

TO: Program Planning & Development

DATE: 05/26/05

FROM: WIB Staff

For Action

For Information

For Discussion

SUBJECT: Tutorial – Location Quotients

PROPOSED MOTION(S): Information Only

DISCUSSION: During the April 28, 2005 Program Planning & Development Committee meeting, data was presented to the committee concerning Trends and Shift-Share Analysis for Manufacturing and Health Care Industries in Merced County, 2001-2003. “Bubble Charts” were used to depict the Workforce Investment Board’s targeted industries, and to show the relative strengths and sizes of the chosen industries. Members requested the same data be presented for a 5-year period. The attached papers contain definitional information on “Location Quotients” and 5 years of Bubble Charts for the manufacturing industry cluster and for the health care industry. Additionally, an alternative way to look at the same data is offered.

ATTACHMENTS: Tutorial

Location Quotient

What is a Location Quotient (LQ)?

A location quotient is a measure of an industry's concentration in an area relative to the rest of the nation. It compares an industry's share of local employment with its share of national employment.

Location quotients can indicate if a community produces more than is needed for its own use and is selling the excess to nonlocal markets. It can also tell us which types of businesses are not accommodating local needs and are a source of consumption leakage.

The location quotients approach assumes the national economy is self-sufficient. While that is not completely true, it is more appropriate to make that assumption for the national economy than a state, multistate, or multicounty economy. The local economy is compared against that standard of self-sufficiency. If the local economy has relatively less economic activity in a particular sector, that suggests the good or service is being imported from other communities. If the local economy has relatively more economic activity in a particular sector, that suggests the good or service is being exported to other communities.

How to interpret the Location Quotient.

The location quotient provides information for two important conditions. A location quotient greater than 1 indicates the sector is self-sufficient activity or an export activity and is an important link to the outside economy. It is important to recognize that the location quotient probably needs to exceed 1.25 (some economists use 1.75 for this value) before it represents much export activity. The second important value is a location quotient less than 1, particularly .75 or less. It suggests that a particular sector is not meeting local needs and is importing those needs. The use of the range .75 to 1.25 is recognition of data imperfections. The minimum and maximum values essentially tries to restrict the analysis to those sectors that are extremes.

One has to be careful in making hasty conclusions from location quotients. For example, a location quotient less than one does not mean the community should strive for self-sufficiency in that activity. Each community need not

be completely self-sufficient in all sectors (e.g., Automobile Manufacturing). However, if the location quotient is less than one in a trade or service activity, it suggests there may be a gap in the local economy, because most trade and service activities are expected to be present in most communities.

One has to use a sense of judgment when interpreting location quotient. To a large extent that judgment is based on the question, "Is it feasible to have this type of trade or service activity in this particular community?" If the answer is yes, there are several additional items to consider.

One consideration is to compare the local community's location quotient with the location quotient of similar communities. If those communities are exporting ($LQ > 1$) or are at least self-sufficient ($LQ = 1$) in this sector, that reinforces the idea that the community could expand that sector.

The location quotient is only a first cut at possible activities. The real answer comes from a feasibility study. Such studies give information about potential customers, the anticipated profitability of a particular business, and offer more conclusive information about the possibility of expansion in a certain activity. People who understand marketing can conduct such studies. But it is senseless to spend a great deal of money and time on a feasibility study unless one first calculates the location quotients, compares them to similar communities, and calculates the population-employment ratios to narrow the possibilities.

Location Quotients and Some Cautions to Their Use.

Just like any other tool, location quotients need to be used with caution because some elemental assumptions can lead to errors if they are violated. The technique requires us to assume local and nonlocal demand and productivity are similar. Remember, we are trying to identify economic opportunities. If the local economy has a local demand that varies substantially from the national conditions, then the level of self-sufficiency may be quite different from that implied. For example, the local community is growing and has a relatively large share of its employment in residential housing construction

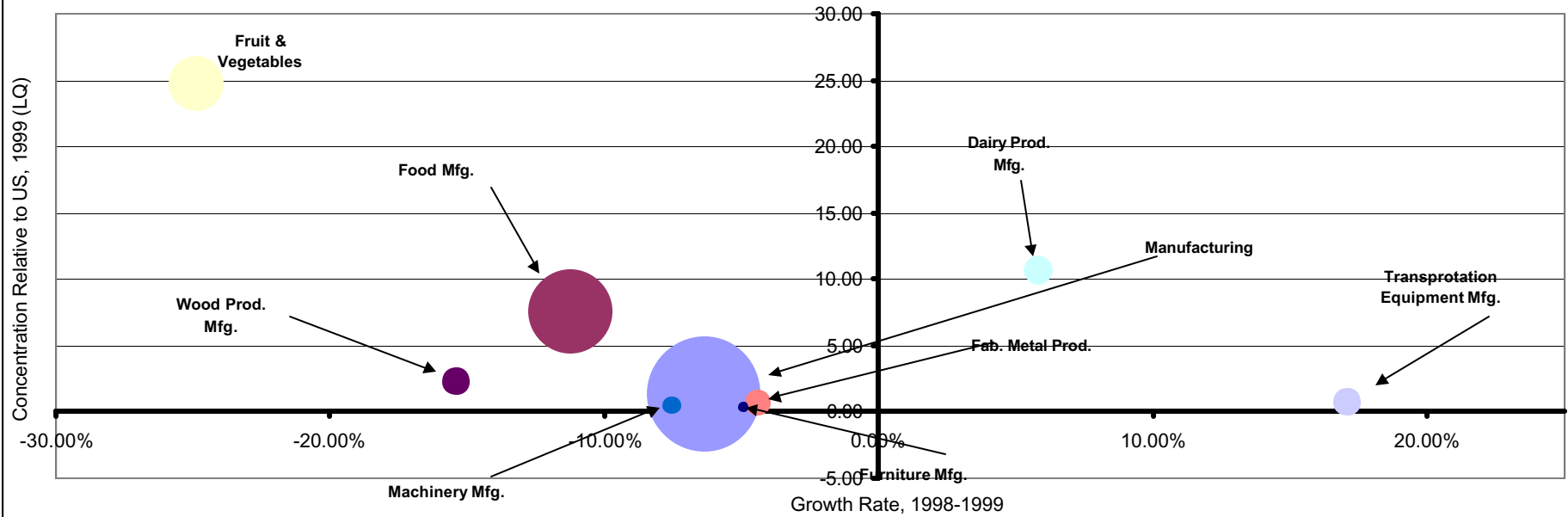
because the community is experiencing a housing boom, not because it is exporting houses to other locales. Productivity is also important because if the local workforce is less productive than the national average, then relatively more people need to be employed to just meet local needs. In this case, the relatively high share of local employment in a particular sector reflects poor management or workers who do not produce at a comparable rate to national average. Yet, the location quotient would suggest they are exporting.

