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University of Wisconsin-Madison

September 2001 **Staff Paper No. 444**

The Economic Structure of the Fox Valley: A Study of Economic Opportunity

By

David Muench and Steven C. Deller

AGRICULTURAL & APPLIED ECONOMICS

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David Muench and Steven C. Deller

Department of Agricultural & Applied Economics
University of Wisconsin-Madison
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The Economic Structure of the Fox Valley: A Study of Economic Opportunity

Report Prepared for the
Fox Valley Economic Development Partnership,
in conjunction with the FCEDP Research Committee

by

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September, 2001

The analysis presented in this report is intended to provide the FCEDP Research Committee with insights on the economic structure of the regional economy with a particular focus on the identification of specific industrial strengths and weaknesses. The authors are responsible for all errors of omission or commission. The opinions expressed in this report are those of the authors with the contribution of the FCEDP Research Committee and are not those of the University of Wisconsin. Released as University of Wisconsin-Madison/Extension, Department of Agricultural and Applied Economics Staff Paper No. 444.

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The Economic Structure of the Fox Valley: A Study of Economic Opportunity

Executive Summary

This study was commissioned by the Fox Cities Economic Development Partnership and undertaken by the University of Wisconsin-Extension. The intent of the study is to identify potential areas of economic growth and development for the region. The ultimate goal of this study is to provide insight and identify potential future policy directions by the Partnership and other economic development practitioners and policy makers.

Key findings include, but are not limited to:

- Historical (30 years) growth is modestly strong for the region❖ (Figures 2, 3 & 5; Table 1) but ten year forecasts hint at slightly stronger growth rates (Tables 13, 14 & 15).

- The Valley purports higher than average reliance on transfer payments, which is a source of new monies but at a certain risk given dependencies on federal and state policies. Further the Valley has lower than average proprietor income, hinting at the potential need to strengthen local entrepreneurial activities (Figure 7 & 8).

- The Valley is more dependent on manufacturing than either Wisconsin or the US (Figure 4; Tables 2, 3, 4 & 8).

❖ For purposes of data generation using IMPLAN, only complete county data are available. Therefore, occasional use of the term "Fox Valley" indicates the use of Winnebago and Outagamie County economic data.

- Future macroeconomic trends indicate growth in the service sectors, such as health care services, and decline or no growth in manufacturing, such as paper and allied products (Tables 15, 16, 17 & 18).

- Industries that appear to have strong potential in the Valley include: computer and data processing, management, engineering and architectural consulting services, advertising, and commercial printing (Tables 11, 12, 16, 17 & 18).

- Occupations with the greatest future growth potential will require increased levels of higher education at a minimum (Tables 17 & 18).

The Fox Cities is a strong, dynamic community. While not as fast as the national average, it's population is growing and becoming diversified. Since 1969, total employment growth in the Fox Valley outpaced the state and the nation in every sector except retail. It has seen many new business starts, but established companies, especially manufacturing, continue to provide the strong economic base. Paper is king in the Valley and remains a strong foundation for the economy. Whether this reliance on manufacturing, especially paper, in the wake of national trends to the contrary, should continue at the same pace, will be one of the issues examined in this study.

The Fox Valley has made some progress in increasing income. Until 1983, the Valley

lagged behind both the state and the country in per capita income. Today, per capita income, in 1987 dollars, is $26,636 for the Fox Valley, ahead of Wisconsin's $25,965, but slightly behind the U.S. $26,894. One area of note is the relatively lower levels of proprietor's income, which accounts for about 20 percent of all income for the U.S. and Wisconsin, but less than five percent for the Fox Valley. While it has seen some growth since the mid 1980s, it was still far behind that of the U.S.

A major part to the economic analysis looks at the top 25 sectors in various categories. Paper and various manufacturing consistently rank high in most categories. This further proves the importance and the over emphasis of this sector on the local economy. Is it too dependent? Maybe. Regardless, as the study indicates, the economic trends do not favor a growing manufacturing sector, and all indications point to a need to diversify.

Besides analysis and trends, the study looked at gaps and disconnects in the local economy. Gaps are industries either missing completely or producing only a fraction of what is used in Valley. Disconnects are raw materials or finished parts, that are being produced locally, but are being imported to produce products locally. One gap readily noticeable is in the plastics industries, where $122 million of plastic resins are imported and only $4.2 million are produced locally. A disconnect may be the pulpwood industry, which imports $146 million, while exporting $95 million.

Location Quotients are still another measure of economic activity used in this study. These indicators compare local economic activity in various sectors against that of the nation. Location Quotients greater than one point to areas of specialization, or relative strength, whereas quotients less than one may point to areas of weaknesses. Based on these Location Quotients, areas of strength for the Valley include: paper related activities, industrial patterns, printing, plastic bags, and selected food processing sectors. Sectors of strength for Wisconsin, but are not present in the Valley, include metal sanitary ware, creamery butter and X-ray equipment to name a few. It should be noted that both Wisconsin and the Valley are strong in various manufacturing sectors, but larger macroeconomic trends suggest manufacturing is inherently unstable and not a source of long-term growth. In addition, many jobs in manufacturing today may not pay the targeted wages of $12 to $19 per hour identified by the Fox Cities Economic Development Partnership.

The service sector is the fastest growing segment of the national and local economies. A look at the top 25 industries for jobs lists quite a few service related industries, including #1-eating and drinking and #2-education. Selected industries within the service sector, such as computer and data processing, management and consulting services, security and commodity brokers, engineering, printing, business services, and advertising are gaps in the local economy and may provide opportunities for job growth. All indications are the service sector is where the growth is now and will be in the future. While often mistakenly associated with low paying jobs, selected skilled service related jobs pay very well, and would meet one of the criteria identified by the Research Committee, namely attracting jobs in the $12 to $19 range.

Table of Contents

Acknowledgements …….. i
Executive Summary …….. ii
Introduction ……. 1
Historical Perspective ……. 2
Strengths and Weaknesses ……. 6
Industrial Linkages ……..…….. 15
Forecasts …… 24
Conclusions …… 26

Figures

Figure 1: Population Patters …… 2
Figure 2: Total Employment ……. 2
Figure 3: Employment Shares, Service Sectors ..…… 3
Figure 4: Employment Shares, Goods Sectors …… 4
Figure 5: Per Capita Income …… 4
Figure 6: Per Capita Income as Share of National …….. 5
Figure 7: Sources of Personal Income …….. 6
Figure 8: Proprietors' Income …….. 7

Tables

Table 1: Percent Employment Growth 1969-1999 ……. 3
Table 2: Top 25 Industries Total Industrial Output ……. 8
Table 3: Top 25 Industries Employment …….. 9
Table 4: Top 25 Industries Total Value Added ……. 10
Table 5: Top 25 Industries Total Industrial Output per Employee …… 11
Table 6: Top 25 Industries Wages and Salaries per Employee …….. 12
Table 7: Top 25 Industries Total Value Added per Employee ……. 13
Table 8: Location Quotients on Rank of Valley Strength ……. 14
Table 9: Location Quotients on Wisconsin Strengths vis-à-vis Valley …….. 15
Table 10: Imported Commodities Not Available Locally …… 17
Table 11: Industry Disconnect and Gaps: Industry Importing by Commodity …… 18
Table 12: Industry Disconnect and Gaps: Imported Commodity by Industry ……. 20
Table 13: Forecasted Population Growth 1999-2010 …… 24
Table 14: Forecasted Income Growth 1999-2010 ……. 25
Table 15: Forecasted Employment Growth 1999-2010 …… 25
Table 16: Detailed National Employment Forecasts ……. 26
Table 17: National Employment Forecasts 2010 …….. 27
Table 18: Fastest Occupational Growth Rates National …….. 28

The Economic Structure of the Fox Valley: A Study of Economic Opportunity

Introduction

The Fox Cities, as this mid-sized metropolitan area has become known, consists of a combination of urban cities, villages and towns, and has a population of approximately 220,000. Appleton, the largest city in the Fox Cities at 70,000 people, is at the center of the Fox Cities and often is mistakenly referred to when thinking of the entire area. The town and cities of Neenah and Menasha anchor the south end of the Fox Cities, while the City of Kaukauna is at the extreme east end. Three villages lie between Appleton and Kaukauna: Little Chute, population 10,000; Kimberly, population 6000; and Combined Locks, population 3,000. Two suburban towns, Grand Chute, population 18,000, and Menasha, population 17,500, are important commercial and retail centers.

Paper is king in the Fox Valley. The manufacturing of various types of paper and paper products has long been the basis of the economy. The Fox River, with its water power and transportation, made the Fox Valley and Fox Cities an important manufacturing place. Today outgrowths of those early manufacturing activities have lead to a more diverse economy, which includes insurance, plastics, retail, health care, education, government, and food processing.

The Fox Cities has a formidable Chamber of Commerce providing support for the local economy, with a committee devoted to cooperatively furthering the growth called the Fox Cities Economic Development Partnership. Fifteen years ago, a targeted industries study was spearheaded by Fox Cities Metro Marketing (a forerunner of today's Fox Cities Economic Development Partnership). The study was done by a private consulting firm, INFO-SERVE/ Information and Research Service, which identified the following 10 industries as top targets. The 10 are divided into manufacturing and nonmanufacturing.

Manufacturing

- Machine Tool Accessories
- Industrial Chemicals
- Miscellaneous Plastics
- Manifold Business Forms
- Paper Coating/Glazing
- Other Converted Paper Products
- Commercial Printing

Nonmanufacturing

- Life Insurance
- Business Services
  - Computer and Data Processing
  - Miscellaneous Business Services
- Engineering/Architectural Services

The latest study uses a slight variation to the "targeted study approach." Called "import substitution," it looks at gaps in the local economy and for disconnects, where raw and finished materials or products are imported instead of using locally generated resources. The big difference between the two study methods is that the method used to develop this study is education based, that is, Fox Cities Economic Development Partnership Research Committee members are active participants in the process and, as such, learn much about their economy and about how the study will be used in the future.

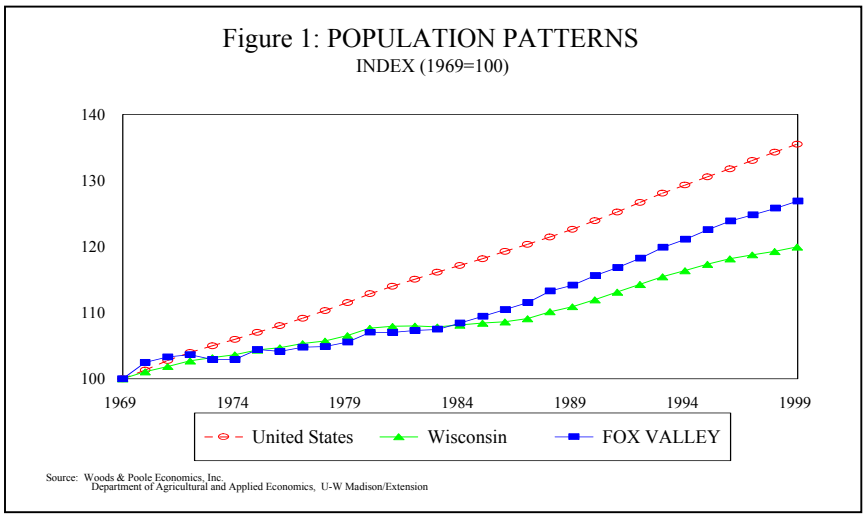
The report is composed of five sections beyond the introductory comments. First, a thirty-year historical overview of the "Fox Valley" is provided. A detailed discussion of local economic strengths and weaknesses is then provided, followed by a discussion of local "gaps" and "disconnects" in the local economy. Economic forecasts of industries and occupations are then provided for the Fox Valley. Finally, the report concludes with a broad overview of potential directions and policy options, with sets of appendices provide more detailed analysis for interested readers.

