

Regional Differences in the Dairy Industry and Their Use in Evaluating Dairy Surpluses

by

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PREFACE

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TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Milk Production -- Who's on First and Other Trends	1
How Big is Big	1
Prospects for Growth	5
California and Washington	7
Pennsylvania, Texas, and Wisconsin	9
New York, Ohio, and Michigan	9
Minnesota and Iowa	10
Regional Patterns	10
How Does Production Compare to Measures of State Surpluses or Deficits?	11
Production vs. Class I Sales	11
Production vs. Total Consumption	13
Sales to the CCC	15
CCC Sales Relative to Production	18
Cheese	18
Butter	19
Nonfat Dry Milk	20
Product Summary	21
Milk Equivalent Totals	21
Milk Prices -- Where Are They and How Have They Changed?	21
Using Price and Quantity to Describe the Surplus	26
Conclusions: How Do Regions View Each Other and Dairy Policy?	31
References	33

LIST OF TABLES

	<u>Page</u>
Table 1. State Shares of U.S. Milk Production, 1889 to 1987	2
Table 2. Trends in Milk Production Per Cow Among Leading Dairy States, 1960 to 1987	5
Table 3. State Shares of U.S. Sales to the CCC, 1987	16
Table 4. Sales of Cheese to the CCC as a Percent of State Total and American Cheese Production	19
Table 5. Sales of Butter to the CCC as a Percent of State Butter Production, 1987	20
Table 6. Sales of Nonfat Dry Milk to the CCC as a Percent of State Nonfat Dry Production, 1987	20
Table 7. State Sales to the CCC as a Percentage of State Milk Marketings, 1987 (butterfat and whole milk equivalent) . . .	22
Table 8. State Average Farm Price for All Milk, 1987	24
Table 9. Comparing State Contributions to the Surplus Problem Based on the Percent of Milk Marketings Sold to the CCC and Average Farm Price	30

LIST OF FIGURES

	<u>Page</u>
Figure 1. State Milk Marketings as a Percent of U.S. Total Marketings, 1987	3
Figure 2. Areas of Equal Volume Marketings, 1987	4
Figure 3. Percentage Change in Milk Production by State, 1960 to 1987 .	6
Figure 4. Change in Milk Production by State, 1960 to 1987	6
Figure 5. Change in Production Per Cow by State, 1960 to 1987	8
Figure 6. Fluid Utilization as Percent of Milk Marketings, 1987	12
Figure 7. Net Balance Between Milk Production and Approximate Dairy Product Consumption by State, 1987	14
Figure 8. State Sales to CCC as a Percent of U.S. Total, 1987 (milk equivalent, fats basis)	17
Figure 9. State Sales to CCC as a Percent of U.S. Total, 1987 (milk equivalent, whole milk basis)	17
Figure 10. State Sales to CCC as a Percent of State Milk Marketings, 1987 (milk equivalent, fats basis)	23
Figure 11. State Sales to CCC as a Percent of State Milk Marketings, 1987 (milk equivalent, whole milk basis)	23
Figure 12. State Average Farm Price for All Milk, 1987	25
Figure 13. Change in All Milk Prices (3.5% bf), Selected States, 1983 to 1987	27
Figure 14. Farm Price vs. Relative Sales to the CCC, 1987	29

INTRODUCTION

Dairy marketing analysts and policymakers can use several factors or characteristics to differentiate milk producing regions: milk production, farm milk prices, costs of producing milk, levels of local commercial sales, sales to the CCC, and so on. Becker and others have illustrated how many of these variables differ across regions. This paper provides further information, focusing especially on differences across states. The major objective is to review some of the indicators that are frequently used to describe states or regions and to discuss how they relate to perceptions about surplus dairy production.

Part of our purpose is also to point out that there often are considerable differences among states in a region. A corollary is that the states one chooses to include in a region can affect how a region looks in total. Another basic point is that how one characterizes a state or region depends quite a bit on the indicators used to describe it.

MILK PRODUCTION -- WHO'S ON FIRST AND OTHER TRENDS

HOW BIG IS BIG?

One hundred years ago New York was the leading milk producing state and there were more dairy farms in the Northeast than we now count for the country as a whole. At that time Wisconsin was the sixth largest milk producing state, and California didn't make the top ten. Fifty years ago, Wisconsin was firmly entrenched as the leading milk producing state; New York had slipped to third (behind Minnesota); and California had climbed to ninth place.

In becoming the leading milk producing state, from the late 1800s to the early 1900s, Wisconsin increased its milk production more rapidly than California has done over the last two decades. Wisconsin is still the leading milk producing state today, but California has become the number two state. New York has settled back into third place after reclaiming second position in the 1950s and 1960s. The shifting in the ranking and market shares of the top ten dairy states is shown in Table 1. The current rank and share of all states, based on 1987 milk marketings, is illustrated in Figure 1. This sort of naive trend analysis is not a sound basis for long-term projections; however it does illustrate the magnitude of growth rates over the last two decades.

The rapid growth in California and Washington, and very recently in Texas, is well known and much discussed. Based on production trends since 1960, California milk production will just pass Wisconsin's in 2005. Texas passed Ohio for the seventh spot in 1988 and could surpass Michigan if current growth rates persist. Washington replaced Iowa as the number nine state in 1987, but it is growing more slowly than Texas (c.f. Novakovic and Keniston). Washington and Texas may move up in the rankings, but neither is likely to break into the top five.

As California and Wisconsin become even larger, it appears that the gap between them and states lower in the rankings will widen. From the late 1800s through the 1960s, the top two dairy states accounted for about 20% of the nation's milk, as shown in Table 1. In 1987, the top two states had 30% of the U.S. total. By 2005 they may have well over one-third.

Table 1. State Share of U.S. Milk Production, 1889 to 1987

State	1889	1909	1926	1946	1966	1987
	percent					
Wisconsin	5.8	8.9	16.0	12.7	15.1	17.4
California	<u>1</u> /	3.1	3.7	5.0	7.2	12.7
New York	12.7	10.5	7.4	6.6	8.8	7.9
Minnesota	<u>1</u> /	5.5	7.5	7.4	8.4	7.3
Pennsylvania	7.1	5.5	4.6	4.4	5.9	7.2
Michigan	4.3	4.7	4.3	4.6	4.2	3.7
Ohio	6.3	4.8	4.4	4.4	4.1	3.4
Texas	<u>1</u> /	3.2	3.4	<u>1</u> /	<u>1</u> /	3.0
Washington	<u>1</u> /	<u>1</u> /	<u>1</u> /	<u>1</u> /	<u>1</u> /	2.7
Iowa	9.3	6.6	5.6	5.7	4.7	2.4
Illinois	7.1	5.3	4.8	4.7	<u>1</u> /	<u>1</u> /
Top 2	22.0	19.4	23.5	20.1	23.9	30.1
Top 5	42.5	37.0	41.3	37.4	45.4	52.5
Second 5	21.5	21.1	20.4	21.5	18.5	15.2
Top 10	64.0	58.1	61.7	58.9	63.9	67.7

1/Not in the Top 10 at this time.

The next three highest states have increased their share slightly. Among these three, Pennsylvania has grown the most and New York the least. In 1987 less than 253 million pounds (2%) separated Pennsylvania and Minnesota. Preliminary estimates for 1988 show that the gap has narrowed a bit further. Within the next few years Pennsylvania could well become the fourth largest dairy state.

Today over half of U.S. milk marketings come from the top five states. Prior to the 1960s the second five had a share of slightly over 20%. In 1987 their share is just over 15%. The jump from fifth to sixth is large. Pennsylvania has almost twice as much milk as Michigan. The market share of the second five totals less than Wisconsin's and may continue to get marginally smaller.

With two-thirds of the U.S. milk supply coming from 10 states, one might well question how important it is to look at production in any one of the other states. None of the other 40 states has more than a 2% share, and the average share for the lower 40 is less than 1%.

Figure 2 provides a visual perspective on the scale of milk producing regions, using the largest milk producing state as a numeraire. Wisconsin's milk marketings represent roughly one-sixth of the U.S. total. The U.S. is divided into six regions in Figure 2. Each is chosen simply to have contiguous states totaling approximately equal regional marketings. Thus each region has marketings nearly equal to Wisconsin's.