Another caution is the aggregation of the data - location quotients values can vary because of the data used. For example, North America Industrial Classification System (NAICS) code 31-33 is Manufacturing while NAICS code 3366 represents Ship and Boat Building. A community may have a location quotient of less than one at the two digit level, which suggests no exports. But if the data were broken down to the four digit NAICS code level, the building of ships and boats, the location quotient might indicate the community is an exporter.

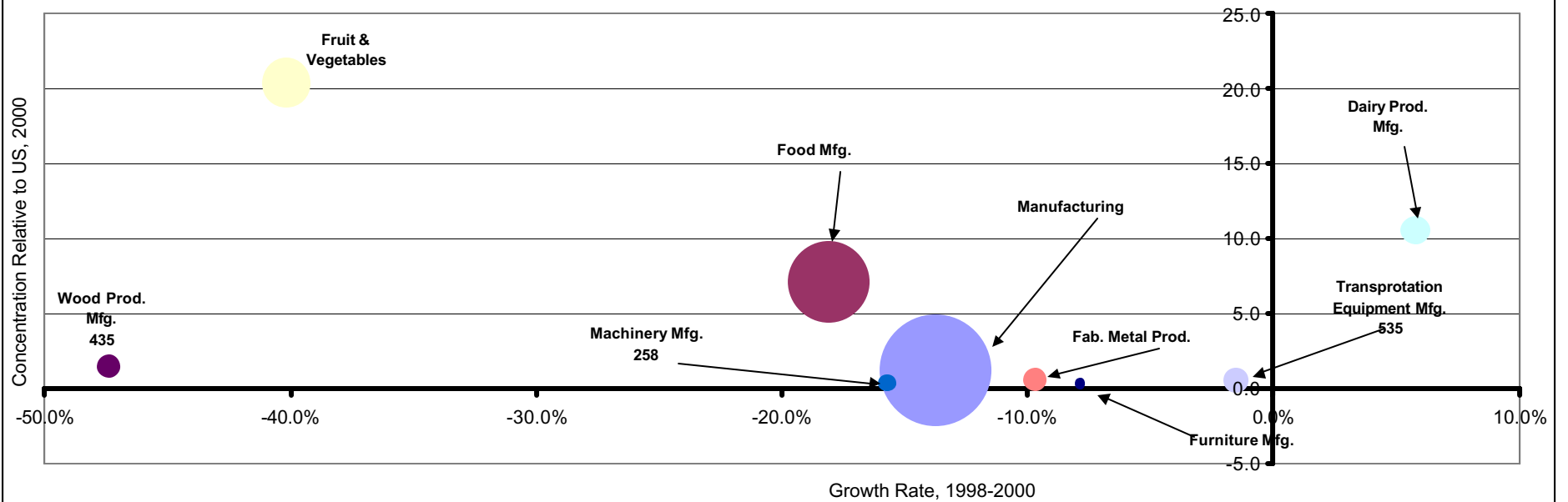
The ideal is to use three or four digit NAICS codes for calculating location quotients (even to the five digit code). Most employment data for our community is available to the six digit level, although most data past the four digit level are suppressed due to confidentiality. For example, Hospitals is a three digit NAICS level, but the data was suppressed due to only one employer in our community. In our analysis we use the two, three, and four digit NAICS levels when data are present.

The next six pages show employment growth, concentration (LQ), and size of firm for the manufacturing industry and health care/social services industry in Merced County for the last 5 years.

