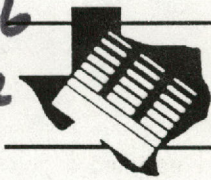


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Milk Supplies in the Southwest

by

Robert Schwartz, Joe Outlaw and Calvin Berry¹

The Southwest is composed of six states: Arkansas, Kansas, Missouri, New Mexico, Oklahoma and Texas. In 1984 milk production in these six states totaled 10.7 billion pounds (Table 1). By 1990, milk production in these states had increased to 13.4 billion pounds, an increase of more than 25 percent. The cash receipts earned by milk producers from the sale of the 13.4 billion pounds of milk totaled \$1.9 billion (Table 2).

Despite the downturn in milk prices and the large number of farmers leaving the dairy industry during 1991, these states produced 13.5 billion pounds of milk last year. This nearly continuous increase in production over the past several years has prompted questions about the long-term milk production prospects in the Southwest region. This article traces milk supplies in each of the states in the region and projects supplies for the next 9 years.

Arkansas

Total cash receipts from milk sales by Arkansas milk producers totaled \$112 million in 1990, according to USDA estimates (Table 2).

These milk sales represented 2.6 percent of total cash receipts to agriculture in the state and rank eighth as an income earner among all agricultural commodities marketed in Arkansas.

Milk production in Arkansas tended to be somewhat cyclical over the past 20 years. Production increased slowly during the early 1970s, declined in the late 1970s, then turned upward again during the first half of the 1980s. Production turned downward again during the early 1980s, but fluctuated up and down from year to year during the last half of the 1980s. The fluctuation was attributed in part to substantial participation by Arkansas dairy farmers in the Dairy Termination Program. These production cycles had higher peaks and troughs during the 1980s than in the 1970s. However, despite the cycles in the early 1970s, milk production has trended upward over the past 20 years at slightly less than 1 percent per year.

If observed trends continue, by the year 2000 Arkansas milk production could at best total as much as 875 million pounds annually (Table 1). However, it seems more likely that it will amount to about 820 million pounds annually by 2000.

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Approximately 75 percent of the milk shipped by Arkansas dairy producers comes from operations milking 80 cows or fewer. In fact, nearly 80 percent of the producers milk fewer than 50 cows.² Factors contributing to growth in Arkansas are proximity to abundant feed supplies and proximity to major population centers to the south.

Kansas

The USDA estimated producer cash receipts from milk sales in Kansas totaled \$163 million in 1990. This amount represented 2.3 percent of total cash receipts earned by Kansas farmers in that year (Table 2). Milk sales ranked sixth as a source of income among all commodities produced in Kansas.

Long-term milk production in Kansas has trended down at approximately 1 percent per year since 1972. Based on the historical trends, annual milk production in Kansas could range between 1.0 billion pounds and 1.1 billion pounds during the decade of the 1990s. This is about a 26 percent decline in production from the 1.5 billion pounds produced in 1972 (Table 1).

Almost 75 percent of the milk producers in Kansas milk 50 cows or fewer. And nearly 80 percent of the milk production comes from operations milking 120 cows or fewer.³

Missouri

The USDA estimated that returns from milk sales to Missouri milk producers amounted to \$406 million in 1990, or 10.3 percent of total farm cash receipts (Table 2). Milk sales ranked fourth in terms of total cash receipts from agricultural commodities, which totaled \$4 billion in 1990.

Historically, milk production in Missouri has been extremely volatile (Table 1). From 1972 through 1979, it declined 10.3 percent, bottoming out at 2.72 billion pounds in 1979. From 1980 through 1983, production trended upward and peaked at 3.1 billion pounds in 1983. In 1984 production fell to 2.75 billion pounds before it began to trend back upward at just over 1 percent per year to 3.04 billion pounds in 1990. As an example of the volatility in milk production, at 3.04 billion pounds of milk in 1990, production is just slightly ahead of the 3.025 billion pounds produced in the state in 1972.

Milk production for 1991 declined 6 percent to 2.9 billion pounds from year earlier levels. If historic trends continue, annual milk production in Missouri likely will average between 2.9 billion and 3.2 billion pounds annually through the year 2000.

Variation in production has declined over the past few years, suggesting that there are fewer "inners and outers" in the dairy business. In the past, many Corn belt dairy producers had multiple enterprise operations. This stability in production suggests that more producers are concentrating on their dairies as the predominant or only enterprises in their operations. Further evidence suggests that dairy production is concentrating in those areas where it has an economic advantage over other types of agriculture.⁴

Milk production in the southwestern corner of Missouri has shown a moderately strong upward trend since 1984, while production had decreased in the rest of Missouri. It is clear that the increases in production in Missouri over the past 7 years are due to increases in southwestern Missouri. Southwestern Missouri is an area where cattle raising, specifically dairying, has a comparative advantage.

Nearly 75 percent of the milk is produced on dairies with fewer than 85 cows. More than over 90 percent of the milk producers in Missouri milk 70 cows or fewer.⁵

New Mexico

Cash receipts from milk sales for New Mexico totaled \$212 million in 1990, which ranked milk sales second among all agricultural commodities (Table 2).

Over the past 2 decades, New Mexico has experienced the fastest increases in milk production of any of the six Southwestern states, moving from the smallest milk production to the third largest milk production in the region (Table 1). If long-term trends continue, annual milk production in New Mexico could range from 1.7 billion pounds to 4.3 billion pounds by the year 2000. If milk production continues to increase at the rate observed in the state from 1989 to 1990 then annual production would approach 13.4 billion pounds. Growth in milk output appears to be greatest in the eastern third of the state.⁶

More than 45 percent of New Mexico producers milk more than 630 cows, and more than 80 percent of the milk produced in New Mexico comes from these operations.⁷

Weather, relatively cheap land, proximity to irrigated forage and a favorable economic and regulatory climate have contributed to the growth of milk production in New Mexico. Current market relationships favor the shipment of New Mexico milk to the east. Producers from other regions who choose to relocate tend to prefer the arid climate of New Mexico to the more humid, semi-arid regions of Central Texas. Continued growth of milk production in New Mexico would most likely be hindered if drastic changes in environmental regulations or in price relationships between New Mexico and markets to the east should occur.

Oklahoma

The USDA estimated 1990 cash receipts from milk sales by Oklahoma milk producers to be \$147 million. Milk sales account for 10.3 percent of the cash receipts from all agricultural commodities, and ranked fifth among all agricultural commodity sales in the state (Table 2).

Production trends from 1987 through 1990 suggest that production in Oklahoma could average between 1.3 and 1.6 billion pounds annually by the end of the century (Table 1).

Milk production in Oklahoma was cyclical and highly variable over the past 20 years, but now seems more stable. Estimated annual milk production for 1990 was the highest in 20 years, but was only 10 million pounds more than annual production for 1972. Output of milk in 1991 was 2 percent below the 1990 level.

Approximately 60 percent of the milk produced in Oklahoma comes from operations milking fewer than 85 cows. About 65 percent of the dairy operations have 50 cows or fewer. The abundance of high quality forage, adequate supplies of feed grain and the proximity to markets to the south have encouraged milk production in Oklahoma.⁸

Texas

Texas is the largest milk producing state in the Southwest. In fact, it is the largest milk producing state in the southern portion of the United States,

and ranks sixth in milk production among all states. The USDA estimated that 1990 cash receipts from milk sales by Texas producers totaled \$809 million, or 6.8 percent of the total agricultural receipts. Milk sales ranked third behind cattle and cotton in total cash receipts (Table 2).

Texas milk production increased modestly from 1972 to 1977, and gave no indication it was on the verge of a significant expansion. However, after 1977, total annual milk production in Texas began to increase more rapidly. Milk output dropped slightly during the Dairy Diversion program, but picked up again from 1984 to 1991 (Table 1).

Based on this recent production trend, total annual milk production in Texas would grow to 8.5 billion pounds by 2000. However, the long-term growth trend (1972-1991) suggests that it will approximate 6.1 billion pounds by 2000. The introduction of improved forages, adequate supplies of grain concentrate and the proximity to large population centers have encouraged the growth of milk production in Texas. Also, Texas has benefitted from the technical and managerial influences brought into the state by people from other states and countries.

More than half the milk sold by Texas dairies comes from operations milking more than 200 cows, but only 15 percent of the operations.⁹

Producers' reactions to the emerging issues facing the Texas dairy industry will set the course of the industry for the next several decades. In fact, each state in the region will face the same issues. The economic importance of the industry within each state will determine to some extent the course the industry follows.

Survival and Success

A 1991 study done by Shiek at the University of Florida, analyzing production trends for the eight major milk production regions of the United States, found that production will increase about 3 percent in the Corn Belt (Missouri and Kansas), 11 percent in the Southwest (New Mexico and Texas) and 1 percent in the South Central region (Oklahoma and Arkansas) under the most adverse of Federal Order price policy changes.

A major contributor to the growth of dairying in Texas and New Mexico has been the cost structure. The large dairies in those states are able to capture some cost economies due to size.

Further, larger operations tend to generate more cash flow and are better able to withstand economic shocks caused by price variability or sudden increases in costs (Knutson et al.).

The Agricultural & Food Policy Center (AFPC) at Texas A&M University developed models for seven typical dairy operations representative of farms in the Southwest. Table 3 presents the characteristics of these dairies and Table 4 presents the implications of the 1990 Farm Bill on these dairies. The research indicated that under current dairy policy, the large dairies in New Mexico, Missouri and Erath County, Texas and the moderate size dairy in Missouri have the greatest probability of economic success¹⁰ over the next 3 years. The large dairy in East Texas has a fairly good probability of economic success, but the moderate size dairy in East Texas does not.

Of the seven typical dairies in the region, five had an increase in real net worth over the simulated 5 year planning horizon. The large Erath County dairy had a 146 percent increase in real net worth, followed by a 95 percent increase in New Mexico. The moderate Erath County dairy experienced a 1 percent decline in real net worth, while the moderate East Texas dairy had a 46 percent decline.

No comparable data exist for Arkansas, Kansas or Oklahoma. However, milk production practices are similar among comparable size operations across the region. While it is dangerous to conclude that the same results apply to the dairies in Arkansas, Kansas and Oklahoma, it is likely that larger operations in these three states will be successful, and experience at least moderate increases in real net worth. Moderate size dairies in northwest Arkansas with characteristics similar to the moderate dairies in southwest Missouri might have similar results.

This study and other studies conducted at Texas A&M University (Outlaw et al. and Schwart et al.) consistently indicate that regardless of the national policy option in place, larger dairies have the greatest chance of survival and success. This conclusion applies when comparing moderate size and large dairies within the same area and when comparing large dairies across regions.

Implications for the Region

Historical trends suggest that milk supplies will continue to grow within the six state region. By the turn of the century, annual milk production will likely total 17 billion pounds annually, an increase of more than 25 percent over the 1991 production level. Most of this growth will likely occur in New Mexico and Texas.

