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The Economic Benefits of
Wayne State University

Estimating the net additional income and tax revenue the University brings to Southeastern Michigan

Prepared by:

Patrick L. Anderson, Principal
Ilhan K. Geckil, Economist
Scott Watkins, Consultant

Anderson Economic Group
260 East Saginaw
East Lansing, Michigan 48823
Tel: (517) 333-6984
Fax: (517) 333-7058

http://www.AndersonEconomicGroup.com

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I. Executive Summary

PURPOSE OF REPORT

This report provides a comprehensive analysis of the net economic and fiscal benefits that Wayne State University ("WSU" or "The University") provides the regional economy. The report is the culmination of a six-month study of the university's operations, expenditures, employment, enrollment, and research activities; the role of the university within the region's economy, demography, and geography; and the increased earnings that accrue to graduates of the university.

Net Benefits Defined. Throughout the report, we identify, and where possible, estimate the *net* economic benefits of the University. These are the benefits *after* deducting the likely earnings, expenditures, or employment that would otherwise have occurred in the region without the operation of WSU.

Region Defined. We define the region as the seven-county area of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne. We also consider in the report the three-county metro Detroit area.

THREE BENEFITS OF THE UNIVERSITY

In this report, we identify three categories of benefits from the University:

1. The *expenditure and income* benefits, which we estimate as the increase in earnings among area residents due to the expenditures of the university, its employees, and vendors.

   In this analysis we also estimate the *net* impact of WSU, meaning the impact after subtracting out the benefits of the expenditures that would be made by other institutions if WSU were no longer in operation. This is a far more conservative measure than that used in commonly-exaggerated "economic impact" reports.

   Please see"Expenditure and Income Analysis" on page 27 for further discussion on the expenditure and income benefits of WSU.

2. The *cultural and knowledge endowments*, which include the gains in knowledge from research in the University in life sciences, physical sciences, applications in manufacturing, health and medicine, and other fields, as well as the cultural activities and preservation and dissemination of art, literature, and other cultural endowments.

   These are impossible to quantify, and easily and quickly move across state and national borders. However, while we do not quantify the cultural and knowledge endowments, they are likely to be the longest-lasting benefits of the university.

   "Cultural and Knowledge Endowments" on page 31 provides further discussion on these benefits.

3. The *human capital* benefits, which we measure as the increase in earnings from students that would not otherwise have attended college if WSU were not teaching students in its current locations.

   We base our analysis on an estimate of the share of WSU's student body who would not otherwise attend a comparable higher education institution and gain a comparable increase in earnings, and who furthermore, remain in the area during their working years. Thus, we estimate the *net* increase in earnings in the region, rather than the gross earnings of all WSU grads.

   Please see "Human Capital Analysis" on page 35 for further discussion on these benefits.

Other Benefits. There are other benefits that the University brings to the region. One is the improved visibility of Detroit, and the many positive experiences of visitors, students, and researchers that come to WSU. This "showcasing" benefit is important, but we have not quantified it.

Another benefit is the motivation WSU provides to students that are still in High School. WSU's continued success in fulfilling its mission as an urban college illustrates to many young people that they can achieve a college degree, if they continue to work in High School, remedial training, or in the workforce. While important, this motivation benefit is not quantified here.

OVERVIEW OF APPROACH

Our analysis included the following steps:

1. The collection and management of data from several sources, including the University, the State of Michigan, and our own library of economic and demographic data.
2. A comparison of Wayne State University to other public universities in Michigan.
3. An analysis of the socio-economic and demographic characteristics of the primary market for Wayne State University.
4. An analysis of the expenditures of WSU on payroll to researchers and non-research faculty and staff; direct WSU expenditures to vendors and governments; expenditures of visitors and students; and expenditures of employees.
5. An allocation of the portion of those expenditures that represent *bona fide* new or additional expenditures in the region, above those that would otherwise occur if WSU were not in operation.
6. Based on this, an economic impact analysis providing a measure of economic activity that is directly or indirectly caused by the University.
7. A qualitative analysis of other benefits the University has on the economy, but which could not be quantified.
8. A human capital analysis that estimates increased worker productivity and income accruing in the state and regional economies as a result of educations provided by WSU.

9. A fiscal impact analysis to measure new tax revenue to the state government, and identify reduced expenditures that are due directly or indirectly to the additional economic benefits of the University.
10. A calculation of partial Return on Investment on the State's share of funding for WSU's operations, using only the additional tax revenue to the State in the calculation.

CONSERVATIVE APPROACH TO MEASURING NET BENEFITS

The approach we take is much more conservative and realistic than most "economic impact" reports. In each category we estimate only the *net* benefit, that is, the benefit *after* subtracting out the income, expenditures, or other benefits that would have otherwise accrued to local businesses, governments, and residents.

For example, we calculate the benefit of the University's expenditures net of the likely expenditures of other institutions that would occupy the facilities if WSU were to cease operations. Similarly, we consider only the earnings of the students that would not otherwise achieve a comparable higher-education attainment if WSU were not in operation.

Our analysis properly accounts for economic costs and benefits, reductions in economic activity due to displacement or substitution effects, and revenue reductions and appropriations by governments. As a result, our findings are much more conservative and realistic than most "economic impact" reports. These often take all related expenditures and then "multiply" them, to derive a figure that would be more accurately called "gross related expenditures." In contrast, this analysis only considers the *net* benefits *actually caused* by WSU's operations.

OVERVIEW OF FINDINGS

Comparing WSU with Other State Universities

Our comparison of Wayne State University with select other public universities in Michigan found that:

- Wayne State has the most diverse student body, by racial heritage, in the group. As one indicator, WSU's student body is slightly more than 50% white, compared to 75% for the next lowest university, Michigan State. Along with other indicators, this indicates that Wayne State's students are diverse ethnically, culturally, and socially.
- Wayne State is among the most affordable of the selected universities. The low tuition and fees make WSU an attractive option for people who might not pursue a college education for financial reasons.
- Wayne State relies more heavily on state appropriations than any other comparable university.

An analysis of WSU and competing colleges can be found at "Comparative Analysis" on page 12.

WSU's Regional Economy

We examined the surrounding counties of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne. This helps us understand how Wayne State's expenditures affect the surrounding community and region, and to what extent WSU's operations add to the region's economy, or merely substitute for other operations. Some prominent socio-economic and demographic characteristics of the area are as follows:

- In the seven-county area, the population and the number of households are growing. Only Wayne County is losing population and households.
- Despite gains in population, the total number of employed persons has decreased in recent years. The seven-county area lost nearly 200,000 employed people from 2000-2003, dropping from 2.4 million employed persons in the peak economic year of 2000 to 2.2 million in 2003. While employment is now growing again, this underlines the importance of WSU in maintaining an educated workforce.
- Livingston County and Oakland County are the most prosperous of the seven counties. They earn, and spend, far more than any of the other counties. Wayne County is by far the least prosperous, with an average household income approximately $30,000 less than Livingston and Oakland Counties.

See "Socio-Economic and Demographic Analysis" on page 21 for further description of WSU's regional economy.

FIRST BENEFIT: INCOME FROM WSU EXPENDITURES

Universities such as Wayne State play an important role not only in education, but also within the economies that they operate. Our analysis of the direct and indirect expenditures due to Wayne State University's operations found that:

- Increased net expenditures of $1,076,418,127 in the 7-County Region surrounding WSU, due directly or indirectly to the additional activity caused by WSU in the region.
- The economic benefit of WSU on the Tri-County Region amounted to $910,412,322. This is slightly smaller than the benefit in the 7-county region as some expenditures occur outside Wayne, Oakland, and Macomb, and also because there is less substitution possible for WSU's services within the 3-county area than the larger region.
- WSU's non-payroll expenditures on teaching, operations, and research have a combined net economic benefit (direct and indirect) of $327,500,723 in the 7-County Region, and 261,226,687 on the Tri-County Region.
- Other significant economic benefits from WSU on the 7-County Region are generated by expenditures and incomes of students ($386,095,861), faculty and staff ($337,973,332), and visitors ($24,848,210).
- All these measures are "net benefits," meaning they have been calculated by subtracting out expenditures outside the relevant area, and also subtracting out the likely expenditures that would have occurred by other individuals or institu-

tions in the area if WSU were not in operation. These adjustments reduced the share of expenditures we considered caused by WSU by between 10% to 90%, depending on the category of expenditures.

A more detailed discussion on the economic benefits that stem from Wayne State's expenditures and incomes can be found in "Expenditure and Income Analysis" on page 27. Please also see Table 17, "Input Data: Expenditures and Income," on page 2 of Appendix B, and Table 18, "Direct and Indirect Economic Impact Analysis," on page 4 of Appendix B.

SECOND BENEFIT: CULTURAL AND KNOWLEDGE ENDOWMENTS

Aside from the quantitative measures of economic impact presented above, Wayne State University provides many other important benefits that are more difficult to quantify because of their wide reaching impacts. These include:

- The creation of new knowledge, which serves as a public good, facilitating new discoveries and methods that can improve business efficiencies, advance medical care, and lead to more environmentally friendly practices, among other things.
- The introduction of new technologies to the public through licensing with private sector businesses. This, along with the University's small business assistance, helps many start-up companies get off the ground, providing high-skill, high-wage jobs.
- Programs and community services that improve the quality of life in the community. These include free and low cost medical care, legal aid, art and recreation, computer and internet access, and much more that helps keep the community healthy, well informed, and cultured.
- An interest in re-developing the Midtown neighborhood, which makes the University and the entire area more appealing.

These benefits are difficult to measure in dollars and cents, but they are no less important than those we quantify in this report. Access to a computer may help community members find employment, a medical clinic may help stop the spread of disease, and a smoking prevention program may reduce the number of people needing long term medical care for lung cancer. Arts and cultural attractions encourage businesses to locate in the area, and residents to spend their leisure time and money in the region. Knowledgeable individuals are more likely to start new businesses, and those relying on local institutions are more likely to keep their businesses in the region.

More discussion of the cultural and knowledge endowments attributable to WSU is in "Cultural and Knowledge Endowments" on page 31.

THIRD BENEFIT: HUMAN CAPITAL

It is common knowledge that receiving an education from a college or university can enhance an individual's economic standing.[1] There are even precise measures of this: lifetime earnings for someone with a 4-year degree are

$900,000 higher than someone with only a high school diploma; obtaining a graduate level degree leads to lifetime earnings of $1.3 million more than obtaining only a high school diploma; and those who earn a professional degree can expect to earn $3.2 million more than those who did not continue their education beyond high school.[1]

Wayne State's Impact on Human Capital

Our human capital analysis was done using a sophisticated simulation model, which forecasts the increased earnings over time of the WSU graduates that remain in the regional workforce. As with our economic benefit analysis, we considered only the *additional* earnings of WSU graduates, and furthermore only considered those earnings of WSU graduates that would likely not have gone on to other higher education institutions. Finally, we subtracted the additional earnings of WSU graduates that moved to other regions, or that retired from the workforce.

Even with these significant reductions, we found a large increase in labor earnings among residents in the region due directly to the operation of WSU. In particular, we found that:

1. WSU likely adds about 2,200 net new graduates to the area workforce every year. By "net," we mean graduates who would not have otherwise attended college if it were not for WSU. Note that we assume the large majority of WSU students (approximately 30,000 out of 32,000) would otherwise attend another institute of higher education.
2. Over time, we anticipate that a share of the graduates in the area retire or move out, and that within 30-40 years all graduates either retire or move out of the area. Taking this into account, over the next 10 years, we expect a total of over 20,000 net additional graduates in the regional workforce due to WSU.

   See Figure 5, "Additional Graduates, Retirements, and Net Change," on page 40.
3. These new grads will earn and spend over $93 million per year within the first 2 years of their graduation. As they grow in number, the amount of additional labor earnings (in constant 2004 dollars) will grow to over $586 million within 6 years, and to $1.3 billion by the end of the decade following the

1. Recent studies have also shown the importance of having an educated workforce to fill the knowledge based jobs that generate high wage and high growth potential. See: Patrick L. Anderson and Scott Watkins, *The Life Sciences Industry in Michigan: Employment, Economic, and Fiscal Contributions to the State's Economy,* (Grand Rapids, Van Andel Institute, 2003); Lou Glazer and Donald Grimes, *A New Path to Prosperity? Manufacturing and Knowledge-based Industries as Drivers of Economic Growth,* (Ann Arbor, University of Michigan, Institute of Labor and Industrial Relations, 2004).

1. Source: U.S. Census Bureau. Figures in 1999 dollars.

graduation of the initial class. Note that these earnings are *in addition* to earnings these graduates would have earned at their lower educational attainment, and include only earnings from the net additional graduates due to WSU's operations.

4. The additional personal income will result in approximately $8.4 million in additional state tax revenue per year within the first two years of graduation, growing to $100.8 million per year by the end of the decade, again in constant 2004 dollars.
5. Our human capital and economic benefit analyses both begin in the current year, and compare the earnings and expenditures of a region with WSU against a region without WSU. The human capital analysis, however, focuses on earnings of multiple years of graduates over decades.

   Therefore, our estimate of additional earnings from graduates in the region is only accurate when ten or more years of graduates are considered. As Wayne State has been in operation for over 20 years, we observe that the decisions over the past few decades to support WSU are bearing fruit today, with additional earnings among area residents. The amount of these additional earnings today is probably smaller than the amount we estimate for 10 years from now, but is still substantial.

Please see "Human Capital Analysis" on page 35 for further details on our Human Capital analysis.

FISCAL IMPACT AND STATE RETURN ON INVESTMENT

The direct fiscal impact of Wayne State University's operations include the following:

1. The additional tax revenues generated as a result of the higher earnings of its graduates. We estimate this in our human capital analysis for years following the current year.
2. The additional tax revenues due to additional earnings and expenditures in the region. We estimated this in our economic benefits analysis.
3. The additional tax revenue from other activity in the area from the economic benefits, cultural and knowledge endowments, and other factors that are not quantifiable or are not estimated in this report.
4. The direct costs to the state and its taxpayers for appropriations to support the University. We considered in the report only the net additional expenditures and the net additional earnings due to WSU. Consistent with this conservative methodology, we consider the fiscal impact of the university to be the additional tax revenue, less the direct taxpayer-funded costs.

Our analysis indicates that the direct state taxes paid on earnings due to WSU expenditures in the area amount to $89.9 million per year. See Table 20, "Fiscal Impact Analysis," on page 7 in Appendix B, and the discussion in "Fiscal Impact Assessment" on page 43.

As discussed above, there are important benefits of a university that are not quantifiable, and these benefits—such as improving the cultural and knowledge endowments of the area's residents—are a primary part of the mission of most universities. However, we did attempt a partial analysis of the direct "return on investment" the State of Michigan gets from its expenditures to support WSU.

For this, we compared the direct state taxes paid by the net additional earnings of graduates in the state workforce, and the net additional taxes paid due to WSU's operations, to the direct appropriations costs. This is a conservative comparison, as the state would almost certainly continue to support other institutions if WSU ceased to operate. As a result, the appropriations figure used is higher than it should be for an apples-to-apples comparison with the additional taxes paid on net additional earnings and expenditures.

Even using this conservative approach, our analysis indicates that the State of Michigan receives about $140 million in additional state taxes in the current year due directly to WSU, while appropriating approximately $245.5 million.

See "State Return on Investment" on page 45. See also Table 21, "State Return on Investment," on page 8 of Appendix B.

We recognize that this analysis is partial, as it ignores many of the important benefits of the University, and also ignores some local government costs and some state costs other than the direct appropriations. However, it does indicates an important finding: the ability of the University to attract expenditures, contributions, research grants, and economic activity to the area, as well to improve the earnings of its graduates. This results in the generation of direct state taxes that are a substantial portion of the direct cost of the University to the State.