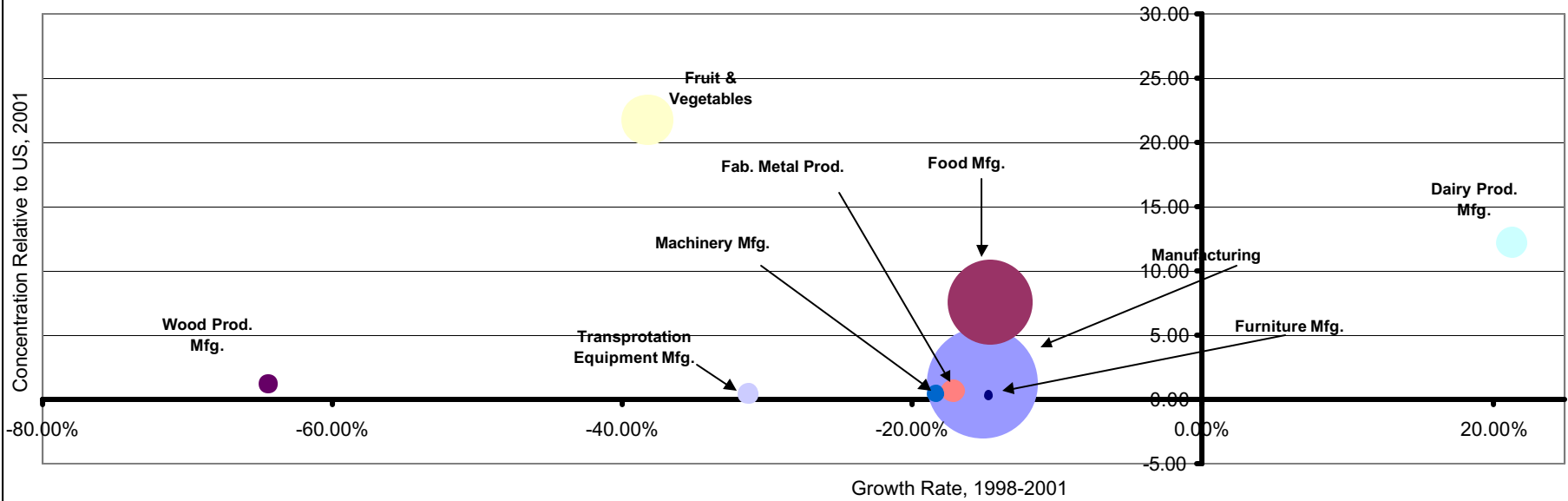
Growth, Employment Size, and Concentration to U.S. (Location Quotient)
for Manufacturing Sector/Sub-Sector/Industrial Group, Merced County 1999



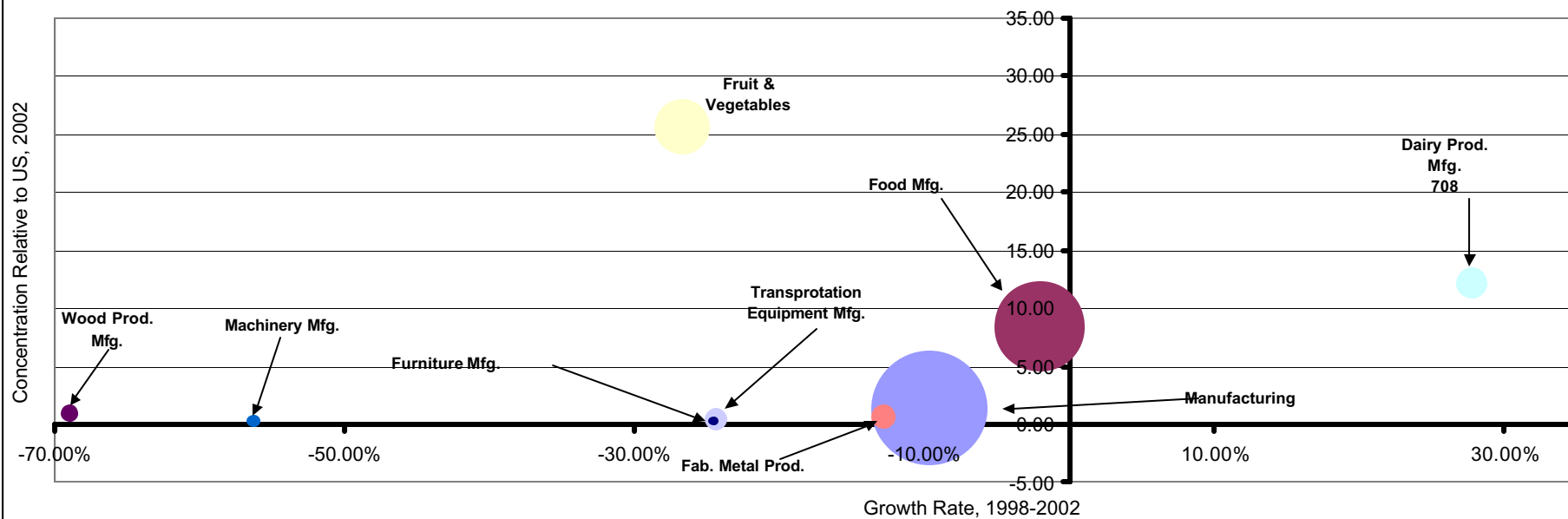
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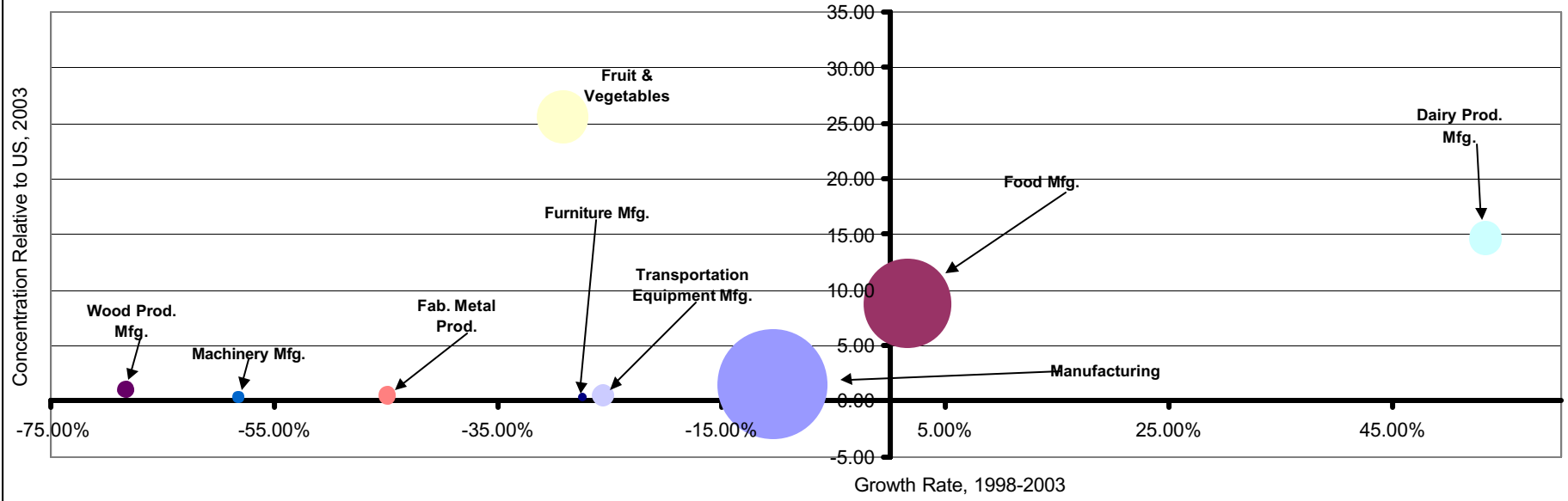
Growth, Employment Size, and Concentration to U.S. (Location Quotient)
for Manufacturing Sector/Sub-Sector/Industrial Group, Merced County 2001