A major determinant of this growth is the structure of production costs in Texas and New Mexico. The relatively low investment per cow, the relative ease of physical expansion and the economies of production associated with size contribute to growth. As dairies increase in size, management must necessarily improve and specialize. Good management is a key to the cost structure of a dairy.

Close examination of milk production patterns within each state suggests that proximity to feed and markets is an important factor in the extent, nature and direction of growth within an area. Furthermore, milk production seems to concentrate in areas where it has economic advantages over the production of other agricultural commodities. Recent studies suggest that production will continue to concentrate in those areas of each state that have had the most growth over the past decade.

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Endnotes

1. Professor and Extension Economist - dairy marketing, and research associate, The Texas A&M University System; and professor, University of Arkansas.
2. Size group and county production for each of the six states in this analysis are supplied by Federal Milk Market Administrators in Texas, Kansas and Missouri and by Associated Milk Producers Inc., Arlington, Texas.
3. Ibid.
4. Data furnished by Federal Market Order Administrators in Texas, Missouri, Kansas and Arkansas, and by Associated Milk Producers, Arlington, Texas.
5. Ibid.
6. Ibid.
7. Ibid.
8. Ibid.
9. Ibid.
10. Economic success is defined as earning a return on initial equity greater than 0.050.

Table 1. Annual milk production by states in the Southwest region, 1972-91, and projections to 2000.

Years	States						Southwest region
	Arkansas	Kansas	Missouri	New Mexico	Oklahoma	Texas	
	--- Million pounds ---						
1972	728	1629	3025	326	1235	3340	10283
1973	706	1505	2992	318	1140	3280	9941
1974	706	1403	2989	338	1137	3380	9953
1975	707	1403	2840	366	1060	3208	9584
1976	710	1463	2919	405	1102	3309	9908
1977	725	1461	2918	426	1120	3372	10022
1978	729	1372	2719	458	1090	3433	9801
1979	717	1330	2714	506	1070	3377	9714
1980	745	1330	2826	602	1110	3625	10238
1981	792	1397	2877	670	1150	3665	10551
1982	828	1356	2905	812	1165	3780	10846
1983	845	1382	3100	938	1183	3985	11433
1984	808	1225	2754	1006	1130	3848	10771
1985	848	1285	2870	1078	1183	3968	11232
1986	755	1301	2930	1092	1190	4089	11357
1987	748	1261	2940	979	1170	4300	11398
1988	789	1269	3000	1099	1180	4865	12202
1989	794	1251	2975	1243	1232	5170	12665
1990	817	1245	3040	1524	1245	5539	13410
1991	817	1230	2865	1917	1223	5418	13470
1992	831	1191	2926	2130	1212	5139	13429
1993	837	1176	2928	2403	1217	5253	13814
1994	843	1160	2930	2677	1223	5366	14198
1995	850	1145	2931	2950	1228	5479	14583
1996	856	1129	2933	3224	1233	5593	14967
1997	862	1114	2934	3497	1239	5706	15352
1998	868	1098	2936	3771	1244	5820	15737
1999	875	1082	2937	4044	1249	5933	16121
2000	881	1067	2939	4318	1255	6047	16506

Table 2. Cash receipts from the sale of milk and receipts as a percent of total cash receipts for the six Southwestern states.

State	1988		1989		1990	
	Million dollars	Percent of total	Million dollars	Percent of total	Million dollars	Percent of total
Missouri	359	9.5	388	9.9	406	10.3
Kansas	150	2.3	163	2.5	163	2.2
Arkansas	105	2.7	112	2.7	112	2.6
Oklahoma	148	4.4	168	4.8	148	4.2
New Mexico	137	10.6	170	11.6	212	13.9
Texas	639	6.2	735	6.7	809	6.8
Region	1537	5.3	1736	5.7	1849	5.7

Table 3. Characteristics of seven typical dairy farms.

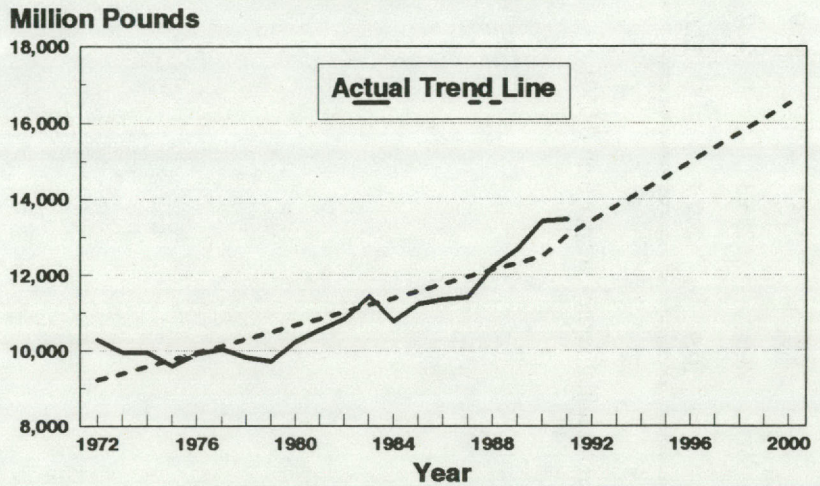
	New Mexico large	Central Texas moderate	Central Texas large	East Texas moderate	East Texas large	Missouri moderate	Missouri large
No. of cows	1600.0	300.0	720.0	180.0	812	65	200.0
Milk/cow (cwts)	189.3	140.9	172.2	140.9	162.0	175.0	185.3
Assets	Per cow (\$)						
Real estate	1234.8	1361.3	852.8	2240.6	1433.7	2109.2	3759.0
Machinery	183.4	594.3	323.9	731.1	425.9	1735.4	1362.0
Livestock	1670.0	1480.0	904.0	922.2	920.6	1395.4	1237.5
Debt/asset ratio	0.23	0.27	0.26	0.22	0.24	0.21	0.25
1992 Gross receipts	\$1,000						
Total	4738.6	658.5	1845.5	421.3	1990.3	173.5	553.3
Milk	3994.2	557.5	1635.1	334.5	1734.2	141.4	460.5
Livestock	744.4	101.0	210.4	54.4	234.0	27.5	74.7
Crop	0.0	0.0	0.0	0.0	0.0	4.6	18.1
Total acres	150.0	606.0	460.0	400.0	600	250	600.0
Owned acres	150.0	303.0	160.0	200.0	400	145	600.0
Leased acres	0.0	303.0	300.0	200.0	200	105	0.0

Table 4. Simulation results for typical farms in the Southwest region, 1990-1995.

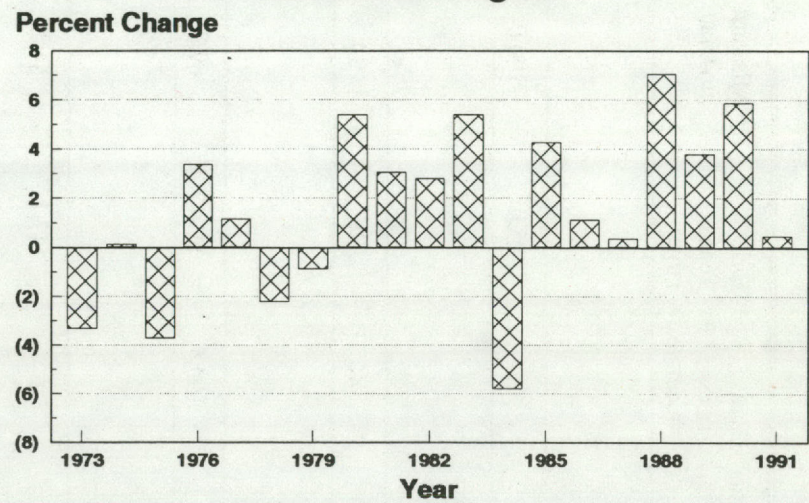
	New Mexico large	Central Texas moderate	Central Texas large	East Texas moderate	East Texas large	Missouri moderate	Missouri large
Probability of economic success ¹							
Percent	100.0	57.0	100.0	0.0	85.0	100.0	100.0
Real change in net worth (1990-1995)							
Percent	95	-1	146	-46	26	14	18
Average ratio of expenses to receipts (1990-1995)							
Percent	77.4	88.9	77.1	100.8	89.4	69.7	75.7
Average net cash income (\$1,000)							
1991	1055.9	62.9	389.3	-6.4	147.1	53.2	129.2
1992	1065.0	65.9	404.7	-12.9	157.4	48.2	126.5
1993	1138.9	82.0	456.5	-5.2	234.4	52.9	135.2
1994	1149.5	79.5	467.9	-8.6	255.3	54.7	137.6
1995	1123.6	72.7	479.6	-19.9	249.9	52.6	135.8

¹ Chance that the farm will earn a return on initial equity greater than 0.0501.

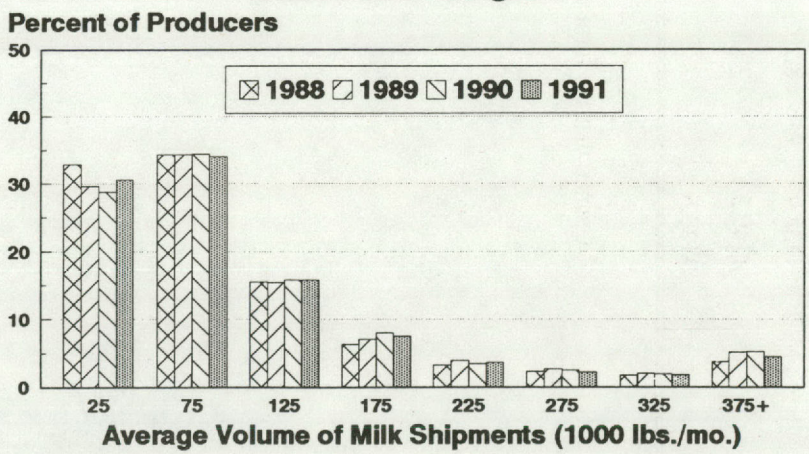
Annual Milk Production, 1972 to 2000 Southwest Region



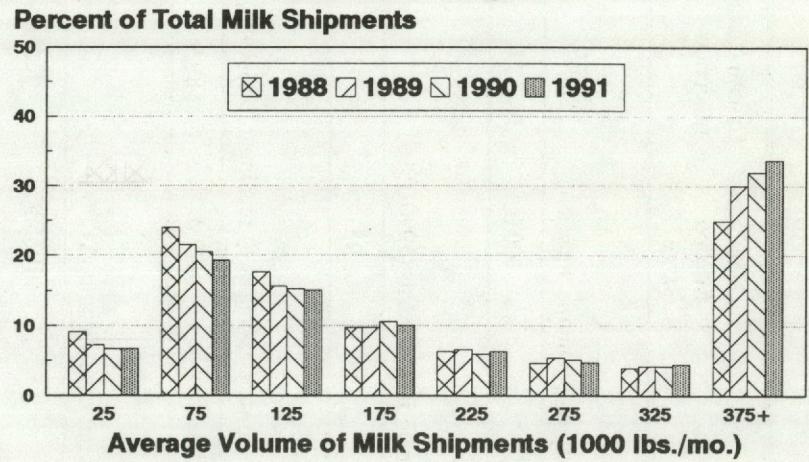
Percent Change in Production from Previous Year Southwest Region



