	20	12%	171
2007	50	34%	76	52%	19	13%	145
2008	27	19%	87	63%	25	18%	139
2009	47	46%	30	29%	25	25%	102
2010	29	30%	57	59%	10	10%	96
2011	27	48%	19	34%	10	18%	56
2012	29	49%	24	41%	6	10%	59
Average for 1980-2012							
period	66	35%	86	46%	50	19%	203

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From 1980 to 2012, 5,646 cooperatives ceased operations or consolidated at an average rate of 176 cooperatives per year (Figure 14). Removals from the list of active agricultural cooperatives have declined from an average of 117 cases per year during 1980-1999 to 89 cases during 2000-2012. In 2016, there were 94 fewer cooperatives than in 2015. Figure 11 shows that the number of total removals from USDA data in the total number of agricultural cooperatives was on average 4%. Based on data from all types of cooperatives, a World Council of Credit Unions study found that only 10% of cooperatives fail after their first year in business, in comparison to 60%-80% of businesses using other business models in the U.S. After five years, 90% of cooperatives are still operating while only 3-5% of businesses using other models remain in business (Williams, 2007).

While the total number of agricultural cooperatives in the U.S. continues to decrease, new cooperatives are being established too. For example, in 2015, there were 59 fewer cooperatives than in 2014: 73 cooperatives were dropped from the USDA data list and 14 new cooperatives were added (Wadsworth et al., 2016). Although exit rates were higher than in the previous year, the generally declining trend in cooperative exit rates suggest low exit rates in the future.

The number of small agricultural cooperatives is likely to increase as local food sales grow as this is an area of recent growth. In 2015, 8% of all U.S. farms participated in local food sales through various channels (USDA, 2017b). They produced and sold \$8.7 billion worth of food to consumers, retailers, institutions and food hubs (USDA-NASS, 2016). Food hubs, in particular, may function as a cooperative.

The USDA Cooperative Programs collected data on 35 local food cooperatives in 2016. 26 of them had less than \$1 million sales and 7 had \$1 million or more (USDA, 2018). In 2016, the Center

for Cooperatives at the University of Wisconsin-Madison collected data on 715 start-up cooperatives including food and agriculture cooperatives (UWCC, 2016). In 2017, 18% of food hubs in the U.S. were organized as cooperatives of consumers, producers, mixture of the two stakeholder groups (Colasanti, et al., 2018). Food hubs are "businesses or organization[s] that actively manage the aggregation, distribution and marketing of source-identified food products, primarily from local and regional producers to strengthen their



ability to satisfy wholesale, retail and institutional demand." (Colasanti, et al., 2018)

Trend 4: Financial Trends

Increase in Total Assets

Assets include anything a cooperative owns that has marketable value, even if it cannot be readily sold. Examples of a cooperative's assets include cash, accounts receivable (what other persons or businesses owe the cooperative), inventory, equipment, machinery, and more. Corresponding with an increase in the size of agricultural cooperatives, total assets of agricultural cooperatives increased from \$25.15 billion in 1979 to \$48.88 billion in 2000, up by \$19.46 billion (Figures 17 and 18). After a slowdown in early 2000s, the nominal value of agricultural cooperative total assets rapidly increased to \$70.26 billion in 2008. The 2008 Great Recession caused a decline in the total assets by \$9.03 billion, to \$61.23 billion. As the economy recovered, total assets for all agricultural cooperatives increased. In 2016, total assets amounted to \$92.06 billion.

The inflation-adjusted value of U.S. agricultural cooperatives' total assets amounted \$61.78 billion in 1979. In response to the 1980s agricultural crisis, the real value of total assets declined from \$66.3 billion in 1980 to \$45.32 billion in 1991. By 2000, the real value of total cooperatives assets had reached \$59.69 billion. In the 2000s, the real value of total assets follows a similar trend to the nominal total assets trend. In 2016, inflation-adjusted value of total assets amounted \$82.46 billion.

The average total assets per agricultural cooperative grew from \$3.9 million in 1979 to \$47.14 million in 2016 due to increases in cooperative size. Figure 15 depicts this increasing trend. Figure 16 focuses on trends during the 2000-2016 period. Average total assets sharply declined in 2008 due to the Great Recession of 2008. In 2008, agricultural cooperatives in the U.S. had, on average, \$25.45 million in total assets. Since 2009, the average total assets of cooperatives has increased and reached \$47.14 million in 2016.