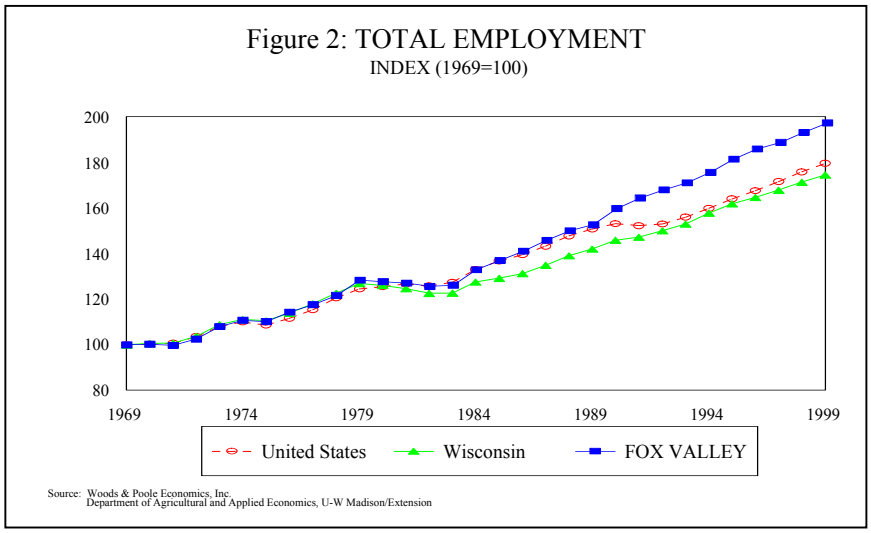
Historical Perspectives[1]

The Fox Valley, defined for this study as Outagamie and Winnebago Counties, has experienced significant economic growth over the past 15 to 20 years. Four simple measures of economic activity are reported: population, employment, per capita income and sources of income. All data used in this section are from Woods and Poole, Inc., which in turn is based on the US Department of Commerce's Regional Economic Information System.[2]

In terms of population growth (Figure 1) for the past thirty years, population grew about 35 percent for the US overall, 20 percent for Wisconsin, 27 percent for the Fox Valley. While the US grew faster overall, primarily along the coasts and the southern states, the Fox Valley has been one of the faster growing areas of Wisconsin in population. This is certainly the case for the past fifteen years, growing by almost 40,000 people. Much of the growth has been in the "suburbs" of the Fox Cities, including Grand Chute, Darboy, Greenville and Town of Menasha.

Employment Growth has also been strong for the Fox Valley area. From 1969 to 1999, total employment in the Fox Valley grew by 97.6 percent while Wisconsin and the US grew by 79.6 and 74.5 percent respectively (Figure 2; Table 1). The bulk of this growth occurred since the early 1980s and, indeed, there is little evidence of a down-turn in employment during the recession of the early 1990s.





While employment growth overall has been strong for the Fox Valley, certain sectors have accounted for a majority of the growth. The service sector, for example, which includes health care, various business services, eating and drinking, and other professional services, grew by an amazing 238 percent, slightly higher than either the US or Wisconsin. The historical data also indicate that the service sector is not only rapidly growing, but the growth has been

[1] Detailed graphical representations of growth and distributions in employment, income and population are available in an appendix to this report.

[2] The BEA-REIS data can be obtained at http://www.bea.doc.gov/bea/regional/data.htm and Woods and Poole, Inc can be reviewed at http://www.woodsandpoole.com/Index.htm

Table 1: Percent Employment Growth 1969-1999			
	US	Wisconsin	Fox Valley
Total Employment	79.6	74.5	97.6
Agriculture	-21.4	-31.8	-34.8
Mining	17.6	2.1	63.7
Construction	102.8	89.4	124.3
Manufacturing	-4.4	21.3	46.3
Trans, Communication, Pub Utilities	63.7	72.1	100.0
Wholesale	83.6	105.5	139.5
Retail	101.6	79.8	99.4
Finance, Insurance, Real Estate	112.7	133.2	170.2
Services	207.4	202.5	237.7
Government	40.2	45.9	55.3

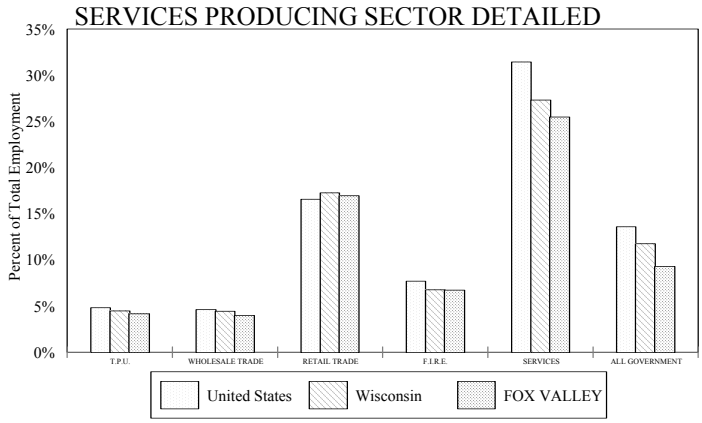
remarkably stable. Other strong growth sectors include finance, insurance and real estate growing by 170 percent over the past thirty years and Construction growing by 124 percent.

Not all sectors, however, have experienced this strong of a growth pattern. Agriculture, which includes farming, forestry and commercial fishing, declined by about one-third from its 1969 levels, with most of this decline occurring after the Farm Crisis of the early 1980s. Of particular importance is the decline in manufacturing at the national level. From a national perspective, manufacturing has *not* been a growth sector nor has it been a particularly stable sector. But manufacturing has grown in Wisconsin and in particular the Fox Valley area. As the national economy develops, the US has shifted from a "goods-consuming" to more of a "service-consuming" economy. The ramifications of this shift will be more fully developed in following discussions.

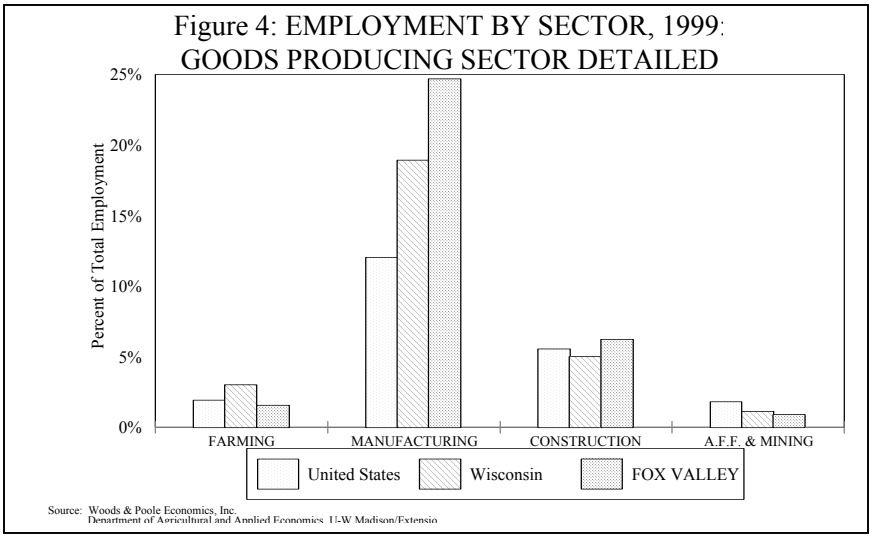
In terms of the distribution of employment across the various sectors of the economy, 25.5 percent of total employment is captured in services, 24.7 percent in manufacturing, and 16.9 percent in retail trade for the Valley. In terms of the retail sector, retail, the Valley is within a percentage point of the US overall and Wisconsin. But for the service sector, the Valley has a much smaller share of total employment when compared to the US in particular (25.5 vs 31.4 percent). The Valley is, however, particularly dependent on manufacturing, which accounts for 24.7 percent of all jobs. This compares with only 12 percent for the US and about 19 percent for Wisconsin. This is reflective of the phrase "Paper is King in the Fox Valley."

Two key observations can be made concerning the "overly" high dependence on manufacturing. First, as noted before, manufacturing is not a growth sector for the national economy. Part of this decline in the importance of manufacturing has been the exporting of manufacturing to developing counties and the general decline in the demand for manufactured goods in the US. From a national perspective, as we become wealthier we spend an increasing share of our income on service producing sectors, such as health care and professional services and a smaller share on manufactured goods. Second, the goods producing sectors, including construction and manufacturing, are much more sensitive

Figure 3: EMPLOYMENT BY SECTOR, 1999: SERVICES PRODUCING SECTOR DETAILED



Source: Woods & Poole Economics, Inc.
Department of Agricultural and Applied Economics, U-W Madison/Extension



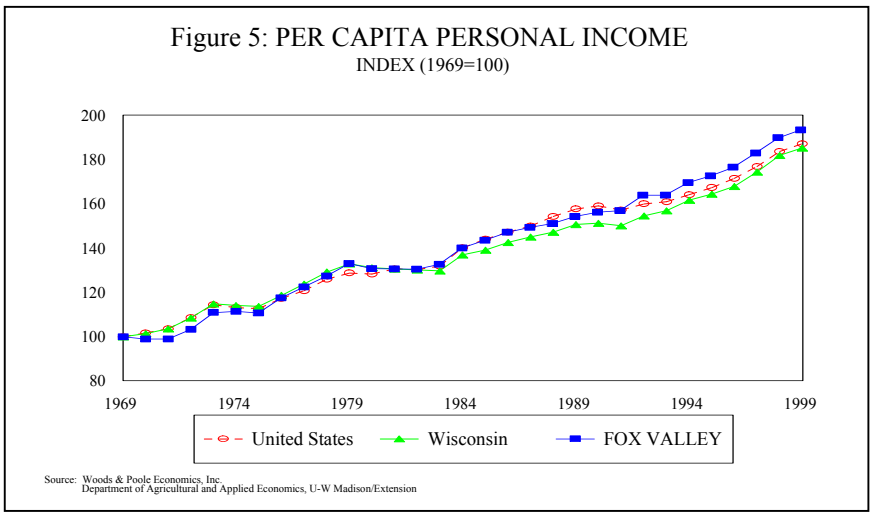
to declines in the economy and are inherently less stable than the service producing sectors.