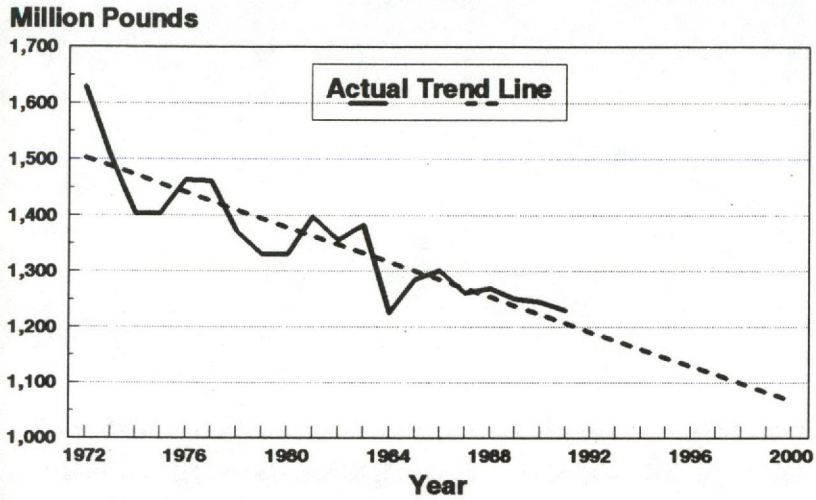
Distribution of Producers by Average Monthly Volume of Milk Shipments, January 1988-1991 Southwest Region



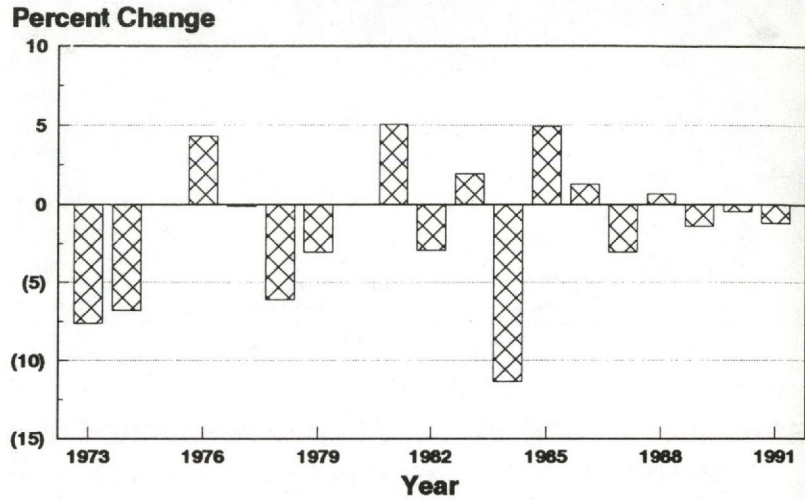
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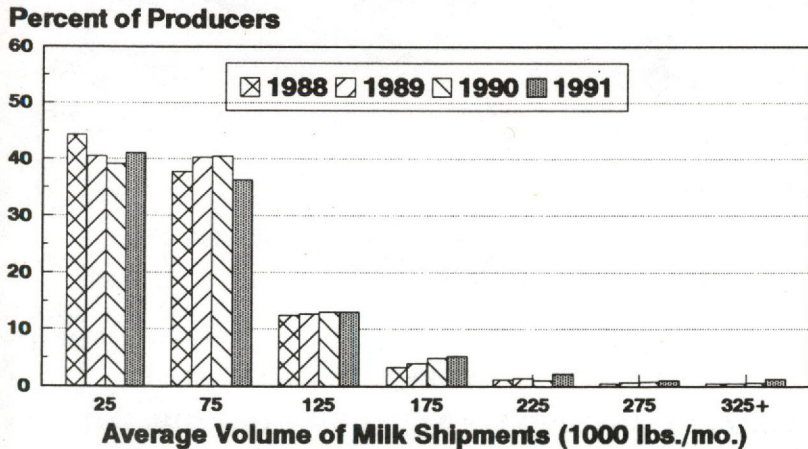
**Actual and Projected Milk Production, 1972-2000
Kansas**



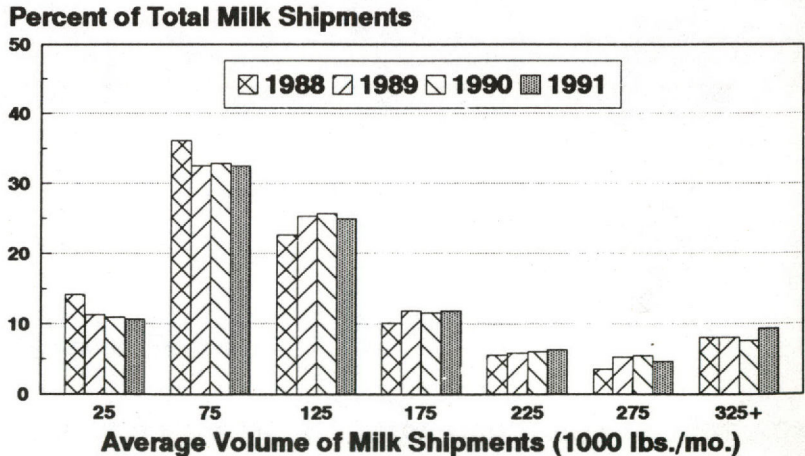
**Percent Change in Production from Previous Year
Kansas**



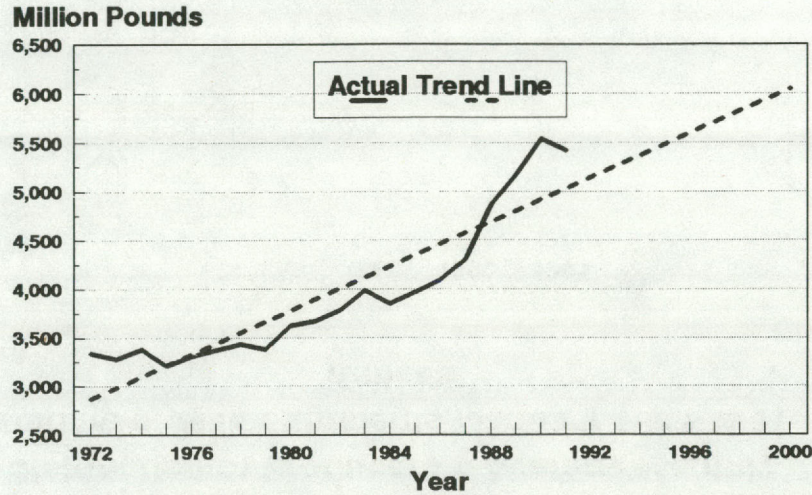
**Distribution of Producers by Average Monthly Volume of Milk Shipments, January 1988-1991
Kansas**



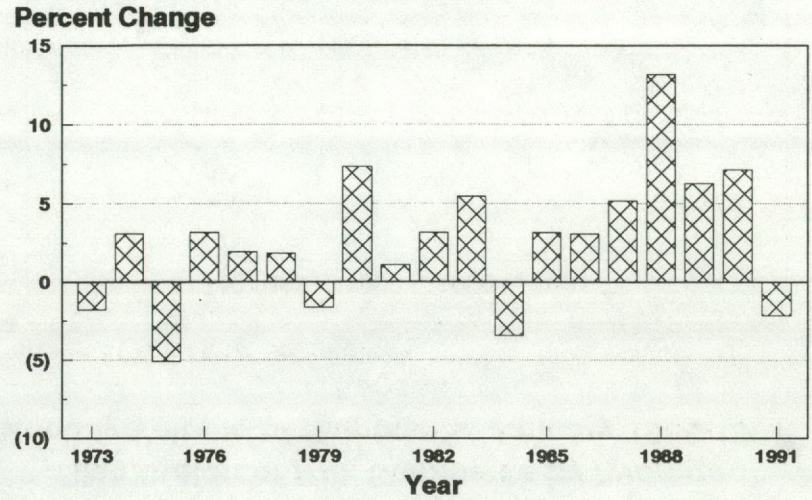
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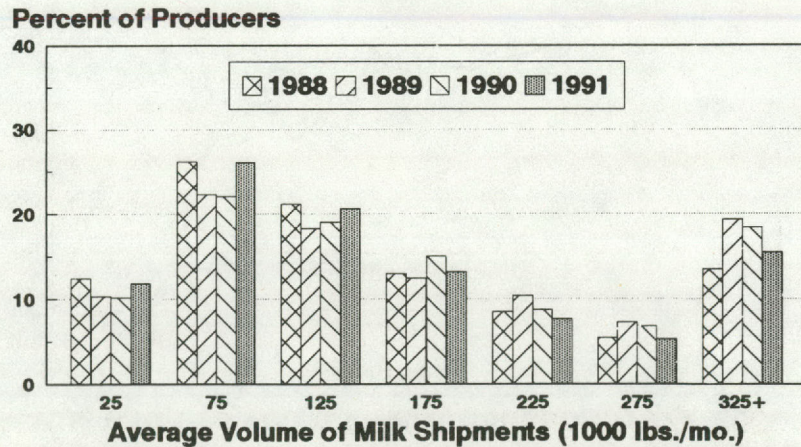
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Texas**



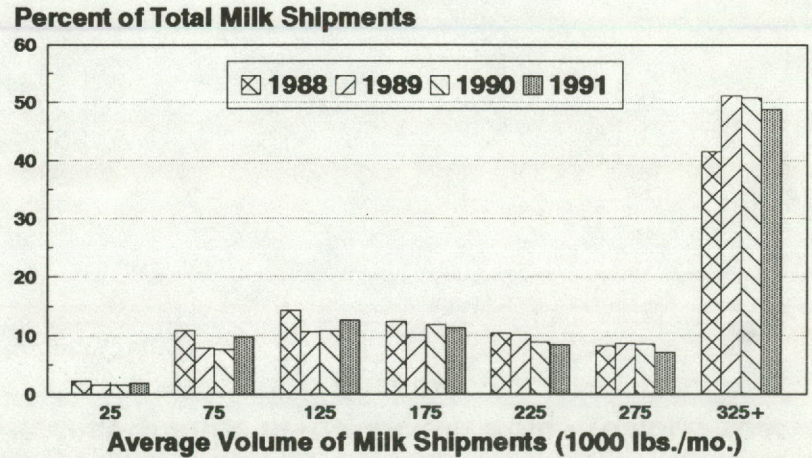
**Percent Change in Production from Previous Year
Texas**