II.Overview of Wayne State University

Wayne State University, located in the heart of Detroit, provides a top-notch education for students from Michigan, the United States, and around the world. For geographic illustration, see Map 1, "Universities & Community Colleges in the Region," in Appendix A.

BRIEF HISTORY

Wayne State University is the only urban research university in the State of Michigan. In 1933, by action of the Detroit Board of Education, the Colleges of Liberal Arts, Education, Engineering, Medicine and Pharmacy, and the Graduate School were united into a university organization, temporarily called the Colleges of the City of Detroit. The name was changed to Wayne University in 1934, and to Wayne State University in 1956. See Table 1, "Wayne State School and College Foundations," on page 9 for historical additions data.

TABLE 1. Wayne State School and College Foundations

Additions	Year
School of Medicine	1868
College of Education	1881
College of Liberal Arts	1917
College of Pharmacy & Allied Health Professions	1924
Law School	1927
College of Engineering & Graduate School	1933
Graduate School	1933
School of Social Work	1935
College of Nursing	1945
School of Business Administration	1946
College of Lifelong Learning	1973
College of Urban, Labor, and Metropolitan Affairs	1985
College of Fine, Performing, and Communication Arts	1985
College of Science	1993

Source: Wayne State University

WSU TODAY

Currently, the University has 13 schools and colleges, including:

- Business Administration
- Education
- Engineering
- Fine, Performing, and Communication Arts
- The Graduate School

- Law
- Liberal Arts & Sciences
- Library and Information Science
- Medicine
- Nursing
- Pharmacy and Health Sciences
- Social Work
- Urban, Labor, and Metropolitan Affairs

Additionally, Wayne State University offers more than 350 major academic programs, including 126 bachelor's degree programs, 139 master's degree programs, 60 doctoral degree programs and 32 certificate and other professional programs.

STANDING IN THE ACADEMIC WORLD

In the Lombardi Program on Measuring University Performance's 2003 annual report, Wayne State University tied for 31st for top public research universities in the United States.[1]

The National Science Foundation's (NSF) annual report on Research and Development expenditures in the sciences and engineering at U.S. universities for the fiscal year 2002 showed Wayne State advancing two places in the overall ranking to 61st among all U.S. universities, and one place to 41st among public universities. The University's medical sciences program maintained its overall ranking of 22nd.

RECENT DEVELOPMENTS

In 2002, the School of Medicine was awarded a 10-year, multi-million dollar contract to house and support an intramural branch of the National Institute of Health to conduct studies into maternal and infant health and disease.

Other recent Wayne State University research includes acoustic holography technology, dementia, childhood neuro-psychiatric disorders, and the life sciences.

Recently, Wayne State has invested over $300 million in new construction, including a $15 million recreation and fitness center, a $17.1 million Law School addition, and a $64 million Pharmacy and Allied Health Professions building.

1. "*The Center: The Top American Research Universities,*" an annual report from the Lombardi Program on Measuring University Performance. November 2003.

According to *Detroit at 300... Then and Now*, published in the summer of 2001 by *Crain's Detroit Business*, Wayne State employs nearly 8,000 regular and more than 2,000 student employees, making it the 10th-largest employer in Detroit.

III.Comparative Analysis

In this section, we compare Wayne State University to other selected universities in the State of Michigan. This comparative analysis shows Wayne State's relative expenditures and enrollment, when compared with selected universities in Michigan, and helps us understand the relationship between the University's operations and the economy in which it operates.

ENROLLMENT

One of the most fundamental statistics in determining a university's impact on the surrounding area is its enrollment. The more students a university has, the more powerful its impact on the area. See Table 2, "Fall Enrollment," on page 12 for enrollment information for Wayne State and comparable universities. Wayne State is the third largest university in terms of enrollment with 33,091 students in 2003. Only Michigan State University (44,542) and the University of Michigan (38,808) are larger.

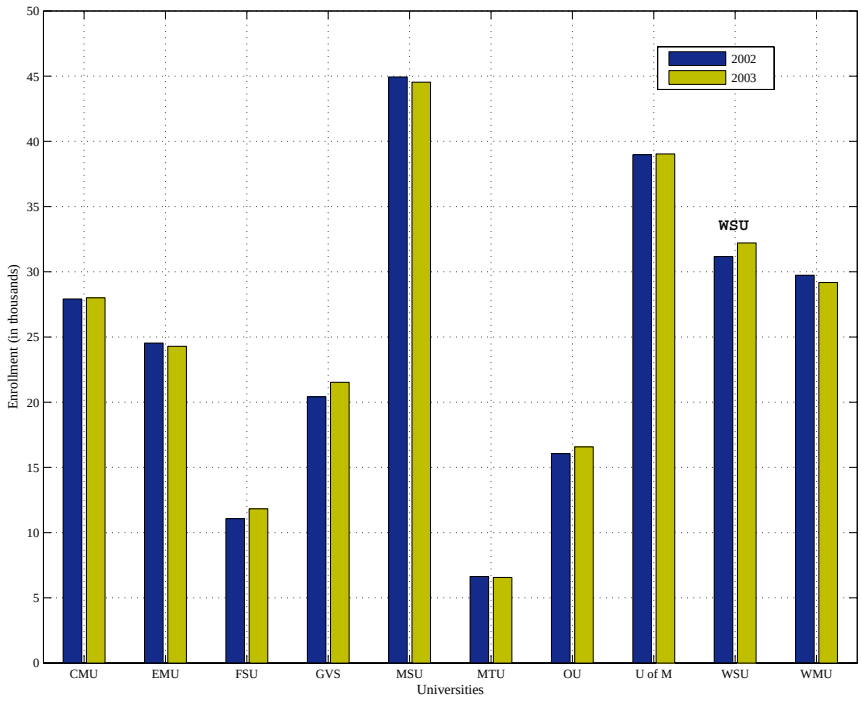
For graphical illustration, see Figure 1, "Fall Enrollment, 2002 v. 2003," on page 13.

TABLE 2. Fall Enrollment

University	2002	2003	Change
Wayne State	*31,167*	*33,091*	*1,924*
Central Michigan	24,594	24,616	22
Eastern Michigan	24,505	24,387	-118
Ferris State	11,074	11,822	748
Grand Valley State	20,407	21,429	1,022
Michigan State	44,937	44,542	-395
Michigan Tech	6,592	6,544	-48
Oakland	16,059	16,576	517
University of Michigan	38,618	38,808	190
Western Michigan	29,732	29,178	-554

Source: Presidents Council, State Universities of Michigan. Date: MI Department of Management and Budget, Operating Budget Requests, Appendix A, 2002-2003

FIGURE 1. Fall Enrollment, 2002 v. 2003



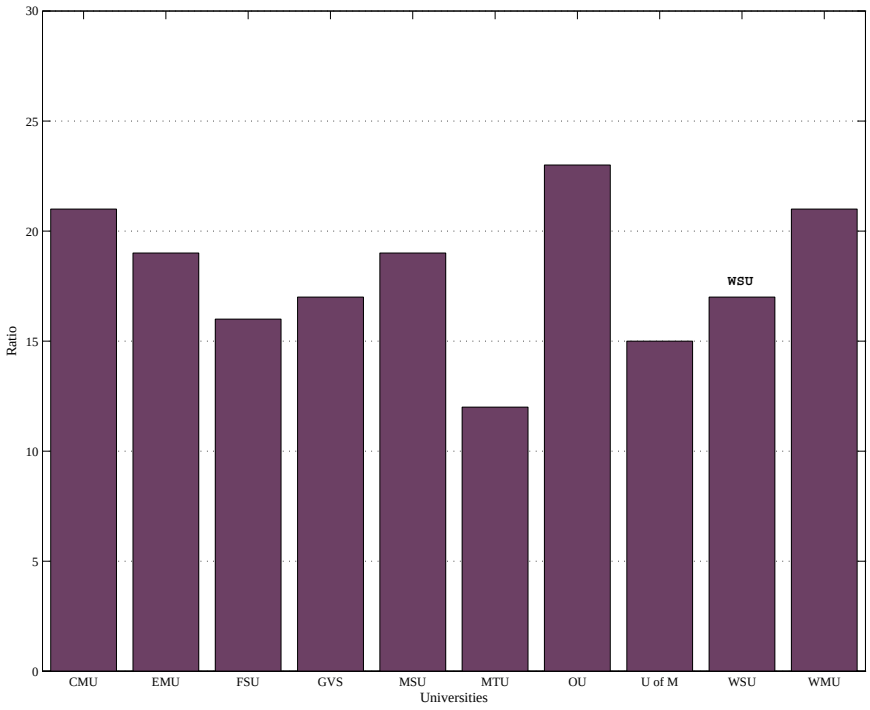
Data: National Center for Education Statistics and University websites *Generated Date: 12 Aug 2004*
Source & Analysis: Anderson Economic Group, www.AndersonEconomicGroup.com

STUDENT TO TEACHER RATIO

An important aspect of educational quality is the student to teacher ratio. Fewer students per teacher means greater opportunity for more individual attention. Large student to teacher ratios tend not to facilitate one-on-one interaction. See Table 3, "Student to Faculty Ratio, 2003," on page 14 and Figure 2, "Student to Teacher Ratio, 2003," on page 14, for university comparisons. Most of the universities, including Wayne State University, fall into the 15-19 range.[1]

1. The ratio of full-time-equivalent students to full-time-equivalent faculty during the fall of 2003, as reported by the school to U.S. News & World Report. This excludes faculty and students of law, medical, business, and other stand-alone graduate or professional programs in which faculty teach virtually only graduate-level students. Faculty numbers also exclude graduate or undergraduate students who are teaching assistants.

FIGURE 2. Student to Teacher Ratio, 2003



Data: Pinceton Review, Wayne State University *Generated Date: 12 Aug 2004*
Source & Analysis: Anderson Economic Group, www.AndersonEconomicGroup.com

TABLE 3. Student to Faculty Ratio, 2003

University	Student to Faculty Ratio
Wayne State	*17:1*
Central Michigan	21:1
Eastern Michigan	19:1
Ferris State	16:1
Grand Valley State	17:1
Michigan State	19:1
Michigan Tech	12:1
Oakland	23:1
University of Michigan	15:1
Western Michigan	21:1

Source: U.S. News & World Report, America's Best Colleges 2005

TUITION

Table 4, "Undergraduate Tuition & Fees," on page 15 compares tuition at Wayne State for both resident and non-resident students with that of other state-supported universities. "Tuition" is defined as tuition and fees for full-time, first-time undergraduate (lower division) students. In both 2002-03 and 2003-04, Wayne State was one of the most affordable of all the universities for both resident and non-resident undergraduates.

TABLE 4. Undergraduate Tuition & Fees

	Resident			Non-Resident		
	2002-2003	**2003-2004**	**Change**	**2002-2003**	**2003-2004**	**Change**
Wayne State	*$4,723*	*$5,274*	*$551*	*$10,201*	*$11,295*	*$1,094*
Central Michigan	$4,747	$5,218	*$471*	$11,119	$12,148	*$1,029*
Eastern Michigan	$5,027	$5,627	*$600*	$13,760	$15,046	*$1,286*
Ferris State	$5,334	$6,044	*$710*	$10,826	$12,088	*$1,262*
Grand Valley State	$5,056	$5,452	*$396*	$10,936	$12,216	*$1,280*
Michigan State	$6,143	$6,747	*$604*	$15,210	$16,707	*$1,497*
Michigan Tech	$6,455	$7,440	*$985*	$14,825	$18,330	*$3,505*
Oakland	$4,814	$5,260	*$446*	$11,406	$11,954	*$548*
University of Michigan	$7,485	$7,975	*$490*	$23,365	$24,777	*$1,412*
Western Michigan	$4,924	$5,535	*$611*	$11,609	$13,048	*$1,439*

Source: Presidents Council, State Universities of Michigan

COMPOSITION OF STUDENT BODY

As evidenced in Table 5, "Composition of Student Body, 2002-2003," on page 16 Wayne State has by far the largest percentage of minority students in Michigan, at nearly 35%. Wayne State's largest minority group, African-Americans, account for 26.6% of the students. This is 10.7% larger than Eastern Michigan, the university with the next highest percentage of African-American students, at 15.9%.

Wayne State University is 59.0% female, and 41.0% male. Out of the selected universities, Wayne State has the fifth highest percentage of females. However, Michigan State is 54.2% female, and the University of Michigan is only 48.4% female.

TABLE 5. Composition of Student Body, 2002-2003

	Female	Male	White	African-American	Asian-American	Hispanic	Native American	Foreign
Wayne State	59.0%	41.0%	50.4%	26.6%	5.8%	2.1%	0.4%	7.7%
Central Michigan	59.6%	40.4%	76.3%	12.3%	1.3%	2.2%	0.6%	2.0%
Eastern Michigan	61.5%	38.5%	63.3%	15.9%	2.4%	2.0%	0.6%	3.6%
Ferris State	47.6%	52.4%	78.6%	6.8%	1.8%	1.3%	0.7%	2.3%
Grand Valley State	61.2%	38.8%	88.3%	4.7%	2.0%	2.4%	0.6%	.8%
Michigan State	54.2%	45.8%	75.1%	8.1%	5.1%	2.8%	0.6%	7.4%
Michigan Tech	25.0%	75.0%	80.3%	2.0%	1.3%	1.1%	0.8%	10.4%
Oakland	62.4%	37.6%	76.5%	7.6%	3.7%	1.5%	0.4%	2.4%
University of Michigan	48.4%	51.6%	59.7%	7.1%	12.1%	4.3%	0.7%	11.7%
Western Michigan	52.9%	47.1%	85.1%	5.2%	1.4%	1.7%	0.4%	5.9%

Source: NCES: IPEDS Enrollment (does not include Medical Residents)

FINANCES

Revenue and Expenditure figures describe not only a University's size, but also its ability to contribute to an economy. In Figure 3, "State Appropriations, 2001-2002 v. 2002-2003," on page 20 we compare the revenue and expenditure figures of select public universitites in Michigan.

Wayne State University ranks third in both total revenue ($709,110,987) and total expenditure ($681,672,014). Michigan State is second with total revenue of $1,376,250,371 and total expenditure of $1,299,315,408. University of Michigan is first by a wide margin, with $3,834,285,000 in total revenue and $3,585,974,000 in total expenditure.

TABLE 6. Revenue and Expenditure, 2002-2003

	Total Revenue	Total Expenditure
Wayne State	*$709,110,987*	*$681,672,014*
Central Michigan	$320,689,666	$288,233,235
Eastern Michigan	$272,324,868	$270,421,888
Ferris State	$179,189,866	$175,681,948
Grand Valley State	$249,233,551	$213,252,626
Michigan State	$1,376,250,371	$1,299,315,408
Michigan Tech	$158,443,000	$159,870,000
Oakland	$169,313,508	$165,039,320
University of Michigan	$3,834,285,000	$3,585,974,000
Western Michigan	$463,651,437	$421,860,485

Source: NCES: IPEDS Finance 2004

As shown in Table 7, “Operating v. Non-Operating Revenues, 2002-2003,” on page 18 Wayne State is unique in that its non-operating revenue nearly matches its operating revenue. Most universities’ non-operating revenue is only 25-60% of its operating revenue, but Wayne State’s non-operating revenue is 85% of its operating revenue.

The high percentage is due to Wayne State’s high reliance on state appropriations. Wayne State ranks third in state appropriations with $245,520,223 in 2002-2003, behind Michigan State ($380,802,125) and the University of Michigan ($350,838,000). Although Wayne State’s total revenue is only about 18% of the University of Michigan’s, it collects approximately 70% of the state appropriations that U of M does.