**Figure 1. State Milk Marketings as a Percent of
U.S. Total Marketings, 1987**

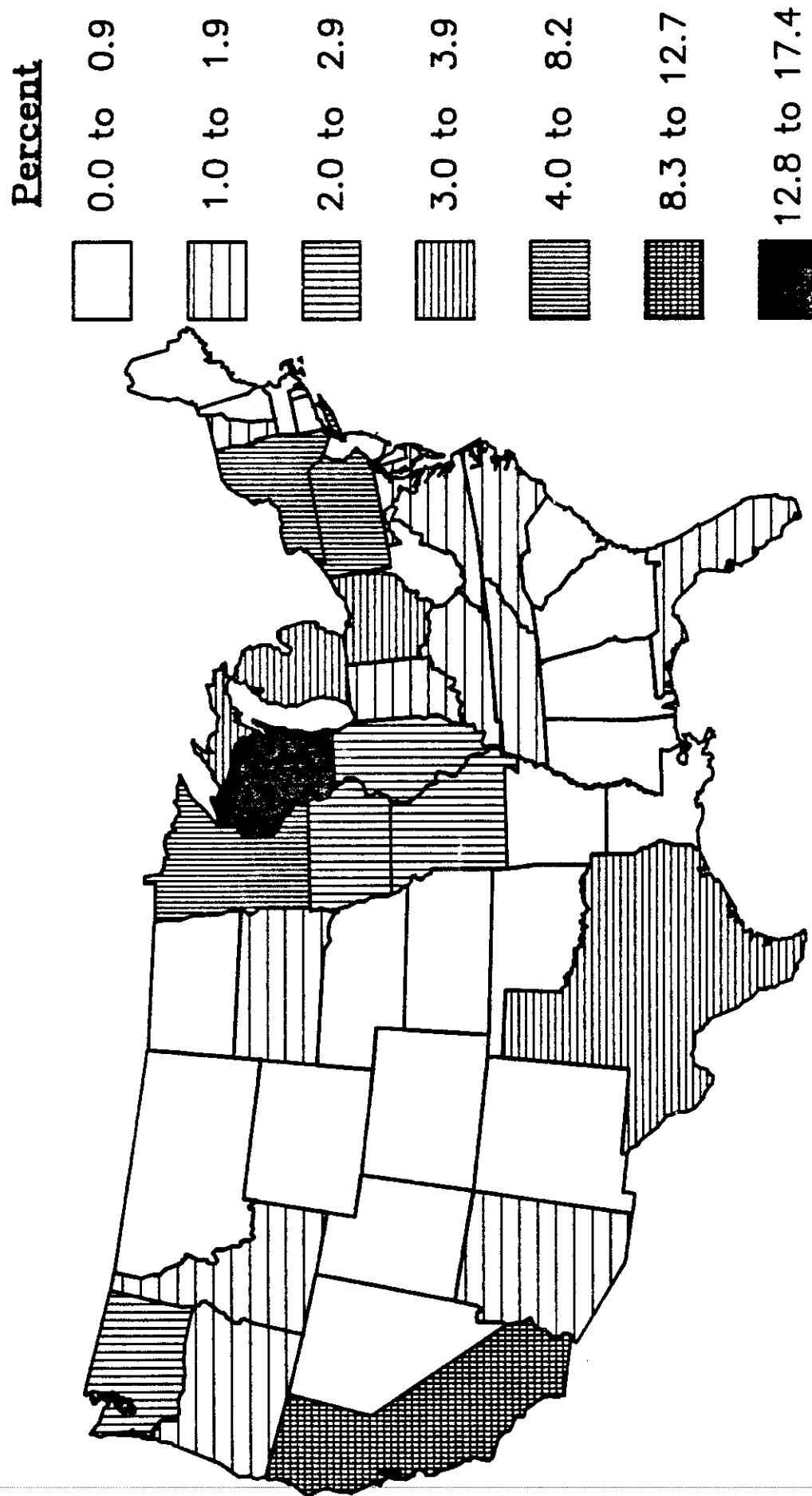
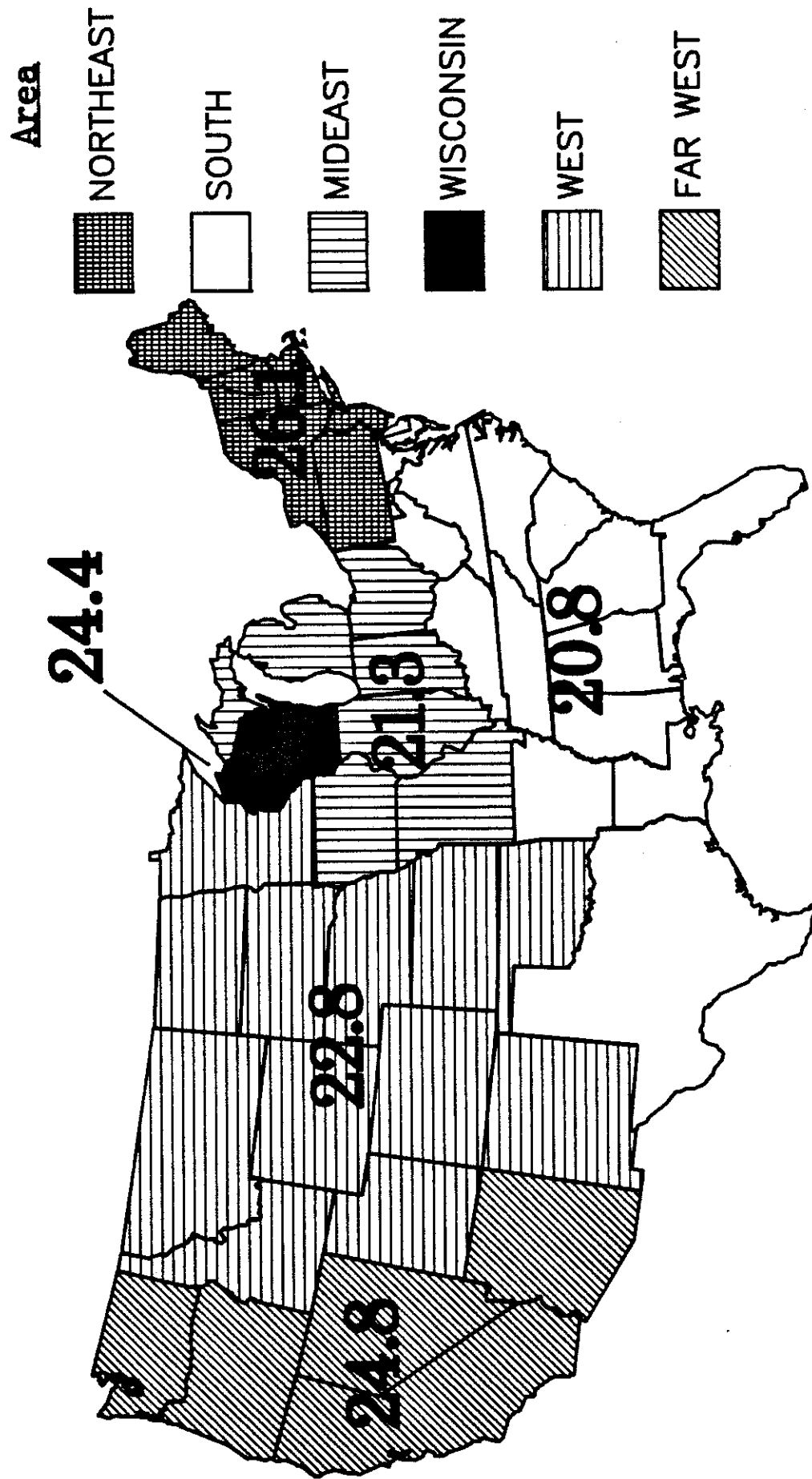


Figure 2. Areas of Equal Volume Marketings, 1987
(Billion Pounds)



This demonstrates how large a geographic area is required in the Southeast or the Mountain and Plains states to equal Wisconsin production. The purpose of this figure is to further highlight the commanding position that the largest dairy states hold and to provide a different perspective on the more usual regional groupings (such as the standard USDA regions Becker uses).

This should also suggest that for some comparisons, percentage changes in milk production in a smaller state or region need to be balanced with actual production levels. The fact that percentage growth in New Mexico, say, is large is of some interest, but generally it is of small consequence. Even in a top ten state like Texas, comparisons with the largest states must be balanced by actual volume. For example, the amount of milk associated with a 6% increase in Texas is equal to a 1% increase in Wisconsin. The differences implied by percentage growth versus actual growth is illustrated in Figures 3 and 4, which show changes in state milk production from 1960 to 1987.

PROSPECTS FOR GROWTH

Growth in milk production has not occurred in all states; however all states have improved their record of milk production per cow. Until the 1980s, national growth and growth in most states was achieved by steady increases in production per cow. Table 2 illustrates the very different rates by which the leading milk producing states have improved their production per cow. In 1987, Washington ranked second (behind New Mexico) in annual rate of gain since 1960 and first in actual production per cow. California is close behind Washington. Texas is the only other leading state that ranks above the U.S. average rate of gain, although it ranks well below the U.S. average in actual production per cow.

Table 2. Trends in Milk Production Per Cow Among Leading Dairy States, 1960 to 1987

	<u>Trend</u>		<u>1987</u>		<u>1960</u>	
	<u>rank</u>	<u>lbs/yr</u>	<u>rank</u>	<u>pounds</u>	<u>rank</u>	<u>pounds</u>
Washington	2	347	1	18,091	6	8,380
California	7	293	2	17,970	1	9,780
Texas	9	285	32	13,070	42	5,100
U.S.	22	241	21	13,786	26	7,029
Michigan	25	231	13	14,537	15	8,070
Pennsylvania	26	227	16	14,123	16	7,780
Wisconsin	42	198	19	13,816	8	8,270
Ohio	43	198	33	13,000	18	7,460
New York	46	182	25	13,242	11	8,150
Iowa	48	171	43	11,755	28	6,980
Minnesota	50	163	34	12,680	13	8,120

Figure 3. Percentage Change in Milk Production by State, 1960 to 1987

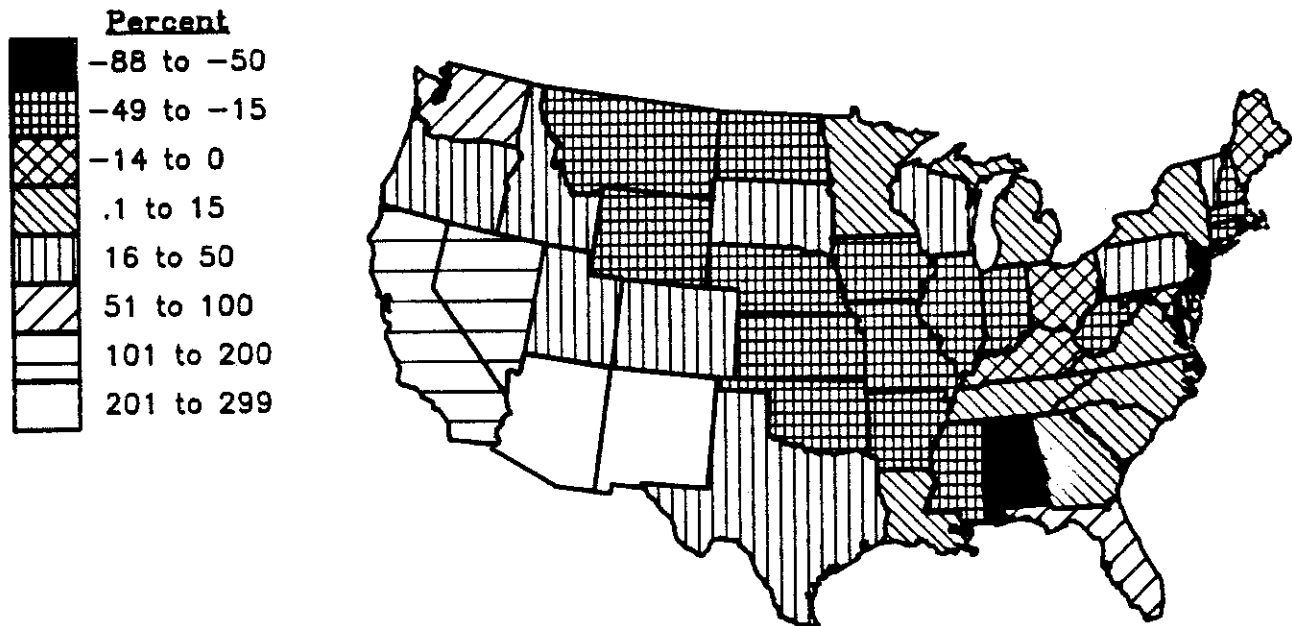
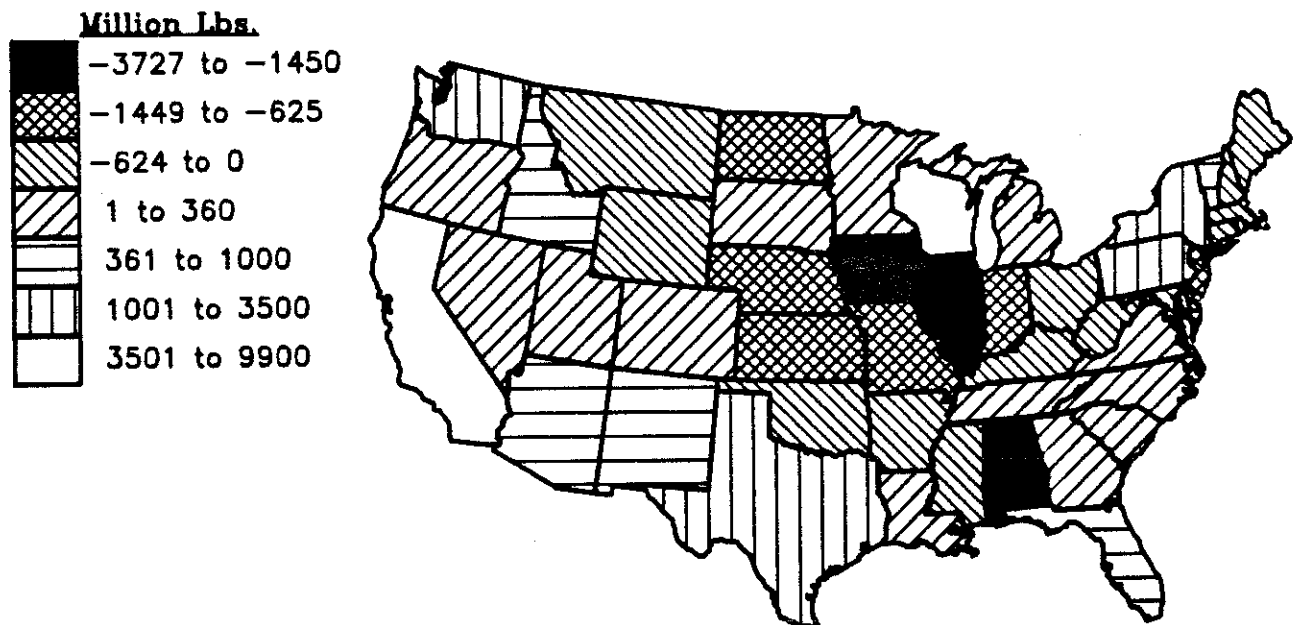


Figure 4. Change in Milk Production by State, 1960 to 1987



Michigan and Pennsylvania rank slightly below the U.S. average rate of gain, but they are above the U.S. average production per cow. The remaining leading states are five of the bottom ten states according to annual rate of gain. With the exception of Wisconsin, they also rank below the U.S. average production per cow. New York is within 500 pounds of the U.S. average. Iowa is over 2000 pounds below the U.S. average.