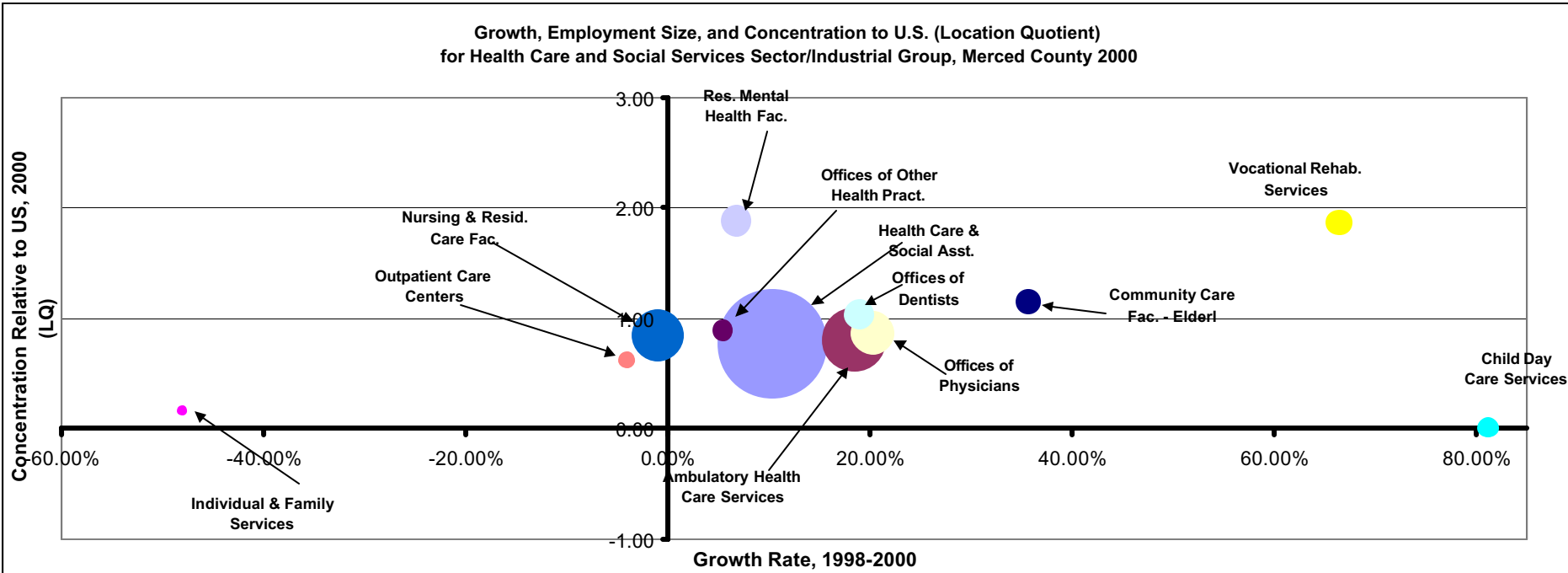
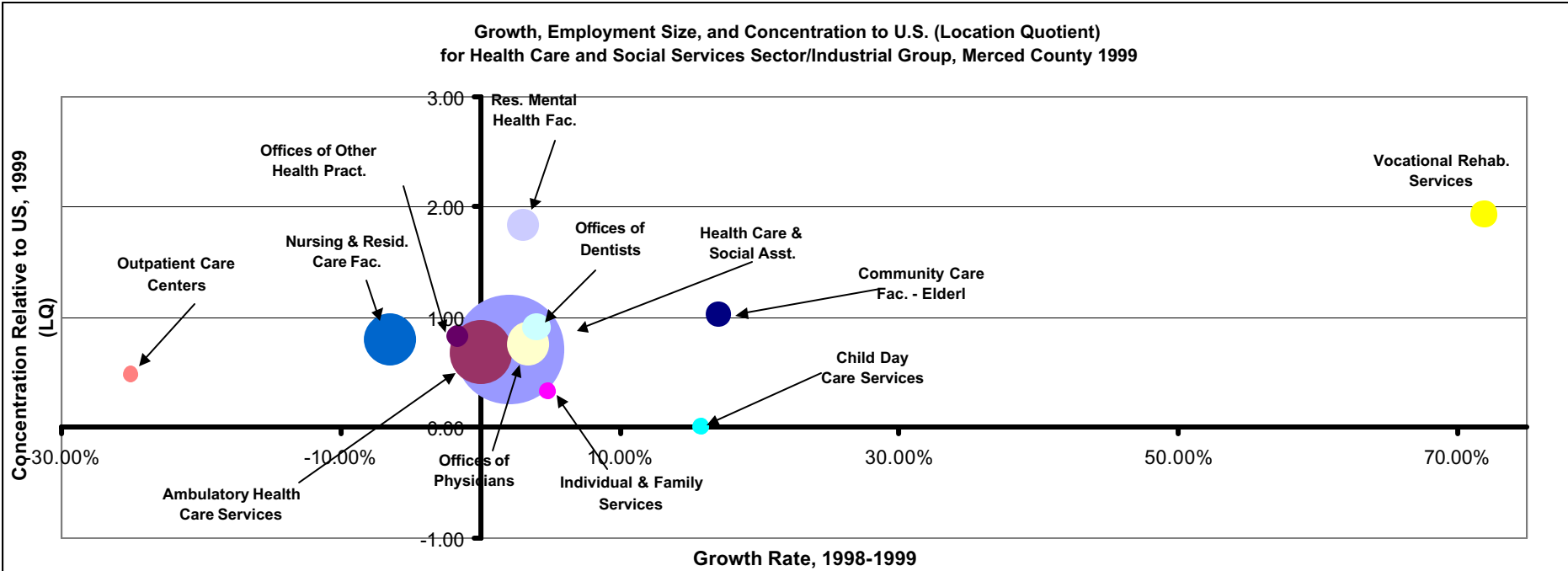