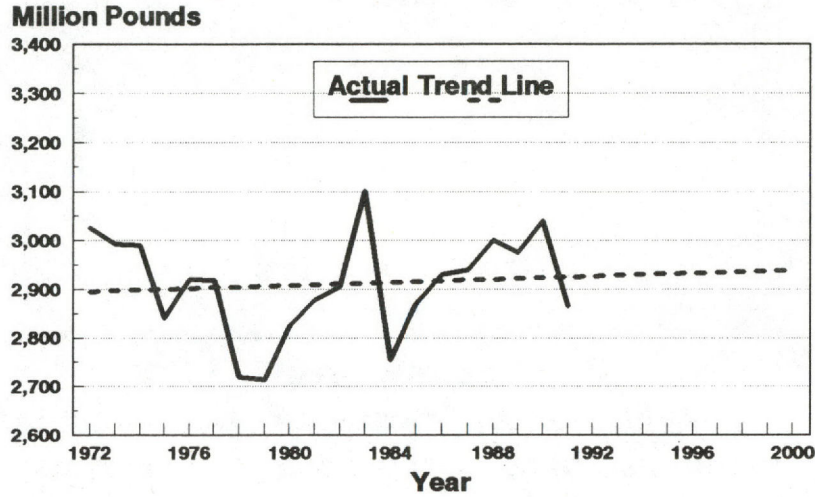
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Texas**



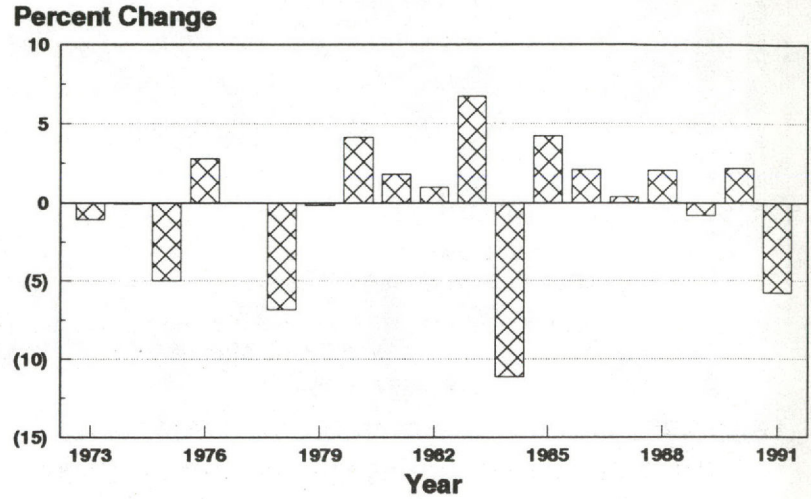
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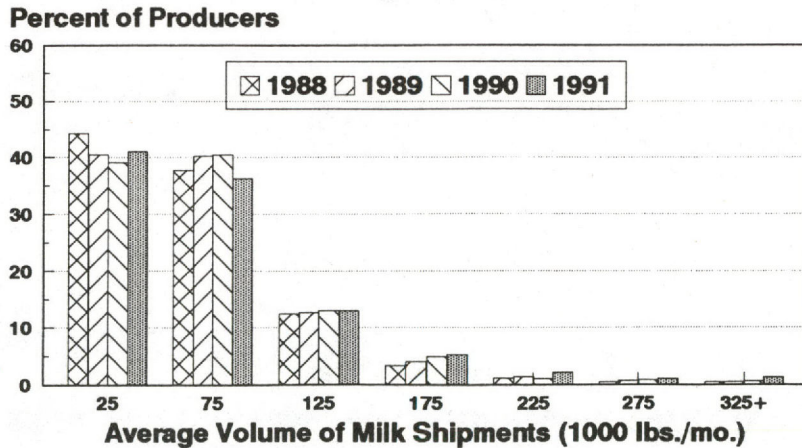
Actual and Projected Milk Production, 1972-2000 Missouri



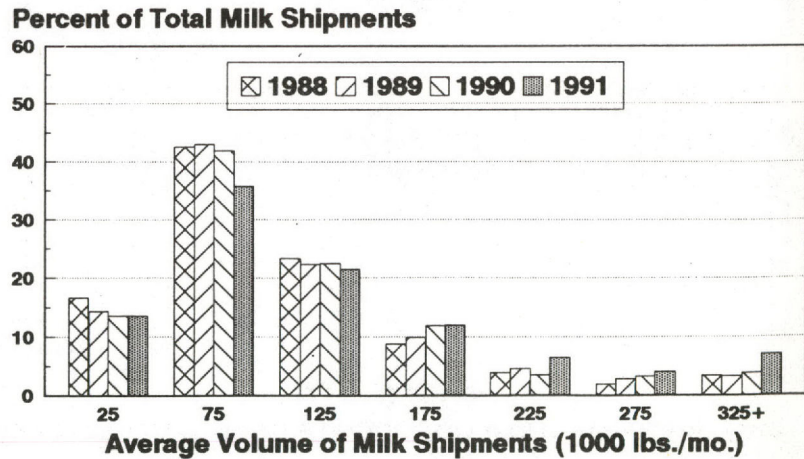
Percent Change in Production from Previous Year Missouri



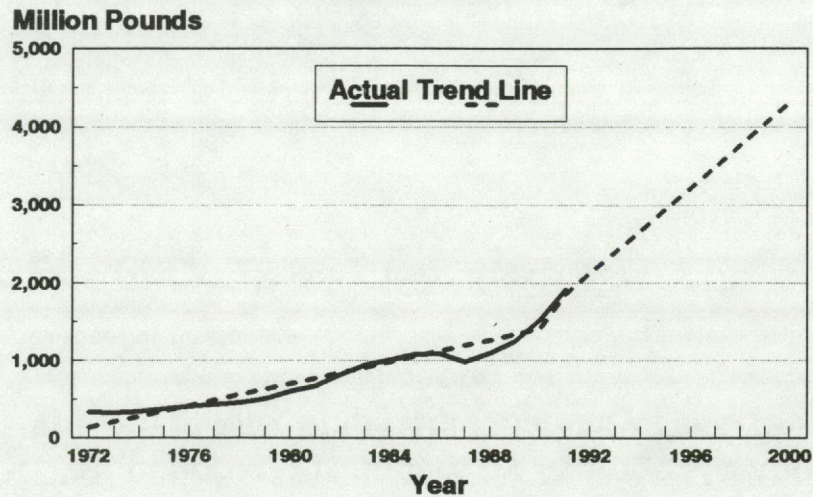
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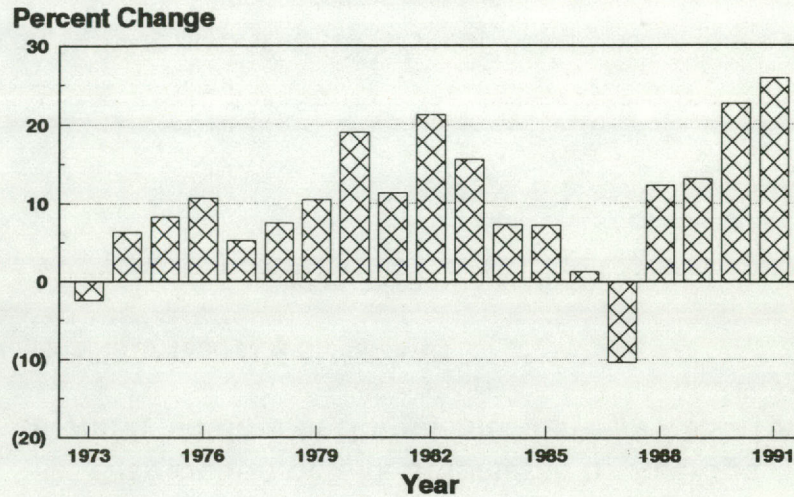
Distribution of Milk Shipments by Average Monthly Volume of Shipments, January 1988-1991 Missouri



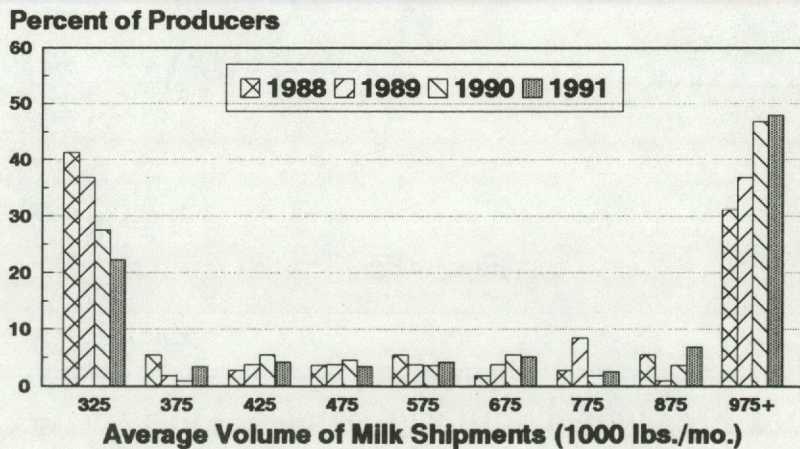
Actual and Projected Milk Production, 1972-2000 New Mexico



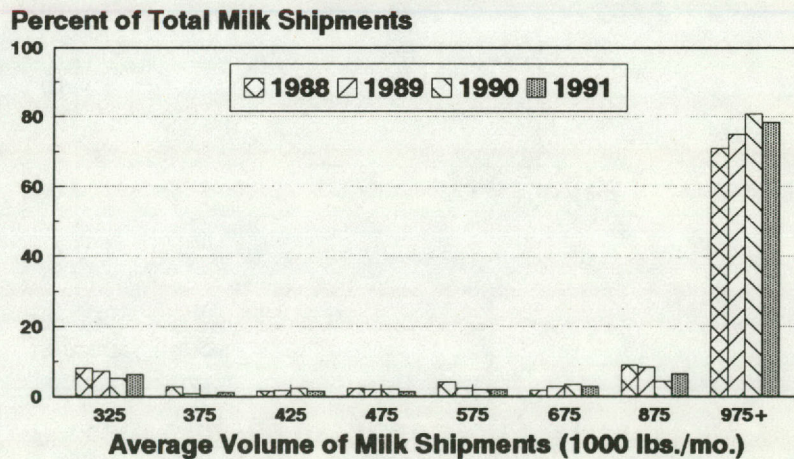
Percent Change in Production from Previous Year New Mexico