The state rankings in actual milk production per cow for 1960 and 1987, shown in Table 2, illustrate the effects of poor rates of gain. Among the leading states, only Washington and Texas showed any significant improvement in their rankings from 1960. California slipped to second, but it obviously stays in a strong position. Michigan and Pennsylvania, which rank near the U.S. average, basically held their spots. The remaining five leading states had an appreciable deterioration in their ranking. Thirty years ago these five states were among the leading states according to production per cow as well as total production. Today they are among the fair to poor states, based on production per cow.

Past performance in production per cow is not the only indicator of likely future performance or current vitality, but those states showing better yield increases are probably more likely to have financially healthy dairy farms. Gains in production per cow are illustrated for all states in Figure 5.

CALIFORNIA AND WASHINGTON

Many analysts have commented on the rapid growth rates along the West Coast. Washington and California are clearly on the fast track in all dimensions. Among major milk producing states, they are the undisputed leaders in average production per cow, in average annual improvements in production per cow, and in growth in cow numbers. The only question facing producers in these two states is: will they hit a limit to their growth, and if so, when will it hit? On the production side it is difficult to see any major roadblocks; however both states have had some trouble on the marketing side. That is, while production has increased rapidly in these two states, the use of their milk in commercial markets has not always kept pace. They have relied more heavily on price support sales to the CCC than many other states. (Sales to the CCC will be discussed more fully in the next section.)

In California, this has started to change as more plants are being geared up to produce products for local commercial markets. From 1984 to 1987, California cheese production increased 62%; the rest of the U.S. had an increase of 14%. Although California sales to the CCC dropped in 1986 relative to previous years, 1987 showed a major increase over even 1985 sales levels. At the same time, since 1985, California's sales of cheese to commercial markets has increased faster than its production.

To what extent California cheese can replace Midwestern cheese remains to be seen, but total replacement of commodity cheeses is possible because of the large price advantage California manufacturers enjoy. Raw product cost (milk price) for California cheese makers is basically the California Class 4 price; for everyone else in the U.S. raw product cost is more or less the M-W price (usually more). In 1987 the California Class 4 price averaged \$10.47 (at 3.5% fat test); the M-W averaged \$11.23 (at 3.5% fat test), 76 cents more.

For the first six months of 1988, the California Class 4 price averaged 74 cents lower than the M-W price, and varied by as much as \$1.05 to 59 cents below. In October 1988, the difference was about \$1.68. At this kind of price spread, California manufacturers are not only cost competitive in California markets but in markets far to the east of California (c.f. Caruso). Recent changes in Class 4 pricing in California will narrow this spread considerably, but it will not eliminate the spread.

The challenge of shifting more production toward dairy products that will end up on commercial markets has been harder for Washington. Average Washington farm prices are closer to the U.S. average. The federal order minimum Class III price for regulated manufacturers in Washington is the same as that set in all other federal orders. Thus with raw product cost about the same as that for Midwestern manufacturers and high transportation costs to Eastern markets, Washington manufacturers are not cost competitive on dairy products delivered far outside their own state. Washington milk production may have to slow for the lack of any place to put it.

Freer dairy product trade with Canada could help Washington considerably. The Vancouver market could easily be served by Washington. Milk supplies in British Columbia are tight and prices are higher than Washington's, although this is at least partly due to Canadian dairy policy. The chances of Canada permitting sales of Washington milk in bulk or packaged form are slim to none. The recent bilateral trade agreement with Canada, for example, expressly excludes changes for milk or dairy products.

Washington is also fairly well positioned for trade along the Pacific Rim, but low world prices have usually made that option unattractive. Recent increase in world prices for nonfat dry milk made U.S. produced nonfat dry milk competitive in world markets in 1988. It remains to be seen how long this situation will last. In any case, Washington's marketing options depend on and tend to be limited by some basic economics and world trade policies.

PENNSYLVANIA, TEXAS AND WISCONSIN

Pennsylvania does not have quite as strong a record as the two Western states, but its overall growth record and especially its good record on annual improvements in production per cow suggest that dairy farmers there are in a good competitive position. Wisconsin and Texas are not in quite as strong a position, but these three states form a second tier, according to the strength of the top ten dairy states. Growth, particularly in the important dimension of production per cow, is average to good in these states. Texas production per cow is still relatively low, but it is growing rapidly, as has total production in the last two years. Wisconsin's production per cow is fairly high, but it is not growing as much.

NEW YORK, OHIO, AND MICHIGAN

New York, Ohio, and Michigan fall in a third group. Michigan ranks third among major states in production per cow; however its total production is growing less than most other major states. This may suggest that the dairy industry will not grow much in Michigan but that it will stay competitive. Ohio may fall just on the other side of that fence.

Until 1987, Ohio's dairy industry had been showing some signs of expansion, but in that year its total production dropped by 126 million pounds from 1986 levels. In 1988, Texas surpassed it as the seventh largest producer of milk. Additionally, Ohio's production per cow record has been poor.

New York is the only top ten state that has consistently ranked as one of the top three milk producers over the last 100 years. Nonetheless, these data would suggest that it has an industry that is more or less stuck. The sheer size of New York's industry today will probably keep it the number three state well into the next century; however the trends of the last 10 to 20 years do not indicate a particularly strong position for the Empire State.

MINNESOTA AND IOWA

Minnesota and Iowa rank near the bottom of the top ten states in terms of growth trends and production per cow. Minnesota's total growth is almost equal to the national average and greater than New York's, but her poor record on production per cow has to be a source of concern for the dairy industry in that state.

Among the top ten, Iowa's record is the weakest. This reflects a very long period of general decline in dairy farming throughout the Corn Belt. In the late 1800s, Iowa was the number two state and states like Illinois, Indiana, Missouri, and even Kansas were in the top ten. For the last 100 years dairy farming in these states has been gradually drying up. All but Iowa have dropped out of the top ten. Iowa was pushed to the 10th spot by Washington in 1987. Missouri and Illinois are 11th and 12th. Preliminary estimates for 1988 show Iowa growing at an inexplicably high rate, along with Missouri and Illinois. For the time being this appears to be an anomaly. In any event, Iowa should cling to the tenth place spot, but its market share seems likely to continue to drop.

REGIONAL PATTERNS

Are there obvious regional patterns here? Yes and no. Growth in the West has obviously been the greatest. But it is not all downhill in the Midwest and Northeast. In fact, the intraregional differences are more intriguing than those across regions. In the Midwest, Minnesota and Iowa are in weak positions, but neighboring Wisconsin is holding its own. In the Northeast, Pennsylvania seems to be very healthy, but neighboring New York has a lackluster record.

Becker notes that regions of the U.S. have had different rates of increases in milk production. The discussion here points out that the largest milk producing states are gaining market share, and this includes states in the Northeast, Midwest, and West. It also points out that states within regions have had rather different growth rates and suggests that the absolute size of milk production in an area should be taken into account when comparing percentage growth rates. We might also note that other studies have repeatedly pointed out that the growth rates across farms within a state or region are far more spread out than those across regions (NY-NJ Market Administrator).

HOW DOES PRODUCTION COMPARE TO MEASURES OF STATE SURPLUSES OR DEFICITS?

Popular debate of the dairy surplus problem frequently elicits the question: who is causing the surplus? Assigning blame or credit on the basis of production growth only is one way to answer this question; in other words, those who increase production are causing the surplus. By this reasoning, attention is drawn to states like California, Texas, Washington, and Wisconsin.

Some have argued that production growth alone should be balanced against the use made of that additional milk. For example, it can be argued that if additional milk supplies in an area are being used in commercial markets, then this type of growth is reasonable -- it does not contribute to the surplus. By this measure, for example, production growth in the Southeast does not contribute to the surplus, because those states have a large dairy deficit or are in a net importing position.

Various measures can be used to size up regional surpluses. Is the region a net importer or net exporter of dairy products, based on total farm production and milk equivalent consumption of dairy products? How much is the region producing in excess of Class I use? How much of the region's milk is being used in hard manufactured products (Class III, using federal order jargon), or how much is being used in the products that USDA purchases, namely cheddar cheese, butter, and nonfat dry milk? How much is the region selling to the CCC in terms of absolute amount, as a percentage of total CCC sales, or relative to the amount of milk and/or dairy products produced in the state?