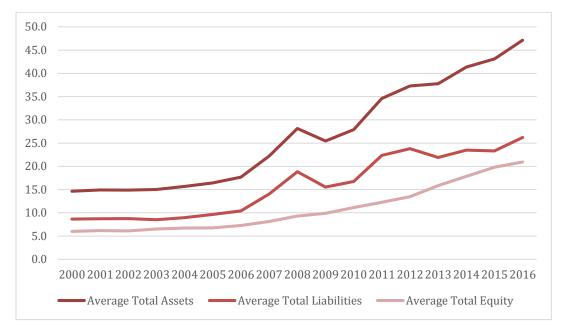


Figure 16: Average Total Assets per Agricultural Cooperative, million \$, 2000-2016

Total assets of cooperatives were expected to grow in 2017. Similar to business volume, it is estimated that the model to obtain an exponential curve best fits cooperatives total assets data. Using 37 years of data from 1979 to 2016, agricultural cooperatives had a statistically significant positive average annual growth rate of 3.47%. Corresponding projected value of total assets in 2017 was \$95.25 billion.

Increase in Total Equity

Total equity (net worth) is calculated by subtracting total liabilities from total assets. Cooperative members provide equity capital to finance cooperative growth in proportion to their use of the co-op. The average annual total equity for the 1979-1999 period was \$13.99 billion (Figure 17). In 2000, total equity reached \$19.99 billion (Figure 18). Figure 19 shows an increasing trend in agricultural cooperatives' total equity since 2000. The average annual total equity for the 2009-2016 period exceeds the average for the 2000-2008 period — \$33 billion versus \$20 billion. The inflation-adjusted annual value of total equity averaged \$22 billion during the 1979-1999 period. From 2009 through 2016, the average annual inflation-adjusted total equity was \$30.7 billion, \$8.2 billion more than from 2000 to 2008 period. Figure 15 also shows a remarkable increase in the total equity (net worth) per cooperative: from \$6 million in 2000 to \$20.9 million in 2016. Increased net investment by agricultural cooperatives, for example in constructing, maintaining or replacing storage facilities, has created a need for increased equity (Briggeman and Mickelsen, 2014; Briggeman et al., 2016).

Figure 17: Financial Structure of Agricultural Cooperatives, 1979-1999

Year	Cooperatives	Total Assets		Total Assets Total Liabilities		Total Equity (Net Worth)	
	Number	Billion \$	Inflation- Adjusted Billion \$	Billion \$	Inflation- Adjusted Billion \$	Billion \$	Inflation- Adjusted Billion \$
1979	6,445	25.15	61.78	15.61	38.35	9.55	23.46
1980	6,293	29.42	66.30	18.83	42.43	10.59	23.86
1981	6,211	28.84	59.44	17.92	36.93	10.92	22.51
1982	6,125	28.55	55.40	17.39	33.75	11.16	21.66
1983	5,989	28.81	53.79	17.28	32.26	11.54	21.54
1984	5,782	29.18	52.61	17	30.65	12.18	21.96
1985	5,625	27.77	48.52	15.73	27.48	12.05	21.05
1986	5,369	26.5	45.38	14.6	25.00	11.9	20.38
1987	5,109	27.64	46.16	14.82	24.75	12.82	21.41
1988	4,937	29.29	47.26	16.46	26.56	12.83	20.70
1989	4,799	29.65	46.05	16.34	25.38	13.31	20.67
1990	4,663	30.02	44.96	16.58	24.83	13.45	20.14
1991	4,494	31.27	45.32	17.23	24.97	14.04	20.35
1992	4,315	31.99	45.33	17.78	25.20	14.21	20.14
1993	4,244	33.45	46.30	18.63	25.79	14.81	20.50
1994	4,174	35.96	48.74	20.34	27.57	15.62	21.17
1995	4,006	40.27	53.46	23.64	31.38	16.63	22.08
1996	3,884	42.59	55.53	25.2	32.86	17.39	22.67
1997	3,791	44	56.40	25.46	32.64	18.54	23.77
1998	3,651	46.56	59.04	26.61	33.74	19.95	25.30
1999	3,466	47.68	59.55	27.42	34.25	20.26	25.30
Average for 1979-1999 period		33.08	52.25	19.09	30.32	13.99	21.93