The question then becomes one of opportunity or threat. Clearly, from national perspective, over-dependence on manufacturing is a threat, both from a growth and stability perspective. Yet, there is little evidence of the Valley being affected by the early 1990s recession. This begs the question- is the manufacturing sector in the Valley, in particular paper, sufficiently unique to off-set general weaknesses in manufacturing overall?

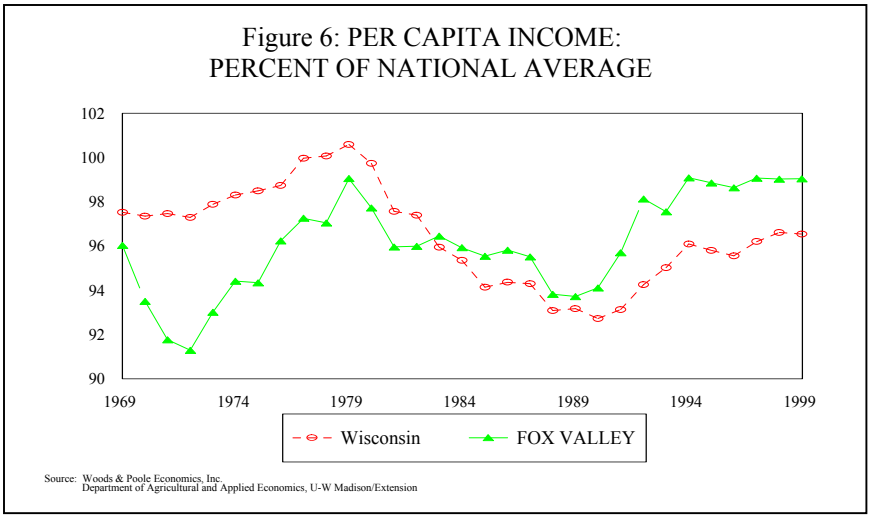
Our third measure of historical economic growth for this study is change in real per capita income. Here, the affects of inflation have been removed, and the growth reported captures growth above nominal changes in inflation.

From 1969 to 1999, real per capita income for the US grew by 86.9 percent. Wisconsin grew slightly slower at 85.1 percent and the Valley grew slightly faster at 92.8 percent (Figure 5). While the recession of the early 1990s is not evident in the employment analysis, there is some evidence of a mild recession, or a period of "no" growth in per capita income. Through the 1990s, the annual growth rate in real per capita income for the Valley averaged 4.5 percent, which is reflective of the overall strength of the economy during the past ten years.

While growth in real per capita income has been strong for the US, Wisconsin and the Fox Valley, it is important to keep in mind that each started the period at different levels. In 1969, Wisconsin's real per capita income in 1987 dollars was $14,029, which was 2.5 percent below the US per capita income of $14,386 (Figure 6). The Valley was a bit below the US and Wisconsin average at $13,816.

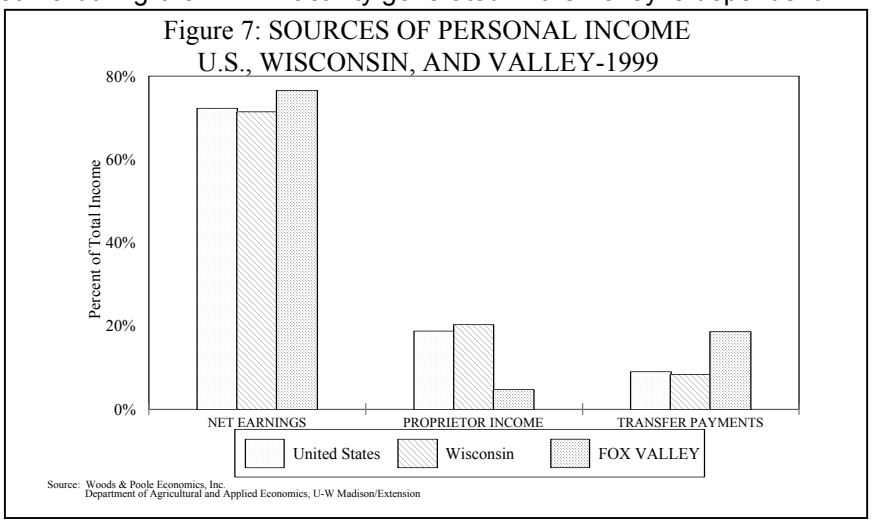


Throughout most of the 1970s, Wisconsin and the Valley witnessed relative strong growth in real per capita income when compared to the US. The recession of the early 1980s, however, was particularly hard for Wisconsin overall, and somewhat hard for the Fox Valley. In 1983, the Valley's real per capita income surpassed Wisconsin's overall average and has remained consistently above Wisconsin since. This latter "gap" has actually risen in latter years and the growth in the first half of



performance because it captures the activities of smaller, locally owned businesses. Of particular interest is the growth in proprietor income at the national level. For the period examined for this study, proprietor income grew by 104 percent for the US, but only 4.8 percent for Wisconsin and 30.6 percent for the Fox Valley (Figure 8). Nearly all of this growth, at least for the US and the Valley, occurred since about 1984. Much of the economic activity generated in the Valley is dependent upon "outside" firms. Given the newfound importance of small businesses in the "new information economy," this relatively low level of dependency on proprietor income may represent an opportunity for enhanced local entrepreneurial activity.

the 1990s saw both Wisconsin and the Valley catching up to the US overall average. While there has been strong growth in real per capita income during the latter half of the 1990s, the growth has paralleled the US. Today, per capita income, again in 1987 dollars, is $26,894 for the US, $25,965 for Wisconsin and $26,636 for the Fox Valley. In other words, while the Valley has moved from below to above the Wisconsin average, it has fallen just shy of the US average and the latter gap does not appear to be closing.

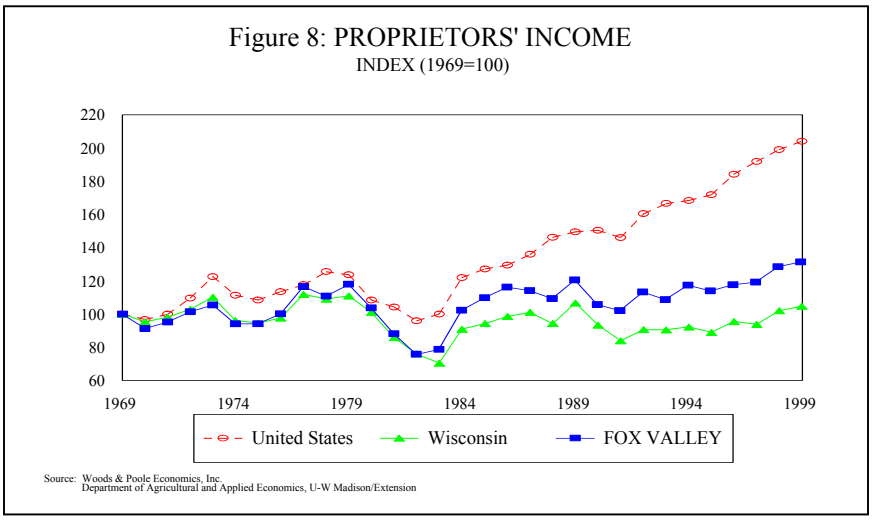


The final measure of economic activity is sources of income, which although is dominated by wages and salary also includes transfer payments, proprietor income (e.g., business profits paid to sole proprietors) and interest, dividend and rental income. For the Fox Valley, wage and salary income accounted for 76.6 percent of all income, which is slightly higher than the US or Wisconsin (Figure 7).

Of particular interest for the Valley is the relatively lower levels of proprietor income, which accounts for about 20 percent of all income for the US and Wisconsin, compared to less than five percent for the Valley. Proprietor's income is an important gauge of economic

Finally, the Valley appears to be markedly dependent on transfer payments (e.g., social security, Medicaid, unemployment insurance, etc.). For the US and Wisconsin, transfer payments account for nine and eight percent of total income respectively. In the Valley, however, transfer payments account for 18.6 percent of total income (Figure 7). From one perspective, transfer payments represent an injection of outside money into the local

economy. Indeed, over the past thirty years, transfer payments have grown over 324 percent for the US and 257 percent for the Valley. This represents significant growth in new money for the Valley's economy. On the other hand, household dependency on transfer payments for income generally is associated with lower overall standards of living. In addition, transfer payments are generally government programs that are subject to the political climate. For example, there was little if any growth in transfer payment income during the more conservative Reagan Administration.



Because social security payments represent such a large component of transfer payments, examination of trends in age distributions warrants consideration. In 1970, 9.2 percent of the Valley population was 65 years of age and over. In 1999, that figure is 11.9 percent for the Valley and 12.7 percent for the US. Projecting to the year 2025, 18.3 percent of the Valley's population will be 65 and older, compared to 18.7 percent for the US. On one hand, the aging population represents injections of new monies through transfer payments. On the other, the aging of the population has significant potential impacts on the labor force and the ability of the economy to grow, given a potential labor constraint.

In conclusion, the Fox Valley has seen significant changes in much of its economy. But at the same time, so has the US and Wisconsin. While the Valley may not have been growing as fast as the US in terms of overall population and income, the Valley has outperformed Wisconsin in each of these broad areas including employment. The Valley's growth rate in total employment surpassed that of Wisconsin in 1984 and the US in 1990. Manufacturing employment remains strong in the Valley, with the percent of total employment in manufacturing twice the level of the US and 25% higher than Wisconsin.

The increase in employment in finance, insurance and real estate (FIRE) and retail trade has partially diversified the economy away from manufacturing, however, manufacturing, specifically paper, is still king in the Valley. While retail trade employment is still lower than the US average, growth rates in employment in this sector has kept pace with the US making significant increases in 1989 and 1990. This latter time period witnessed rapid growth in "big box" retail around the Fox River Mall / Casaloma Drive.

With infrastructure improvements in place, the Valley, specifically the Fox Cities, is poised to continue its expansion and growth. Job creation, including those identified in the original targeted industry study, has lead to increases in most sectors of the economy. Low entrepreneurial activity and labor shortage are two challenges that need to be overcome.

Strengths and Weaknesses

The analysis presented in this section of the report is aimed at identifying the specific strengths and weaknesses of individual industries in the Fox Valley area. Attention is paid to industry sales (Total Industry Output, TIO), wages and salary and total income (Total Value Added, TVA) which includes wages and salaries,

proprietor income and other property income.[3]

Two specific measures are used to assess overall strength and weakness: levels of TIO, wages and TVA per job, and location quotients (LQ). The location quotient 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, multi state or multi county economy. The local economy, in this case the Fox Valley, is compared against that standard of self-sufficiency. If the local economy has relatively less economic activity in a particular sector, it might suggest the good or service is being imported from other communities. If the local economy has relatively more economic activity in a particular sector, it might suggest the good or service is being exported to other communities.