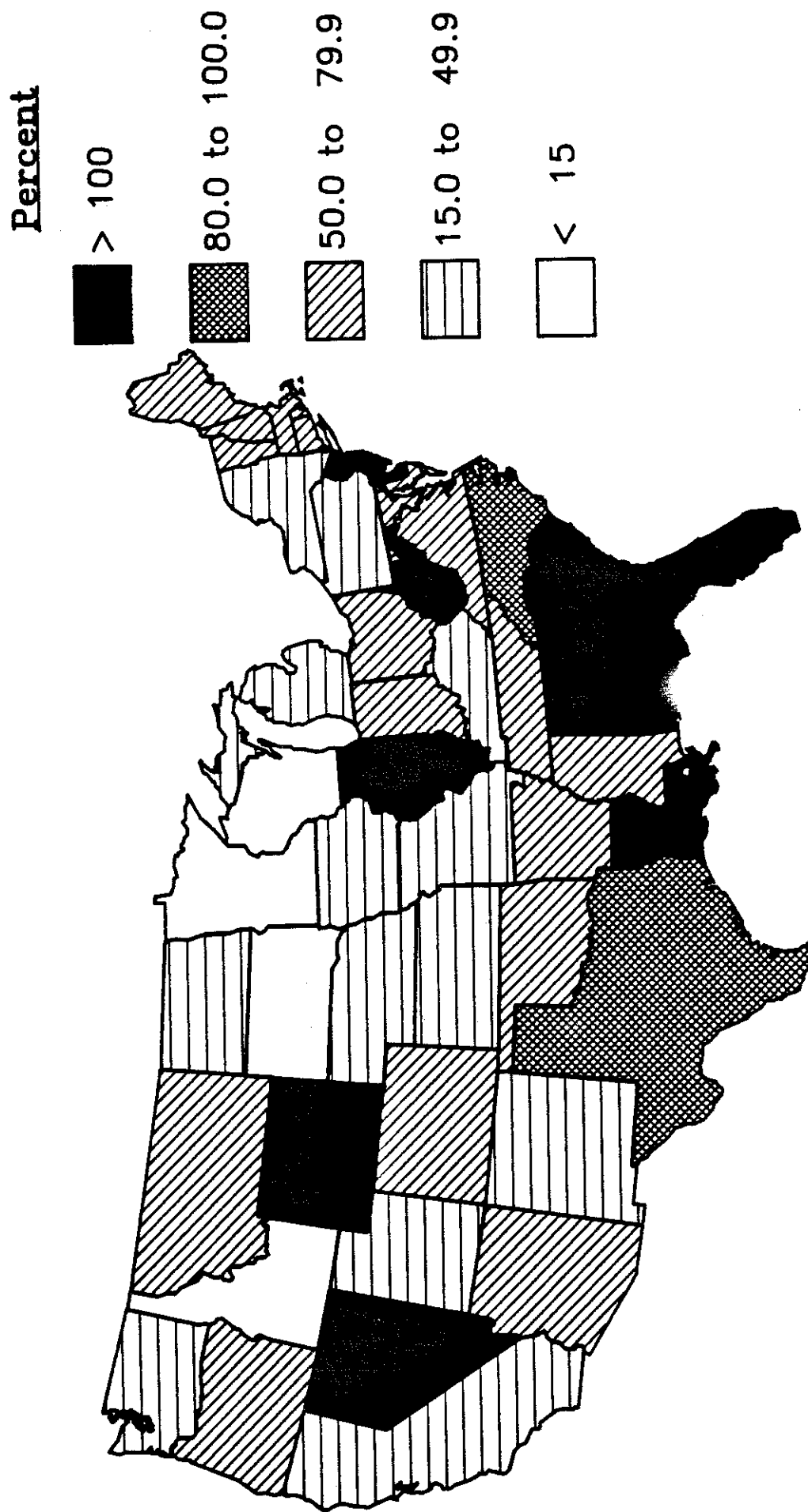
PRODUCTION VS. CLASS I SALES

Critics of federal orders often point to Class I utilization, the percentage of producer receipts used in Class I, as a measure of the appropriateness of Class I price in a particular market (c.f. USDA, pp. 42 ff.). Typically an average Class I utilization of 80% is taken as a breakpoint between fluid self-sufficiency and fluid deficiency. Implicit is the recognition that a certain "reserve" is required to reflect daily and seasonal fluctuations in milk production and Class I sales. This logic is applied to state estimates of the level of fluid product consumption as a percentage of farm milk marketings, with results illustrated in Figure 6. This calculation uses state per capita fluid milk consumption estimates based on federal and state milk marketing order Class I data. The U.S. average fluid milk utilization by this measure is 43%.

Eleven states have Class I consumption in excess of their milk marketings. These are mostly states in the Southeast. Also included are the populous states of New Jersey, Delaware, and Illinois, which border large milk producing states.

Texas and North Carolina are the only other states which pass the 80% rule. (Actually, all the New England states except Vermont have a fluid deficit. They are treated as a region here because of their small geographic area.)

Figure 6. Fluid Utilization as Percent of Milk Marketings, 1987



New England states are treated as a region

The next category illustrated arbitrarily groups those states having fluid consumption between 50% and 80% of farm marketings. States in this category include the rest of the Southern states (except Kentucky), New England, some Western states, Indiana, and Ohio. The next tier of the list covers fluid sales equal to 15% to 50% of marketings. Three of the top five milk producing states fall in this group.

The states having fluid sales less than 15% of their marketings are Idaho, South Dakota, Minnesota, and Wisconsin. At 5%, Wisconsin is the low spot in the list.

The states at the endpoints of this list come as no surprise, although those who are more accustomed to the familiar federal order Class I utilization data may find some of the magnitudes surprising. As always, the interpretation of state data of this sort must be tempered by the fact that geographic markets for Class I milk do not conform to state boundaries. Just as New England states were grouped together, northern New Jersey could be grouped with New York. southern New Jersey could be grouped with other middle Atlantic states, and so on. This would resemble the more natural boundaries of federal order areas. Our presentation is intended to provide a set of state comparisons consistent with other parts of this paper.

What then do these comparisons imply? For one, they draw attention to the fact that there are several areas of the country that have significant proportions of their milk supply available for manufacturing. Also highlighted is the fact that the South, Texas included, is very much a region of fluid deficit.

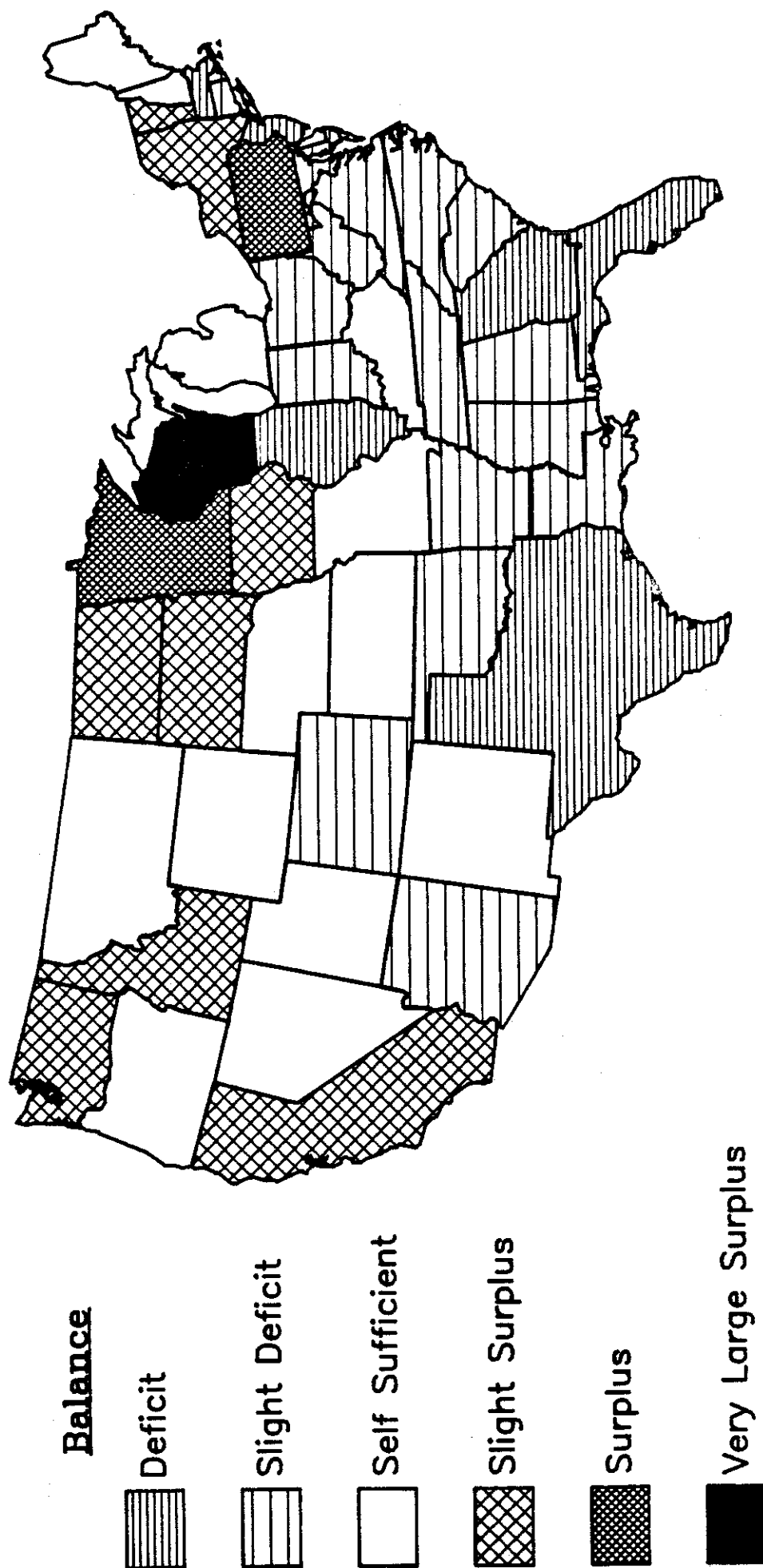
Comparisons such as these beg numerous questions, one of which is how does fluid use square with Class I or average farm prices? Prices will be brought into the picture in a later section. For now the next step will be to examine state production relative to total consumption of dairy products.

PRODUCTION VS. TOTAL CONSUMPTION

One often heard defense of production growth in the West is that this region is still a net importer of dairy products. The argument implies that it is reasonable for production to grow as long as the area is a net deficit area. This reasoning has even been offered as a justification for the establishment of new, very large farms in the Southeast, such as the Masstock Farm in Georgia. In general, a blind application of this sort of thinking ignores the reality that it may be cheaper for consumers in one area to purchase dairy products produced in another area. Nonetheless this is an argument that has a certain popular appeal. The price argument will be explored in a later section.

Becker illustrates the approximate level of regional net deficits or surpluses by comparing regional milk production with an estimate of regional use based on national per capita consumption (milk equivalent) and regional population. Similarly calculated estimates are shown in Figure 7 on a state by state basis.

Figure 7. Net Balance Between Milk Production and
Approximate Dairy Product Consumption by State, 1987



States were assigned to the following categories: deficit, slight deficit, self sufficient, slight surplus, surplus, and very large surplus. Any such categorization is necessarily arbitrary. Ours is based on the following rationale. States having a calculated surplus or deficit equivalent to no more than the amount of milk needed to satisfy the requirements of a city of about one million persons were considered to be self sufficient. Those states whose positive or negative balance was equivalent to no more than the milk consumption of a city of three to four million people (a Chicago or Los Angeles, for example) were categorized as having a slight surplus or a slight deficit, respectively. States having a net positive or negative balance equivalent to no more than the consumption of a city of 13 million (metropolitan New York City, for example) were respectively classified as having a surplus or deficit.

Wisconsin is in a class by itself -- very large surplus. Its surplus is equal to the amount of milk consumed by roughly 40 million people, e.g. the populations of both California and Florida, or the combined populations of New York, New Jersey, and Pennsylvania.

Within the New England area, Vermont is a major exporter; in fact only Wisconsin ranks ahead of it as a net exporter on a per capita basis. As a region, New England would fall in the deficit category. Not surprisingly, states having small shares of total milk production are generally net importers. Within the top ten dairy states, only Ohio and Texas show deficits. Michigan is approximately self sufficient, and the rest are in slight surplus or surplus situations. After the next section we will see that a state's net deficit or surplus position (by this calculation) does not correlate particularly well with how much product is sold to the CCC from that state.

SALES TO THE CCC

Another popular measure of surplus quantities is sales of manufactured products to the Commodity Credit Corporation (CCC) under the dairy price support program. Becker provides regional data on CCC sales; here we will look more closely at state level data.

Actual sales of dairy products and their milk equivalent total are listed for all states in Table 3.¹ In 1987, California replaced Minnesota in holding the dubious distinction of contributing the greatest amount of dairy products to the CCC. Washington and Wisconsin also contributed sizeable quantities. The individual product breakdowns, which are shown later in this section, reveal that in 1987 California sold more cheese to the CCC than did third place Wisconsin, and although Minnesota still ranks first in cheese sales, it sold a great deal less butter and nonfat dry milk than California. Thus, California occupied pride of place for both butterfat basis sales and whole milk basis sales.