Table 8, “Major Revenue Sources: 2002-2003,” on page 18 compares revenue from tuition and fees, grants and contracts, and state appropriations for each university. For 2002-2003 grants and contracts revenue, Wayne State, $237,754,191, is a close third to Michigan State’s $283,894,590. However, both trail the University of Michigan by a wide margin.

TABLE 7. Operating v. Non-Operating Revenues, 2002-2003

	Operating Revenue	Non-Operating Revenue
Wayne State	*$375,555,129*	*$315,824,539*
Central Michigan	$183,147,391	$106,254,311
Eastern Michigan	$179,357,551	$90,687,229
Ferris State	$106,517,255	$63,005,533
Grand Valley State	$143,672,964	$74,415,932
Michigan State	$872,185,411	$483,040,332
Michigan Tech	$94,462,000	$60,247,000
Oakland	$107,270,101	$57,371,367
University of Michigan	$3,065,081,000	$641,135,000
Western Michigan	$286,233,806	$136,931,528

Source: NCES: IPEDS, Finance 2004

TABLE 8. Major Revenue Sources: 2002-2003

	Tuition and Fees	Grants and Contracts	State Appropriations
Wayne State	*$108,076,670*	*$237,754,191*	*$245,520,223*
Central Michigan	$112,013,948	$15,035,979	$86,853,527
Eastern Michigan	$105,709,841	$12,544,464	$84,993,686
Ferris State	$56,720,120	$14,182,166	$53,577,031
Grand Valley State	$90,780,281	$13,937,645	$57,992,024
Michigan State	$280,395,364	$283,894,590	$380,802,125
Michigan Tech	$41,055,000	$28,645,000	$53,308,000
Oakland	$65,412,200	$15,214,825	$50,551,147
University of Michigan	$496,562,000	$747,043,000	$350,838,000
Western Michigan	$134,691,763	$36,602,536	$121,278,313

Source: NCES: IPEDS, Finance 2004.

STATE APPROPRIATION

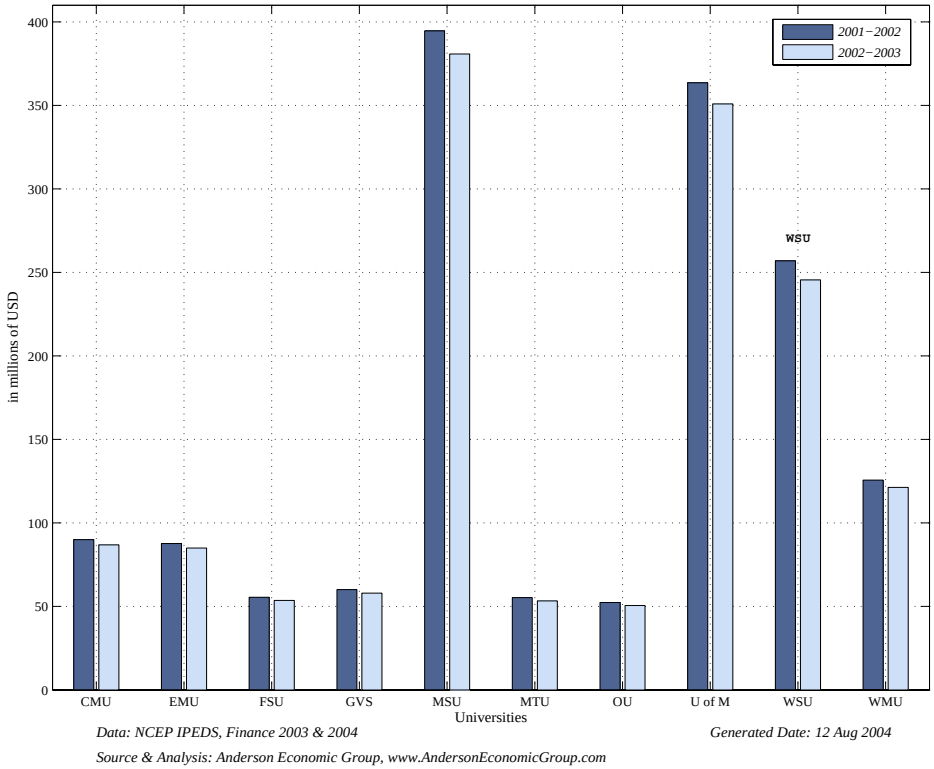
WSU's heavy dependence on state appropriations makes it especially vulnerable to decreases in state appropriations. As seen in Table 9, "Change in State Appropriations," on page 19 universities' state appropriations are declining. Wayne State was among the hardest hit, losing 4.6% from 2001-2002 to 2002-2003. Michigan State and the University of Michigan both lost 3.6%. For graphical illustration, see Figure 3, "State Appropriations, 2001-2002 v. 2002-2003," on page 20.

TABLE 9. Change in State Appropriations

	2001-2002	2002-2003	Change	Percent Change
Wayne State	*$256,899,036*	*$245,520,223*	*-$11,378,813*	*-4.6%*
Central Michigan	$90,003,800	$86,853,527	-$3,150,273	-3.6%
Eastern Michigan	$87,637,200	$84,993,686	-$2,643,514	-3.1%
Ferris State	$55,520,532	$53,577,031	-$1,943,501	-3.6%
Grand Valley State	$60,095,400	$57,992,024	-$2,103,376	-3.6%
Michigan State	$394,613,600	$380,802,125	-$13,811,475	-3.6%
Michigan Tech	$55,242,000	$53,308,000	-$1,934,000	-3.6%
Oakland	$52,384,700	$50,551,147	-$1,833,553	-3.6%
University of Michigan	$363,562,600	$350,838,000	-$12,724,600	-3.6%
Western Michigan	$125,677,197	$121,278,312	-$4,398,885	-3.6%

Source: NCEP IPEDS, Finance 2003 & 2004

FIGURE 3. State Appropriations, 2001-2002 v. 2002-2003



IV.Socio-Economic and Demographic Analysis

In order to fully understand Wayne State University's economic and social contribution to the State and local economies, we must first understand its market area, which is defined to include the counties of Wayne, Macomb, Oakland, Monroe, Washtenaw, Livingston, and St. Clair. See Map 1, "Universities & Community Colleges in the Region," in Appendix A, for the area overview.

89% of graduate students and 94% of undergraduate students at WSU live in the seven-county region. Additionally, 93% of professors/researchers and 98% of non-academic employees of WSU live in the seven-county region. For a geographic illustration of this data see Map 7, "Residential Location of WSU Employees," in Appendix A and Map 5, "Graduate & Undergraduate Students," in Appendix A.

POPULATION & NUMBER OF HOUSEHOLDS

Given that Wayne State draws a large number of its students from the greater Detroit area, it stands to reason that the more people in the area, the greater the potential student pool. As evidenced by Table 10, "Population," on page 21, the overall population of the seven-county area is rising. All of the counties, with the exception of Wayne County, experienced positive changes in population from 2000-2003. This trend is expected to continue from 2003-2008. For geographic illustration of population growth rates between 2003 and 2008, see Map 2, "Projected Population Growth and Campus Locations," in Appendix A.

TABLE 10. Population

	Population			Annual Change in Population	
	2000	2003	2008	2000-2003	2003-2008
Livingston	156,912	174,112	200,556	3.5%	2.9%
Macomb	786,968	816,336	861,442	1.2%	1.1%
Monroe	144,939	149,663	156,914	1.1%	1.0%
Oakland	1,193,902	1,206,266	1,225,190	0.3%	0.3%
St. Clair	163,235	168,216	175,868	1.0%	0.9%
Washtenaw	322,835	339,377	364,792	1.7%	1.5%
Wayne	2,060,851	2,038,326	2,003,987	-0.4%	-0.3%
Seven-County Area	4,829,642	4,892,297	4,988,749	0.4%	0.4%

Analysis: Anderson Economic Group; Data Source: Applied Geographic Solutions, Inc.

The number of households is also important in determining the future potential student pool as it is households that will be providing the necessary money for tuition, books, and other expenses. As seen in Table 11, "Households," on page 22, the number of households correlates strongly to the population. As in the population table, the number of households for the seven-county area has increased, and will continue to do so. Again, the exception to the rule is Wayne County, which experienced a 0.2% annual loss of households from 2000-2003, and is expected to continue to lose households at that rate from 2003-2008.

TABLE 11. Households

	Number of Households (HH)			Annual Change in Number of HHs	
	2000	2003	2008	2000-2003	2003-2008
Livingston	55,371	62,443	73,698	4.1%	3.4%
Macomb	308,690	326,926	356,071	1.9%	1.7%
Monroe	53,409	56,193	60,623	1.7%	1.5%
Oakland	471,017	482,344	500,026	0.8%	0.7%
St. Clair	61,633	64,389	68,728	1.5%	1.3%
Washtenaw	125,305	133,791	147,162	2.2%	1.9%
Wayne	768,325	762,595	753,600	-0.2%	-0.2%
Seven-County Area	1,843,750	1,888,681	1,959,908	0.8%	0.7%

Analysis: Anderson Economic Group; Data Source: Applied Geographic Solutions, Inc.

INCOME FIGURES

A strong positive relationship between income and level of education exists. So, if the incomes of people and families in the market area are increasing, then more people can be expected to go to college. Table 12, "Income," on page 23 shows the income trend in the seven-county area. All counties experienced an annual growth in income, both per capita and median household income, from 2000-2003. Wayne and Oakland Counties were the only ones under a 3% increase for per capita income, posting gains of 2.8% and 2.9%, respectively.

For median household income, Washtenaw and Monroe Counties were at the low end, each posting only a 2.0% annual increase from 2000-2003. In fact, only Livingston County was over the 2.3% seven-county average, posting a notable 2.7% annual increase. For geographic illustration of median household income, see Map 3, "Median Household Income, 2003," in Appendix A.

TABLE 12. Income

	Per Capita Income				Median Household (HH) Income			
	2000	2003	Annualized Change 2000-2003	Projected 2008	2000	2003	Annualized Change 2000-2003	Projected 2008
Livingston	$27,965	$30,960	3.4%	$36,443	$68,282	$73,871	2.7%	$85,600
Macomb	$24,254	$26,638	3.2%	$31,136	$52,784	$56,134	2.1%	$63,804
Monroe	$22,235	$24,427	3.2%	$28,201	$52,192	$55,468	2.0%	$62,517
Oakland	$32,321	$35,266	2.9%	$40,808	$62,438	$66,451	2.1%	$75,720
St. Clair	$21,218	$23,427	3.4%	$26,527	$46,416	$49,610	2.2%	$55,468
Washtenaw	$26,601	$29,416	3.4%	$33,901	$52,549	$55,798	2.0%	$63,057
Wayne	$19,816	$21,513	2.8%	$24,037	$40,888	$43,614	2.2%	$48,774
Seven-County Area	$24,468	$26,799	3.1%	$30,820	$49,970	$53,478	2.3%	$59,622

Analysis: Anderson Economic Group; Data Source: Applied Geographic Solutions, Inc.

LABOR MARKET

Equally important to the level of income for the region is the number of people actually earning an income. Table 13, “Employment,” on page 24 shows that in every county, except for Livingston, there was a decrease in the number of employed from 2000-2003. Overall, the seven-county region lost nearly 200,000 employed persons from 2000-2003. It is important to note that these were recession years for the entire country.

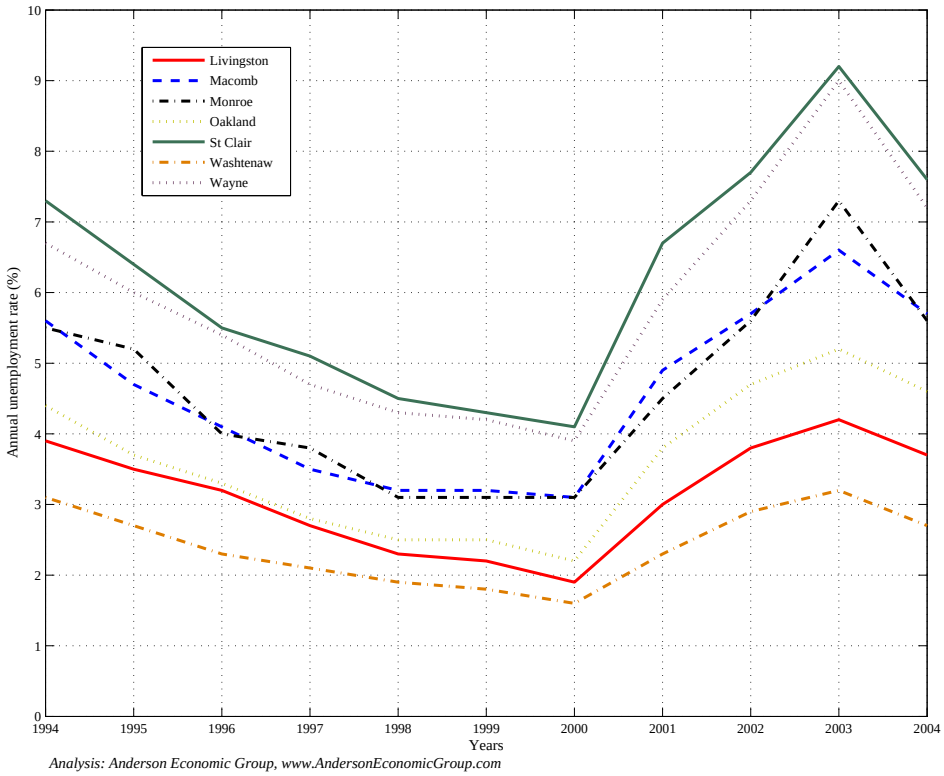
Also see Figure 4, “Annual Unemployment Rates, 1994-2004,” on page 24, which shows the volatility of the labor market in the seven-county area.

TABLE 13. Employment

	Total Number of Employed				Unemployment Rate			
	1994	1997	2000	2003	1994	1997	2000	2003
Livingston	66,895	73,399	81,719	83,032	3.9%	2.7%	1.9%	4.2%
Macomb	384,353	410,638	440,954	411,852	5.6%	3.5%	3.1%	6.6%
Monroe	64,090	68,511	75,062	69,858	5.5%	3.8%	3.1%	7.3%
Oakland	600,280	636,232	691,985	635,348	4.4%	2.8%	2.2%	5.2%
St. Clair	68,992	73,445	81,661	75,950	7.3%	5.1%	4.1%	9.2%
Washtenaw	158,518	164,005	177,004	174,033	3.1%	2.1%	1.6%	3.2%
Wayne	872,233	899,300	925,398	839,721	6.7%	4.7%	3.9%	9.0%
Seven-County Area	2,215,361	2,325,530	2,473,783	2,289,794	5.5%	3.7%	3.0%	6.9%

Analysis: Anderson Economic Group; Data Source: BLS

FIGURE 4. Annual Unemployment Rates, 1994-2004



Analysis: Anderson Economic Group, www.AndersonEconomicGroup.com

Base Data: Bureau of Labor Statistics

Generated Date: 28 July 2004

HOUSEHOLD EXPENDITURE ANALYSIS

Table 14, "Household Expenditures," on page 25 details how much income households have, and what they are spending it on. Livingston County and Oakland County had the highest average household incomes in 2003, with $86,037 and $87,623 respectively. Wayne County ranked the lowest with only $56,850. Not surprisingly, Livingston and Oakland Counties had the highest expenditures for every single category, and Wayne County was last in every category.

Notice that there is complete correlation between average household income and average education expenditure. This means that the more money a household has, the more it will spend on education.

Note on Data Precision. This analysis is based on survey data from the US Census and the Bureau of Labor Statistics, as well as supplemental data and analysis from private demographers and geographers. It is not based on a "cost of living" analysis, or on specific tax rates applied to example properties. Therefore, we use these data to compare counties within the state, rather than to judge the actual costs or expenditures of specific families.