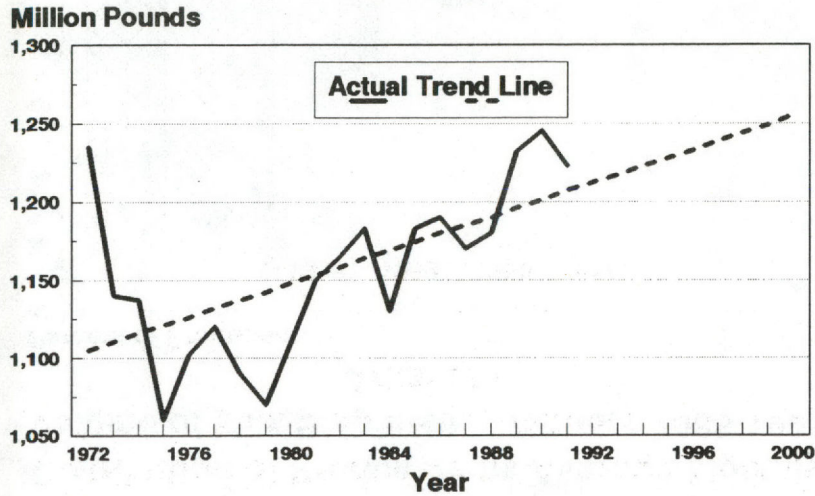
Distribution of Producers by Average Monthly Volume of Milk Shipments, January 1988-1991 New Mexico



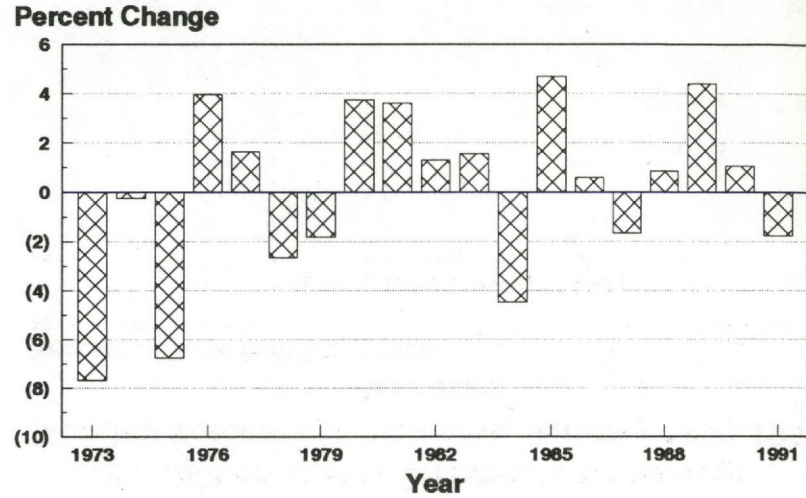
Distribution of Milk Shipments by Average Monthly Volume of Shipments, January 1988-1991 New Mexico



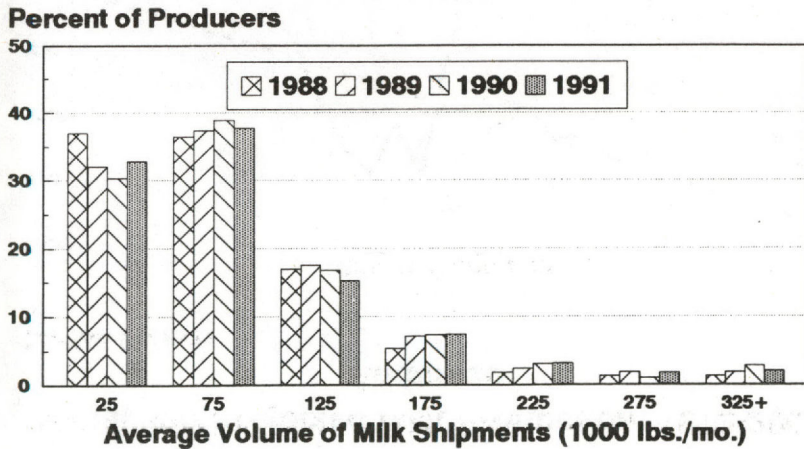
**Actual and Projected Milk Production, 1972-2000
Oklahoma**



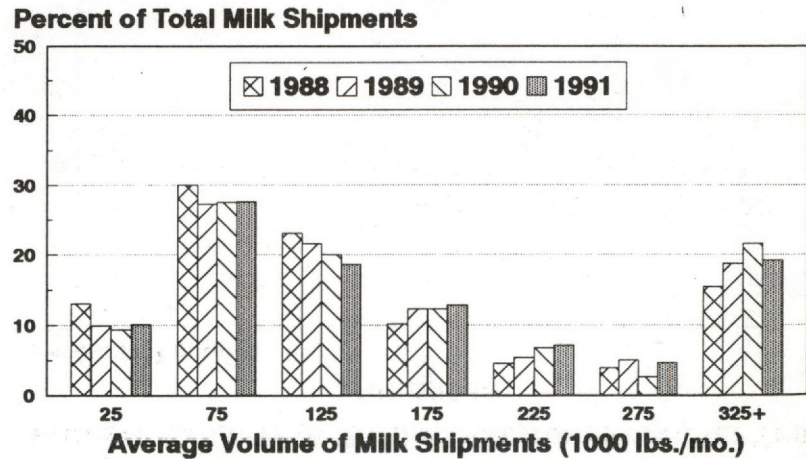
**Percent Change in Production from Previous Year
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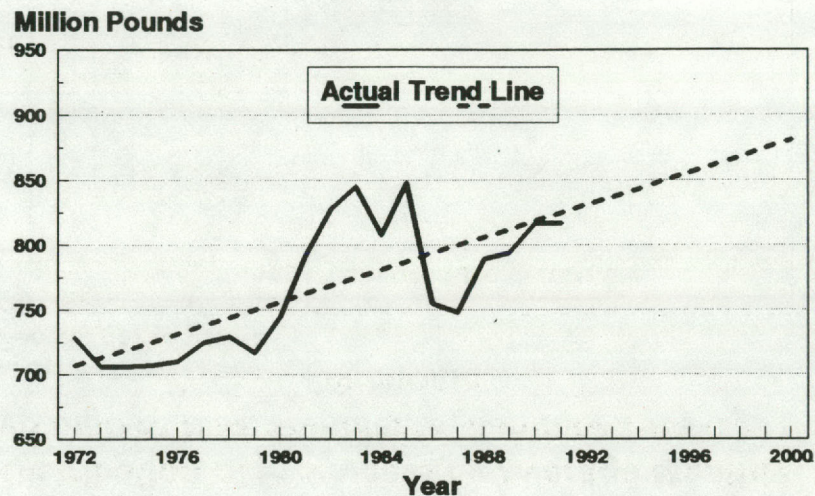
**Distribution of Producers by Average Monthly Volume of Milk Shipments, January 1988-1991
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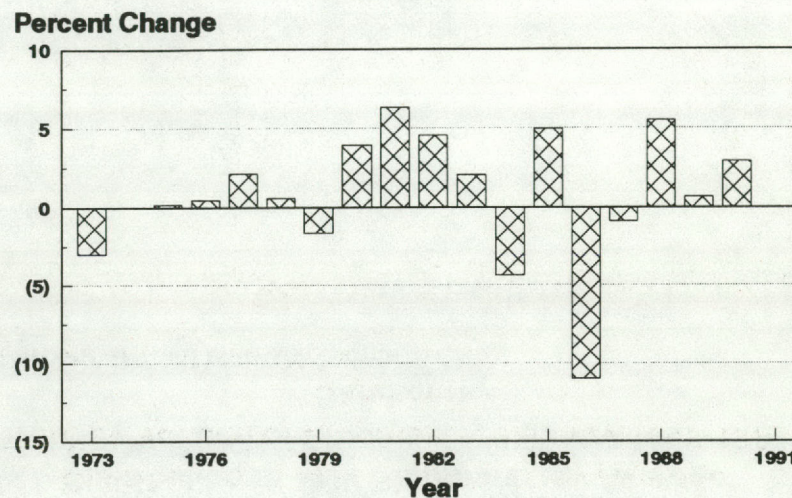
**Distribution of Milk Shipments by Average Monthly Volume of Shipments, January 1988-1991
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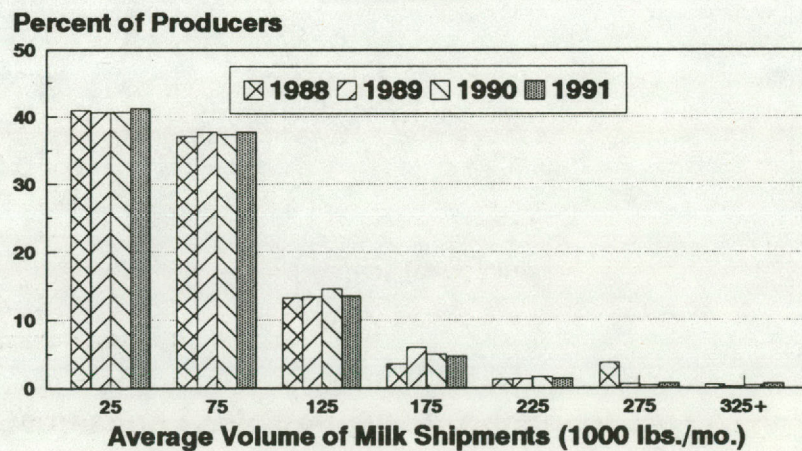
Actual and Projected Milk Production, 1972-2000 Arkansas



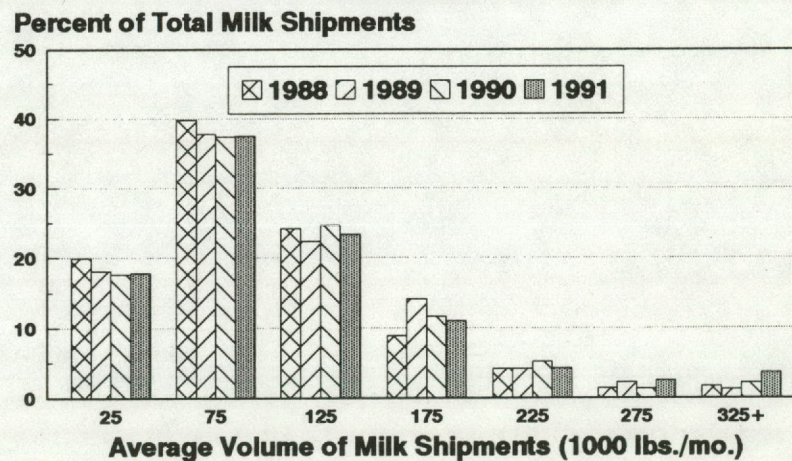
Percent Change in Production from Previous Year Arkansas