Growth, Employment Size, and Concentration to U.S. (Location Quotient)
for Manufacturing Sector/Sub-Sector/Industrial Group, Merced County 2002

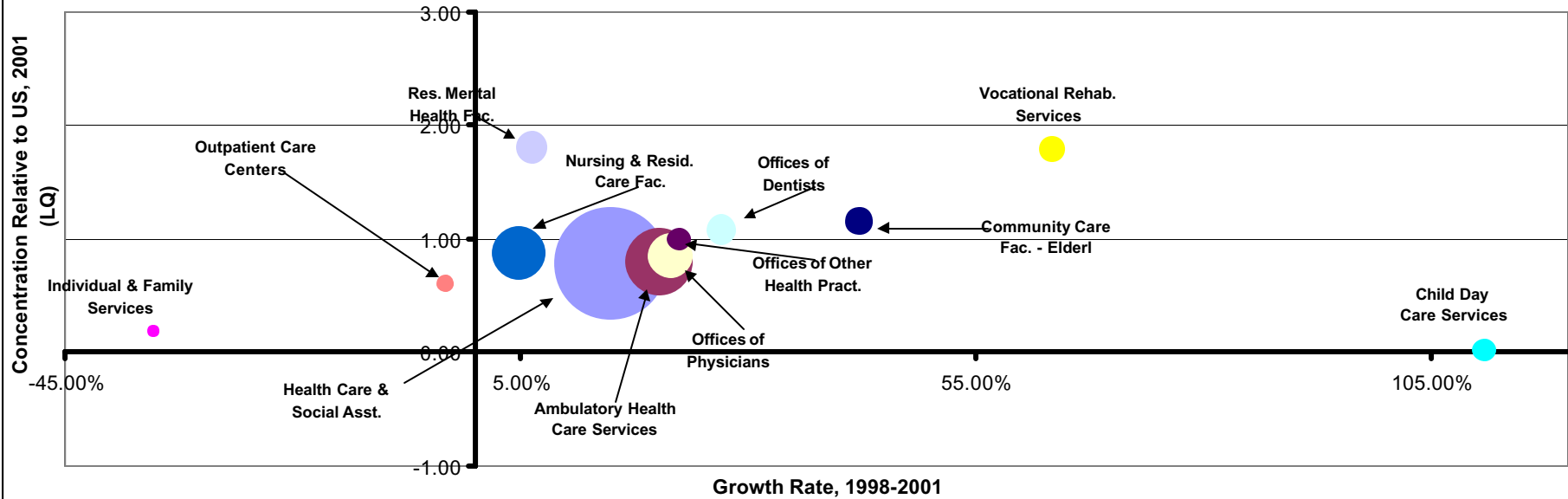


Growth, Employment Size, and Concentration to U.S. (Location Quotient)
for Manufacturing Sector/Sub-Sector/Industrial Group, Merced County 2003