TABLE 14. Household Expenditures

	Livingston	Macomb	Monroe	Oakland	St. Clair	Washtenaw	Wayne	Seven-County Area
Average Household Income	$86,037	$66,051	$64,421	$87,623	$60,316	$73,165	$56,850	$68,766
Total Expenditure	$62,470	$51,794	$51,027	$62,363	$48,730	$55,219	$46,469	$52,811
Education	$1,052.43	$888.93	$872.46	$1,065.74	$835.65	$953.30	$811.69	$910.56
Books and Supplies	$167.87	$141.06	$138.64	$169.50	$132.60	$150.73	$127.80	$144.18
Tuition	$884.56	$747.88	$733.81	$896.25	$703.05	$802.57	$683.89	$766.38
Reading	$330.31	$276.18	$271.18	$332.35	$259.44	$295.41	$248.64	$281.84
Newspaper	$147.12	$122.90	$120.72	$147.62	$115.57	$131.37	$110.77	$125.40
Magazines	$69.56	$58.41	$57.31	$70.30	$54.83	$62.45	$52.45	$59.54
Books	$113.64	$94.87	$93.14	$114.43	$89.04	$101.59	$85.42	$96.90

Analysis: Anderson Economic Group; Data Source: Applied Geographic Solutions, Inc.

Education expenditure also shows how much money is being spent in the market area on education right now. This can help determine how much of a potential revenue base there is in the market, not just for Wayne State University, but for education in general.

For geographic illustration, see Map 4, "Average Household Tuition Expenditures, 2003," in Appendix A.

Another important factor in determining the nature of an area is reading expenditures. Notice that there is a strong positive correlation between income and reading expenditure, and also between education expenditure and reading expenditure.

V. Expenditure and Income Analysis

As a major University, Wayne State provides more than educational and research benefits. The University is also a large employer, visitor destination, and residential location for students. As such, it provides direct expenditures and income that produce measurable economic impacts, which we quantify here.

DEFINITION OF "IMPACT"

Our firm has rigorously completed, or critiqued, numerous economic impact analyses. We depart from many other practitioners by insisting on a specific, conservative, and realistic definition of "economic impact." We define economic impact as only *bona fide*, new economic activity directly or indirectly caused by the subject. In calculating the effects, we take into account both costs and benefits. In particular, we subtract from the total net benefit figure any reductions in economic activity due to displacement or substitution effects. Activity that merely replaces or displaces other activity—such as students attending WSU instead of another area college or University—are subtracted out.

The resulting findings are much more conservative, and realistic, than many reported analyses that fail to subtract costs, ignore substitution effects, or exaggerate benefits. Throughout this report, we provide only the *net* benefit figures. These are not comparable to the gross expenditure totals often touted in "economic impact" studies.[1]

We define "fiscal impact" similarly, by including only *bona fide*, new, tax revenue or reduced government expenditures. To arrive at our total net fiscal impact figure, we subtract out any lost tax revenue or increased expenditures. For a summary of WSU's fiscal impacts, see "Fiscal Impact Assessment" on page 43.

ECONOMIC IMPACTS

To evaluate how WSU expenditures and related income translate into economic impacts, we:

1. Determined annual expenditures (and resulting income to area businesses and residents) in the 7-county area surrounding WSU that stem directly from the University.
2. Accounted for the likely substitution of other economic activity for Wayne State's operations, should the University cease operations. These "substitution" effects were then subtracted from direct expenditures to arrive at a net direct economic impact figure.[2]

1. For a detailed examination of the sources of exaggeration in common "economic impact" studies, see Patrick L. Anderson, *Business Economics and Finance*, CRC Press, 2004, chapter 4.

3. Used specific multipliers to calculate the net indirect economic impact of the University from the net direct impact.
4. Summed the net direct and indirect impacts to arrive at an overall economic impact.

Determining Annual Expenditures and Income

Our analysis of the expenditures and income that stem from the University relies on information from WSU's 2003 consolidated financial statements, WSU personnel and employment data, student expenditure data, and University visitor information. With these data, we:

1. Measured the University's direct, non-payroll expenditures subdivided into two categories: teaching & operations, and research.
2. Estimated the annual expenditures of WSU students and employees in the area.
3. Estimated total annual WSU visitor spending, including spending by those coming to campus for cultural activities, sporting events, commencements, and to visit students.

Note that we did not add tuition and fees, or state appropriates to the WSU expenditures, as this would double-count the resulting expenditures. Table B-17, "Input Data: Expenditures and Income," on page B 2 in the Appendix contains the details on expenditure and income data used in our analysis.

Accounting for Substitution Effects

The income and expenditure analysis provides an estimate of the total economic activity stemming from Wayne State. However, a portion of this economic activity would still occur even if Wayne State University were not a part of the economy. For example, the absence of WSU would not mean all of WSU's employees stop working. Certainly some would find similar employment in the area, while others would have to move outside of the area to find employment. Those who would work in the area regardless of WSU's existence are part of the substitution effect.

Table 15, "Substitution Effect Parameters," on page 29 shows the share of WSU's direct operations that would likely be substituted by other operations, should WSU cease operations. Each variable listed describes the amount of expenditures assumed to continue within the regional economy without Wayne State University. For example, we assume that if WSU were not in the regional economy, other economic activity would occur that equals 25% of WSU's total expenditures for teaching and operations (non-payroll).The failure to include

2. See "Accounting for Substitution Effects" on page 28.

substitution effects is one of the most common sources of exaggeration in naive "economic impact" studies.

TABLE 15. Substitution Effect Parameters

	7-County Area	Tri-County Area
Teaching and Operations Expenditures (non-payroll)	25%	20%
Research (non-payroll)	10%	5%
Students	45%	30%
Professors, Researchers & Non-Academic Employees	30%	25%
Visitors	40%	35%

Source: Anderson Economic Group

Direct and Indirect Economic Impact.

The additional income that results from the direct expenditures of Wayne State, less substituted economic activity, are what we refer to as the net direct economic impact. Note that we do not include all related expenditures as part of the net "economic impact" of the organization. As discussed above, including all related expenditures—such as including all expenditures of a university—would exaggerate its actual net benefits. This exaggeration would occur primarily because some expenditures would have occurred even without the university. In particular, the economic activity in the area surrounding the university would be sharply reduced if the university was to stop operating. However, it would not go to zero.

Indirect Impact. The direct impact includes the net economic benefits caused by the expenditures of the University. A portion of these expenditures are then respent in the same region. These benefits are referred to as indirect economic impact, and include income provided and expenditures made by businesses that are dependent on the University, such as equipment suppliers, local restaurants, and auto dealers who sell to University employees. Typically, indirect benefits are equal to or smaller than direct benefits, especially in a small area, or where substitute goods and services are easily found.

Note on Impact Multipliers. To account for indirect effects, we use a different set of "multipliers" for different categories of expenditures, and for different areas. For example, we use a multiplier of 1.6 for teaching and operation expenditures, but a 2.0 multiplier for student expenditures in the region. This difference originates in the fact that typical student expenditures are on consumables and services that are largely sourced within the region, while teaching and operations expenditures are often supported by purchases outside the region. Note that all multipliers are smaller for the 3-county primary market area than for the 7-county region. Section E of Table B- 17, "Input Data: Expenditures and Income," on page B 2 contains the economic impact multipliers used in our analysis.

Summary of Economic Impacts. As shown in Table 16, "WSU Net Economic Impact by Region," on page 30, the University has a net economic impact of more than $1 billion on the 7-County Region, and a net economic impact of about $910 million in the Tri-County Region.

See Table B- 18, "Direct and Indirect Economic Impact Analysis," on page B 4 for further details from our economic impact analysis.

TABLE 16. WSU Net Economic Impact by Region

	7-County Region	**Tri-County Region**
Direct Economic Impact (Net of substitution effects)	$589,421,145	$535,142,143
Indirect Economic Impact	$486,996,982	$375,270,179
Total Net Economic Impact	**$1,076,418,127**	**$910,412,322**

Source: Anderson Economic Group

VI.Cultural and Knowledge Endowments

Beyond the economic and fiscal impacts measured above, Wayne State University provides economic contributions in a number of other areas that, because of their far reach and immeasurable impacts, are more difficult to assess quantitatively. These impacts, which we provide a qualitative assessment of below, include:

1. The creation of knowledge, which becomes a public good for all to utilize and benefit from.
2. The transfer of new technology from the academic world to the marketplace.
3. Quality of Life Improvements for the entire WSU community, including those living and working near the campus.
4. Investment in the re-development of Detroit's Midtown neighborhood.

KNOWLEDGE CREATION

While we do not quantify the economic value of these impacts, they are an important benefit that WSU provides the community. Since our impact calculations do not include these, it is highly likely that results are on the conservative side.

The environment at Wayne State is one that encourages thought and the creation of new knowledge. Much of this knowledge is presented in lectures, articles, or other forums, making it a valuable public good.

Public goods are non-exclusive and non-rival; non-rival meaning that one person's consumption does not take away or negatively impact another's ability to consume the good (knowledge), and non-exclusive meaning that once the good is made public, it is available for anyone to use. The problem with public goods, that of free-riders, arises from their non-exclusivity. With the costs involved in the development of new ideas being so significant, for-profit firms lack the incentive to invest in the work needed to generate them.

Universities such as Wayne State help fill this void by providing an environment conducive to the development of new ideas. At Wayne State, this often occurs through teaching and research in all fields, and especially in medicine and engineering. Researchers at Wayne State are constantly publishing, presenting, and working collaboratively with other researchers. Also, Wayne State works closely with a number of private sector businesses, furthering the sharing of ideas that leads to the creation of new knowledge.

TECHNOLOGY TRANSFER

In addition to generating new knowledge, WSU researchers often fully develop ideas, resulting in the patent of a new technology. In 2002 WSU had research expenditures of nearly $199 million. Such research expenditures result in new technologies, many of which the University makes available for licensing.

These technologies include medical devices, diagnostics, therapeutics, drug discoveries, research tools, and physical science/engineering.

Recent examples of Wayne State technologies available for license include:

- a method to remove arsenic from drinking water
- a magnetic resonance force microscopy for the study of biological systems
- neoepitope detection of cancer using protein arrays
- compounds with anti-tumor and anti-parasitic activity

Currently, there are approximately eighty such technologies available for license. Because the University desires the most efficient and effective transfer of new technology to the marketplace possible, the Technology Transfer Office exists. The TTO is responsible for the "identification, protection, marketing and licensing" of the new technologies.

Wayne State licenses technologies to companies all around the country, and even the world. While Wayne State prefers to license to local companies, it must find an appropriate market for the technology. However, an estimated 35-40% of licenses do go to companies in Michigan.

Wayne State also assists in the start-up of new companies. Such start-ups are based on Wayne State technology, and almost always see involvement of WSU researchers, either as employees or advisors. Currently, there are 14 Wayne State start-up companies, 10 of which are in Michigan. These 14 start-ups provide high-skill, high-wage jobs for approximately 100 people.

An example of a successful WSU start-up is Lumigen, a high-tech company located in Southfield, Michigan, employing approximately 45 people. They produce chemi-luminescent reagents for clinical diagnostic tests. The reagents react under certain conditions, providing valuable medical information to the doctor. Lumigen still works with Wayne State, and nearly half of its workforce is composed of Wayne State graduates.[3]

"Tech Town," a 47-acre, multi-million dollar research and business technology park, continues to grow after its grand opening in April, 2004. The project's goal is to attract mature and incubator-stage companies involved in life sciences, advanced engineering, advanced manufacturing industries, and information technology. Among current tenants is Asterand, a tissue bank that serves genomic researchers around the world. At capacity, approximately 60 companies, and over 1,600 employees are expected to be located at TechTown. Expansion plans at the site call for a new technically oriented high school.

3. Tech town, WSU start-up, and licensing data provided by the Wayne State University Technology Transfer Office.

QUALITY OF LIFE

The WSU School of Medicine's Mission Statement explicitly states a desire to "deliver comprehensive primary care for the urban poor that is of the same quality as that available to the affluent." To do this, the School provides the Detroit metropolitan area with services, including free medical care for the homeless and unemployed at Detroit's Cass Clinic. Annually, the School of Medicine, with the help of Detroit Medical Center, provides $150 million in uncompensated health care.

The Wayne State University Medical Center

A Senior Citizen Outreach Project, Adolescent Substance Abuse Prevention Program and Teen Pregnancy Education Program are also sponsored by students at Wayne State University. A number of other events are also sponsored by the University to make the community better informed about health issues such as diabetes, obesity, and smoking related dangers.

The Wayne State University Law School also plays a large role in providing services to the community. The Free Legal Aid Clinic, Disability Law Clinic, Nonprofit Corporations and Urban Development Law Clinic, Criminal Appellate Practice Clinic and the Civil Rights Litigation Clinic are all live-client clinics where law students provide valuable legal service to members of the community who might otherwise not be able to afford such assistance.

The University helps keep the community art, culture, and news savvy through its ownership and operation of WDET-FM 101.9, a National Public Radio affiliate, as well as its many venues for art exhibitions, theatrical productions, and dance and musical performances. WSU also hosts the Detroit Festival of Arts, an annual celebration of visual and performing artists. Wayne State University's ensemble in the Department of Music visits local area schools, exposing young students to art music, and WSU music students and alumni staff The Weekend School of Music, a 300 student program offering low-cost instrument classes to the public.

Guest library cards are also made available to the general public, providing access to an impressive collection of literature and research materials. The libraries also make computer and internet access available to the public. The David Adamany Undergraduate Library alone hosts 500 computer workstations, a number of which can be used by the public.

There are over 100 student organizations on the WSU campus. Many of these organizations make direct contributions to the metropolitan Detroit area. Project

Volunteer, an organization known for its community service efforts, organizes events such as Into the Streets, World AIDS Day, Martin Luther King Day, Hunger & Homelessness Week, and Alternative Spring Break. Other WSU student organizations host events that take up collections for the needy, distribute food to the homeless, and provide other valuable community services.

MIDTOWN DETROIT AND WAYNE STATE UNIVERSITY

For years, Wayne State has actively pursued the re-development of Midtown Detroit. The University has spent millions of dollars on abandoned buildings and unused lots to attract new businesses to the campus area. In 2002, Barnes & Noble opened a store on campus, and a Starbucks opened in 2004. These stores are open to all and are located on major thoroughfares.

The University has worked to develop or renovate property all around the campus. Wayne State has spent more than $200 million buying property in the past four years. This property is then used to construct new buildings, renovate old ones, or given to outside developers for their own projects.

The Inn on Ferry Street, located in Midtown Detroit

The University's development plan is both altruistic and practical. The previously run-down areas surrounding the school have been improved through development. They are no longer as decrepit or as dangerous as they once were. Due to the improvements, the University can attract more students and businesses, enhancing the appeal of the overall community. The developments also help to increase the property values in the area, creating a larger tax base for City and State.

VII. Human Capital Analysis

THE THIRD BENEFIT OF THE UNIVERSITY

University operations add to the current income of area residents. Universities also add to the knowledge and cultural endowment of a region through their research activities and preservation of cultural resources such as art and literature. However, documenting only these effects would miss the largest type of benefit that a university can bring to the state and local economies.

The fundamental goal of a University is to increase the knowledge and skills of the students they teach. An increase in the usable knowledge and skills of a person is known as increasing the *human capital* of the individual.[1]

The quest for human capital is so vital that much of human effort is devoted to it. This effort starts before school, and continues beyond it during the years of school, in homes, businesses, churches, and clubs. It includes instruction of parents, the basic and extended curriculum in schools, and training in the workplace, as well as training in private organizations and self-study in both informal and formal settings.