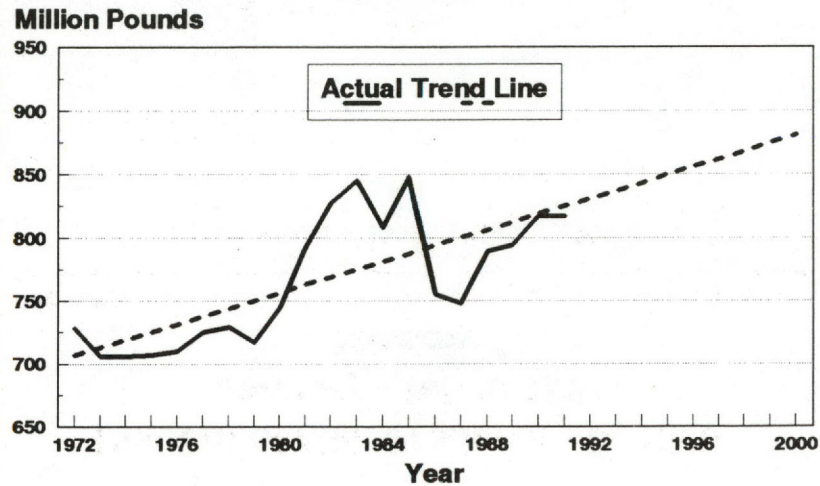
Distribution of Producers by Average Monthly Volume of Milk Shipments, January 1988-1991 Arkansas



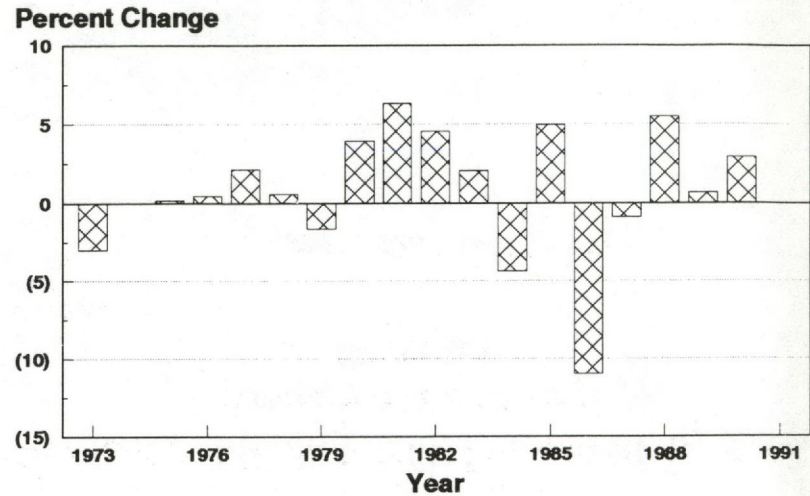
Distribution of Milk Shipments by Average Monthly Volume of Shipments, January 1988-1991 Arkansas



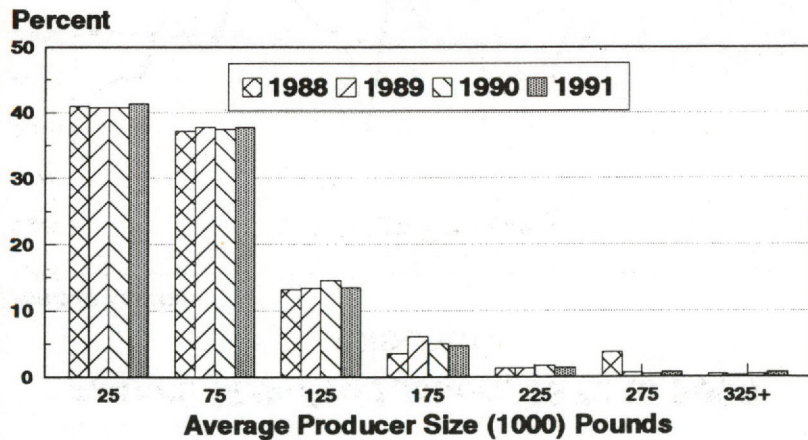
Annual Milk Production, 1972 to 2000 Arkansas



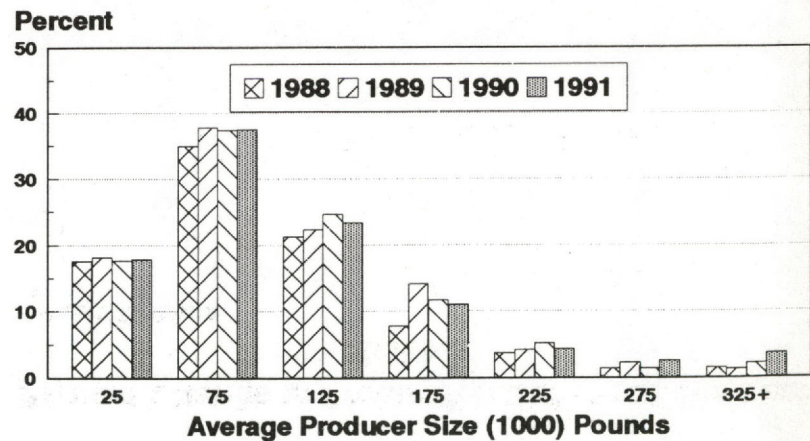
Percent Change in Production from Previous Year Arkansas



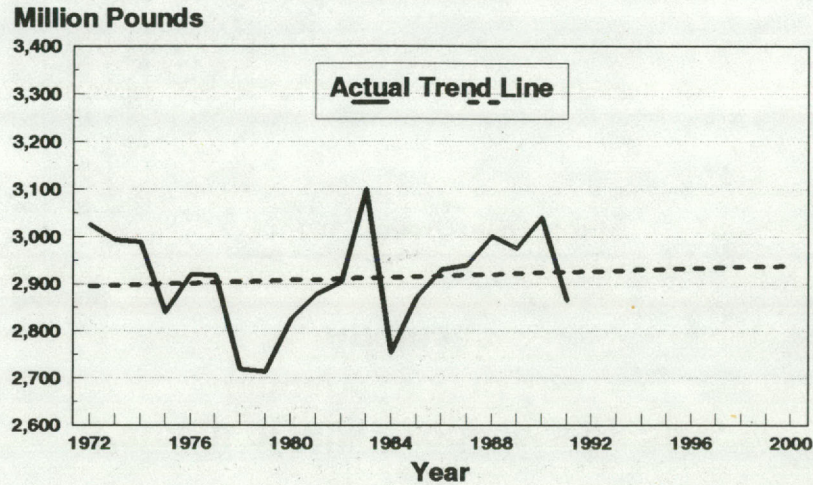
Percent of Milk Producers by Size, January 1988 to 1991 Arkansas



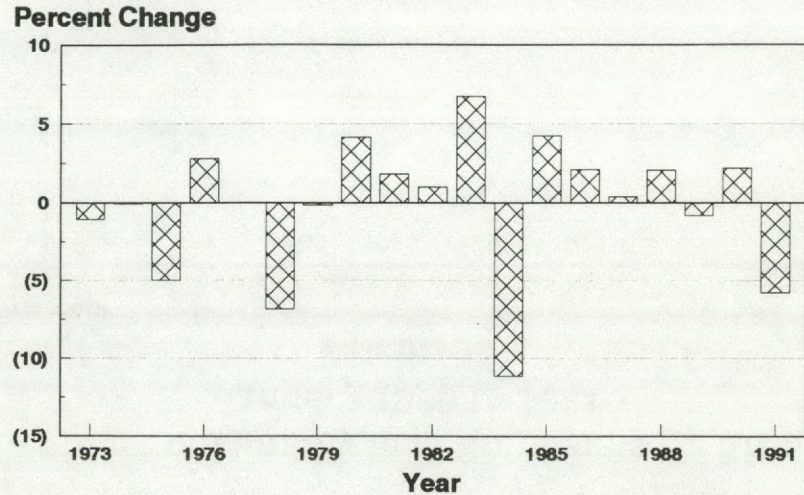
Percent of Monthly Milk Shipments by Size, January 1988 to 1991 Arkansas



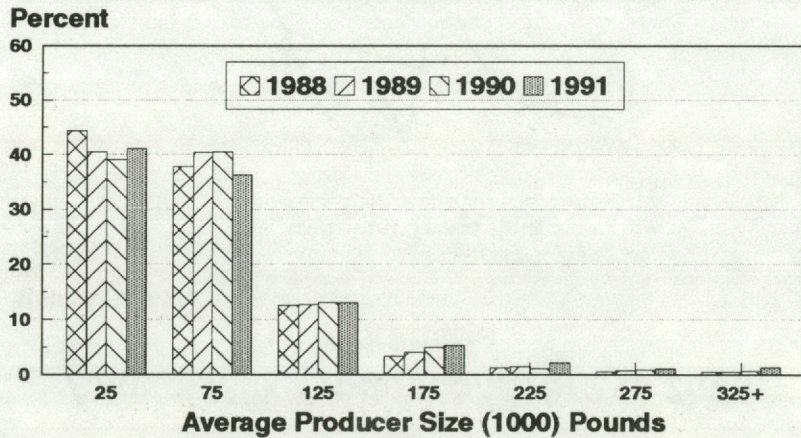
**Annual Milk Production, 1972 to 2000
Missouri**



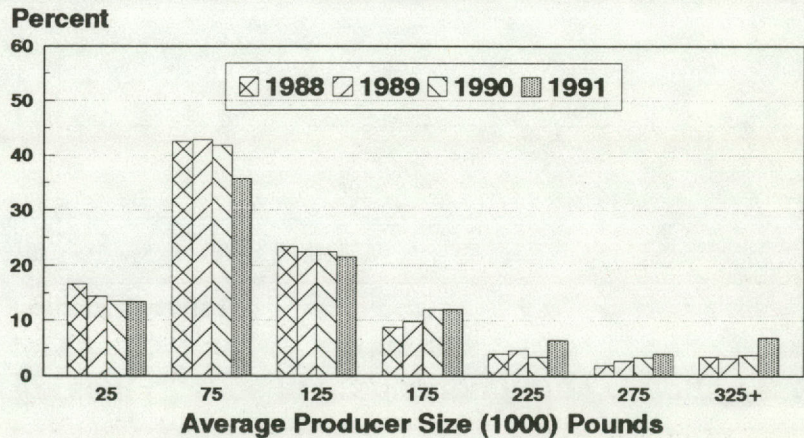
**Percent Change in Production from Previous Year
Missouri**



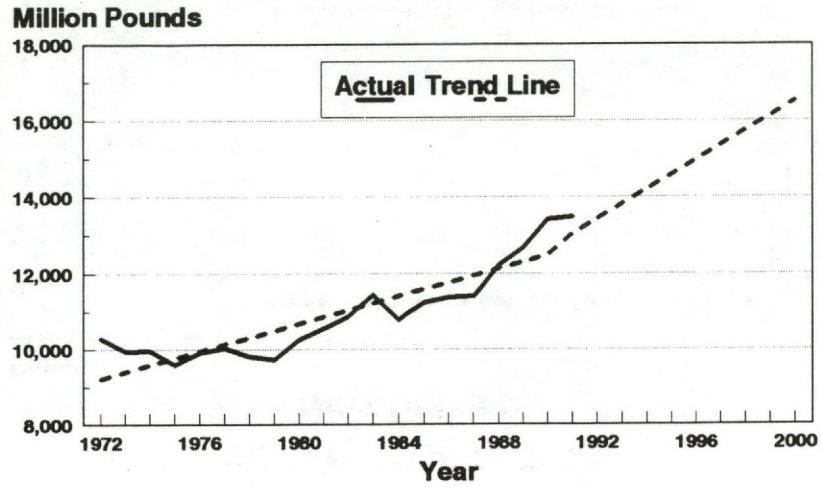
**Percent of Milk Producers by Size,
January 1988 to 1991
Missouri**