The calculation of the LQ is relatively straightforward and involves comparing the percent of total economic activity in the Valley in some specific sector to the percent of total economic activity for the US in the same sector. A ratio of "1" means that the local level of economic activity in that sector is just sufficient to support local demand (supply equals demand). An LQ greater than "1" implies that the sector being examined produces more than is need for local consumption (supply is greater than demand). The surplus is said to be exported from the region. An LQ less than "1" suggests that local production does not satisfy local demand (demand is greater than supply). Unmet demand implies importation of the good or service.

Traditional economic development theory has focused on the promotion and expansion of sectors that have LQ greater one. The rationale is that export sectors brings new monies into the local economy enhancing economic growth. For Wisconsin and the Valley, these types of sectors have historically included, but not limited to, manufacturing and agricultural production. These types of industries are often referred to as "basic" industries and represent the engine of the economy. The remaining "non-basic" sectors, traditionally thought of as trade and services, are in place to support the "basic" industries. The economic growth policies that have followed from this simple view of the economy has tended to focus on the promotion of "basic" industries such as manufacturing and agriculture.

Care must be taken in drawing conclusions based on 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., steel mills or shoe manufacturers, etc.). 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 cities and villages. At the same time, the idea of what defines a "basic" industry has expanded to include a range of service producing sectors such as financial and insurance companies, health care facilities and certain types of recreational or tourism activities.

The simplest means to examine industry strengths is to rank the top 25 industries out of a total of 260 industries in the analysis according to our three measures of economic activity: industry output (or sales) (TIO), jobs, and total income, or total value added (TVA). In terms of total industry sales, half of the top ten are manufacturing related, dominated by the paper industry (Table 2). Specifically, the top ten industries account for $8.4 billion, or 38.3 percent of total industrial output for the Valley. Of those, paper accounts for $3.8 billion in industry sales, or 17.5 percent of total industry sales in the Valley. The aggregate of the top 25 industries accounts for more than half, 62 percent, of all industry sales, or about $13.6 billion.

[3] The analysis presented in this section is based on an input-output model of the Valley's economy. A total of 260 sectors are included in the model. Additional details of the model are provided below.

Table 2: Top 25* Industries TIO	Total Industrial Output
Paper Mills, Except Building Paper	$2,774,309,326
Motor Vehicles	960,448,975
Wholesale Trade	896,693,909
Miscellaneous Plastics Products	687,889,465
Sanitary Paper Products	558,395,813
Doctors and Dentists	529,624,268
Motor Freight Transport and Warehousing	521,105,835
Owner-occupied Dwellings	480,629,974
Paper Coated & Laminated N.E.C.	476,295,288
New Residential Structures	464,367,371
State & Local Government - Education	442,917,786
Truck and Bus Bodies	440,721,405
Insurance Carriers	435,983,429
Electronic Components, N.E.C.	416,648,041
Paperboard Containers and Boxes	355,186,676
Hospitals	354,161,804
Real Estate	350,565,399
Eating & Drinking	343,633,728
Maintenance and Repair Other Facilities	326,162,231
Sausages and Other Prepared Meats	318,224,884
Banking	299,242,889
New Industrial and Commercial Buildings	293,112,549
Paper Coated & Laminated Packaging	283,558,624
Commercial Printing	280,790,161
Paper Industries Machinery	273,689,026

*: Top 25 out of a possible 260 sectors.
Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

located in the Valley have total sales of $529 million while hospitals have sales of $354 million. The extent of export these sectors have will be examined below with location quotient analysis.

The single largest employer in the Fox Valley is eating and drinking establishments, accounting for 11,623 jobs, or about 5.4 percent of total employment (Table 3). This is followed closely by the public school systems in the Valley with 11,081 jobs and paper mills with 10,729. These three top employment sectors account for 33,433 jobs or 15.6 percent of total employment. Rounding out the top five employment sectors includes miscellaneous retail and wholesale trade, each with about 2,700 jobs. The top 25 employment sectors account for 126,321 jobs, or 58.8 percent of all employment in the Valley.

It is important to keep in mind that manufacturing in the Valley tends to be part of the "basic" sectors of the economy marketing to national and international markets. Hence the sales potential can be significantly higher, given the scale of operations than firms that are more "non-basic" in nature (supporting local markets). Regardless, local markets can be significant. For example, doctors and dentists offices

It is important to note that the employment figures reported here are *not* full-time equivalent or, in other words, part and full-time jobs are counted as the same. Given the nature of the restaurant industry, some of these jobs may be part-time and, therefore, care must be taken in interpretation of the results.

Table 3: Top 25* Industries Employment	Employment
Eating & Drinking	11,623
State & Local Government – Education	11,081
Paper Mills, Except Building Paper	10,729
Miscellaneous Retail	8,707
Wholesale Trade	8,673
Hospitals	6,189
State & Local Government - Non-Education	5,745
Doctors and Dentists	5,735
Maintenance and Repair Other Facilities	4,687
Personnel Supply Services	4,617
Motor Freight Transport and Warehousing	4,569
Automotive Dealers & Service Stations	4,147
Labor and Civic Organizations	4,091
Miscellaneous Plastics Products	3,847
General Merchandise Stores	3,805
Food Stores	3,605
Insurance Carriers	3,472
New Residential Structures	3,418
Real Estate	3,053
Credit Agencies	2,740
Nursing and Protective Care	2,603
Commercial Printing	2,486
New Industrial and Commercial Buildings	2,292
Banking	2,241
Other Business Services	2,165

*: Top 25 out of a possible 260 sectors.
Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

Our final measure of aggregate economic activity is total value added (TVA), which is a comprehensive measure of income including wages and salaries, proprietor income and rental income. The paper industry, defined more narrowly as paper mills, is again dominant in the Valley accounting for slightly more than $1billion, or 9.9 percent of TVA for the Valley (Table 4). Yet, there are a number of other sectors that are significant. For example, the wholesale trade sector, which would include larger firms such food and beverage distributorships, and smaller specialty distributorships such as Acoustical Floors of Wisconsin in Appleton, contributes $613 million to total value added in the Valley. The top 25 sectors reported in Table 4 accounts for $6.6 billion in TVA, or about 63.4 percent of the Valley's total.[4]

Based on the simple listing in Tables 2, 3 and 4, a handful of sectors rise to the top in terms of aggregate size. These include paper mills, the public education system, wholesale trade, the health care industry, including doctors, dentists and hospitals, and motor freight transport and warehousing. The extent to which these sectors are exporting out of the Valley or supporting one local market will be examined below.

While aggregate levels are insightful, it is often difficult to make direct comparisons because of differences in scale of operation. One common method for accounting for size is to place aggregate measures of activity on a common scale. In this case, placing industry output, wage and salary income, and total value added on a *per job* basis captures size of operation effects. The top 25 sectors in terms are TIO per job, wage and salary income per job and TVA per job are provided in Tables 5, 6 and 7.

The largest industries in the Valley in terms of Total Industry Output (TIO) per job are listed in descending order in Table 5. Industry output per job is generally considered a simple measure of industry productivity. Higher levels of output per job are generally associated with more product

[4] The sector called "Owner Occupied Dwellings" is a specialty sector that accounts for homeowners' mortgage payments and should *not* be considered a productive industry such as manufacturing or services.

Table 4: Top 25* Industries TVA	Total Value Added
Paper Mills, Except Building Paper	$ 1,033,208,533
Wholesale Trade	613,771,233
State & Local Government – Education	442,917,786
Owner-occupied Dwellings	367,955,879
Doctors and Dentists	358,094,527
Real Estate	245,949,543
Miscellaneous Plastics Products	244,809,195
Motor Freight Transport and Warehousing	239,845,857
Insurance Carriers	239,559,141
Banking	223,207,760
Hospitals	222,912,744
State & Local Government - Non-Education	222,080,360
Miscellaneous Retail	215,248,606
Maintenance and Repair Other Facilities	212,951,512
Truck and Bus Bodies	197,491,695
Automotive Dealers & Service Stations	190,765,852
Sanitary Paper Products	183,699,994
Paper Coated & Laminated N.E.C.	179,466,855
Eating & Drinking	171,926,649
Motor Vehicles	170,054,711
Credit Agencies	142,475,458
Communications, Except Radio and TV	128,532,990
New Residential Structures	119,468,487
Commercial Printing	115,664,127
New Industrial and Commercial Buildings	115,152,817

*: Top 25 out of a possible 260 sectors.
Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

and/or efficient industries. For the Valley, the general category of motor vehicles has the highest TIO/Job ratio at $614,968. The major companies in this sector include Oshkosh Truck, which makes vehicles under contract for the Department of Defense, and Pierce Manufacturing which makes fire fighting trucks and equipment.

While the paper industry is generally considered a high output industry, it is not in the top five most productive sectors. Sanitary paper products is ranked seventh at $461,919, which is a part of Kimberly Clark. Paperboard mills, which includes a number of companies, is 9th at $409,444. Pulp mills, including Appleton Paper and International Papers (Thilmany), are 20th at $306,550. Other high output per employee include various dairy-processing industries, including cheese, at $559,002 and condensed and evaporated milk at $548,046.

The additional information of job level provided in the third column of these tables points to a few factors that warrant discussion. First, highly productive firms need not be large by definition. In the Valley there are several small firms, as measured by employment levels, which have high levels of output. For example, the sector "internal combustion engines," has total industrial sales of almost a million dollars, but has only three jobs associated with that output. This translates into more than $300,000 of industry output per employee.

Second, what should become clear is that targeting sectors of the economy for growth and development should not hinge on a single indicator, but rather on a comprehensive analysis that considers several factors. The range of measures and the differences in industry strengths and weaknesses point to the need for clearly defined objectives of the growth policy, specifically, what is the growth policy attempting to maximize or minimize.

Table 5: Top 25* Industries Based on Industry Output per Employee

	TIO/Jobs	Jobs
Motor Vehicles	$614,968	1,562
Gas Production and Distribution	578,984	29
Cheese, Natural and Processed	559,002	384
Condensed and Evaporated Milk	548,046	168
Petroleum and Coal Products, N.E.C.	507,717	38
Prepared Feeds, N.E.C	464,704	39
Sanitary Paper Products	461,919	1,209
Electric Services	416,631	129
Paperboard Mills	409,444	127
Miscellaneous Metal Work	387,599	18
Fertilizers, Mixing Only	384,372	11
Fluid Milk	360,537	24
Copper Rolling and Drawing	338,274	108
Meat Packing Plants	333,170	135
Bottled and Canned Soft Drinks & Water	322,408	334
Paints and Allied Products	321,883	49
Lawn and Garden Equipment	320,818	104
Other Federal Government Enterprises	318,376	14
Internal Combustion Engines, N.E.C.	312,306	3
Pulp Mills	306,550	30
Poultry and Eggs	305,755	13
Chemical Preparations, N.E.C	300,181	36
Inorganic Chemicals Nec.	291,788	66
Cattle Feedlots	269,628	17
Adhesives and Sealants	269,320	16

*: Top 25 out of a possible 260 sectors.
Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

One of the clearly stated objectives of the Fox Cities Economic Development Partnership Research Committee is to maximize the number of well paying jobs. One way to gain insight into these well paying jobs is to examine wage and salaries earned per job and total value added per job. The former is reported in Table 6 while the latter is reported in Table 7.