¹Jesse shows how totals of dairy products sales vary when different standards are used to determine milk equivalence. The butterfat equivalency totals shown here are calculated in the same fashion that USDA uses for its published data. Using a butterfat equivalency means that nonfat dry milk sales do not affect the milk equivalent total. The whole milk equivalents shown here use a butterfat based equivalency for cheese plus the higher of the following: a butterfat based equivalent for butter and a nonfat solids equivalent for nonfat dry milk. By taking the higher of the two, this procedure implicitly includes some component of the milk equivalent that is sold commercially.

Table 3. State Shares of U.S. Sales to the CCC, 1987 (milk equivalents)

State	Milk Equivalent (butterfat basis)	State	Milk Equivalent (whole milk basis)
CA	23.3%	CA	30.5%
MN	18.1%	MN	15.8%
WA	14.1%	WA	14.7%
WI	12.8%	WI	9.8%
TX	4.6%	IA	7.8%
NE	3.8%	ID	3.8%
IA	3.4%	TX	3.5%
ID	3.1%	SD	3.4%
IL	2.6%	NE	2.9%
SD	2.2%	IL	2.0%
ND	2.2%	ND	1.8%
OR	1.7%	OK	1.4%
OH	1.5%	PA	1.4%
TN	1.5%	KS	1.3%
PA	1.2%	OR	1.3%
MO	1.1%	OH	1.2%
IN	0.7%	TN	1.1%
NY	0.4%	MI	1.1%
MD	0.3%	MO	1.1%
MA	0.3%	MD	0.9%
KS	0.3%	IN	0.5%
VT	0.3%	LA	0.5%
KY	0.2%	NY	0.3%
GA	0.1%	MA	0.3%
MS	0.0%	VT	0.2%
AZ	0.0%	KY	0.2%
UT	0.0%	GA	0.1%
WY	0.0%	MS	0.0%

The highest ranking Northeastern states, Pennsylvania and New York, represented 1.2% and .4% of CCC sales respectively (butterfat basis). Pennsylvania represented about 1.9% of the cheese, 1.1% of the nonfat dry milk, and less than 1% of the butter sold to the CCC; while New York sold only butter and nonfat dry milk in negligible amounts.

Generally the Southeastern states have no sales to the CCC. A small quantity of cheese sold to CCC was allocated to Georgia in 1987 (about .1% of the CCC total), and Louisiana was credited with some nonfat dry milk sales. The Georgia sale appears to relate to a small plant operated for seasonal balancing purposes.

Figures 8 and 9 illustrate state shares of sales to the CCC based on the milk equivalent of product sales (fats basis and whole milk basis respectively). Comparing this to Figure 1, one can see that there is some correlation between sales to the CCC and total milk production. Most of the big sellers to the CCC are big dairy states.

Figure 8. State Sales to CCC as a Percent of U.S. Total, 1987
(milk equivalent, fats basis)

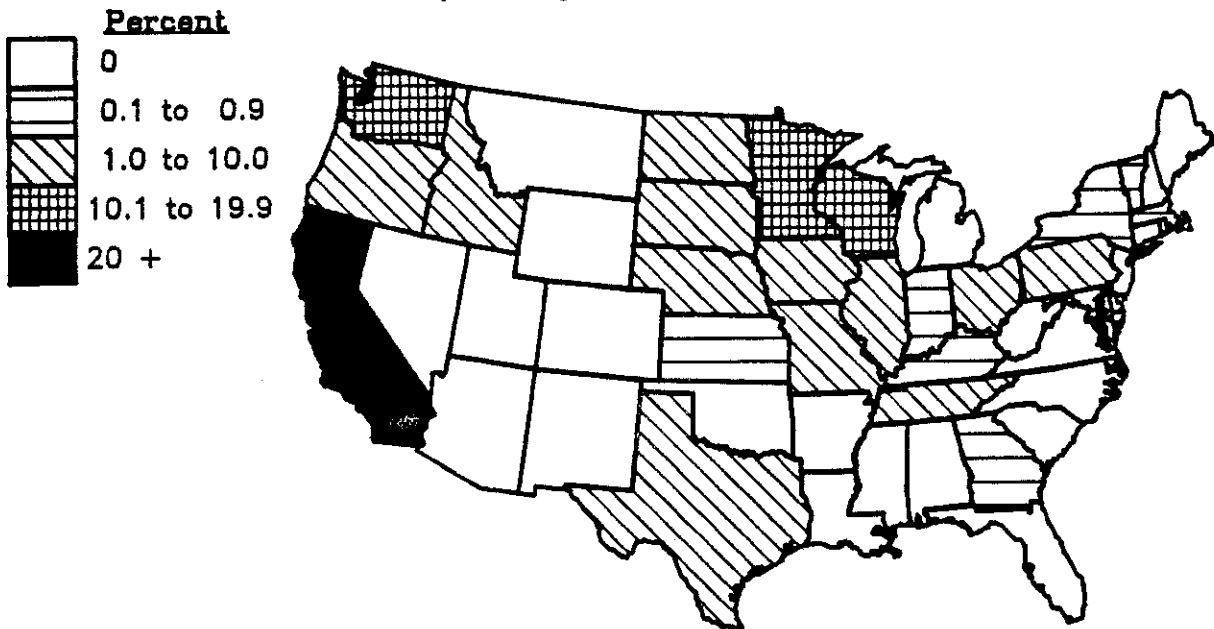
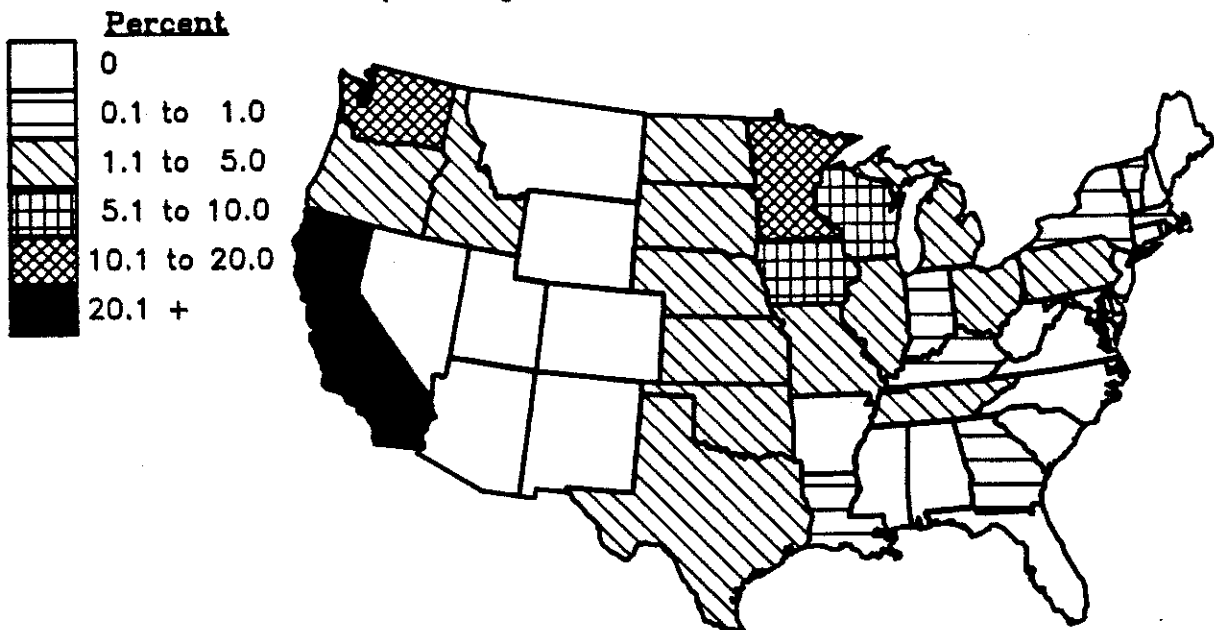


Figure 9. State Sales to CCC as a Percent of U.S. Total, 1987
(milk equivalent, whole milk basis)



CCC SALES RELATIVE TO PRODUCTION

The fact that a state provides a large or small share of the total sales to the CCC probably should be balanced against how much milk or dairy products are produced in that state. In the tables and text presented below, each state's sales to the CCC are looked at as a percent of its total milk marketings and as a percent of its production on a product basis.

Before we look at specific numbers, three caveats about the data should be mentioned. First, USDA does not estimate state production for a dairy product unless three or more plants produce that product; hence cheese, butter, and/or nonfat dry milk (NDM) production estimates are not reported for some states that have been credited with sales to the CCC. Thus, we may know that there is a large butter plant in Texas, say, and that it sells butter to the CCC, but we don't have public data to determine what percentage of Texas butter is sold to the CCC.

Second, CCC credits a state with a sale based on the location of the product at the time of the sale. It makes no difference where the product was produced. For example, cheese made in Vermont (maybe from milk produced in New Hampshire), moved to a distributor in New York, and then sold to the CCC will be identified as a New York sale.

Third, as in the parenthetical example above, one also runs into the fact that dairy products made in one state often are made from milk or intermediate dairy products produced in other states. For example, if Wisconsin makes butter from Indiana cream, and then sells it to the CCC, is this a Wisconsin surplus or an Indiana surplus? Thus, we can only get an approximate estimate of the percentage of a state's cheese, butter, or NDM that is sold to the CCC, even when we have production and CCC sales data listed for a state.

CHEESE

Recognizing the inherent limitation in the data, the following relationships are indicated for cheese in Table 4. North Dakota and Minnesota topped the list whether cheese sales to the CCC were taken as a percent of total cheese or just American cheese production. South Dakota, Iowa, and California also exceeded the U.S. average in both cases. It is perhaps interesting to note that Wisconsin, which is by far the leading cheese producing state, ranked well below the U.S. average percentage of cheese sold to the CCC. Thus, even though Wisconsin accounts for 11% of total cheese sales to the CCC, this volume is a relatively small percentage of the cheese produced in Wisconsin. This sharply contrasts with a state like North Dakota which is far down the list of cheese producing states but sells a high percentage of what it does produce to the CCC. Although the production levels of several states which sold cheese to the CCC is not reported, USDA does report the subtotal production of all of the "other" states not individually itemized. Based on total production for "other" states, these states averaged selling 6.3% of all the cheese and 13.2% of the American cheese they produced to the CCC.

Table 4. Sales of Cheese to the CCC as a Percent of State Total and American Cheese Production, 1987.

State	CCC as % of Total Cheese	State	CCC as % of American
ND	32.5%	ND	32.5%
MN	19.2%	CA	25.7%
NE	11.7%	MN	21.4%
SD	11.6%	SD	19.9%
CA	11.4%	IA	16.7%
IA	8.4%	US	10.7%
US	5.4%	MO	10.0%
MS	5.1%	MS	5.2%
MO	4.1%	KY	3.9%
PA	2.5%	ID	3.1%
KY	2.2%	WI	3.1%
ID	2.0%	WA	1.7%
VT	1.7%	KS	1.3%
WI	1.7%	UT	0.2%
WA	1.0%	NY	0.0%
KS	0.9%		
UT	0.1%		
NY	0.0		

Note: Texas and Georgia are credited with sales to the CCC but USDA does not provide cheese production data for them. Additionally, USDA does not provide American cheese production data for NE, PA, and VT.

BUTTER

USDA did not publish production data for eleven of the states credited with butter sales to the CCC in 1987. Therefore, whether or not CCC sales are a very high percentage of production in states like Texas, Idaho, Tennessee, Maryland, or Massachusetts is subject to speculation. As with the residual cheese production data, we can use the butter production USDA reports for all "other" states to determine that their CCC sales averaged 22% of production. This means that the states having sales to the CCC must have averaged selling at least 22% of their butter production, and the actual average was probably higher.