THE ECONOMIC BENEFITS OF INCREASING HUMAN CAPITAL

There are obviously many benefits to human capital. Most cannot be measured. One key benefit, however, is well-documented. Individuals who attain college degrees consistently earn more money than individuals who do not. Individuals who go on to earn advanced degrees (such as Master's or Doctorate degrees) earn still more.

Projecting the Benefits of Increased Higher Education. To estimate the future benefits of the higher education among the workforce, we use a human capital model. This model estimates the increased worker productivity and income accruing to the state and regional economies as a result of higher education provided by Wayne State University. The model associates higher earnings over a lifetime with higher educational attainment, based on data compiled from federal sources, with adjustments for local wages and occupations.

Allowing for Substitution. An important step is the estimate of the substitution effect for WSU. As with the economic impact analysis, we cannot assume that all WSU students would have simply not gone to college had WSU not been in operation. Most would have substituted other colleges. These other colleges

1. Note that increasing human capital means that the individuals will be able to earn more in the future. Simply spending money on a person—such as making a transfer payment to them—does not increase their human capital. Increasing their ability to *earn money themselves* is an addition to their "human capital," much as adding new machines to a manufacturing plant is adding physical capital, increasing the ability of the plant to produce goods, and therefore earn money.

would, on the whole, have been less convenient, often more expensive, and less tailored to their needs. Students at those colleges would have also substituted, as some would not have been admitted due to space constraints if WSU did not educate nearly 33,000 students annually.

However, some students would not have been able to go to college if it were not for WSU. The share of students "captured" into the higher education system is likely higher at WSU because of the unique mission of the University.

Given WSU's mission and its student body, its net impact is probably proportionally larger than many other first-class universities. This would be due to the fact that a somewhat larger portion of its students need high school remediation as part of the University experience, and thus a disproportionate number would receive this quality of education only at WSU.

METHODOLOGY FOR HUMAN CAPITAL ANALYSIS

To estimate the earnings increase due to the operation of Wayne State University, we followed a rigorous methodology:

1. We examined the number of students at the graduate and undergraduate level at WSU, the number and location of other higher-education institutions in the area, and the demographics of the WSU student body.
2. We estimated the share of WSU students who, if WSU were not in operation, would attend other higher-education institutions of comparable quality. This is the "substitution" effect analogous to the substitution effect in the direct economic impact analysis. This share of students, which is a fraction of the overall student body, we termed the "capture" segment of the University.

   The location of the University, its historic mission, and the demographics of its student body all indicate that this share is larger at WSU than at most other large research institutions.[1]
3. Using the capture share and student-body size data, we forecasted the number of WSU students who would not otherwise go to a higher-education institution, and termed these the "net capture students." In this analysis, we acknowledge that many students consider multiple institutions, and some transfer to another institution part-way through their college years. Our *net* capture is an estimate of the total increase in graduates, after all transfers and substitutions have occurred.
4. We examined recent Census Bureau estimates of earnings by education attainment for residents across the country. We then adjusted downward somewhat the earnings estimates for potential WSU students and college graduates to account for the location and demographics of the WSU student body.

1. For example, we would anticipate that almost all of the University of Michigan students would, if they were not admitted to that school, attend another university.

5. We did not include additional earnings from students who were motivated to stay in high school, or complete additional course work, in order to attend WSU. This could add another 10% or more to our net benefit figures.
6. Using a weighted average of the earnings of potential students (High School graduates and college graduates) and graduates (bachelor's and advanced degrees), we calculated a composite earnings figure for a representative potential WSU student, and a WSU graduate.
7. These data were then used in a simulation model. The simulation model takes base data, and calculates the value of identified variables over time.[1] The key calculations can be summarized as follows:[2]

    i. The earnings, and earnings growth, for both representative WSU graduates and potential students over time, were projected over the forecast period of ten years. All earnings figures were denominated in constant 2004 dollars. Conservative productivity increases (output per hour) were assumed to drive real income higher during the forecast period.

    Consistent with the growing importance of knowledge-based occupations, productivity among college-educated workers was forecasted to grow slightly faster than productivity in occupations available to high school graduates.

    These calculations were done in the productivity subsystem in the simulation model, a schematic of which is shown in Figure 7, "Human Capital Simulation Model," on page 42.

    ii. The share of students in the area that are net additions to the pool of graduates were estimated in a labor force subsystem. The calculations include new additions to the college-educated workforce of the area each year, based on the new graduates among the "capture" segment of students. These new graduates cumulate over time, with annual losses in the workforce due to retirements and individuals moving out of the area.

    These calculations are done in the labor force subsystem in Figure 7 on page 42.

1. The simulation model was implemented in Matlab and Simulink, which are mathematical software designed for this purpose. The use of simulation models for this type of policy analysis is described in Patrick L. Anderson, *Business Economics and Finance*, CRC Press, 2004.
2. These calculations are organized in subsystems, which are illustrated in the Figure 7, "Human Capital Simulation Model," on page 42.

iii. These earnings, and the number of additional graduates who earn them, are then used to calculate output, income, and state taxes over the forecast period. These calculations are done in the production function subsystem in Figure 7 on page 42.

8. The overall results are conservative because we take into account substitution for other colleges, retirements and moves out of the area, and also because we estimate only state taxes on personal income. Furthermore, our analysis only considers graduates starting in 2004, thus ignoring the benefits of the tens of thousands of existing WSU grads in the area.

RESULTS

We summarize our results, and illustrate them graphically, as follows:

1. WSU likely adds about 2,200 net new graduates to the area workforce every year. By "net," we mean graduates who would not have otherwise attended college if it were not for WSU. Note that we assume the large majority of WSU students (approximately 30,000 out of 32,000) would otherwise attend another institute of higher education.
2. Over time, we anticipate that a share of the graduates in the area retire or move out, and that within 30-40 years all graduates either retire or move out of the area. Taking this into account, over the next 10 years, we expect a total of over 20,000 net additional graduates in the regional workforce due to WSU.

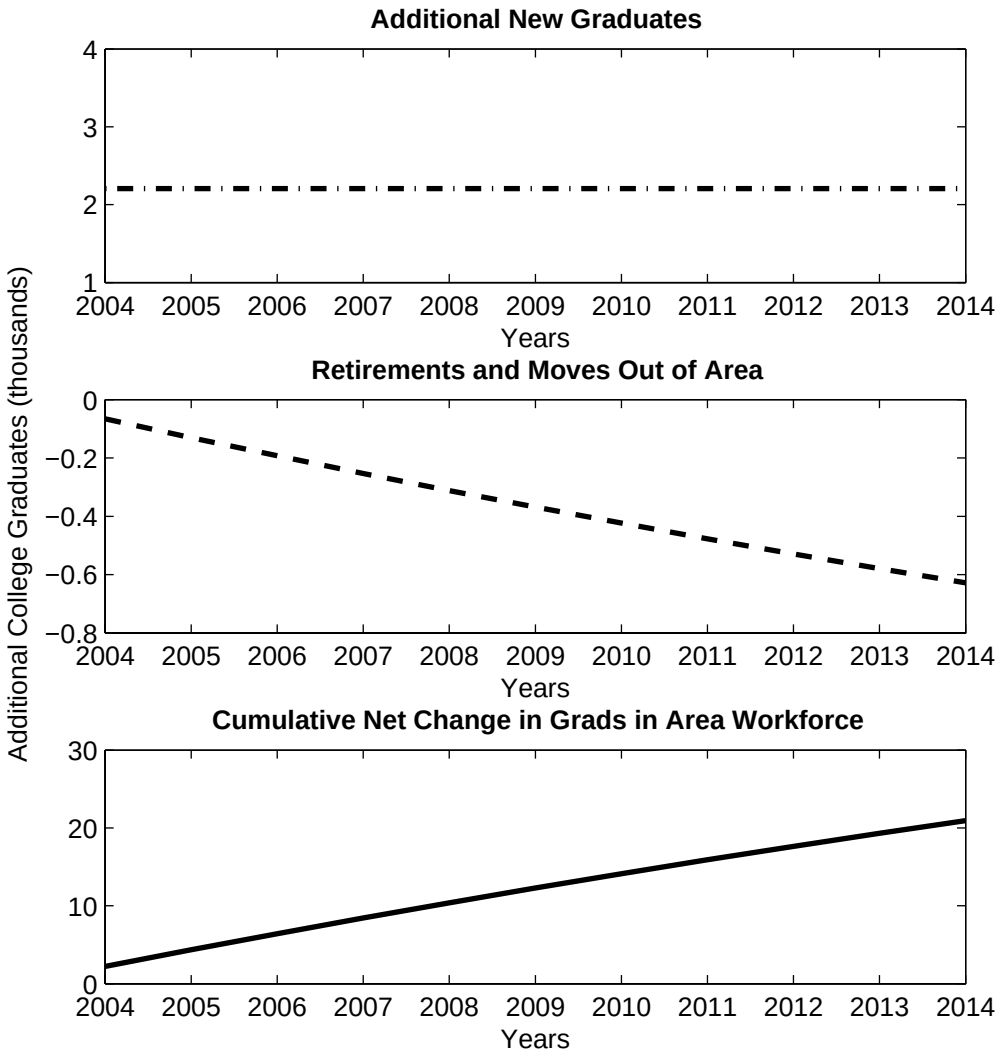
   See Figure 5, "Additional Graduates, Retirements, and Net Change," on page 40.
3. These new grads will earn and spend over $93 million per year within the first 2 years of their graduation. As they grow in number, the amount of additional labor earnings (in constant 2004 dollars) will grow to over $586 million within 6 years, and to $1.3 billion by the end of the decade following the graduation of the initial class. Note that these earnings are *in addition* to earnings these graduates would have earned at their lower educational attainment, and include only earnings from the net additional graduates due to WSU's operations.
4. The additional personal income will result in approximately $8.4 million in additional state tax revenue per year within the first two years of graduation, growing to $100.8 million per year by the end of the decade, again in constant 2004 dollars.
5. Our human capital and economic benefit analyses both begin in the current year, and compare earnings and expenditures with WSU against a region without WSU. The human capital analysis, however, focuses on earnings of multiple years of graduates over decades.

   Therefore, our estimate of additional earnings from graduates in the region is only accurate when ten or more years of graduates are considered. As Wayne State has been in operation for over 20 years, we observe that the decisions

over the past few decades to support WSU are bearing fruit today, through additional earnings among area residents. The amount of these additional earnings today is probably smaller than the amount we estimate for 10 years from now, but is still substantial.

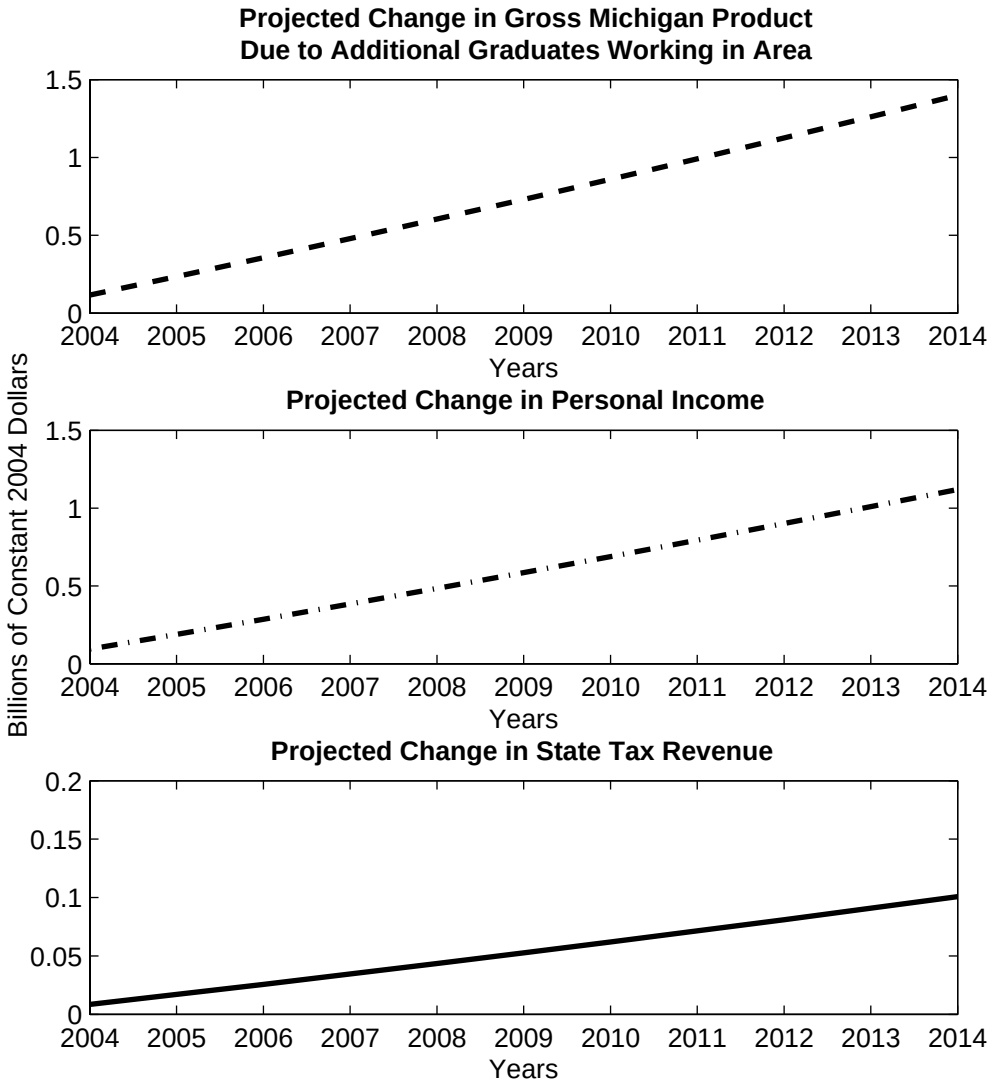
6. All these figures are based only on net additional WSU graduates starting in 2004, staying in the area and remaining in the workforce. As the figures are in constant 2004 dollars, a somewhat smaller benefit (due to real productivity increases) is already being realized by the area residents due to the past ten years of graduates.

FIGURE 5. Additional Graduates, Retirements, and Net Change



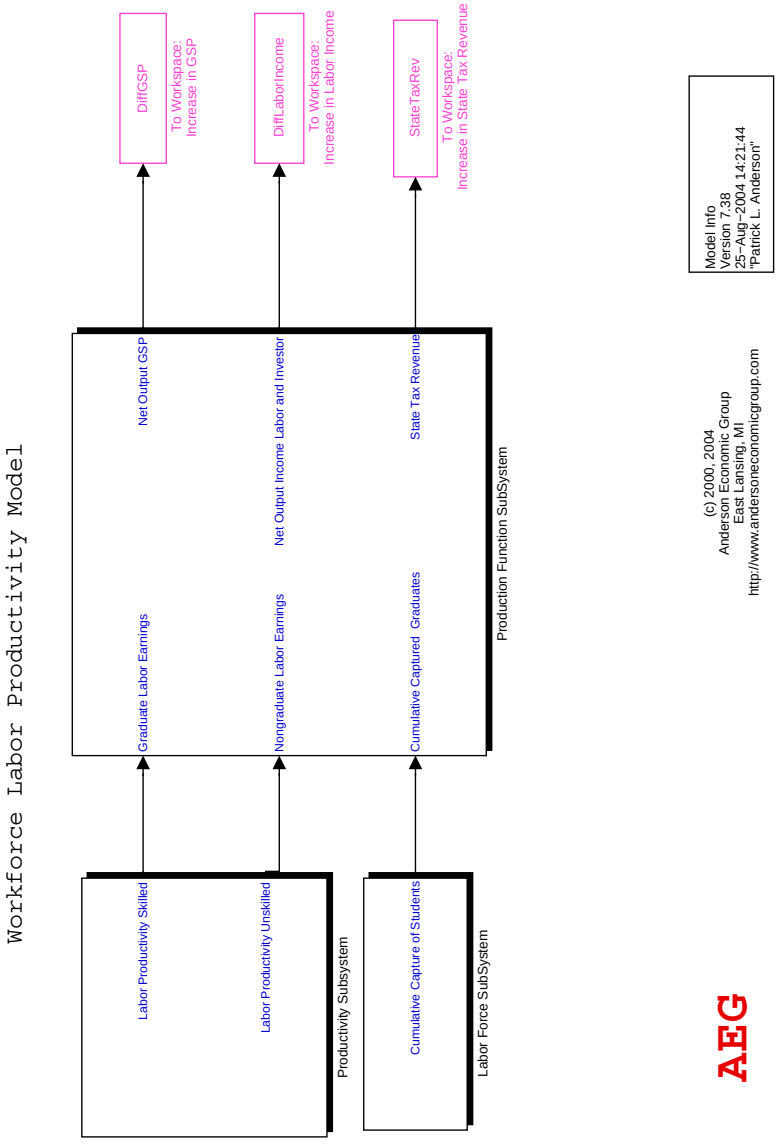
Source: Anderson Economic Group projections

FIGURE 6. Net Increase in Income and State Tax Revenue



Source: Anderson Economic Group projections

FIGURE 7. Human Capital Simulation Model



VIII.Fiscal Impact Assessment

The net fiscal impact of WSU on the State of Michigan is the difference between the fiscal costs of the university to the state's taxpayers, and the fiscal benefits arising from its operations.