Figure 18: Financial Structure of Agricultural Cooperatives, 2000-2016

Year	Cooperatives	Total Assets		Total 1	Liabilities		l Equity Worth)
	Number	Billion \$	Inflation- Adjusted Billion \$	Billion \$	Inflation- Adjusted Billion \$	Billion \$	Inflation- Adjusted Billion \$
2000	3,338	48.88	59.69	28.89	35.28	19.99	24.41
2001	3,210	47.84	57.12	28.03	33.47	19.81	23.65
2002	3,138	46.66	54.87	27.47	32.30	19.18	22.55
2003	3,071	46.15	53.21	26.18	30.18	19.98	23.04
2004	2,928	45.91	51.51	26.21	29.41	19.7	22.11
2005	2,863	47.04	51.14	27.67	30.08	19.37	21.06
2006	2,698	47.72	50.33	28.07	29.61	19.65	20.72
2007	2,608	57.95	59.54	36.7	37.70	21.25	21.83
2008	2,497	70.26	70.79	47.06	47.42	23.2	23.38
2009	2,406	61.23	61.23	37.41	37.41	23.83	23.83
2010	2,327	64.89	64.11	38.99	38.52	25.9	25.59
2011	2,294	79.41	76.86	51.3	49.66	28.11	27.21
2012	2,236	83.36	79.23	53.21	50.57	30.15	28.66
2013	2,186	82.56	77.22	47.92	44.82	34.64	32.40
2014	2,106	87.08	80.02	49.49	45.48	37.6	34.55
2015	2,047	88.23	80.21	47.72	43.38	40.51	36.83
2016	1,953	92.06	82.46	51.16	45.82	40.90	36.63
Estimate for 2017		95.25		52.96		42.29	

Note: From the exponential growth model, Total Assets, Total Liabilities, and Total Equity had a statistically significant positive annual growth rate of 3.47%, 3.52%, and 3.39%, respectively.

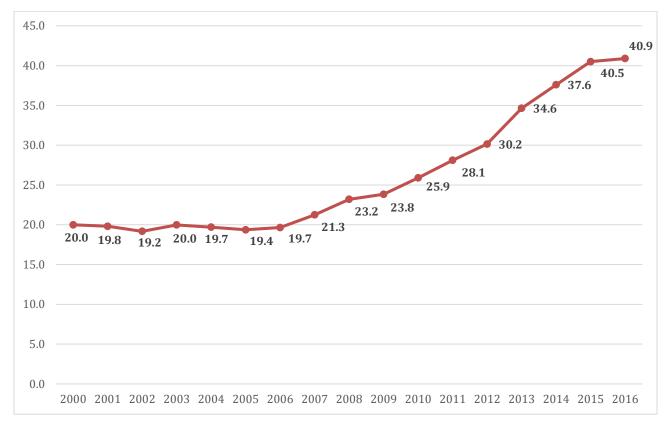


Figure 19: Total Equity, billion \$, 2000-2016

The total equity of agricultural cooperatives was expected to grow in 2017. Based on the exponential growth model for 37 years of data from 1979 to 2016, agricultural cooperatives had a statistically significant positive average annual growth rate in equity of 3.39%. The corresponding projected value of total equity in 2017 was \$42.29 billion.

Figure 20 shows the equity-to-asset ratio of U.S. agricultural cooperatives over the 1979-2016 period. This ratio represents the proportion of a cooperative's assets that are financed by members' equity. On average, the equity-to-asset ratio of agricultural cooperatives was 41% for the 1979-2016 period. Figure 21 shows a substantial drop in cooperatives' equity-to-asset ratio in 2008, to 33%. In 2016, the equity-to-asset ratio was 44%, 2% lower than the previous year, which suggests a decline in the ability of cooperatives to meet long-term financial obligations. However, the ratio in 2016 was still higher than the average ratio over the 2000-2008 and 2009-2016 periods, 40% and 41%, respectively.