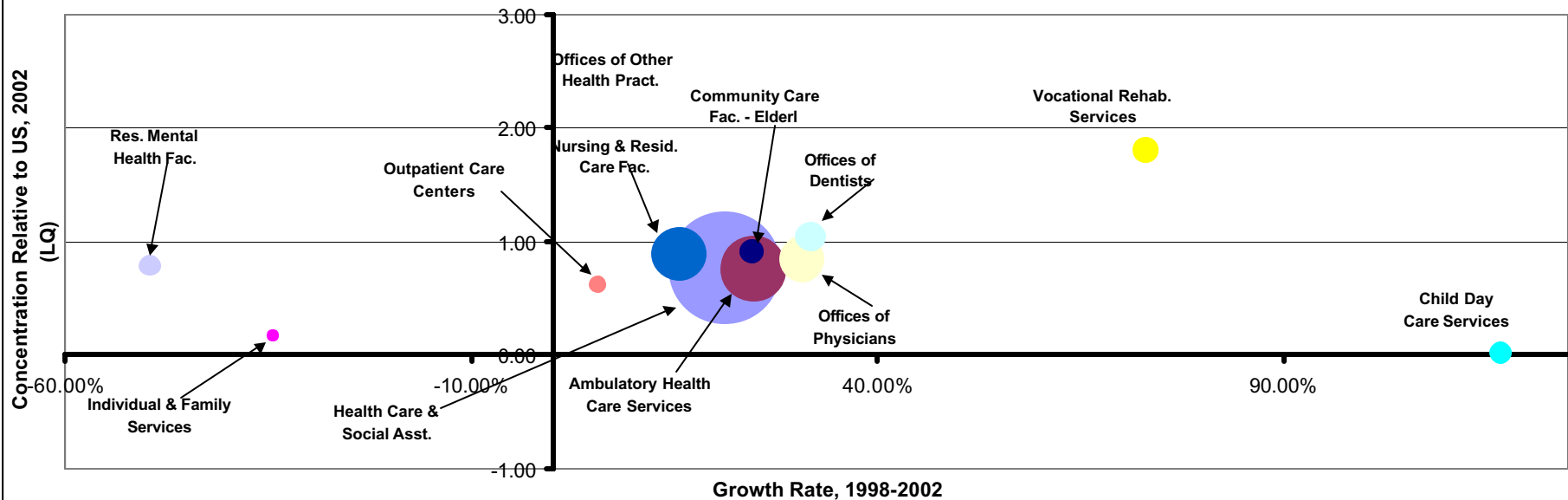




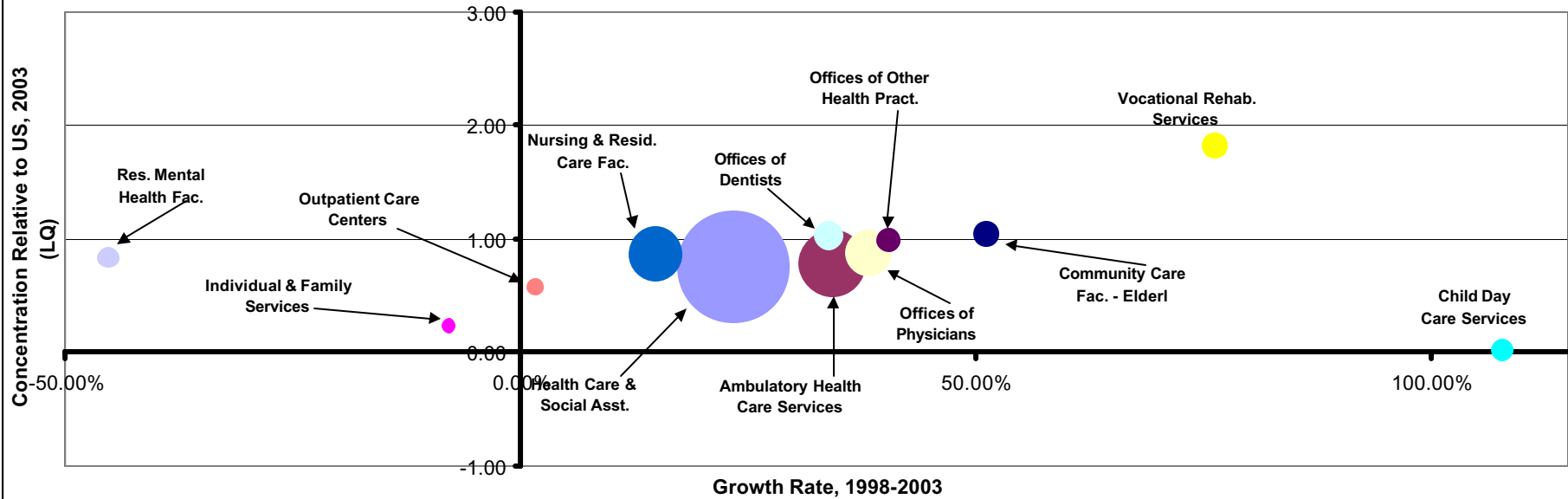
Growth, Employment Size, and Concentration to U.S. (Location Quotient)
for Health Care and Social Services Sector/Industrial Group, Merced County 2001



Growth, Employment Size, and Concentration to U.S. (Location Quotient)
for Health Care and Social Services Sector/Industrial Group, Merced County 2002



Growth, Employment Size, and Concentration to U.S. (Location Quotient)
for Health Care and Social Services Sector/Industrial Group, Merced County, 2003