The fiscal benefits, in turn, come from two major components. The first of these is the tax revenue on the net economic impact attributable to the University's operations. The second is the tax revenue resulting from the improved human capital—and resulting income—that the University creates among its graduates.

FISCAL IMPACT OF EXPENDITURES

To determine the fiscal impact of WSU's operations, we start with the net increase in expenditures in the region. We then assume that 45% of these earnings are not taxable by the state of Michigan.[1] The result is a fully taxable expenditure and income base of $984 million in the 7-County region, and of $854 million in the Tri-County region.

We then allocate a share of these expenditures and incomes to distribution out of the State (including additional federal income taxes). On the amount that stays in State, we apply a total tax rate of 9% to determine the fiscal impact of WSU's direct and indirect expenditures and income in the 7 County Region.[2]

To assess the amount of tax revenue generated for the State from WSU expenditures and income outside of the 7-County Region, we assume that 80% of the business and personal income that is distributed out the of 7-County Region stays within the State of Michigan. Of this amount, we again assume that 9% will be paid in taxes to the State of Michigan.

Summary of Results. The fiscal impact of WSU on the State of Michigan includes more than $89.9 million in taxes paid to the State on the direct and indirect expenditures of the University.

FISCAL IMPACT OF INCREASED HUMAN CAPITAL

As discussed previously in "Human Capital Analysis" on page 35, Wayne State University helps improve the workforce by providing more knowledgeable and skilled employees. These employees, over time, are able to be more productive,

1. By "not taxable," we mean exempt from the Michigan Sales and Use taxes and escaping the Michigan SBT, income, and property taxes. This is a simplifying assumptions, as there is actually a range of taxation applied to these additional earnings. Note that we previously reduced the earnings of WSU employees for federal income taxes, before estimating the effects of their expenditures.
2. This is close to the average rate of taxation by the state, as a share of total personal income, under the "Headlee" formula added in Article IX, section 26 of the Michigan Constitution. The actual ratio fluctuates.

and thus earn more in salary and wages that they otherwise would have been able to.

A direct result of this is that the State is provided a larger base of taxable income. We calculate this directly, using the same method as for the fiscal effects of WSU's expenditures, and illustrate it in Figure 6, "Net Increase in Income and State Tax Revenue," on page 41.

Note on Current-Year Taxes From Graduates. This analysis, however, focuses on earnings of multiple years of graduates over decades. Therefore, our estimate of additional earnings from graduates in the region is only accurate when ten or more years of graduates are considered. As Wayne State has been in operation for over 20 years, we observe that the decisions over the past few decades to support WSU are bearing fruit today, with additional earnings among area residents. The amount of these additional earnings today is probably smaller than the amount we estimate for 15 years from now (even after adjusting for inflation), because the University was smaller in past years, and because the importance of knowledge-intensive jobs has increased over time.

We make a quite conservative estimate of the additional tax revenue to the state from the net increase in the number of graduates in the workforce due to WSU. This conservative assessment arises from reducing the amount of tax revenue from WSU graduates we expect in future years substantially, to allow for the likelihood that many WSU graduates would have eventually fulfilled another college's degree requirements, and earn a similar amount of money as they did after graduation from WSU.

Our estimate is further discussed in "State Return on Investment" on page 45.

IX.State Return on Investment

FINANCIAL RETURN

As presented above, Wayne State University generates over $89.9 million in fiscal benefits from expenditure and income source alone, and another $50.4 million from additional earnings of WSU graduates. Both of these are *net* benefits, meaning they are calculated after deducting increased earnings and taxes that would have been earned or paid if WSU was not in operation.

The State, of course, provides a significant amount of funding to public universities such as WSU. As presented in "State Appropriation" on page 19, WSU received State of Michigan appropriations in the amount of $245.5 million in 2002-2003.

As discussed above, there are important benefits of a university that are not quantifiable, and these benefits—such as improving the cultural and knowledge endowments of the area's residents—are a primary part of the mission of most universities. However, we did attempt a partial analysis of the direct "return on investment" the State of Michigan gets from its expenditures to support WSU. For this, we compared the direct state taxes paid by the net additional earnings of graduates in the state workforce, and the net additional taxes paid due to WSU's operations, to the direct appropriations costs.

This analysis is shown in Table 21, "State Return on Investment," on page 8 of Appendix B. Our analysis indicates that the State of Michigan receives about $140 million in additional state taxes in the current year due directly to WSU, while appropriating approximately $245 million.

UNQUANTIFIABLE RETURNS

In addition to the ROI quantification above, WSU most certainly provides the state with additional returns that are more difficult, if not impossible, to quantify. These likely include

- Higher tax returns due to increased profits of companies that benefit from WSU research.
- A business climate that is strengthened by WSU's relationship with the private sector, and a quality workforce that includes many WSU graduates.
- Additional businesses that locate in the Detroit area.
- A health care system in Detroit that, without WSU support, students, and faculty, may require greater state aid, and provide fewer services, leading to greater incidences of health problems in the urban area.

Conclusion

We recognize that this analysis is partial, as it ignores many of the important benefits of the university, and also ignores some local government costs and

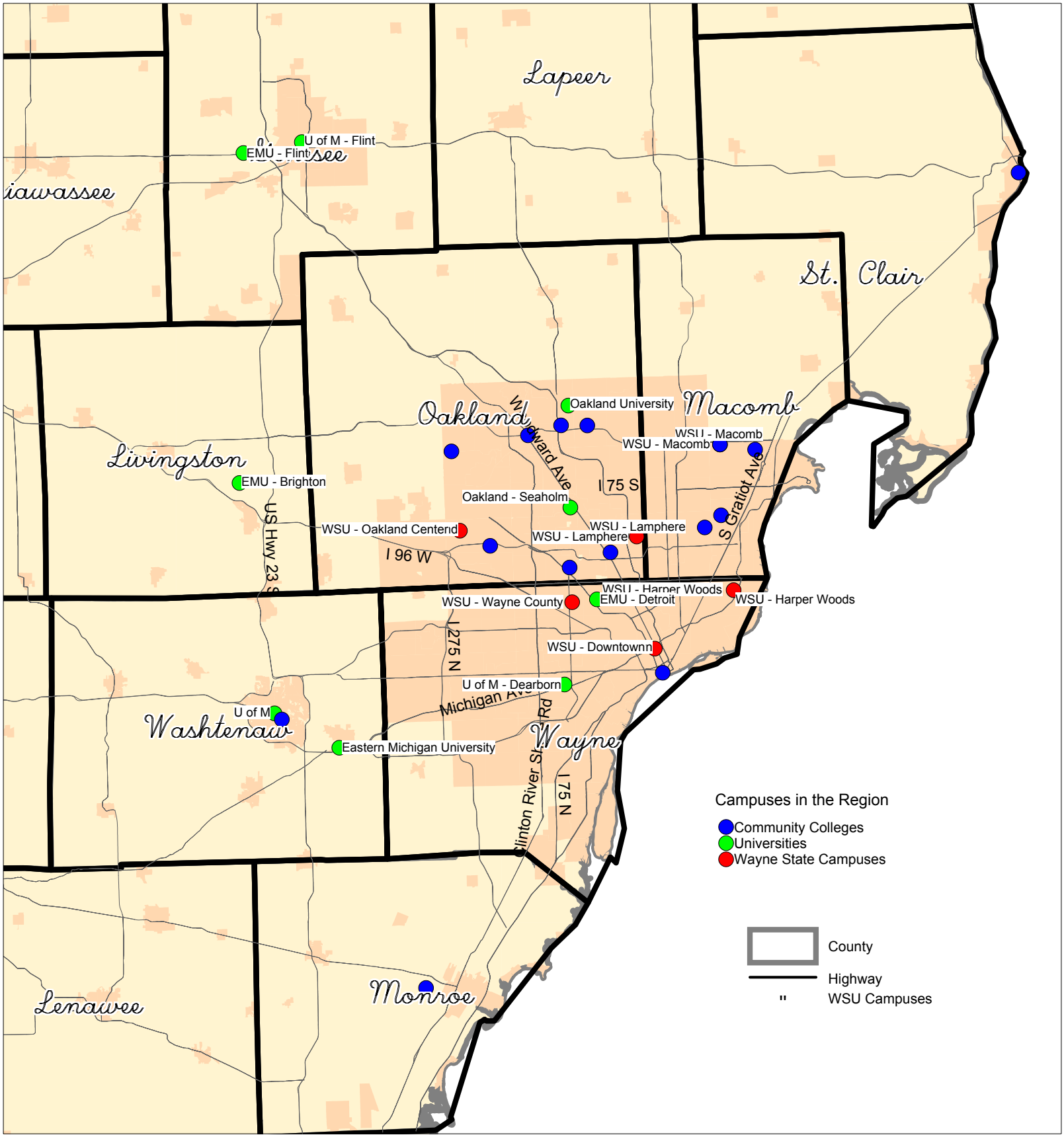
some state costs other than the direct appropriations. However, it also indicates an important finding: the ability of the University to attract expenditures, contributions, research grants, and economic activity to the area, as well as improving the earnings of its graduates; results in direct state taxes that are a substantial portion of the direct cost of the University to the State.

Appendix A: Maps

The following maps serve as exhibits to this report.

- Map 1: Universities & Community Colleges in the Region
- Map 2: Projected Population Growth and Campus Locations
- Map 3: Median Household Income, 2003
- Map 4: Average Household Tuition Expenditures, 2003
- Map 5: Graduate & Undergraduate Students
- Map 6: Alumni Residence Map
- Map 7: Residential Location of WSU Employees

Map 1: Universities & Community Colleges in the Region



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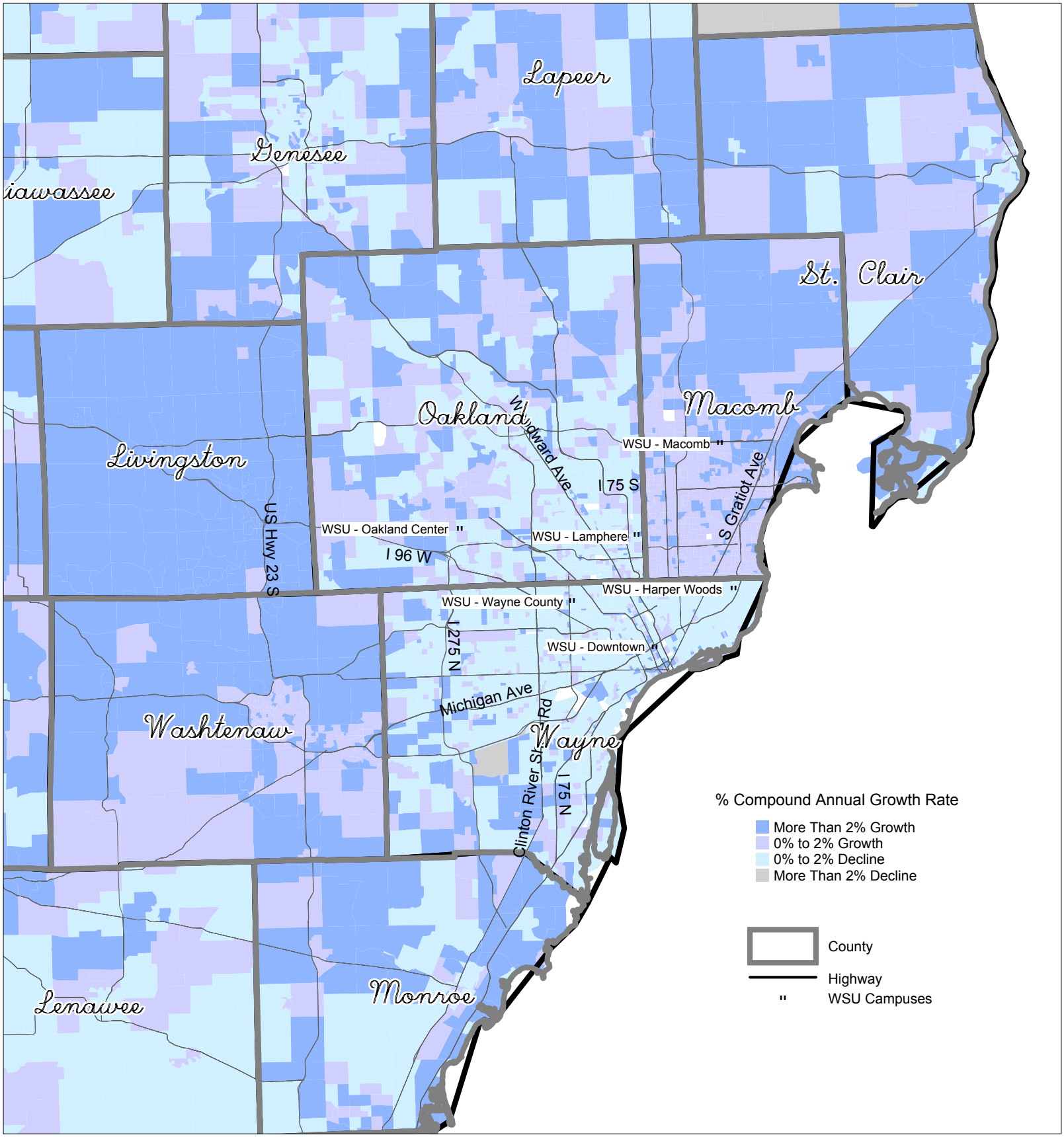
Map 2: # Population Growth 2003 - 2008