One of the highest paying sectors in the Valley is electric services, or electric utilities, with the average employee earning $74,400 per year and total value added of $342,000 per job. The large difference between wage and salary income and TVA per job is attributed to property income which includes rental income, royalties from contracts and profit. Other high income jobs that could be consider “specialty” given the small employment levels includes gas production and distribution which is primarily the natural gas utilities at $56,200 in wages and salaries per job and $163,800 in TVA per job. Finally, the adhesives and sealants industry in the Valley is well paying at $59,000 in wages and salary and $93,400 in TVA per job, but there are a modest 16 jobs in this sector.

Another sector that appears to be well paying is the general category “other federal government enterprises” at $82,800 in wages and salary and $193,400 in TVA per job. This elusive sector for the Valley appears to be composed primarily of the

Veteran Administration Clinic and is reflective of some potential anomalies with the data accounting. Specifically, the data suggests only 14 jobs and this may mask jobs associated with contracted services.

Not all of the high paying industries reported in Tables 6 and 7 are small niche sectors. Paper mills, which employs 10,729, the largest single industrial employer, pays on average $62,100 per job in wages and salary and earns $96,300 in total value added per job. The truck and bus bodies industry in the Valley employees 1,743 persons and pays just over $50,000 in wages and salaries, but has total value added income of $113,300 per job, reflecting the profitability of this industry. Motor vehicles is another large employer at 1,562 jobs and $57,200 per job in wages and salary.

The strength of these sectors can be seen not only in the noteworthy size of the individual LQ but also in the fact that each of the top 25 sectors in the Valley is stronger than Wisconsin overall. Indeed, the strength of these sectors in the Fox Valley strengthens the state's position in these sectors.

Table 6: Top 25* Industries Based on Wages and Salaries per Employee

	Wages/Jobs	Jobs
Other Federal Government Enterprises	$ 82,800	14
Railroads and Related Services	80,872	113
Electric Services	74,441	129
Tanks and Tank Components	70,286	7
Paper Mills, Except Building Paper	62,069	10,729
Steam Engines and Turbines	59,259	1
Adhesives and Sealants	58,989	16
Copper Rolling and Drawing	58,617	108
Polishes and Sanitation Goods	57,261	5
Motor Vehicles	57,227	1,562
Gas Production and Distribution	56,223	29
Paper Industries Machinery	55,399	1,788
Paper Coated & Laminated N.E.C.	55,249	2,162
U.S. Postal Service	54,923	827
Hoists, Cranes, and Monorails	53,675	10
Industrial Furnaces and Ovens	53,549	4
Pulp Mills	53,429	30
Paperboard Containers and Boxes	53,278	1,682
Paperboard Mills	53,126	127
Doctors and Dentists	52,498	5,735
Packaging Machinery	52,371	40
Industrial Patterns	52,176	220
Motor Vehicle Parts and Accessories	51,763	395
Truck and Bus Bodies	51,448	1,743
Printing Trades Machinery	51,346	301

*: Top 25 out of a possible 260 sectors.
Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

Table 7: Top 25* Industries Based on Total Value Added per Employee

	TVA/Job	Jobs
Electric Services	$ 341,714	129
Petroleum and Coal Products, N.E.C.	328,413	38
Other Federal Government Enterprises	193,361	14
Gas Production and Distribution	163,789	29
Sanitary Paper Products	151,961	1,209
Communications, Except Radio and TV	146,596	877
Condensed and Evaporated Milk	133,345	384
Polishes and Sanitation Goods	132,156	5
Railroads and Related Services	121,508	113
Truck and Bus Bodies	113,298	1,743
Motor Vehicles	108,885	1,562
Water Supply and Sewerage Systems	102,258	6
Paperboard Mills	101,862	127
Banking	99,607	2,241
Pulp Mills	98,928	30
Dimension Stone	96,722	174
Paper Mills, Except Building Paper	96,301	10,729
Lawn and Garden Equipment	93,803	104
Natural Gas & Crude Petroleum	93,649	29
Adhesives and Sealants	93,401	16
Primary Batteries, Dry and Wet	92,274	148
Automobile Rental and Leasing	88,846	237
Prefabricated Metal Buildings	86,005	2
Radio and Tv Communication Equipment	85,663	8
Steam Engines and Turbines	85,018	1

*: Top 25 out of a possible 260 sectors.
Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

Based on this analysis, the Valley has some well paying jobs, many of which are not particularly obvious nor appear on the radar screen of policy makers because of the relative small size of the sectors. Yet the phrase "paper is king" is supported by this analysis. Not only does the paper industry employ a large number of persons, but pays above average wages and salaries.

The final set of analysis for this section of the report looks to the export potential of each of the 260 sectors in the Valley input-output model. To do this we analyze sectors using simple location quotients (LQ), as outlined above. Location quotients greater than one imply that the industry is producing more than can be consumed locally, hence must be exporting and is deemed a "basic" sector. Location quotients for the Valley and the state of Wisconsin are provided in Tables 8 and 9. These are computed based on comparison to the US economy.

Not surprisingly, location quotients are very high in paper related activities. Of the top ten industries based on size of the LQ, six are paper-related, seven if book printing is considered paper-related. Other strong export sectors include welding apparatus, truck and bus bodies, industrial

Table 8: Location Quotients on Rank of Valley Strength*

	Fox Valley	Wisconsin	FV-WI Difference
Paper Industries Machinery	62.746	44.878	17.869
Paper Mills, Except Building Paper	52.712	33.810	18.902
Welding Apparatus	45.191	25.659	19.532
Paper Coated & Laminated Packaging	43.885	27.540	16.345
Truck and Bus Bodies	34.894	23.110	11.784
Paper Coated & Laminated N.E.C.	32.591	18.627	13.965
Stationery Products	29.803	18.196	11.607
Sanitary Paper Products	27.451	15.868	11.582
Industrial Patterns	20.825	15.397	5.428
Book Printing	19.865	13.089	6.777
Frozen Specialties	16.205	10.039	6.166
Mining Machinery, Except Oil Field	16.052	11.926	4.126
Converted Paper Products, N.E.C	14.926	8.093	6.834
Petroleum and Coal Products, N.E.C.	12.792	7.409	5.384
Sausages and Other Prepared Meats	10.223	7.852	2.371
Printing Trades Machinery	9.910	6.769	3.141
Transformers	8.497	7.534	0.963
Plate Making	8.472	5.612	2.860
Conveyors and Conveying Equipment	8.393	5.163	3.229
Primary Batteries, Dry and Wet	8.243	7.699	0.544
New Farm Structures	8.135	8.188	-0.053
Bags, Plastic	7.815	5.411	2.404
Condensed and Evaporated Milk	7.403	5.539	1.864
Textile Goods, N.E.C	7.187	4.370	2.817
Miscellaneous Publishing	6.842	4.102	2.740

*: Top 25 out of a possible 260 sectors.
Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

patterns, book printing, plastic bags, frozen specialties and sausage and prepared meats.

There are some sectors that are considered "strong" for Wisconsin overall based on the LQ, but weak to non-existent for the Fox Valley (Table 9). For example, malt and malt beverages (i.e., beer production) has a strong presence in Wisconsin, but is non-existent in the Valley. Another is motorcycle and bicycle manufacturing, which for Wisconsin is Harley-Davidson and Trek Bikes. These are strengths for Wisconsin, but not for the Valley. The question from an economic development policy perspective is if the Valley can position itself to benefit from any growth in these sectors. For example, if HFM in Two Rivers, Wisconsin (metal sanitary wares) elects to expand its production capabilities, Wisconsin and perhaps the Valley may have a comparative advantage in attracting or retaining that expansion.

The remarkable size of the location quotients associated with paper-related industries actually may point to a level of over-dependency on a small handful of sectors. While "paper is king" rings true, is the region at risk during a downturn or restructuring in the paper industry? Is this a signal of strength to be built upon or an indicator to diversify the economic structure of the Valley's economy? These are areas business leaders need to approach with full knowledge and maybe some caution. It is important to keep in mind that the LQ is a simple indicator of strength and/or weakness and should be used as an initial starting point for more detailed analysis.

Table 9: LQ Ranked on Wisconsin Strengths vis-à-vis Valley*	Fox Valley	Wisconsin	FV-WI Difference
Metal Sanitary Ware	0.000	14.006	-14.006
Creamery Butter	0.000	10.487	-10.487
Malt	0.000	10.268	-10.268
X-Ray Apparatus	0.000	8.367	-8.367
Hoists, Cranes, and Monorails	0.874	7.319	-6.445
Motorcycles, Bicycles, and Parts	0.000	5.895	-5.895
Internal Combustion Engines, N.E.C.	0.033	5.032	-4.999
Cheese, Natural and Processed	6.818	11.072	-4.254
Polishes and Sanitation Goods	0.116	3.979	-3.863
Relays & Industrial Controls	0.705	4.371	-3.666
Leather Gloves and Mittens	0.195	3.691	-3.497
Household Appliances, N.E.C.	0.000	3.099	-3.099
Laboratory Apparatus & Furniture	0.000	3.066	-3.066
Leather Tanning and Finishing	0.000	2.901	-2.901
Lawn and Garden Equipment	3.426	5.923	-2.497
Public Building Furniture	0.058	2.536	-2.478
Farm Machinery and Equipment	0.000	2.474	-2.474
Chocolate and Cocoa Products	0.000	2.468	-2.468
Rubber and Plastics Footwear	0.000	2.432	-2.432

In summary, there are several obvious strengths to the Valley's economy. These include high paying, large sectors such as paper, motor vehicles, some public sectors including the public education system, health care services, and plastics. There are however, several other sectors that account for large aggregate measures of activity, such as eating and drinking places and wholesale and retail trade, but the level of income per job generated is modest. For example, eating and drinking places rank in the top 25 industries based on employment and total income (total value added), but wages per job is less than $10,000.

Based on the historical trends, the growth sectors for the Valley appear to be in the services sector (Table 1). Some of these include well paying sectors such as the medical and health care as well as low paying jobs such as hotels, childcare, and laundry services. The challenge from an economic development policy perspective is to balance the limited growth potential for high paying manufacturing jobs with the high growth of potentially lower paying service jobs.

Industrial Linkages

One of the bases of targeted industry analysis for this study is the use of an input-output (I-O) model of the Fox Valley economy. Input-output analysis can be described as a snapshot of the economy at any given point in time. The goal of I-O analysis is to describe the linkages between different actors in the economy. One can think of an I-O model as a "spreadsheet" depicting the economy. Columns account for buyers (i.e., demand) of goods and services in the economy while rows account for sellers (i.e., supply) of those goods and services. Any given cell of the spreadsheet, defined as the intersection between a column (buyers/demand) and a row (sellers/supply), is the transaction between buyers (demand) and sellers (supply). Under some specific assumptions, this "spreadsheet" of the economy can be used to describe the economy and trace changes

throughout the economy (i.e., economic multipliers).