Among states where production was reported, Washington ranked at the top, with Oregon, Ohio, and California above the U.S. average of 16.8%, as shown in Table 5. Ohio dropped from first place in 1986 (67.4% of its production sold to the CCC) to third, behind the Northwestern states of Washington and Oregon. Wisconsin ranked closer to the U.S. average than it did in the case of cheese. New York, Minnesota, and Pennsylvania ranked considerably below the U.S. average.

Table 5. Sales of Butter to the CCC as a Percent of State Butter Production, 1987

State	CCC as % of Production
WA	54.4%
OR	41.4%
OH	36.4%
CA	22.5%
US	16.8%
WI	10.0%
ND	6.3%
MN	4.8%
KS	4.7%
NY	4.2%
MO	4.1%
PA	2.4%

Note: The following states have been credited with sales to the CCC but USDA does not provide corresponding production data: AZ, ID, IL, IN, IA, KY, MD, MA, NE, TN, TX.

NONFAT DRY MILK

In 1987, slightly more than one out of every two pounds of NDM made in the U.S. was sold to the CCC, as shown in Table 6. Leading the list in this case also, California makes a clean sweep across all products by ranking above the U.S. average. Wisconsin ranks just above the U.S. average, and New York was again well below. There were no USDA production estimates for sixteen of the states credited with sales to the CCC in 1987. Based on USDA's reported production total for "other" states, these sixteen must have sold to the CCC on average at least 61% of what they produced.

Table 6. Sales of Nonfat Dry Milk to the CCC as a Percent of State Nonfat Dry Production, 1987

State	CCC as % of Production
CA	68.1%
IA	55.7%
WI	53.5%
US	51.8%
ND	31.0%
MN	19.2%
MI	12.6%
NY	9.7%

Note: The following states are credited with sales to the CCC but USDA does not provide corresponding production data: ID, IN, KS, LA, MD, MA, MO, NE, OH, OK, OR, PA, SD, TN, TX, WA.

PRODUCT SUMMARY

The product data illustrate some important distinctions between states. Wisconsin and Minnesota make a lot of cheese and account for a lot of that which is sold to the CCC, but Wisconsin sells a much smaller share of its cheese to the CCC than its western neighbor. California and Washington sell a lot of butter and NDM to the CCC by any measure. These patterns tend to be mirrored in the marketing and promotion emphasis of some states. For example, Wisconsin has a strong record in and aggressive programs for marketing cheese. Likewise, Minnesota is the home of the leading company in retail and foodservice sales of butter.

Not enough data are available to be very conclusive about Southern states like Tennessee, Kentucky, and Texas; however it would appear that, although they don't produce very much, these states sell a large percentage of their butter and nonfat dry milk to the CCC. This may reflect the inherent difficulty in serving commercial markets when production is highly seasonal. In contrast, Northeastern states produce a relatively large amount of manufactured products, but they sell relatively very little to the CCC.

MILK EQUIVALENT TOTALS

Data are shown for milk equivalent totals in Table 7 and Figures 10 and 11. On a butterfat milk equivalency basis, in 1987 almost 5 of every 100 pounds of farm milk marketed in the U.S. was sold to the CCC in the form of cheese or butter; on a whole milk basis just over 6 of every 100 pounds of milk ended up with the CCC. Twelve states ranked ahead of the U.S. average on a butterfat basis; thirteen were above the whole milk basis U.S. average.

Washington had a clear lead on both a butterfat basis and a whole milk equivalent basis. The milk equivalent and whole milk equivalent of its CCC sales were equal to nearly 26% and 35%, respectively, of its milk marketings. Washington, California, Iowa, Idaho, Illinois, Minnesota, North Dakota, Nebraska, Oregon, South Dakota, and Texas ranked above the U.S. average on both lists. Among the other top ten milk producing states, Wisconsin and Ohio ranked below the U.S. average, and Pennsylvania and New York registered well below. The rankings of Massachusetts and Maryland should be discounted inasmuch as they reflect the presence of two large butter/nonfat dry milk plants that draw on a milkshed much larger than just these states. This problem exists for other states but it is exacerbated for these two small states. New England taken as a whole, for example, sells about 1% of its total milk marketings to the CCC.

MILK PRICES -- WHERE ARE THEY AND HOW HAVE THEY CHANGED?

Some would argue that regional prices should be subject to criticism and debate as well as regional changes in production. State price data are listed in Table 8. Figure 12 illustrates the spread of prices paid by plants across states; the national average price of all grades of milk at average fat test in 1987 was \$12.54 per cwt. The average price across states ranged from a low of \$11.10 in North Dakota to a high of \$16.40 in Florida (over \$20 in Alaska and Hawaii).

Table 7. State Sales to the CCC as a Percentage of State Milk Marketings, 1987 (butterfat and whole milk equivalent)

State	M.E. % (butterfat basis)	State	M.E. % (whole milk basis)
WA	25.9%	WA	35.1%
NE	19.9%	IA	20.4%
ND	14.2%	NE	19.9%
MN	12.1%	SD	17.4%
ID	9.3%	CA	15.3%
CA	9.0%	ND	14.8%
SD	8.8%	ID	14.7%
OR	8.0%	MN	13.8%
TX	7.4%	OK	11.1%
IA	6.9%	KS	9.5%
IL	6.5%	OR	8.0%
TN	5.0%	TX	7.4%
US	4.9%	IL	6.5%
MA	4.6%	US	6.4%
WI	3.6%	MD	5.5%
MO	2.7%	LA	5.3%
OH	2.2%	TN	5.0%
IN	2.0%	MA	4.6%
KS	1.8%	WI	3.6%
MD	1.6%	MO	3.4%
PA	0.9%	OH	2.2%
VT	0.8%	IN	2.0%
KY	0.6%	MI	1.9%
GA	0.5%	PA	1.2%
MS	0.4%	VT	0.8%
NY	0.2%	KY	0.6%
AZ	0.1%	GA	0.5%
UT	0.1%	MS	0.4%
WY	0.0%	NY	0.2%
WV	0.0%	AZ	0.1%
VA	0.0%	UT	0.1%

Figure 10. State Sales to CCC as a Percent of State Milk Marketings, 1987 (milk equivalent, fats basis)



Figure 11. State Sales to CCC as a Percent of State Milk Marketings, 1987 (milk equivalent, whole milk basis)

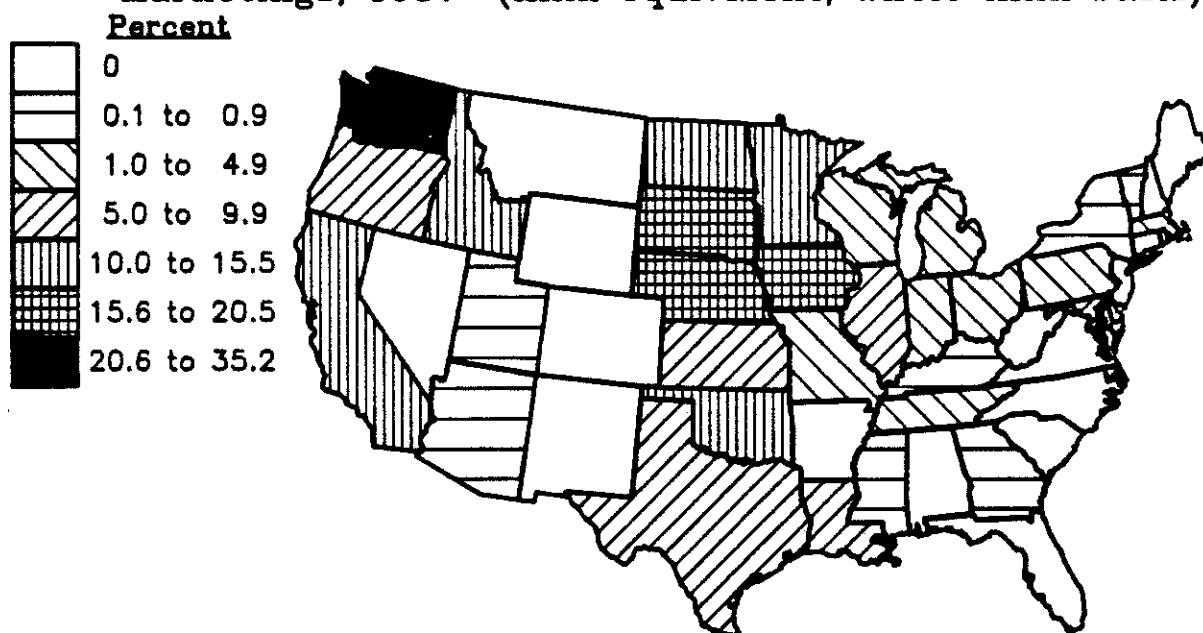


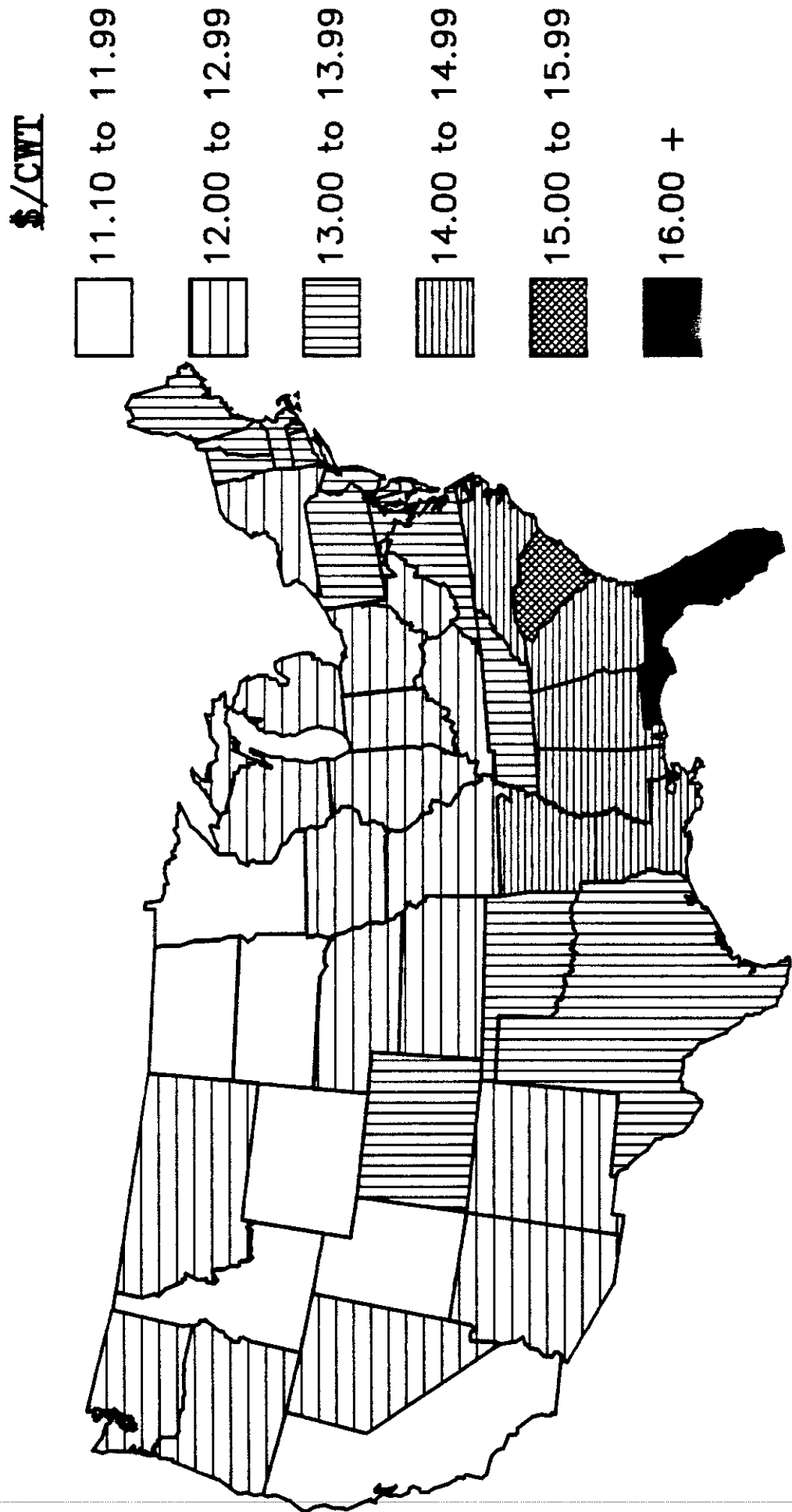
Table 8. State Average Farm Price for All Milk, 1987
(dollars per hundredweight)