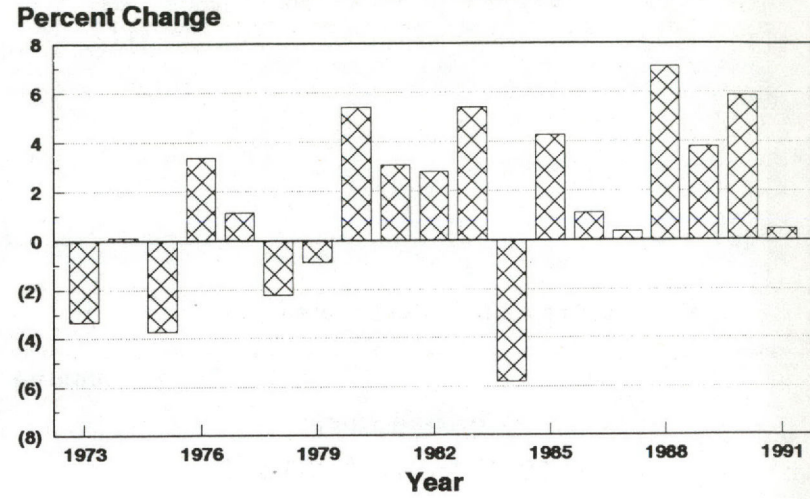
**Percent of Monthly Milk Shipments by Size,
January 1988 to 1991
Missouri**



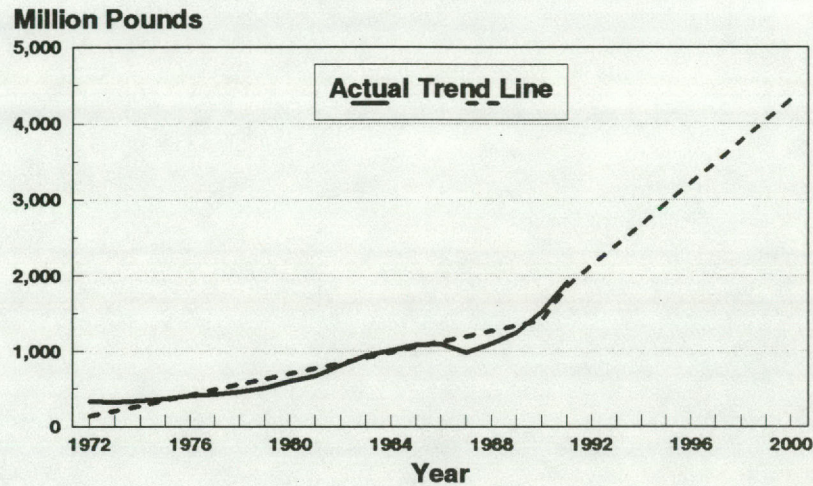
Annual Milk Production, 1972 to 2000 Southwest Region



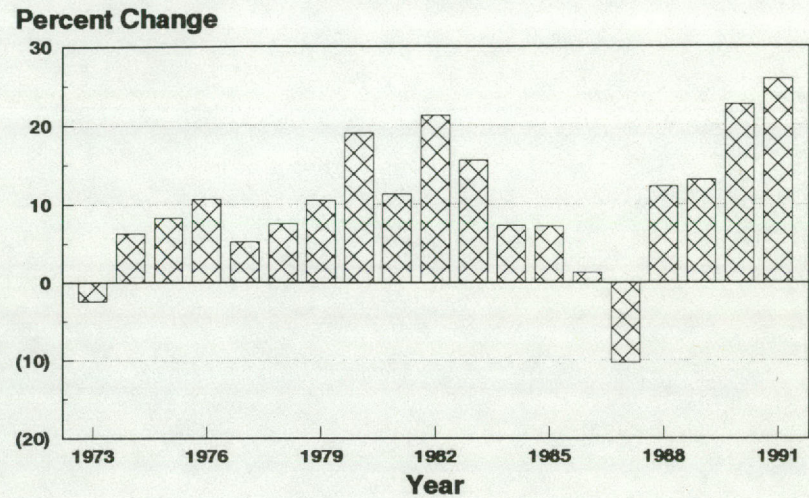
Percent Change in Production from Previous Year Southwest Region



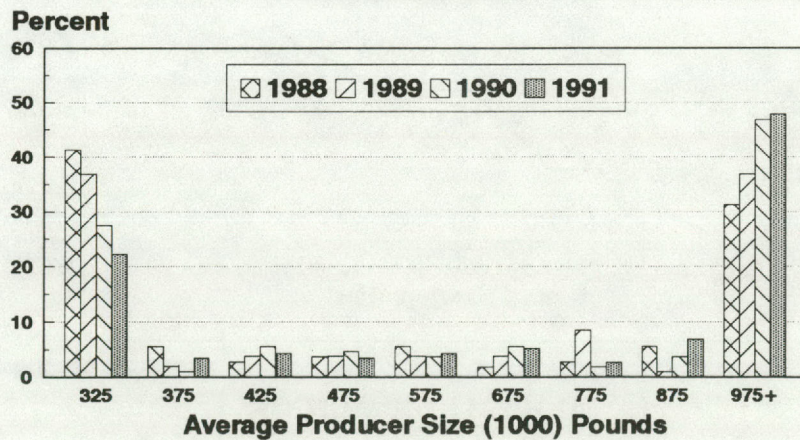
Annual Milk Production, 1972 to 2000 New Mexico



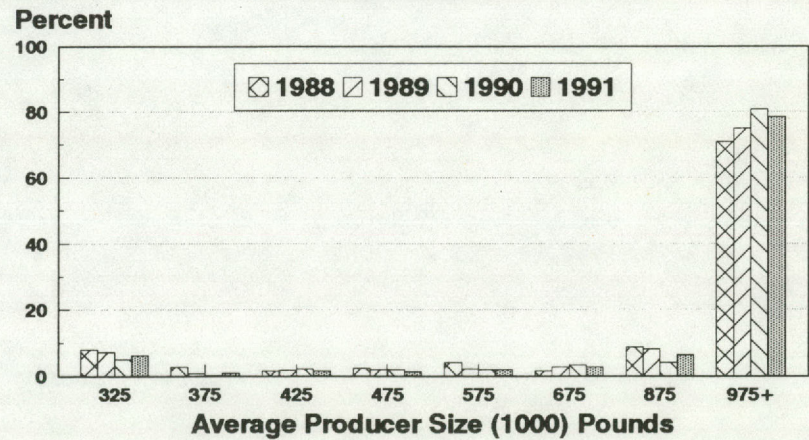
Percent Change in Production from Previous Year New Mexico



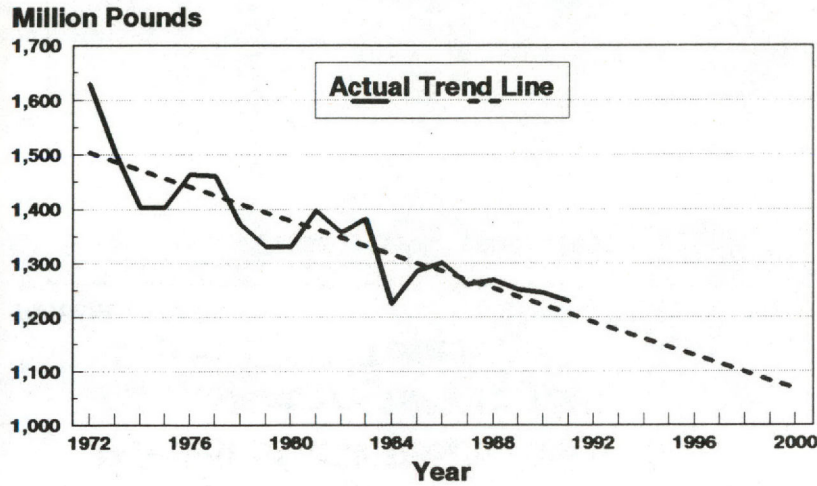
Percent of Milk Producers by Size, January 1988 to 1991 New Mexico



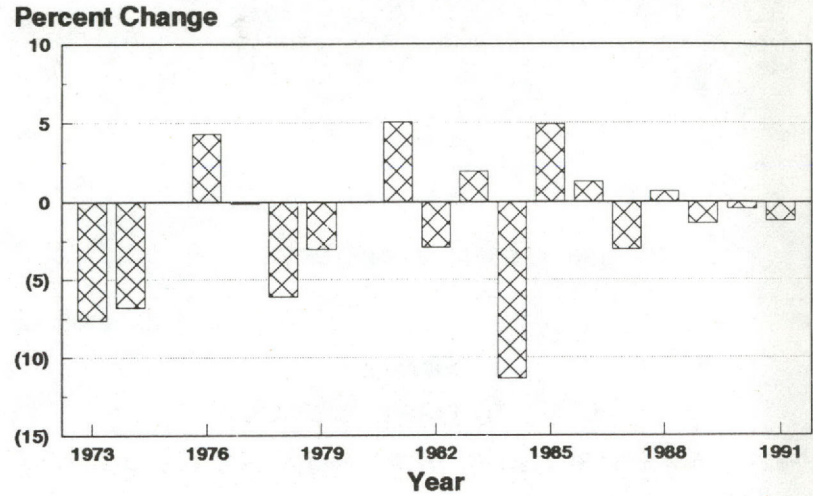
Percent of Monthly Milk Shipments by Size, January 1988 to 1991 New Mexico



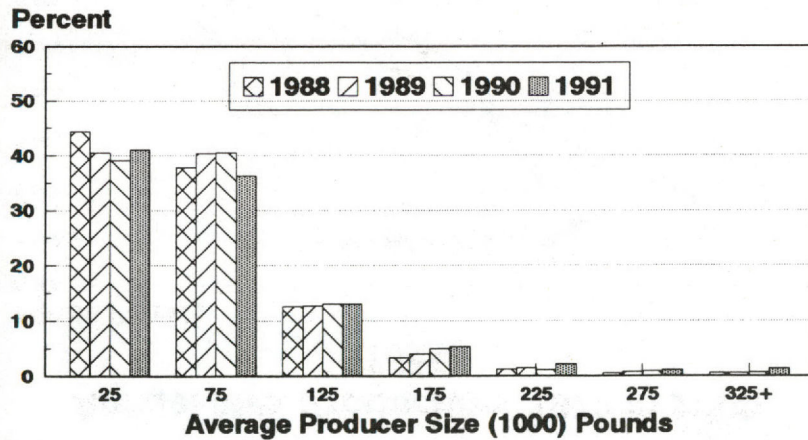
Annual Milk Production, 1972 to 2000 Kansas