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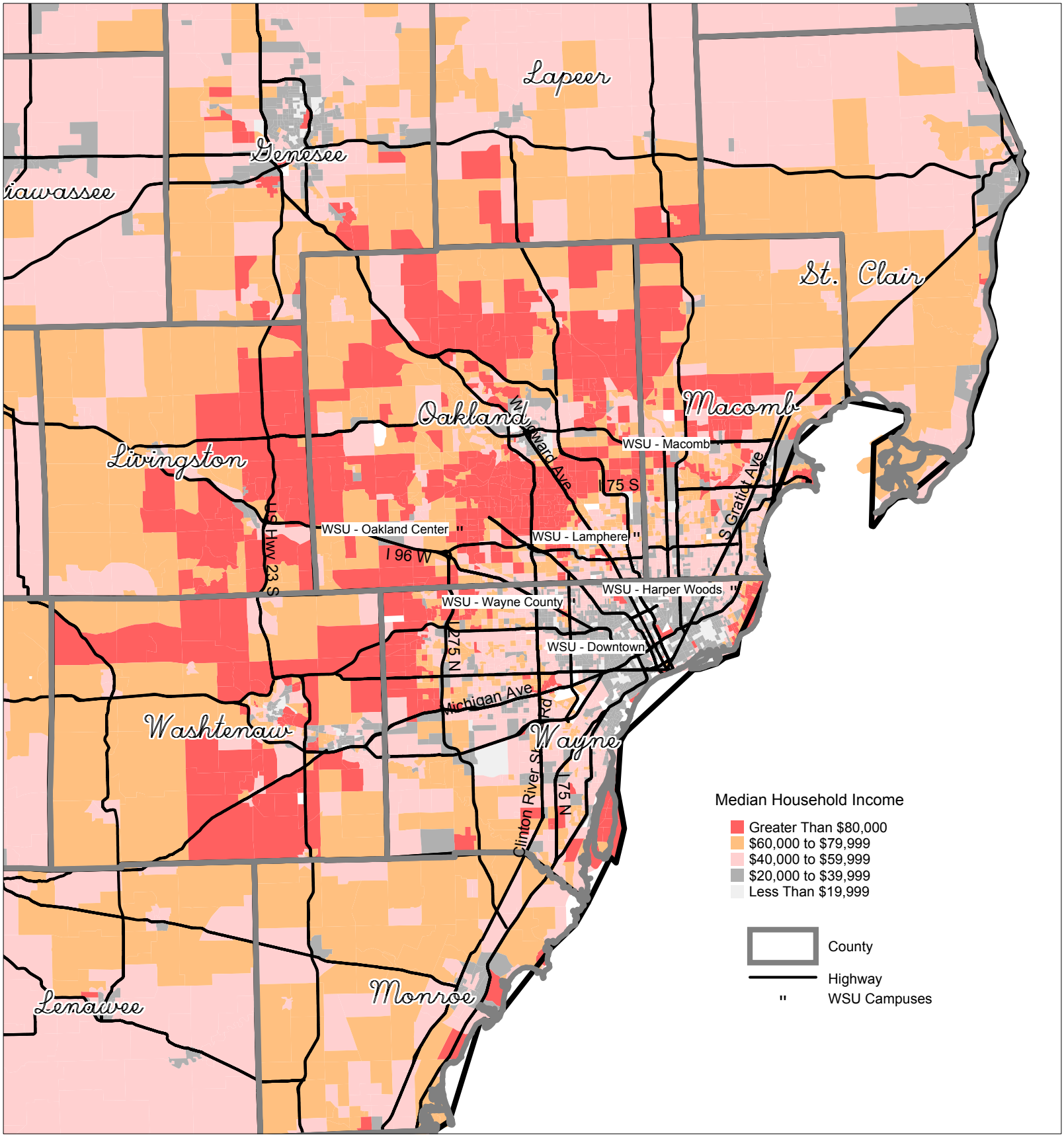
Map 3: Median Household Income



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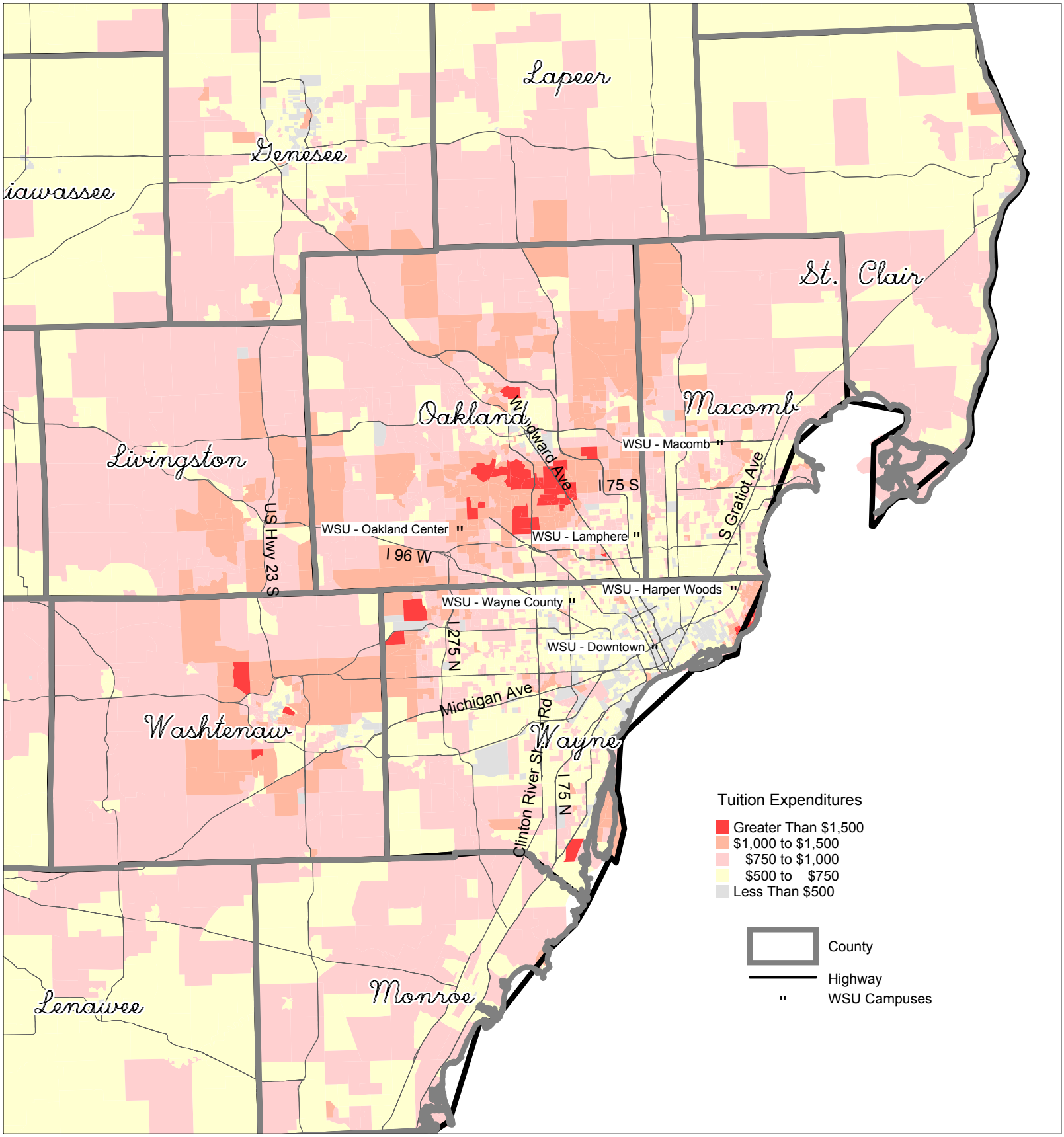
Map 4: Average Household Tuition Expenditures



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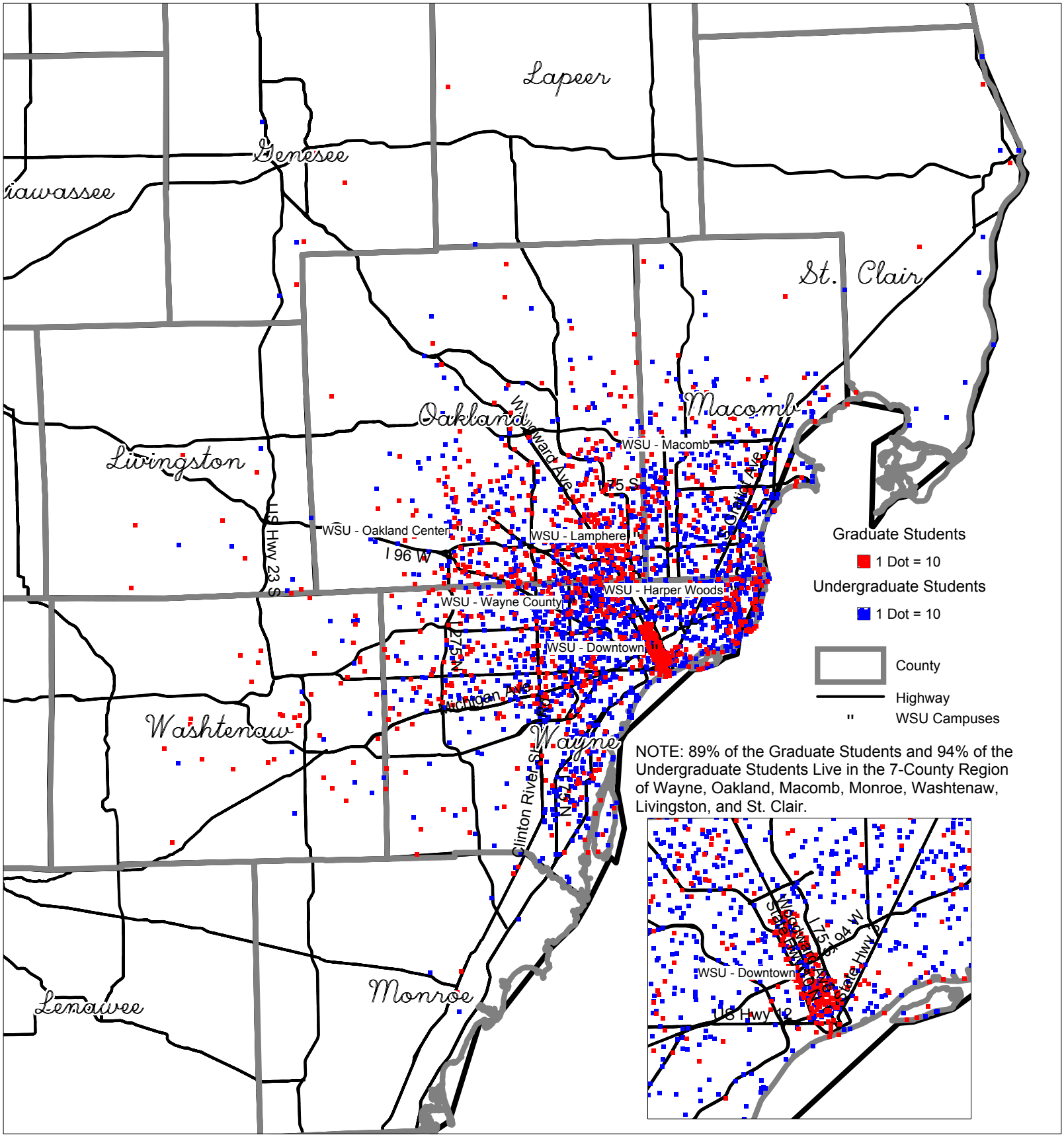
Map 5: Graduate & Undergraduate Students



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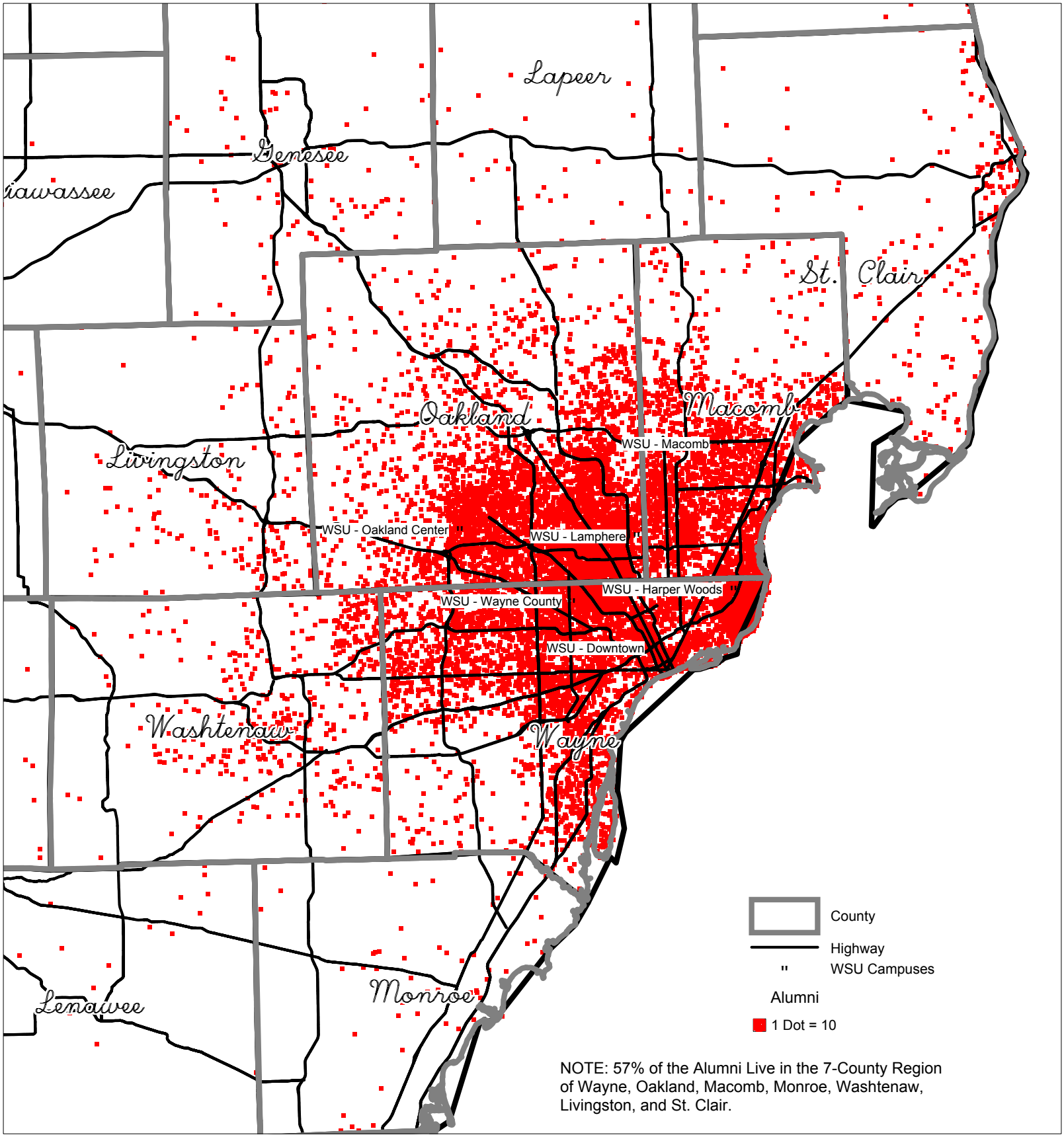
Map 6: # Alumni Map - 1 Dot Represents 10 Alumni



NOTE: 57% of the Alumni Live in the 7-County Region of Wayne, Oakland, Macomb, Monroe, Washtenaw, Livingston, and St. Clair.