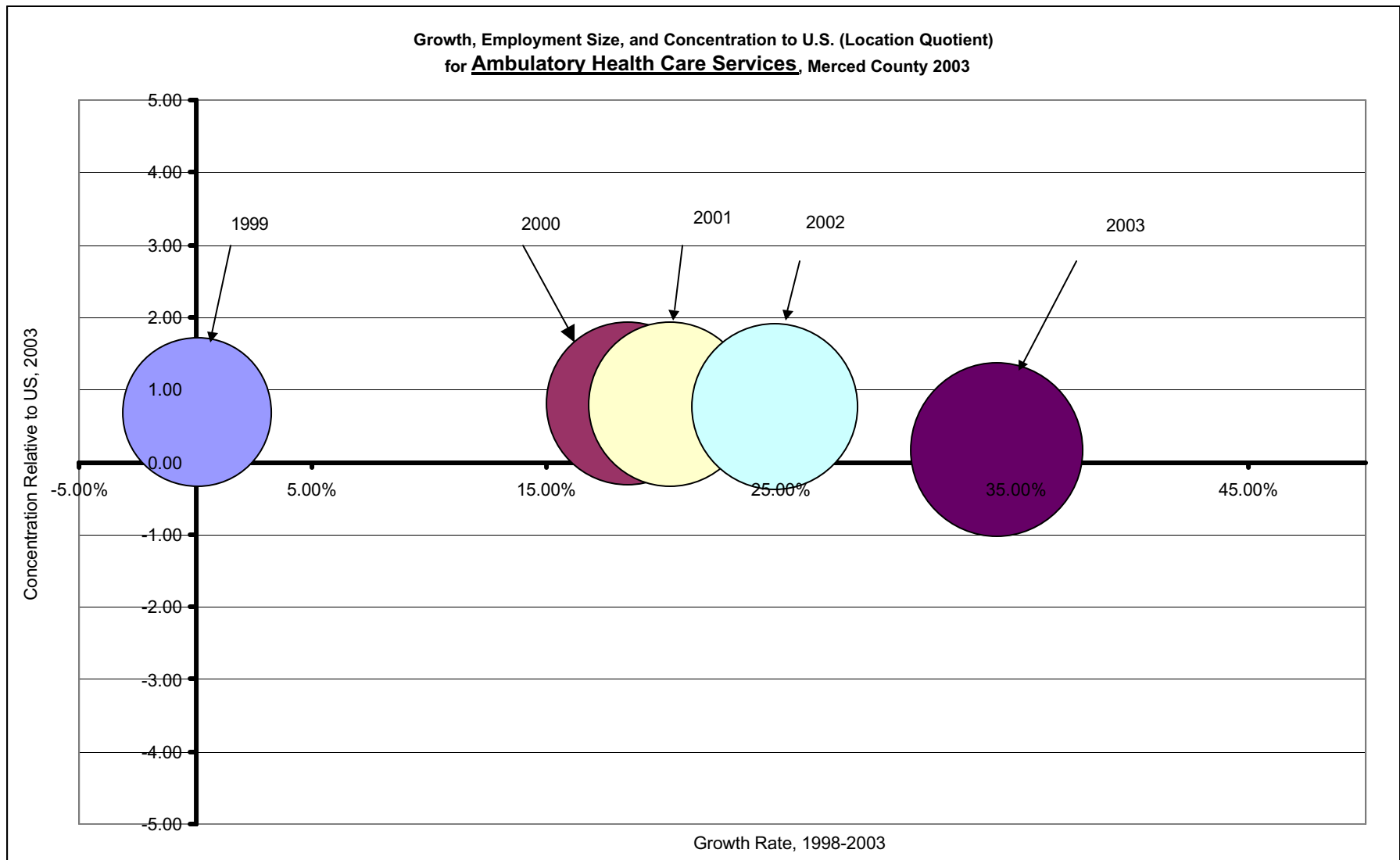


After reviewing the previous graphs, what trends or observations can you make about employment growth, concentration relative to U.S. (LQ), or share of employment for Manufacturing or Health Care/Social Service industries in Merced County? The growth rate may be the only trend that stands out, but difficult to see between graphs. The graph below combines all five years

data for Ambulatory Health Care Services for Merced County. The growth rate (vertical axis) stand out better when we combine the five years, but share of employment and concentration are somewhat hidden. We can see a drop in concentration (LQ-horizontal axis) in 2003, but for prior years it is still difficult to see any change. Share of employment (size of bubble) is impos-

sible to compare.

On the next few pages we will present the information in a different format for better understanding.