State	Price	State	Price
HI	20.30	KY	12.90
AK	20.10	AZ	12.80
FL	16.40	OH	12.70
SC	15.20	NY	12.70
NC	14.70	NM	12.70
AL	14.70	IN	12.70
LA	14.40	MI	12.60
GA	14.20	IL	12.60
AR	14.20	WV	12.50
MS	14.00	NV	12.50
ME	13.80	MT	12.50
TX	13.70	KS	12.50
MA	13.70	OR	12.40
RI	13.60	NE	12.40
VA	13.50	MO	12.40
NH	13.50	WA	12.20
CT	13.50	WI	12.15
TN	13.40	IA	12.10
OK	13.40	UT	11.90
CO	13.40	MN	11.86
VT	13.20	WY	11.70
DE	13.20	SD	11.70
PA	13.10	ID	11.50
NJ	13.10	CA	11.43
MD	13.10	ND	11.10
(U.S. 12.54)			

Numerous reasons explain the wide differences in state average prices. One reason for the low prices in the Dakotas, Idaho, Minnesota, and Wisconsin is the relatively large amount of grade B milk in these states, which brings down the all milk average price. In fact, over 50% of the milk in the Dakotas is grade B. Obviously Class I utilization differences and Class I prices are also reflected in these numbers. For example, Florida has the highest Class I prices and Class I utilization percentages among states. New England states also have higher than average Class I prices and utilization percentages.

One generally accepted tenet in the dairy industry is that high prices in an area are justified when farm production is primarily oriented toward serving local markets for Class I products. The other key requirement is that they be in line with prices from alternative milk supplying regions.

Figure 12. State Average Farm Price for All Milk, 1987
 (U.S. = \$12.54)



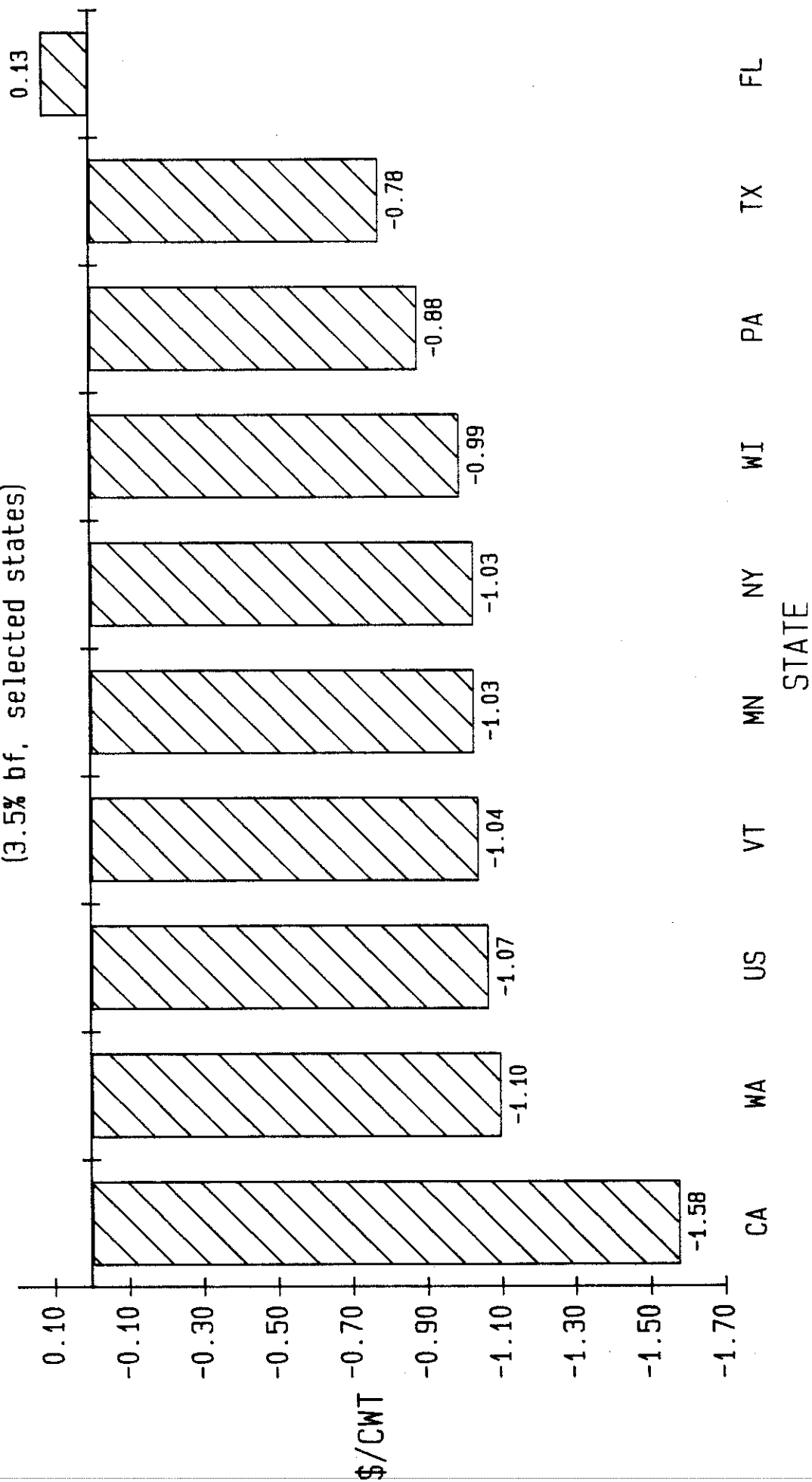
By these guidelines the high prices in the Southeast are arguably reasonable. As illustrated earlier, states such as Florida, Georgia, Alabama, and the Carolinas are fluid deficient. This argument does not support New England prices quite as well. Class I use represents about three-fourths of New England farm marketings. This is higher than the U.S. average of about 40%, but strict adherence to a Class I criterion would suggest Class I use should be closer to 80% or so. In other words, those who focus on Class I utilization as a barometer for appropriate price levels would argue that New England prices should be reduced to bring the percentage used in Class I up by lowering production. Obviously not everyone is going to agree with that type of reasoning, but it does reflect one of the arguments advanced in the past. In fact, this leads one to conclude that farm prices ought to be lower in the rest of the Northeast and the Mideastern states as well. If this reasoning is extended to the price support debate, it would suggest that some Class I prices should be reduced before the support price is reduced.

One final question that might be raised about regional prices is: how have these prices changed over time? In other words, might we observe that, although California has lower prices, prices in California have not declined as much as in other parts of the country? A sample set of price changes is shown in Figure 13. The time period chosen is that during which the U.S. average price had been falling -- 1983 to 1987; in fact it fell \$1.07. According to USDA data, the all milk average price (in this case standardized to 3.5% bf) fell slightly less in the Midwestern states of Wisconsin and Minnesota and the Northeastern states of Vermont, New York and Pennsylvania. Pennsylvania showed the most price strength in this group by dropping 15¢ less than the national average. Texas prices fell 25¢ less than the U.S. average. Florida prices actually averaged 13¢ higher in 1987 than 1983. The price strength in Florida and Texas reflects, at least in part, the increase in Class I prices implemented in 1986. Growth in Texas production, by reducing Class I utilization, diluted the effect of higher Class I prices. Midwestern price changes probably also reflect the increasing percentage of grade A milk produced in these states. Considerably larger declines were observed in the Western states of California and Washington. This is certainly due to the fact that a larger percentage of milk in these states is being used in manufactured products.

USING PRICE AND QUANTITY TO DESCRIBE THE SURPLUS

Some states have high prices (e.g. \$16.40 in Florida in 1987); some states have low prices (e.g. \$11.10 in North Dakota). Some states sell a large percentage of the milk they produce to the CCC (14% for North Dakota on a fats-basis milk equivalent); some don't sell anything to the CCC (Florida). Southerners argue that they can't possibly be contributing to the surplus because they don't sell anything to the CCC. If we look only at quantities, they are right. Westerners argue that they aren't the cause of the surplus because their prices are so low. If we just look at prices and ignore quantities, they are right. Economic theory says we need to look at both quantity and price. Maybe North Dakota is selling too much to the CCC; maybe Florida prices are too high.

Figure 13. Change in All Milk Prices, 1983 to 1987
(3.5% bf. selected states)



So how do we decide who is contributing more to the surplus if we look at both quantities and prices? Obviously if a state had high prices and sold a high percentage of its milk marketings to the CCC, we could argue that it contributes more to the surplus than a state having low prices and low sales to the CCC. Unfortunately, it typically doesn't turn out to be this simple. In fact there tends to be a reverse correlation between prices and sales to the CCC. In other words, high price states, such as those in the Southeast, typically have low sales to the CCC. Low price states, such as those in the Midwest and West, have high sales to the CCC. Thus it is no surprise that Southeastern states talk about quantities and Western states talk about prices.

Figure 14 gives us an illustration of the trade-off between farm prices and sales to the CCC. The vertical axis measures the average price received for all milk in dollars per hundredweight. The horizontal axis measures sales to the CCC as a percentage of marketings of farm milk, where CCC sales are measured as the whole milk equivalent of cheese, butter, and nonfat dry milk sold to the CCC.² The points that are spotted on the graph are state and U.S. average data for 1987, excluding the 19 states that had no sales to the CCC. The U.S. average appears near the center of the cluster of state abbreviations scattered across the graph; it shows a U.S. average price of \$12.54 and whole milk equivalent sales to the CCC equal to 6.4% of farm milk marketings. This diagram enables us to see how one state compares to another in terms of both price and relative sales to the CCC. For example, we can see that eleven states and the U.S. average have both a higher price and higher relative sales to the CCC than Wisconsin. Using this kind of comparison, four states exceed California, six exceed Pennsylvania, thirteen states exceed New York, and three states exceed Minnesota.