Because the Fox Valley economy is an "open" economy, there is significant shipment of goods and services into the Valley (i.e., imports) as well as shipment of goods and services out of the Valley (i.e., exports). Hence, the I-O model developed for this study provides us with three pieces of useful information. First, the magnitude of linkages between sectors in the Valley, second, the level of exports by different sectors out of the Valley, and finally the level of imports by different sectors of the Valley's economy.

This latter information can be used to identify potential "gaps" or "holes" in the local economy that can serve as a starting point for economic development strategies. These "gaps" or "holes" can occur for one of two reasons. First, a particular industry within the Valley may need a certain good or service as an input into their production process, e.g. cheese plants need milk. For some industries, certain inputs may not be available in the local economy, hence must be imported into the area. Paper mills need pulp wood, the volume of which is not available in the study area itself. This latter occurrence is often referred to as a "gap" in the local economy. Second, the good or service that a specific industry may require is produced in the local economy, but is not purchased for whatever reason. For example, a local cheese plant may not be buying milk from local dairy farmers. This is often referred to as a "disconnect" in the local economy.

Economic development policy can be formulated to close these gaps or holes and/or enhance the level of connection between existing local businesses. For example, large gaps in the economy may identify opportunities to attract or start new businesses. This is one method that can be used to "target" select industries. The second economic development policy often referred to as "import substitution," aims at building stronger networks between and across existing businesses. For example, networking local cheese plants with local dairy farms.

While the methods outlined here and applied below serve as a starting point for identifying specific sectors to focus on, some gaps and disconnects are logical once further explored. For example, paper mills import wood pulp because the volume needed simply cannot be produced locally. This is a gap that really cannot be filled. An example of a logical disconnect might be local printing companies that import large amounts of paper stock. One might think that with all the paper production in the Valley commercial printers would buy from these companies. But it may be the case that the type of paper required by the printers is not produced by the local paper industry. This disconnect is easily explained.

Using the regional economic modeling system IMPLAN (IMpact analysis for PLANing), an input-output model for the Fox Valley area is constructed using data from 1998. In total, the model accounts for 260 separate industries and commodities. Three specific techniques are used to analysis the data for gaps and disconnects. First, we examine directly for gaps by looking for specific commodities that are purchased by local businesses that are not produced in the Valley. Second, we examine the purchasing patters of local industries based on the absolute magnitude of imported commodities. Finally, we examine the pattern of businesses that are importing selected commodities. Each of these three techniques will be reported and discussed in turn.

Given the detail of the Valley's input-output model, we were able to identify only nine "absolute gaps" (Table 10). The largest gap is the purchasing of beer (malt beverages) by eating and drinking places, with total imports of $7.6 million. This observation reflects the fact that the beer industry tends to be dominated by a handful of companies that do not have production capabilities in the Valley. The policy question is if this identified gap is sufficiently large to act upon. Other gaps that appear to be reasonable are the importation of cotton and cottonseed oils, neither of which are likely to be produced in the Valley. One potential gap reported in Table 10 that might warrant additional consideration is the

Table 10: Imported Commodities not Available Locally

Importing Industry	Imported Commodity	Level
Eating & Drinking	Malt Beverages	$7,654,303
New Residential Structures	Wood Preserving	3,198,269
Bottled and Canned Soft Drinks & Water	Glass Containers	2,963,135
Eating & Drinking	Roasted Coffee	2,571,726
Canned Fruits and Vegetables	Glass Containers	2,461,947
Frozen Specialties	Cottonseed Oil Mills	1,315,239
Broadwoven Fabric Mills and Finishing	Cotton	1,300,740
Funeral Service and Crematories	Burial Caskets and Vaults	1,146,459
New Residential Structures	Brick and Structural Clay Tile	1,126,756
Printing Ink	Carbon Black	1,069,234
Paper Mills, Except Building Paper	Cottonseed Oil Mills	1,062,500
New Industrial and Commercial Buildings	Wood Preserving	1,016,262

Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

production of glass containers, which are imported at the level of $2.5 million by bottled and canned beverage producers and canned fruits and vegetable producers. While this gap may be below a critical threshold, it may warrant further investigation.

The local interaction among businesses can be described as complex. While it is clear to see the need for importing inputs into the production process, if the input is not available locally, as in Table 10, it is less clear if the good or service is produced locally. The importation of locally available goods may be do to disconnect or a range of legitimate reasons such as pricing, detailed product specifications, or national contracts that supercede local contracts.

The analysis of the Valley input-output model identified several businesses with potential disconnects (Table 11). The paper industry, including paper mills, paperboard containers and sanitary paper products, among others, for example, imports a huge volume of goods used in its production process, many of which are locally available. A specific example of an imported commodity is pulpwood, of which $146 million is imported; yet, the local pulp wood industry exports $95 million. There appears to be a disconnect in the range of one hundred million dollars. Another example is the importation of $55 million of plastic products by paper mills, yet the plastics industry in the Valley exports $133 million worth of product.

Another example of a potential disconnect is commercial printing, which imports $31 million worth of paper. Meanwhile local producers of paper export $1.2 billion. While this appears to be a significant disconnect, it might be readily explained by the types of paper produced locally and needed by local printers, by national contracts, or by pricing.

While the industries discussed in Table 11 appear to be biased towards manufacturing, it is important to keep in mind that the table was generated based on absolute dollar levels. Given the size of manufacturing, these types of firms rise to the top more from study design than potential for policy direction. Cheese production, however, may point to a true disconnect that could serve as the foundation for policy. Cheese plants in the Valley import $68 million worth of dairy products (milk), but the dairy industry in the Valley exports $124 million worth of product (milk and some livestock). This is a clear disconnect that warrants further attention.

Table11: Industry "Disconnect" and "Gaps": Industry Importing by Commodity

Importing Industry	Imported Commodity	Level of Competitive Import	Commodity Export
Dairy Farm Products			
	Feed Grains	$ 36,589,111	$ 42,474,457
Cheese- Natural and Processed			
	Dairy Farm Products	$ 68,328,190	$ 124,164,734
Paper Mills- Except Building Paper			
	Pulp Mills	$ 146,388,891	$ 94,905,426
	Logging Camps and Logging Contractors	$ 124,664,899	$ -
	Cyclic Crudes- Interm. & Indus. Organic Chem.	$ 118,014,582	$ -
	Sawmills and Planing Mills- General	$ 104,539,667	$ -
	Wholesale Trade	$ 85,911,211	$ -
	Electric Services	$ 76,108,132	$ -
	Miscellaneous Plastics Products	$ 55,199,439	$ 633,247,620
	Gas Production and Distribution	$ 52,598,760	$ -
	Computer and Data Processing Services	$ 31,372,818	$ -
	Inorganic Chemicals Nec.	$ 30,505,119	$ -
	Surface Active Agents	$ 27,904,138	$ -
	Electric Services	$ 26,344,001	$ -
Paperboard Containers and Boxes			
	Paper Mills- Except Building Paper	$ 82,676,158	$1,289,690,918
	Paperboard Mills	$ 39,527,968	$ 933,924,866
Paper Coated & Laminated Packaging			
	Miscellaneous Plastics Products	$ 27,029,416	$ 633,247,620
	Paper Mills- Except Building Paper	$ 26,588,182	$1,289,690,918
Paper Coated & Laminated N.E.C.			
	Miscellaneous Plastics Products	$ 44,476,115	$ 633,247,620
	Paper Mills- Except Building Paper	$ 43,750,072	$1,289,690,918
Sanitary Paper Products			
	Paper Mills- Except Building Paper	$ 70,297,932	$1,289,690,918
	Paperboard Mills	$ 33,609,863	$ 933,924,866
	Miscellaneous Plastics Products	$ 25,777,005	$ 633,247,620

Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

doctor and dentist offices, and engineering

Table11 (cont): Industry "Disconnect" and "Gaps": Industry Importing by Commodity

Importing Industry	Imported Commodity	Level of Competitive Import	Commodity Export
Commercial Printing			
	Paper Mills- Except Building Paper	$ 30,931,205	$ 1,289,690,918
Miscellaneous Plastics Products			
	Plastics Materials and Resins	$ 121,996,529	$ -
	Miscellaneous Plastics Products	$ 46,159,327	$ 633,247,620
Electronic Components- N.E.C.			
	Electronic Components- N.E.C.	$ 47,078,373	$ 145,308,533
	Semiconductors and Related Devices	$ 38,995,879	$ -
Motor Vehicles			
	Motor Vehicle Parts and Accessories	$ 222,262,121	$ -
	Automotive Stampings	$ 55,301,812	$ -
	Wholesale Trade	$ 31,258,877	$ -
	Miscellaneous Plastics Products	$ 30,665,124	$ 633,247,620
Truck and Bus Bodies			
	Motor Vehicles	$ 65,244,299	$ 459,345,337
Insurance Carriers			
	Insurance Agents and Brokers	$ 70,876,573	$ -

Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

It is also possible to identify potential gaps via Table 11. For example, the miscellaneous plastics industry in the Valley imports $122 million worth of plastic materials and resins. While there is a small industry in the Valley producing plastic materials and resins, its volume of production, only $4.2 million, is insufficient to meet local demand. In reality this is an example of gap rather than a disconnect.

The third and final method used to identify potential gaps and disconnects looks to the pattern of buyers for specific commodities that are imported into the Valley (Table 12). Discussions of employment trends, location quotients, wage and income ranges and import level outlined above provided guidance in selecting industries to focus discussion.

Various industries in the Valley including paper mills, wholesale trade, and architectural services, import almost $200 million worth of computer and data processing services. While computer and data processing services are available in the Valley, the size of the industry is only $55 million and is not of adequate scale to satisfy local demand. Given a limited amount of exported computer and data processing services, only about $1 million, there appears to be a gap in this sector.

A similar amount,$197 million, of the commodity “plastics materials and resins” is imported mainly by companies producing plastic products in the Valley. Again, modest in-Valley industry producing plastic materials and resins is not of sufficient scale to satisfy local demand. Because so little locally produced plastics materials and resins are exported, this does not appear to be a disconnect, but rather a gap in the local market.