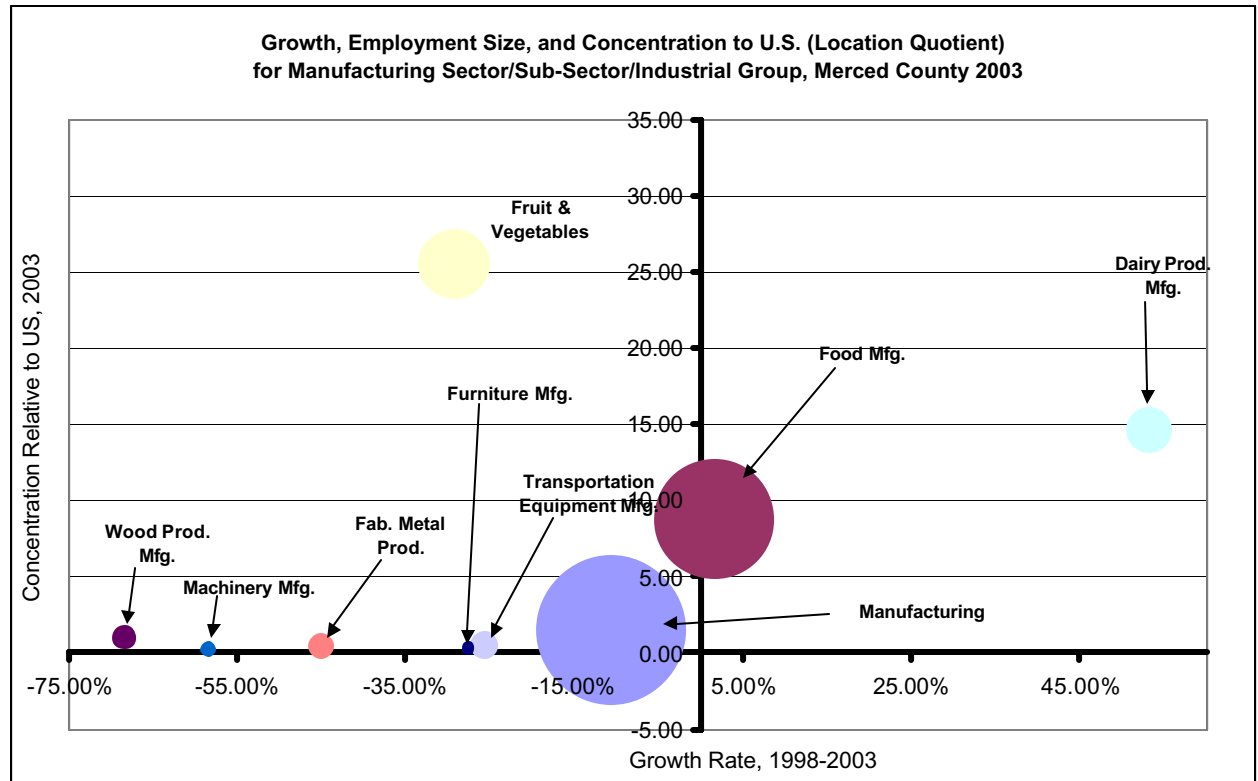
All we really need is the most current year employment data and base year employment data for our community and the nation (it is important to choose a base year that is at the same point in a business cycle as your current year).

Using the Location Quotient and Change in Location Quotient to Determine the importance of an industry to the Regions Economy.

The location quotient, coupled with the change in location quotient, provides a useful tool for understanding our region's industries. For example, our community might pursue one set of strategies for industries with high, but declining, location quotients, and another set of strategies for industries with low, but increasing location quotients.

The chart below allows us to group our region's industries into four categories;

- Large LQ that is declining
- Large LQ that is increasing
- Small LQ that is declining
- Small LQ that is increasing



Employment Trends in Manufacturing : Merced County - 1998-2003

Industry Title	Employment, Growth, and Location Quotient, 2001 - 2003										
	Employment						Growth 1998-2003		Location Quotient		Change in Location
	1998			2003							
Level	Share	Sector Share	Level	Share	Sector Share	Percent	Net	1998	2003	1998-2003	
Total, All Industries	63,672	100.00%		66,359	100.00%		4.22%	2,687	1.33	1.25	-5.9%
NAICS 31-33 Manufacturing	11,732	18.43%		10,502	15.83%		-10.48%	-1230	1.30	1.40	7.7%
NAICS 311 Food manufacturing	6,727	10.57%	57.34%	6,840	10.31%	65.13%	1.68%	113	8.43	8.70	3.2%
NAICS 3114 Fruit and vegetable preserving and specialty	3,429	5.39%	29.23%	2,428	3.66%	23.12%	-29.19%	-1001	32.34	25.46	-21.3%
NAICS 3115 Dairy product manufacturing	669	1.05%	5.70%	1,026	1.55%	9.77%	53.36%	357	9.97	14.61	46.6%
NAICS 321 Wood product manufacturing	827	1.30%	7.05%	262	0.39%	2.49%	-68.32%	-565	2.64	0.94	-64.2%
NAICS 332 Fabricated metal product manufacturing	548	0.86%	4.67%	302	0.46%	2.88%	-44.89%	-246	0.61	0.39	-35.2%
NAICS 333 Machinery manufacturing	306	0.48%	2.61%	128	0.19%	1.22%	-58.17%	-178	0.39	0.22	-45.5%
NAICS 336 Transportation equipment manufacturing	543	0.85%	4.63%	404	0.61%	3.85%	-25.60%	-139	0.51	0.44	-13.5%
NAICS 337 Furniture and related product manufacturing	102	0.16%	0.87%	74	0.11%	0.70%	-27.45%	-28	0.30	0.25	-17.7%

Each category might entail a different economic development approach. For example, if a region wanted to promote the expansion of manufacturing, it might focus its efforts on the industries that have large, but declining location quotients and on those that have small, but increasing location quotients. The industries with large location quotients are obviously quite important to the current economy, and to lose them might cause considerable hardship. Since some industries are experiencing decline, it may be wise to work with them to understand what is causing their demise and develop appropriate programs and policies to stop or slow their decline. Those industries that are heavily concentrated and growing, may be doing quite well and all you will want to do is try to understand why.

On the other extreme are those industries that have small, declining location quotients. These industries are not as important to the economy and apparently do not have much potential in the community. Although an industry may fit into the small, declining location quotient category, it may include one or more small, but dynamic industries. Thus, it is important to look at the types of industries included in each NAICS Sector. Those industries with small but growing location quotients may be a source of considerable future growth for the economy and should warrant special attention.

Manufacturing - NAICS 31-33

Large Location Quotient that is declining

- Wood Product Manufacturing

Large Location Quotient that is increasing

- Manufacturing Sector
- Food Manufacturing
- Dairy Product Manufacturing

Small Location Quotient that is declining

- Fabricated Metal Product Manufacturing
- Machinery Manufacturing
- Transportation Equipment Manufacturing
- Furniture Manufacturing

Small Location Quotient that is increasing

- Fruit and Vegetable Preserving/Specialty