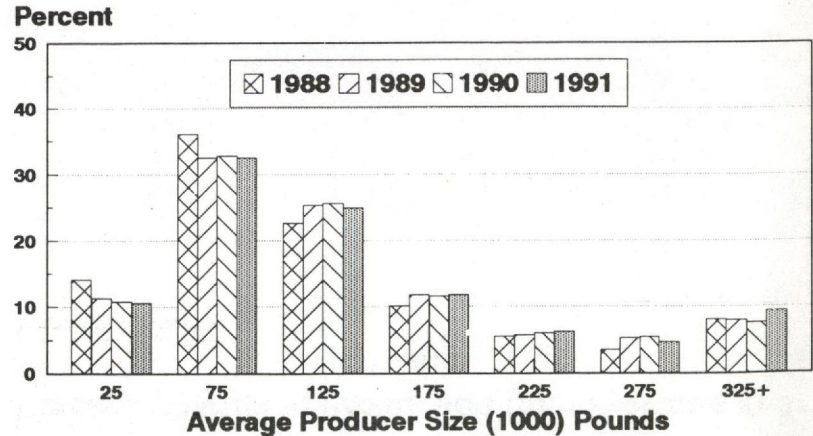
Percent Change in Production from Previous Year Kansas



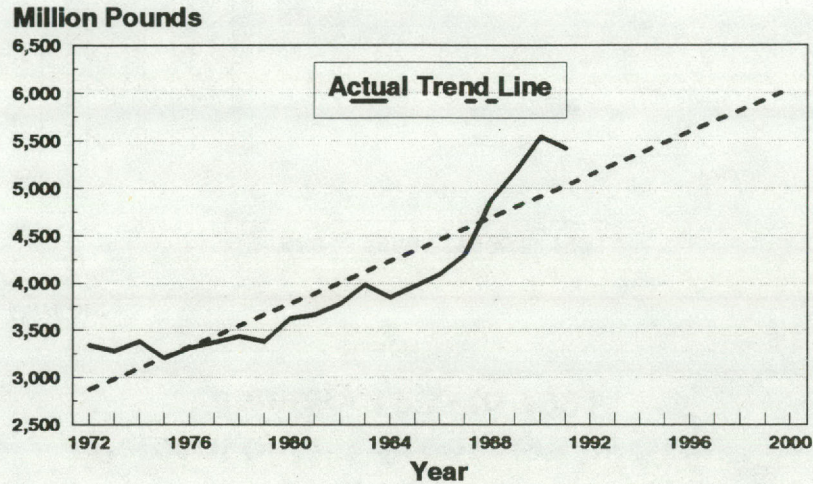
Percent of Milk Producers by Size, January 1988 to 1991 Kansas



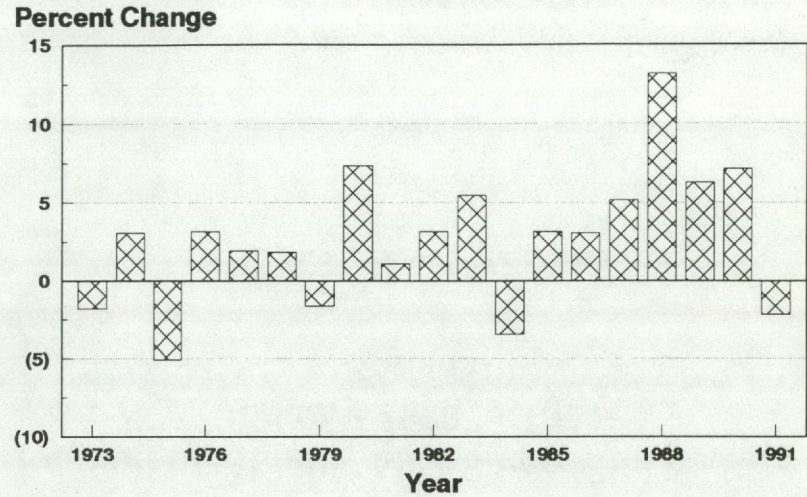
Percent of Monthly Milk Shipments by Size, January 1988 to 1991 Kansas



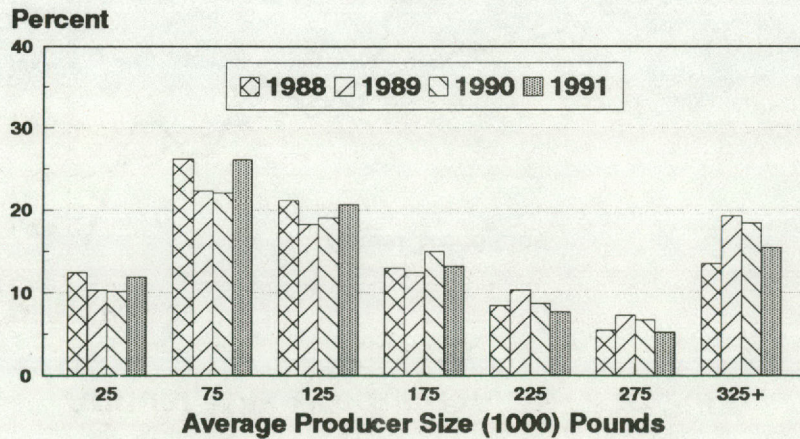
Annual Milk Production, 1972 to 2000 Texas



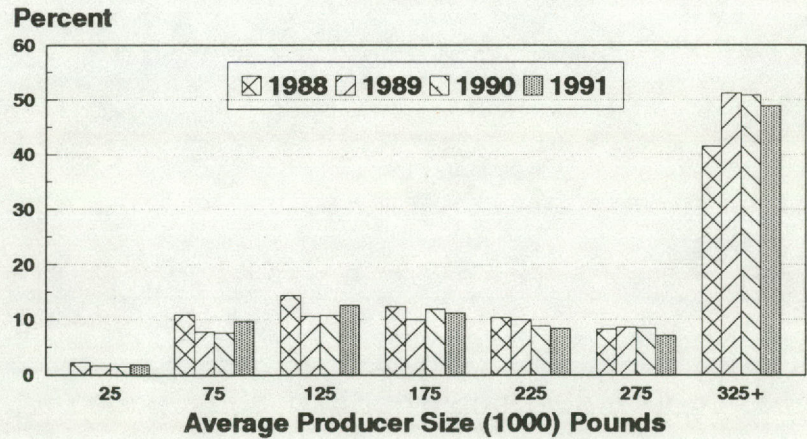
Percent Change in Production from Previous Year Texas



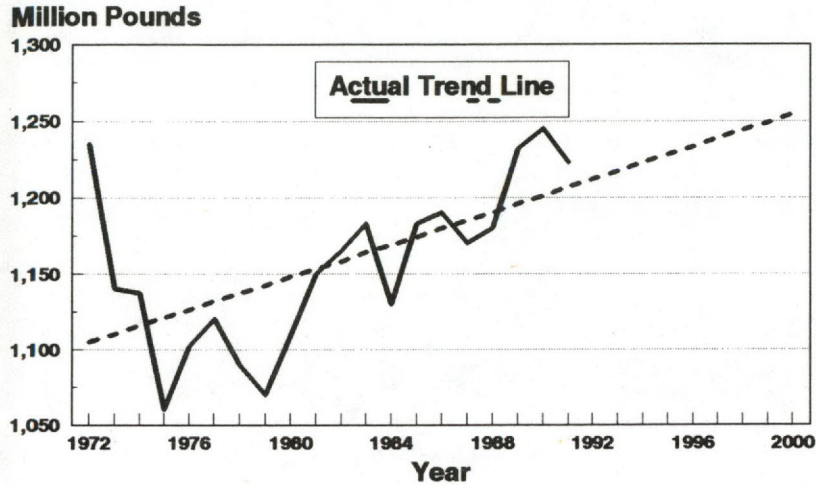
Percent of Milk Producers by Size, January 1988 to 1991 Texas



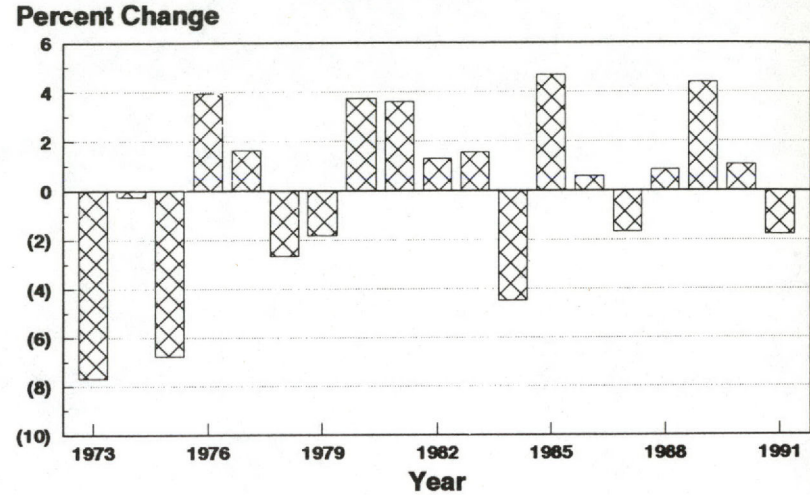
Percent of Monthly Milk Shipments by Size, January 1988 to 1991 Texas



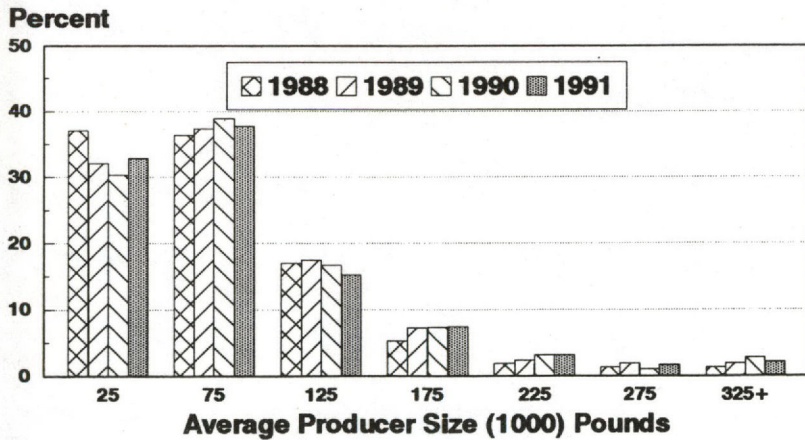
Annual Milk Production, 1972 to 2000 Oklahoma



Percent Change in Production from Previous Year Oklahoma



Percent of Milk Producers by Size, January 1988 to 1991 Oklahoma



Percent of Monthly Milk Shipments by Size, January 1988 to 1991 Oklahoma