Figure 20: Agricultural Cooperatives' Equity-to-Asset and the Assets-to-Liabilities Ratios, 1979-2016

Year	Total Equity/Total Assets Ratio	Total Assets/Total Liabilities Ratio
1979	38%	161%
1980	36%	156%
1981	38%	161%
1982	39%	164%
1983	40%	167%
1984	42%	172%
1985	43%	177%
1986	45%	182%
1987	46%	187%
1988	44%	178%
1989	45%	181%
1990	45%	181%
1991	45%	181%
1992	44%	180%
1993	44%	180%
1994	43%	177%
1995	41%	170%
1996	41%	169%
1997	42%	173%
1998	43%	175%
1999	42%	174%
2000	41%	169%
2001	41%	171%
2002	41%	170%
2003	43%	176%
2004	43%	175%
2005	41%	170%
2006	41%	170%
2007	37%	158%
2008	33%	149%
2009	39%	164%
2010	40%	166%
2011	35%	155%
2012	36%	157%
2013	42%	172%
2014	43%	176%
2015	46%	185%
2016	44%	180%

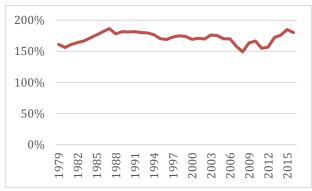
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The assets-to-liabilities ratio measures the ability of cooperatives to meet short-term financial obligations. In response to the 2008 Great Recession, agricultural cooperatives had the lowest value of assets-to-liabilities ratio of any year in the data set—149% (Figures 20 and 21). After an increase in 2009 and 2010, the ratio declined again to 155%, which is explained by the rapid increase in liabilities (financial claims against a cooperative) in 2011. Between 2012 and 2015, the ratio increased to 185%, mostly due to increases in total assets. A decline to 180% in 2016 was associated with substantial increases in liabilities.

Although financial ratios are necessary to assess the status and activities of a cooperative, cooperatives' performance measures should address their dual goals: member benefit and firm profitability. Cooperatives are successful if their members get more service than they can achieve individually or outside of the cooperative (Soboh et al., 2009).

Figure 21: Cooperative Equity-to-Asset and the Assets-to-Liabilities Ratios, 1979-2016



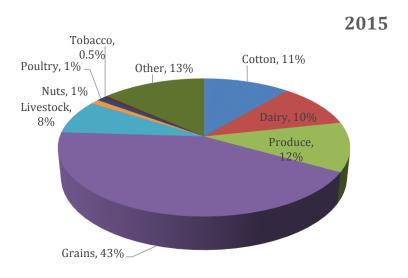




Trend 5: Trends by Product Type

In this section, a breakdown of marketing cooperatives by product type is analyzed. Figure 22 shows the distribution of marketing cooperatives by product type in 2015. Grains, produce, cotton, and dairy cooperatives accounted for 76% of U.S. agricultural marketing cooperatives, with 462, 125, 121, and 112 cooperatives respectively. Livestock, poultry, nuts, tobacco, and other types accounted for 259 cooperatives.

Figure 22: Number of Agricultural Marketing Cooperatives in 2015 by Product Type



Grain cooperatives have increased as a percentage of all agricultural marketing cooperatives. Grain cooperatives are cooperatives that market grains and oilseeds, rice, dry beans and peas. During the 1913-1950 period, grain cooperatives accounted for 33% of marketing co-ops; between 1951 and 1999, they represented on average 45% of marketing co-ops; and between 2000 and 2015, they represented 54% of marketing co-ops. In 2015, grain cooperatives represented 43% of all marketing cooperatives. On average, two grain cooperatives per year discontinue their operations due to exiting business or a merger. The incidence rate is lower in comparison to produce, cotton, and poultry cooperatives. In 2016, grain marketing cooperatives had total assets of over \$21 billion, total equity of over \$9.6 billion, and gross revenue of over \$4.5 billion (USDA 2017c). Low grain prices and a stronger U.S. dollar place competitive pressure on U.S. originated grain in international markets (CoBank, 2015).

^{9 2000-2015} data is based on classification of cooperatives by predominate business type.