Table 12: Industry "Disconnect" and "Gaps": Imported Commodity by Industry

Imported Commodity	Importing Industry		Level of Competitive Import
Computer and Data Processing	Total Import	$	196,792,648
(Industry Sales (TIO): $55m)	Paper Mills- Except Building Paper	$	31,372,818
	Wholesale Trade	$	20,651,279
	Doctors and Dentists	$	15,934,259
	Banking	$	8,186,204
	Hospitals	$	5,654,181
	Miscellaneous Plastics Products	$	5,398,449
	Computer and Data Processing	$	4,699,733
	Air Transportation	$	4,249,672
	Engineering, Architectural Services	$	3,848,012
Plastics Materials and Resins	Total Import	$	196,790,939
(Industry Sales (TIO): $4.2m)	Miscellaneous Plastics Products	$	121,996,529
	Paper Coated & Laminated N.E.C.	$	17,970,630
	Paper Mills, Except Building Paper	$	15,064,947
	Bags, Plastic	$	12,091,398
	Paper Coated & Laminated Packaging	$	10,921,269
	Sanitary Paper Products	$	6,109,719
	Paints and Allied Products	$	2,191,708
	Printing Ink	$	1,701,718
Management and Consulting Services	Total Import	$	104,954,582
(Industry Sales (TIO): $39m)	Hospitals	$	11,015,683
	Wholesale Trade	$	9,398,715
	New Residential Structures	$	8,118,384
	Paper Mills, Except Building Paper	$	5,116,076
	New Industrial and Commercial Buildings	$	4,147,127
	Engineering, Architectural Services	$	3,736,289
	Maintenance and Repair Other Facilities	$	3,062,773
	New Government Facilities	$	3,044,487
	Packaging Machinery	$	2,965,732
	Doctors and Dentists	$	2,824,541
	Other Business Services	$	2,270,707
	Management and Consulting Services	$	2,126,232
	Banking	$	2,000,748
	Eating & Drinking	$	1,868,699
	Miscellaneous Plastics Products	$	1,785,011

Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

Table 12 (cont): Industry "Disconnect" and "Gaps": Imported Commodity by Industry

Imported Commodity	Importing Industry		Level of Competitive Import
Dairy Farm Products		Total Import $	92,303,490
(Industry Sales (TIO): $143m)	Cheese- Natural and Processed	$	68,328,190
	Condensed & Evaporated Milk	$	20,154,350
	Fluid Milk	$	3,734,685
Semiconductors and Related Devices		Total Import $	76,805,710
(Industry Sales (TIO): $3.8m)	Electronic Components- N.E.C.	$	38,995,879
	Motor Vehicles	$	20,423,425
	Wholesale Trade	$	6,254,964
	Motor Vehicle Parts and Accessories	$	2,146,763
	Communications- Except Radio and TV	$	1,664,692
Security and Commodity Brokers		Total Import $	68,598,518
(Industry Sales (TIO): $65m)	Insurance Carriers	$	14,397,631
	Banking	$	13,364,887
	Security and Commodity Brokers	$	6,507,595
	Credit Agencies	$	6,111,115
	Paper Mills- Except Building Paper	$	4,547,863
	Miscellaneous Plastics Products	$	2,143,450
	Motor Freight Transport and Warehousing	$	1,857,407
	Hospitals	$	1,295,231
	Social Services- N.E.C.	$	1,218,501
	Electronic Components- N.E.C.	$	1,170,137
	Wholesale Trade	$	1,035,924
Commercial Printing		Total Import $	53,533,394
(Industry Sales (TIO): $177m)	Miscellaneous Publishing	$	14,824,361
	Commercial Printing	$	11,437,138
	Wholesale Trade	$	5,763,942
	Sausages and Other Prepared Meats	$	4,019,017
	Other Business Services	$	1,766,510
	Advertising	$	1,269,220
	Labor and Civic Organizations	$	1,223,127
	Canned Fruits and Vegetables	$	1,219,074
	Hospitals	$	1,181,233
	Cheese- Natural and Processed	$	1,173,490
	Social Services- N.E.C.	$	1,016,320

Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

Table 12 (cont): Industry "Disconnect" and "Gaps": Imported Commodity by Industry

Imported Commodity	Importing Industry		Level of Competitive Import
Industrial Machines NEC	Total Import	$	65,611,732
(Industry Sales (TIO): $71m)	Paper Industries Machinery	$	14,666,789
	Paper Mills- Except Building Paper	$	6,478,517
	Industrial Machines N.E.C.	$	5,050,048
	Miscellaneous Plastics Products	$	4,802,457
	Pumps and Compressors	$	2,967,376
	Motor Vehicle Parts and Accessories	$	2,355,533
	Welding Apparatus	$	2,197,971
	Conveyors and Conveying Equipment	$	1,787,755
	Printing Trades Machinery	$	1,514,032
	Mining Machinery- Except Oil Field	$	1,493,997
	Special Industry Machinery N.E.C.	$	1,399,196
	Paper Coated & Laminated N.E.C.	$	1,302,435
	Electronic Components- N.E.C.	$	1,241,449
	Truck and Bus Bodies	$	1,234,354
	Transformers	$	1,103,155
	Other State and Local Govt Enterprises	$	1,067,364
Engineering- Architectural Services	Total Import	$	39,769,844
(Industry Sales (TIO): $113m)	New Government Facilities	$	9,506,326
	New Industrial and Commercial Buildings	$	8,851,225
	Maintenance and Repair Other Facilities	$	3,145,496
	New Utility Structures	$	3,125,107
	New Residential Structures	$	2,634,680
	Engineering- Architectural Services	$	2,531,786
	New Highways and Streets	$	1,713,097
	Other State and Local Govt Enterprises	$	1,243,767
	Real Estate	$	1,138,251
Other Business Services	Total Import	$	46,860,798
(Industry Sales (TIO): $125m)	Wholesale Trade	$	5,318,296
	Engineering- Architectural Services	$	4,957,251
	Doctors and Dentists	$	2,348,539
	Apparel Made From Purchased Materials	$	2,213,467
	Paper Mills- Except Building Paper	$	1,705,070
	Social Services- N.E.C.	$	1,344,026
	Hospitals	$	1,277,650
	Real Estate	$	1,050,920
	Motor Freight Transport and Warehousing	$	1,038,017
	Water Supply and Sewerage Systems	$	1,025,359

Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

Table 12 (cont): Industry "Disconnect" and "Gaps": Imported Commodity by Industry

Imported Commodity	Importing Industry		Level of Competitive Import
Advertising	Total Import	$	82,592,636
(Industry Sales (TIO): $287m)	Wholesale Trade	$	8,154,644
	Sanitary Paper Products	$	6,529,951
	Bottled and Canned Soft Drinks & Water	$	4,469,109
	Maintenance and Repair Other Facilities	$	4,468,681
	Paper Mills- Except Building Paper	$	4,078,952
	Industrial Machines N.E.C.	$	2,880,211
	Electronic Components- N.E.C.	$	2,421,448
	Miscellaneous Retail	$	2,388,053
	Miscellaneous Plastics Products	$	1,986,215
	Automotive Dealers & Service Stations	$	1,766,302
	Welding Apparatus	$	1,633,581
	Real Estate	$	1,558,743
	Miscellaneous Publishing	$	1,555,331

Source: IMPLAN 1998, University of Wisconsin-Madison/Extension

Other commodities that are being imported in large volume that have limited local production include semiconductors and related devices, with $77 million worth of imports, but only about $4 million in local production. This represents a gap in the local market and semiconductors and related devices may be a targeted industry. Another potential targeted industry centers on management and consulting services of which $105 million are imported into the Valley, yet local production of these services in the Valley equals about $39 million.

Several disconnects have been identified by the analysis reported in Table 12. One example is commercial printing, where $53 million are imported, yet local production is $177 million. Clearly there is a sizable local commercial printing industry, yet many local food-processing companies elect to import this service. Another example of a disconnect includes advertising, where the local advertising industry has sales of almost $300 million, but a range of industries, including several paper companies, plastic, some retail and real estate firms elect to import advertising services. While this may appear to be a discount, there may be viable reasons, such as national advertising contracts.

In short, gaps and disconnects can be identified by comparing levels of local production, exports and imports. Local industries which have high levels of production, yet the commodity that is produced is imported at high levels, points to a disconnect. The product (commodity) is being produced locally in sufficient quantities, but is not being used to satisfy local demand. An example uncovered in this study is dairy products and cheese production.

Alternatively, high levels of imports of goods and services that are not being produced locally in sufficient quantities points to gaps. Examples uncovered in this study include plastic materials and resins, computer and data processing and semiconductors and related devises.

Given the detail of the Valley input-output model, the summary statistics reported in Tables 10, 11 and 12, begin to generally outline some opportunities to address gaps and disconnects in the Valley's economy. Much greater detail can be found via the model, such as the importation of $1.1 million worth of caskets by funeral homes. Such detailed information, however, may have limited value to the Chamber and its central mission.

Forecasts

Given historical patterns, it is possible to project these patterns into the near future. While economic forecasts are seldom correct in retrospect, forecasts can, with some degree of accuracy, provide insights into general directions and magnitude of change. This section of the report focuses on ten-year projections for the Fox Valley area, Wisconsin and the national economy.

The simplest measures of economic growth include changes in population, income and employment. As outlined in Table 13, the population for the Fox Valley is predicted to grow by 11.8 percent over the next ten years, this is higher than the predicted growth rates for either Wisconsin or the national economy.

Table 13: Forecasted Population Growth 1999-2010

	US	Wisconsin	Fox Valley
Total Population	9.9%	8.2%	11.8%
Age 0-19	3.7	-2.7	1.6
Age 20-64	11.7	12.8	15.9
Age 65+	15.2	11.9	16.2

It is important to note that very little of this growth is predicted to occur in the youngest age category (0-19). In Wisconsin the number of persons under 20 years of age is actually predicted to decline. This slowdown in number of younger persons points to a potential bottleneck in economic growth. Specifically, the number of new entrants into the labor force is expected to stagnate and in some cases decline. This is particularly true for entry level positions that traditionally look to younger workers. Also of interest to note is the relatively larger growth in the number of persons over 65 years of age. As we as a society grow older, the demands for goods and services will be altered at the same time a tightening of the labor force will be occurring.

Constant dollar (i.e., adjusted for inflation) per capita income is expected to grow by 15 percent for the nation, 15.7 percent for Wisconsin, and 14.2 percent the Valley (Table 14). In the year 2010, per capita income in the Valley is estimated to by about $30,400 which is slightly below the national forecast at $30,900 but higher than forecasted per capita income for Wisconsin, about $30,000. Total income, which includes all sources of income, is expected to growth by 27.7 percent in the Valley, which is higher than the forecast for the US and/or Wisconsin. The reason for total income to be growing faster for the Valley than per capita income hinges on the faster population growth predicted for the Valley (Table 13). While total income is predicted to grow at a healthy pace, faster population growth is putting downward pressure on per capita income.

Total employment in the Fox Valley is expected to grow by 17 percent over the next ten years, which outpaces the national economy as well as Wisconsin (Table 15). Comparing employment growth with population growth for the Valley suggests that increasingly tighter labor markets may become the norm. This will result in upward pressure on wages.