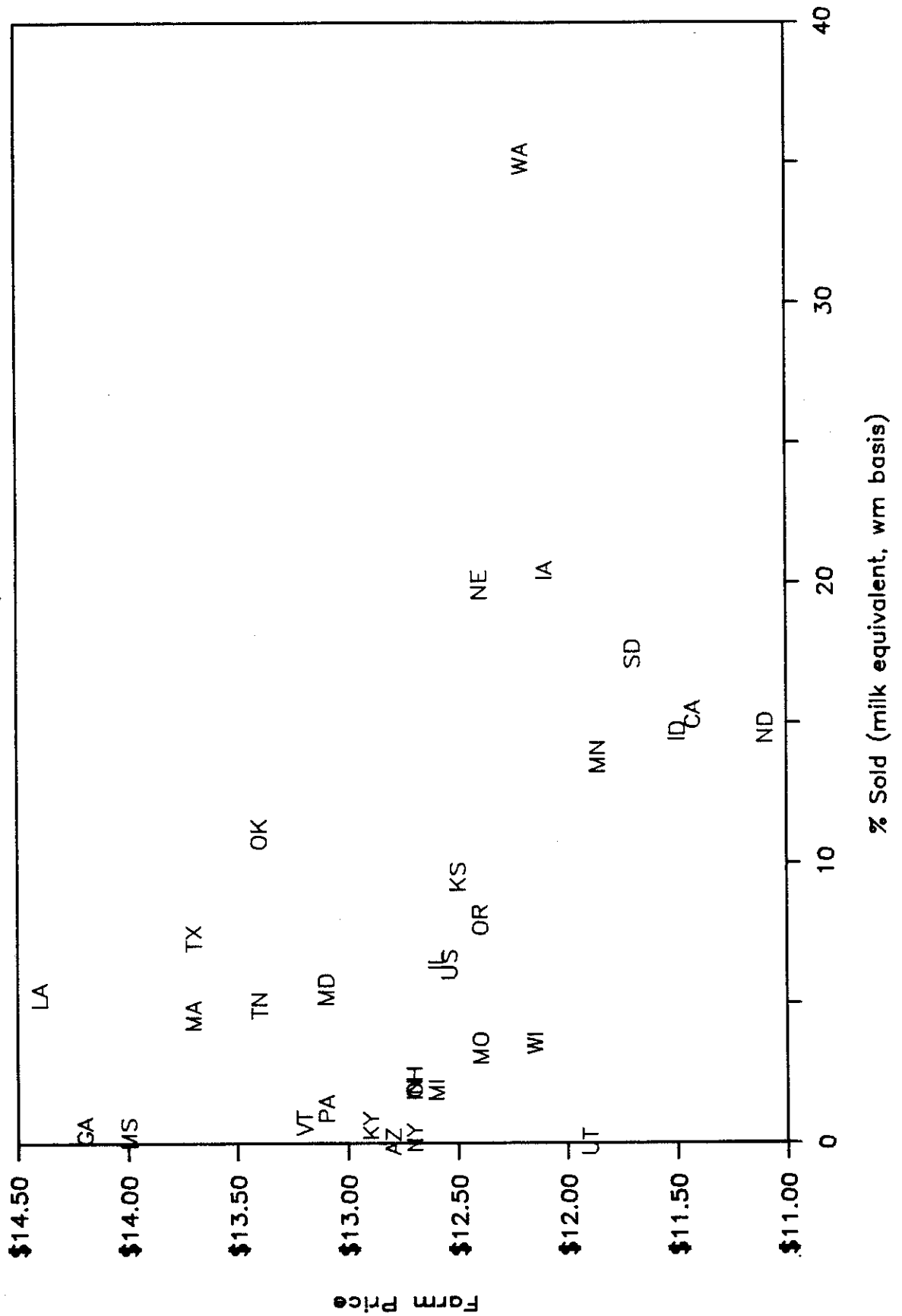
This type of comparison can be used to compare states; however it does not permit us to unequivocally rank all states. For example, Washington, Nebraska, Oklahoma, Texas, Louisiana, and Florida are all in positions where no other state has both higher prices and higher relative sales to the CCC, but how do we compare across these states? Who contributes more to the surplus: Louisiana with very high prices and fairly low sales to the CCC or Washington with the tenth lowest average state price but some 35% of its milk being sold to the CCC? Louisiana says "we don't sell much to the CCC," Washington says "we wouldn't have to if prices were lower in other parts of the country."

In Table 9, states are compared according to their average farm price and the percentage of their milk sold to the CCC in 1987. The comparisons do not lead to unequivocal rankings but they do suggest that high prices in some regions may be just as much a part of the surplus problem as high reliance on CCC sales in other states. It is not possible, at least from the standpoint of this comparison, to determine whether Louisiana or Washington or Texas contributes more to the surplus without studying in more detail the prices in each region and how they relate to production and transportation costs for dairy products.

²As previously noted, there are various methods for calculating the milk equivalent of quantities of dairy products. The procedure used here takes a butterfat based equivalency for cheese plus the higher of the following: a butterfat equivalent for butter and a nonfat solids equivalent for nonfat dry milk. Please note that using either a butterfat equivalency or some other whole milk equivalency measure would result in changes in the ranks of some states. For example, using a butterfat equivalency would show that Washington, Iowa, and Oklahoma sell less to the CCC than our procedure would indicate.

Figure 14. Farm Price v. Relative Sales

to the CCC, 1987



We do know, for example, that Class I utilization is higher in Louisiana than Texas; this might suggest that price alignment is a bigger problem in Texas. But, without more probing research, for now we can simply raise the question.

Table 9. Comparing State Contributions to the Surplus Problem Based on the Percent of Milk Marketings Sold to the CCC and Average Farm Price.

State	States Having Greater Relative Sales to the CCC and Higher Price
Washington	none
Nebraska	none
Oklahoma	none
Texas	none
Louisiana	none
Florida	none
Georgia	LA
Mississippi	GA, LA
Maryland	OK, TX
Tennessee	OK, TX, LA
Kentucky	PA, MD, VT, TN, OK, MA, TX, LA
Missouri	OR, NE, KS, US, IL, MD, TN, OK, MA, TX, LA
Oregon	NE, KS, OK
California	SD, IA, WA, NE
Idaho	SD, IA, WA, NE
Arizona	KY, PA, MD, VT, TN, OK, MA, TX, MS, GA, LA
Utah	WI, IA, WA, MO, OR, NE, KS, US, IL, MI, NY, IN, OH, AZ, KY, PA, MD, VT, TN, OK, MA, TX, MS, GA, LA
U.S. average	IL, OK, TX
Minnesota	IA, WA, NE
South Dakota	IA, WA, NE
North Dakota	CA, SD, IA, WA, NE
Michigan	IL, IN, OH, MD, TN, OK, MA, TX, LA
Wisconsin	WA, OR, NE, KS, US, IL, MD, TN, OK, MA, TX, LA
Iowa	WA
Kansas	OK
Illinois	OK, TX
Ohio	MD, TN, OK, MA, TX, LA
Indiana	OH, MD, TN, OK, MA, TX, LA
Massachusetts	TX, LA
Vermont	TN, OK, MA, TX, LA
Pennsylvania	MD, TN, OK, MA, TX, LA
New York	IN, OH, KY, PA, MD, VT, TN, OK, MA, TX, MS, GA, LA

CONCLUSIONS: HOW DO REGIONS VIEW EACH OTHER AND DAIRY POLICY?

Policy concerns and prescriptions often hinge on how we view regional differences. For example, states up and down the East Coast can argue that they contribute little or nothing to the national surplus; their sales to the CCC are small to none and their production growth has been modest in comparison to Western states. Hence it is no surprise that farmers in the Northeast and Southeast wonder why they should be paying assessments, suffering price cuts, or cutting back production under federal policy.

In contrast, the Midwestern states might suggest that more Midwestern dairy products could be sold on the East Coast, rather than to the CCC, if high Eastern farm prices were lower. For example, Midwesterners argue that their Southern market for Class I milk was reduced when the Food Security Act of 1985 raised Class I prices by considerable amounts in the South, thereby resulting in higher farm prices than would otherwise have occurred and, presumably, higher Southern milk production. When milk production is increased in the South it means an equivalent reduction in milk required from Northern sources. The Northeast had only token price increases under the Food Security Act, but in their case the Midwestern argument would be that traditionally higher prices in the Northeast have permitted a hard product manufacturing sector to exist in competition with Midwestern cheese and butter. The Midwestern complaint about California is that California state pricing laws and federal willingness to purchase surplus dairy products provided opportunities for California milk production and processing capacity to grow. Now California has become a major cheese producing state and is taking local markets away from the Midwestern states that have served them for decades.

Californians, on the other hand, point out that they have very low farm prices and USDA estimates their cost of production to be very low also. Hence they feel that their increases in production are justified by their ability to produce profitably at low prices. While they must admit that their sales to the CCC have been rather large in the past, they would quickly point out that these sales have declined a lot and will decline further as more California milk moves into dairy products that can be sold in local commercial markets. As their milk production increases to higher levels, it becomes easier to justify investments in new plants and equipment and to shift production from surplus butter and nonfat dry milk to more consumer oriented products, like cheese. This is in fact what is occurring in California now.

Conditions in the various regions lead to different ideas about what dairy policy ought to do. The West is a growth market. Farmers there would rather accept lower prices than have their ability to grow restricted by a federal policy that was specifically tilted against them. Westerners want dairy policy to stay out of their way. The Northeast is a mature market that wants stability. There the dairy industry likes things the way they were and wants to be left alone by other regions and by policies that ask them to cut back. Part of their fear of cuts in the profitability of dairying is due to the fact that they can't see any obviously profitable agricultural options. They want a dairy policy that provides security and promotes stability in their area. Southerners feel similarly. They got higher Class I prices in compensation for the production cuts and disruptions they suffered under the Milk Diversion and Dairy Termination Programs. They would be happy to be left alone now also. The Upper Midwest feels threatened by keeping things as they have been in the East and by growth in the West. The dairy industry there would like a policy

that would allow them to get more of the Southern market and price and stop Western displacement of Midwestern cheese and other dairy products.

It is not surprising that regions would promote arguments that are self-serving, but none of these arguments or viewpoints can be dismissed as being totally specious or contrived. In a paper presented at the 1983 Northeast Dairy Conference, it was argued that before a consensus could be reached on how to solve the dairy problem, it would be necessary for industry and policymakers to more clearly agree just what the problem is (Novakovic, 1983). Is it that milk production is too high? Are farm milk prices too high in general or in parts of the country? Perhaps the problem is best defined as large sales to the CCC? Or is it large federal expenditures? Some have said that production and prices are fine, it is just that commercial sales are too low. Undoubtedly most would agree that all of the above are aspects of the dairy problem in the 1980s, but then how do we rank the components of the general problem? Which is the most important aspect for us to address? What are problems and what might be better described as symptoms of a larger problem?

Over the decade, policymakers have reacted to all dimensions of the problem. By 1981 it became fairly clear that price increases had become a problem; so the President and Congress eventually acted to stop further increases. In 1982 Congress decided that expenditures were the problem; so they passed an assessment plan. In 1983 industry argued and Congress agreed that production increases were the problem; so the Milk Diversion Program was enacted to encourage cutbacks. At that time it was also agreed that slow consumption increases were also part of the problem; so a national promotion program was created and total farmer contributions to promotion were greatly increased. In 1985 Congress decided that the way to get at the production problem was to get whole farms, especially the cows, out of production; so they came up with the Dairy Termination Program. In 1988, problem solvers across the country began to say that, whatever it is, the problem is regional in nature. Throughout this period the only continuous thread of dairy policy has been steady price reductions tied to levels of sales to the CCC.

Solving a problem is hard enough when there is no common agreement on what the problem is or how to rank its various components. For the dairy industry, the recent fashion of regionalization makes a hard reconciliation process worse. As this paper illustrates, the perceived performance of states in or across regions depends a lot on the measure used.

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