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Fruit and vegetable cooperatives, as a percentage of all marketing cooperatives, have declined. From 1913 to 1950, fruit and vegetable cooperatives represented 13% of agricultural marketing cooperatives; between 1951 and 1999, they represented on average 11% of marketing co-ops; and between 2000 and 2015, they represented 5% of marketing co-ops. In 2015, fruit and vegetable cooperatives comprised 12% of agricultural marketing cooperatives (Figure 22), representing a recent increase in the number of fruit and vegetable cooperatives. As produce cooperatives tend to be smaller, between 2000 and 2012, they have shown the highest rate of discontinuing operations, due to exiting business or a merger, with an average of 23 incidences per year, or 2.4%. In 2016, fruit and vegetable marketing cooperatives had total assets of over \$5.6 billion, total equity of over \$1.7 billion, and gross revenue of over \$2.6 billion (USDA 2017c).

The number of cotton cooperatives, including cotton and cotton ginning operations, has not changed significantly. These cooperatives represented 5% of agricultural marketing cooperatives during the 1913-1950 period; the percentage increased to 8% during the 1951-1999 period. Between 2000 and 2015, they represented on average 8% of agricultural marketing cooperatives. In 2015, cotton cooperatives represented 11% of marketing cooperatives. From 2000 through 2012, there was one exit or merger of cotton cooperatives and 68 exits or mergers of cotton ginning operations. On average, during this same period, cotton cooperatives had 5 exits or mergers per year. In 2016, cotton cooperatives had total assets of over \$895 million, total equity of over \$365 million, and gross revenue of over \$217 million (USDA 2017c). In the same year, cotton gin cooperatives had total assets of over \$312 million, total equity of over \$175 million, and gross revenue of over \$197 million (USDA 2017c). Growth of this industry depends on future of trade agreements between the U.S. and Mexico, the primary importer of U.S. cotton (Meyer, 2018).

The number of dairy cooperatives as a share of agricultural marketing cooperatives has declined. During 1913-1950, dairy cooperatives represented 28% of all agricultural marketing cooperatives. Between 1951 and 1999, dairy co-ops represented 18% of agricultural marketing cooperatives. During 2000-2015, dairy cooperatives represented 8% of agricultural marketing cooperatives. In 2015, dairy cooperatives represented 10% of all agricultural marketing cooperatives (Figure 22). As the number of dairy cooperatives has declined, they have grown bigger. Dairy cooperatives also have shown the second highest (after produce cooperatives) incidence rate of discontinuing operations. On average, 7 dairy cooperatives per year exited business or merged during 2000-2012. In the two years before the 2008 Great Recession (2006 and 2007), 35 dairy cooperatives discontinued business. In 2016, dairy marketing cooperatives had total assets of over \$9.9 billion, total equity of over \$3.5 billion, and gross revenue of over \$2.7 billion (USDA, 2017c). The dairy sector faces a wide range of uncertainties, with strong domestic demand, lower milk prices, animal disease outbreaks, and deteriorating exports all impacting domestic and international markets in different ways (CoBank, 2015).

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Future Work

In this report, national trends in agricultural cooperatives since 1913 were analyzed, with an emphasis on the 2000s. As the number of agricultural cooperatives has declined, their business volume, total assets, and total equity have increased. Corresponding with an increase in size and the need to finance their growth, cooperatives are looking to restructure their organizations in more advantageous ways. In comparison to other businesses in the U.S., agricultural cooperatives have lower rates of mergers and exits; future work could analyze the factors associated with these low exit rates for cooperatives.

Spatial distribution of agricultural cooperatives suggests the presence of cooperative hotspots in Washington, Minnesota, North Dakota, Wisconsin, Iowa, Illinois, Indiana, Ohio, Kansas, Oklahoma, Texas, Tennessee, and New York. Cooperative coldspots are located in Texas, Arkansas, New Mexico, Colorado, Nevada, Wyoming, South Carolina, North Carolina, Virginia, West Virginia, Georgia, Kentucky, Vermont, and Connecticut. An important aspect of future work will be to identify what "causes" these hotspots and coldspots and to determine their role in cooperative business performance and regional economic development.

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