Table 14: Forecasted Income Growth 1999-2010

	US	Wisconsin	Fox Valley
Per Capita Income (96$)	15.0%	15.7%	14.2%
Total Income (96$)	26.4%	25.2%	27.7%

As expected, given employment growth patterns of the past thirty years, businesses in the service sector are expected to experience the most rapid job growth with about a 30 percent increase from 1999 to 2010. The growth rate for the Valley in the service sector is much higher than either the US or Wisconsin economies. This may be due to the Valley's historic dependency on manufacturing and the Valley's economy slowly shifting away from that dependency. Growth in manufacturing employment itself is expected to grow by slightly more than 10 percent, which is nearly four times the predicted growth for manufacturing at the national level. Agriculture is expected to continue to decline, loosing 3.4 percent of its employment. The large jump in mining employment is attributed to the small scale of quarry mining in the Valley and little emphasis should be placed on mining as a source of growth.

Table 15: Forecasted Employment Growth 1999-2010

	US	Wisconsin	Fox Valley
Total Employment	15.0%	13.9%	17.0%
Agriculture	4.0	0.5	-3.4
Mining	10.7	4.2	31.9
Construction	13.4	15.2	15.8
Manufacturing	2.5	6.1	10.5
Trans, Communication, Pub Utilities	12.6	11.3	14.4
Wholesale	15.2	17.8	16.0
Retail	13.4	10.6	14.0
Finance, Insurance, Real Estate	16.2	16.5	16.7
Services	23.4	23.6	30.2
Government	11.9	10.6	10.9

Detailed national forecasts are provided in Table 16. Here the ten industrial sectors predicted to grow the fastest are reported. The fastest growth sector is computer and data processing services, which is expected to see a 117 percent increase in employment opportunities over the next ten years. The high growth rate, coupled with the high level of importation of this service (see Table 12), may point to an opportunity for industry targeting. Other rapidly growing sectors include residential health care facilities and general health related services that are not directly tied to hospitals and clinics. This growth in demand for these two types of service businesses is directly correlated to the aging of our population. Other rapidly growing sectors include personnel supply services, which includes businesses such as beauty shops and private gyms, to name only two.

A more detailed reporting of national growth projections is provided in Table 17. Again, at the national level, manufacturing does not appear to be a growth sector. Paper and allied products is expected to experience no growth and indeed a mild decline. Given the importance of the paper industry to the Fox Valley, the weakness of this sector in light of the national economy may warrant further investigation. One manufacturing sector that is expected to grow over the next ten years is rubber and plastic products, with employment growth expected to be about 14.5 percent. Given the analysis presented above concerning disconnects and gaps in the local plastics industry, special attention to the plastics industry may be warranted. But based on these results, the growth in employment at the national level as well as the Valley is strongly in the services sectors.

Table 16: Detailed National Employment Forecasts (in 000)

	Employment		Change	
	1998	2008	Number	Percent
Computer and data processing services	1,599	3,472	1,872	117%
Health services, not elsewhere classified	1,209	2,018	809	67
Residential care	747	1,171	424	57
Management and public relations	1,034	1,500	466	45
Personnel supply services	3,230	4,623	1,393	43
Miscellaneous equipment rental and leasing	258	369	111	43
Museums, botanical and zoological gardens	93	131	39	42
Research and testing services	614	861	247	40
Miscellaneous transportation services	236	329	94	40
Security and commodity brokers	645	900	255	40

In addition to industry growth projects, occupational growth rates can also provide insight into the future directions of the economy. The ten fastest growing and ten largest growing occupational categories are provided in Table 18. Five of the top ten fastest growing occupations are all related to computers, including the designing and maintenance of computer systems to simple applications. Other occupations showing rapid growth rates include legal and medical professionals. But much of this latter growth appears tied to assistants, such as paralegal and medical assistants, and not the necessarily higher paying professionals. For example, in the Fox Valley a computer programmer earns on average about $21.76 per hour. But a computer programmer assistant makes only $11.10 per hour. A lawyer in the Valley makes, again on average, about $31.21 per hour. A paralegal on the other hand makes only about $12.22 per hour. Care must be taken to fully understand the occupations attached to individual industries.

In terms of absolute numbers of new positions, many of the more traditional occupations seem to play an important role, such as retail clerks, truck drivers and teacher aids. Again, the importance in wage structure must be considered. A K-12 teacher in the Valley earns about $20 per hour, but a teacher's aid paraprofessional earns only $8.10 an hour on average. The fastest growing occupations, however measured, are still related to computers, computer systems and applications. Increasingly, manufacturing processes and business accounting systems are driven by computer related technologies. The demand for persons to install, maintain and upgrade computer systems will continue to grow.

Conclusions

The Fox Valley economy is strong and robust. While the Valley has not experienced the rapid growth occurring in many places throughout the US, the Valley's economy has historically outperformed Wisconsin overall. Paper remains the dominant industry in the Valley, but a number of service related industries have shown significant growth over the past few years. Looking into the future, manufacturing in general does not appear to be the engine of new economic growth that it once was. As we become wealthier as a

Table 17: National Employment Forecasts 2010

Trans, Communication, Public Utilities	
Miscellaneous Transportation Services	48.9%
Local and Interurban Passenger Transit	40.6%
Cable and Pay Television Service	33.2%
Telephone, Telegraph and Other Comm.	28.5%
Passenger Transportation Arrangements	27.3%
Warehousing and Storage	25.1%
Air Transportation	22.4%
Trucking and Courier Services	12.7%
Water Transportation	6.6%
Radio and Television Broadcasting	2.8%
Pipelines, except Natural Gas	-9.0%
Gas Utilities	-16.6%
Electric Utilities	-17.3%
Combined Utilities	-20.7%
Railroad Transportation	-23.4%
Retail	
Eating and Drinking places	20.8%
Retail Trade	14.5%
Wholesale Trade	8.8%
FIRE	
Security and Commodity Brokers	49.0%
Nondepository, Holding and Investment	31.7%
Real Estate	14.9%
Insurance Agents, Brokers and Services	12.8%
Insurance Carriers	11.6%
Depository Institutions	3.5%
Services	
Computer and Data Processing Services	152.3%
Health Services, NEC	84.6%
Residential Care	71.2%
Management and Public Relations	56.1%
Personnel Supply Services	53.7%
Miscellaneous Equipment Rental and Lease	53.3%
Museums, Botanical and Zoological	51.0%
Research and Testing Services	49.8%
Miscellaneous Business Services	48.7%
Offices of Health Practitioners	48.1%
Automobile Parking, Repair, and Services	46.5%
Amusement and Recreation Services	44.2%
Individual and Misc Social Services	40.2%
Child Day Care Services	39.6%
Job Training and Related Services	38.2%

(Services Continued)	
Producers, Orchestras, and Entertainment	34.2%
Commercial Sports	32.0%
Engineering and Architectural Services	31.8%
Nursing and Personal Care Facilities	31.4%
Automotive Rentals, Without Drivers	30.8%
Service to Buildings	30.7%
Educational Services	28.8%
Legal Services	28.5%
Accounting, Auditing, and Other Services	25.5%
Advertising	25.1%
Hotels	22.1%
Personal Services, nec	16.6%
Beauty and Barber Shops	15.3%
Electrical Repair Shops	14.9%
Video Tape Rental	14.6%
Funeral Service and Crematories	13.3%
Motion Pictures	12.8%
Hospitals	12.7%
Membership Organizations	12.3%
Laundry, Cleaning, and Shoe Repair	7.4%
Miscellaneous Repair Shops	6.5%
Other Lodging Places	2.2%
Watch, Jewelry, and Furniture Repair	-12.3%
Bowling Centers	-17.2%
Manufacturing	
Rubber and Miscellaneous Plastics	14.5%
Transportation Equipment	6.6%
Electronic	4.9%
Furniture and Fixtures	3.6%
Instruments and Related Products	2.6%
Food and Kindred Products	2.5%
Fabricated Metal Products	1.4%
Chemicals and Allied Products	0.0%
Paper and Allied Products	-0.1%
Lumber and Wood Products	-0.2%
Industrial Machinery and Equipment	-0.3%
Printing and Publishing	-1.5%
Miscellaneous Manufacturing Industries	-3.1%
Primary Metal Industries	-11.5%
Textile Mill Products	-19.1%
Petroleum and Coal Products	-19.4%
Apparel and Other Textile Products	-27.2%
Tobacco Products	-31.4%
Leather and Leather Products	-33.6%

Table 18: Fastest Occupation Growth Rates National

Fastest Growth Rate	1998	2008	Change Number	Percent
Computer engineers	299	622	323	108
Computer support specialists	429	869	439	102
Systems analysts	617	1,194	577	94
Database administrators	87	155	67	77
Desktop publishing specialists	26	44	19	73
Paralegals and legal assistants	136	220	84	62
Personal care and home health aides	746	1,179	433	58
Medical assistants	252	398	146	58
Social and human service assistants	268	410	141	53
Physician assistants	66	98	32	48
Largest Growth Levels				
Systems analysts	617	1,194	577	94
Retail salespersons	4,056	4,620	563	14
Cashiers	3,198	3,754	556	17
General managers and top executives	3,362	3,913	551	16
Truck drivers, light and heavy	2,970	3,463	493	17
Office clerks, general	3,021	3,484	463	15
Registered nurses	2,079	2,530	451	22
Computer support specialists	429	869	439	102
Personal care and home health aides	746	1,179	433	58
Teacher assistants	1,192	1,567	375	31

nation, we spend an increasing share of that wealth on the service producing sectors, including, but not limited to, tourism and recreation based sectors.

Throughout this analysis, the notion of local "disconnects" and "gaps" in the economy has been at the forefront. Disconnects are instances where local production is not being used to satisfy local demand. One large disconnect identified in this study is between dairy production and cheese manufacturing. Nearly all of the milk produced in the Valley is shipped out of the Valley, but nearly all of the milk used by local cheese processors is imported.

Gaps in the local economy occur when there is a large local demand for a product or service, but that product or service is not produced locally and must be imported. One gap identified in this study is in the plastics industries. While the Valley has a large plastics industry, the raw materials and resins needed by this industry is not locally available and must be imported.

An array of tools and sources of data have been used to identify local strengths and weaknesses. Paper remains "king" in the Valley, but this does not appear to be a growth sector, at least in the near future. Sectors that warrant consideration include computer-related industries, health care industries, certain transportation services and plastics.

The service sector is the fastest growing segment of the national and local economies. A look at the top 25 industries for jobs lists quite a few service related industries, including #1-eating and drinking and #2-education. Selected industries within the service sector, such as computer and data processing, management and consulting services, security and commodity brokers, engineering (including computer

engineering), printing, business services, and advertising are gaps in the local economy and may provide opportunities for job growth. They are also some of the identified growth industries from Table 17.

All indications are the service sector is where the growth is now and will be in the future. While often mistakenly associated with low paying jobs, selected skilled service related jobs pay very well, and would meet one of the criteria identified by the Fox Cities Economic Development Partnership Research Committee, namely attracting jobs in the $12 to $19 range.

Whomever has ultimate responsibility for identifying and attracting business to the Fox Cities should use appropriate data, such as that presented in this document, and hold fast to the objectives of the study, namely to attract and create quality, higher paying jobs in growing industries. They must also keep in mind the need to diversify the local economy, where a possibility of an overabundance of manufacturing, especially paper-related, currently exists.