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Source: Anderson Economic Group
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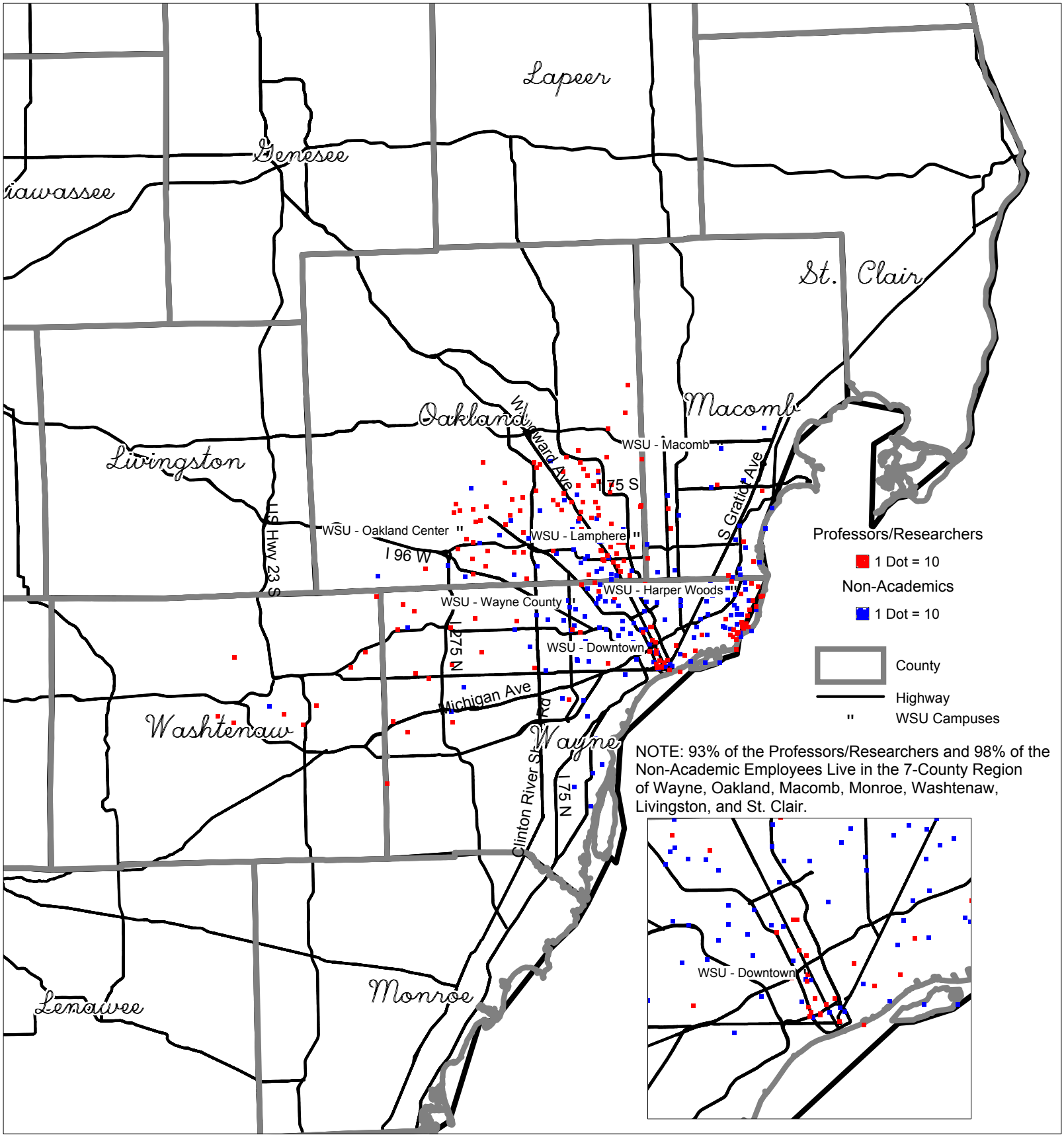
Map 7: Professors/Researchers & Non-Academics



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Appendix B: Data Tables

The following pages contain:

- Table 17: Input Data: Expenditures and Income
- Table 18: Direct and Indirect Economic Impact Analysis
- Table 19: Human Capital Input Data
- Table 20: Fiscal Impact Analysis
- Table 21: State Return on Investment

Table 17. Input Data: Expenditures and Income

All Data for year 2002-2003, or 2003 Year-End, unless noted

A. WSU Expenditures

		Input Value
Total Expenditures: Teaching and Operations	**$**	**509,900,000**
includes:		
Faculty and Non-Research Payroll	$	292,646,615
Direct Expenditures (non-payroll)	$	217,253,385
Total Expenditures: Research	**$**	**148,100,000**
includes:		
Research Payroll (professors, researchers, non-acedemic staff in research dept.)	$	67,486,226
Direct Expenditures (non-payroll)	$	80,613,774

data: WSU 2003 Consolidated Financial Statement; WSU provided Employment and Wage data
note: Does not include medical center.

B. Students

Total Number of Students		**33,091**
Number of Undergraduate Students		20,150
Number of Graduate Students		12,941
Average Annual Expenditures (excluding tuition and fees)		
Room and Board	$	6,631
Books and Supplies	$	675
Other Expenses	$	3,301
Total	**$**	**10,607**

Data Source: Presidents Council of Michigan Universities; National Center for Education Statistics

C. Employees

Number of Faculty & Research Professionals		**3,614**
Income and Expenditures of Employees (Faculty and Research)		
Average Salary	$	57,443
Average Income Tax Rate (federal)		*20%*
Average Income After Tax	$	45,954
Average Savings Rate		*2%*
Expendable Income (after savings and taxes)	**$**	**45,035**
Distribution of Expendable Income		
In 7-County Area		90%
In Michgan		6%
Other		4%
C1. Total Regional Annual Expenditures by Professors & Researchers	**$**	**146,478,613**
Number of Non-Academic Employees		**3,957**
Income and Expenditures of Employees		
Average Salary	$	38,551
Average Income Tax Rate (federal)		*20%*
Average Income After Tax	$	30,841
Average Savings Rate		*2%*
Expendable Income (after savings and taxes)	**$**	**30,224**
Distribution of Expendable Income		
In 7-County Area		90%
In Michgan		6%
Other		4%
C2. Total Regional Annual Expenditures by Non-Academic Employees	**$**	**107,636,674**
Total Regional Annual Expenditures by WSU Employees	**$**	**254,115,287**

Table 17. Input Data: Expenditures and Income (cont'd)

D. Visitors

Visitors for Campus Events and Attractions, From 7-County Region		
Total Visitor Days		88,826
Total Visitor Nights		27,440
Average Daily Expenditure, Day Visitor	$	51
Average Daily Expenditure, Overnight Visitor	$	161
Subtotal: Expenditures from Region	$	8,947,902
Visitors for Campus Events and Attractions, From Rest of MI		
Total Visitor Days		19,106
Total Visitor Nights		10,935
Average Daily Expenditure, Day Visitor	$	51
Average Daily Expenditure, Overnight Visitor	$	161
Subtotal: Expenditures from Rest of MI	$	2,735,005
Visitors for Campus Events and Attractions, From Out of State		
Total Visitor Days		7,793
Total Visitor Nights		6,334
Average Daily Expenditure, Day Visitor	$	51
Average Daily Expenditure, Overnight Visitor	$	161
Subtotal: Expenditures from Out of MI	$	1,417,217
D1. Subtotal: Visitor Expenditures from Campus Events, Activities, Facilities etc.	**$**	**13,100,124**
Visitors From 7-County Region to See Students / Commencements		
Total Visitor Days		148,401
Total Visitor Nights		25,966
Average Daily Expenditure, Day Visitor	$	38
Average Daily Expenditure, Overnight Visitor	$	95
Subtotal: Expenditures from Region	$	8,130,104
Visitors From Rest of MI to See Students / Commencements		
Total Visitor Days		40,510
Total Visitor Nights		16,123
Average Daily Expenditure, Day Visitor	$	38
Average Daily Expenditure, Overnight Visitor	$	106
Subtotal: Expenditures from Rest of MI	$	888,687
Visitors From Out of MI to See Students / Commencements		
Total Visitor Days		6,681
Total Visitor Nights		5,973
Average Daily Expenditure, Day Visitor	$	38
Average Daily Expenditure, Overnight Visitor	$	106
Subtotal: Expenditures from Out of MI	$	888,687
D2. Subtotal: Visitor Expenditures from Student Guests	**$**	**9,907,478**
Total Visitor Expenditures: Campus Events, Attractions, and Student Visitors	**$**	**23,007,602**

E. Indirect Economic Impact Multipliers

	7-county region	3-county PMA
WSU Teaching and Operations	1.6	1.5
WSU Research	1.6	1.5
Student Expenditures	2.0	1.8
Employee Expenditures	1.9	1.8
Visitor Expenditures	1.8	1.75

Table 18. Direct and Indirect Economic Impact Analysis

(2002-2003 or 2003 Year-End)

	Direct Expenditures, After Likely Substitution			7-county region Output Value		3-county region Output Value		share of region in 3-county
A.	WSU: Teaching and Operations (non-payroll)		$ 217,253,385					
	less: expenditures out of 7-county area	0.1	$ 21,725,339					
	Subtotal: Expenditures in region		$ 195,528,047		$ 156,422,437			
	less: likely substitution by other employers	*0.25*	*$ 48,882,012*		*0.20* *$ 31,284,487*			*0.80*
				$ 146,646,035		$ 125,137,950		
B.	WSU Research (non-payroll)		$ 80,613,774					
	less: expenditures out of region	0.20	$ 16,122,755					
	Subtotal: Expenditures in region		$ 64,491,019		$ 51,592,816			
	less: likely substitution by other employers	*0.10*	*$ 6,449,102*		*0.05* *$ 2,579,641*			*0.80*
				$ 58,041,917		$ 49,013,175		
C.	Students (excludes tuition and fee expenditures)		$ 350,996,237		$ 280,796,990			
	less: likely substitution of students to other colleges	*0.45*	*$ 157,948,307*		*0.30* *$ 84,239,097*			*0.80*
				$ 193,047,930		$ 196,557,893		
D.	Professors, Researchers & Non-Academic Employees		$ 254,115,287		$ 203,292,230			
	less: likely substitution by other universities	*0.30*	*$ 76,234,586*		*0.25* *$ 50,823,057*			*0.80*
				$ 177,880,701		$ 152,469,172		
E.	Visitors		$ 23,007,602		$ 18,406,082			
	less: likely substitution by other venues	*0.40*	*$ 9,203,041*		*0.35* *$ 6,442,129*			*0.80*
				$ 13,804,561		$ 11,963,953		
	Total Direct Expenditures (in region, after substitution)			**$ 589,421,145**		**$ 535,142,143**		
	Indirect Expenditures (after substitution)							
A.	WSU: Teaching and Operations			$ 87,987,621		$ 62,568,975		
B.	WSU: Research			$ 34,825,150		$ 24,506,587		
C.	Students			$ 193,047,930		$ 157,246,314		
D.	Professors, Researchers, and Non-Academic Employees			$ 160,092,631		$ 121,975,338		
E.	Visitors			$ 11,043,649		$ 8,972,965		
	Total Indirect Expenditures			**$ 486,996,982**		**$ 375,270,179**		
	Total Direct & Indirect Expenditures							
A.	WSU: Teaching and Operations			$ 234,633,656		$ 187,706,925		
B.	WSU: Research			$ 92,867,068		$ 73,519,762		
C.	Students			$ 386,095,861		$ 353,804,207		
D.	Professors, Researchers, and Non-Academic Employees			$ 337,973,332		$ 274,444,510		
E.	Visitors			$ 24,848,210		$ 20,936,918		
	TOTAL EXPENDITURES			**$ 1,076,418,127**		**$ 910,412,322**		

Table 19. Human Capital Model Inputs

Average Annual Earnings, 1997-1999, by educational attainment (in constant 1999 dollars)	full-time, year-round	all workers
Master's	62300	54500
Bachelor's	52200	45400
Associate's	38200	33000
High School Grad	30400	25900
Not High School Grad	23400	18900

Source: Census Bureau special study p23-210 (July 2002); base data CPS March 1998, 1999, 2000.

Adjustment Factors: Earnings Growth 1999-2004		Annual Average Growth Rates	
	Total Period	1999-2001	2001-2004
skilled	1.208	1.15	1.05
unskilled	1.186	1.14	1.04

Source: Base data on productivity, BLS; Estimated Earnings Growth for WSU labor pool, AEG Analysis.

Estimation of Average Projected Earnings, WSU Grads, 2004-2015

	full-time, year-round	all workers	
Advanced degrees, 2004 dollars	$ 71,466	$ 62,518	
adjustment for WSU demographics	0.95	0.95	
Estimated WSU Average Earnings	$ 67,893	$ 59,392	
Bachelor degrees, 2004 dollars	$ 63,032	$ 54,821	
adjustment for WSU demographics	0.96	0.96	
Estimated WSU Average Earnings	$ 60,510	$ 52,628	
High School Grads, Potential WSU Students	$ 36,042	$ 30,707	
adjustment for WSU demographics	0.96	0.96	
Estimated WSU Average Earnings	$ 34,601	$ 29,479	
weights: advanced degrees	0.2	0.2	
weights: bachelors	0.3	0.3	
Weighted Average Earnings, WSU Grads, 2004			$ 59,398
weights: HS Grads, Potential WSU	0.5	0.5	
			$ 32,040

Source: AEG Analysis

Table 19. Human Capital Model Inputs (cont'd)

Productivity and Earnings Growth in Future

	annual rates of change, total output		
recent data	2002	2003	2004
	1.8%	3.8%	2.0%

Estimated Future Productivity Growth, Trend per annum

Skilled	2.1%
Unskilled	1.8%

Source: Base data on productivity, BLS; Estimated Earnings Growth for WSU labor pool, AEG Analysis.

Background Data on Earnings and Educational Attainment

Educational Attainment and Demographics of WSU Students

projected lifetime earnings by race (constant 1999 dollars, millions)

bachelors: white non-hispanic	$	2.20
bachelors: Black	$	1.70
ratio:		*1.29*

projected lifetime earnings by race

masters: white non-hispanic	$	3.10
masters: Black	$	2.50
ratio:		*1.24*

Source: Census Bureau special study p23-210 (July 2002); base data CPS March 1998, 1999, 2000.

Table 20. Direct Fiscal Impact Analysis

(FY 2002-2003, or 2003 Year-End)

	share	7-county region	out-of-region	*share*	3-county PMA	out-of-PMA
Total Direct & Indirect Expenditures		$ 1,076,418,127			$ 910,412,322	
Note: excludes federal taxes on WSU employee earnings						
less: Non-taxable portion of WSU direct expenditures						
Non-taxable Expenditure Share of WSU Direct Expenditures in Area	*45%*	$ (92,109,579)		*45%*	$ (56,312,077)	
Fully Taxable Expenditures in Area		$ 984,308,549			$ 854,100,245	
Allocated share of expenditures						
Personal Income & Distributed Business Income, In Area	*80%*	$ 861,134,502		*75%*	$ 682,809,242	
Business & Personal Income, Distributed Out of Area (including additional federal income taxes)	*20%*		$ 172,226,900	*25%*		$ 170,702,310
Total State Taxes As Share of Income in Area		*9.0%*			*9.0%*	
Total Tax Paid to State Government from Region		$ 77,502,105			$ 61,452,832	
Statewide Fiscal Impact						
Other taxed income in state of Michigan (as share of income distributed out of area)	*80%*	137,781,520				
Total Tax Rate		9.0%				
State Tax Revenue from outstate counties		12,400,337				
Total WSU-caused Direct Fiscal Benefit to State		**$ 89,902,442**				

(excludes taxes on increased earnings from graduates.)

Table 21. State Return on Investment Analysis

(Year 2004)

			Expenditures or Earnings (millions of 2004 dollars)
State of Michigan Expenditures			
Direct Appropriations (2002-2003)			**$ 245.5**
State of Michigan Tax Revenue			
Taxes on Net Additional Earnings of Michigan Residents due to WSU Operations (see table 20)			$ 89.9
Taxes on Net Additional Earnings of Michigan Residents, due to WSU Education (see figure 6)			
Estimate for 2014 (in 2004 dollars)		$ 100.8	
less: productivity and other adjustments	0.5	$ (50.4)	
			$ 50.4
Total Net Additional Taxes Due to Operations and Graduate Earnings			**$ 140.3**
memo:			
Additional tax revenue due to unquantified benefits:			*unknown*
business locations			
motivation to stay in school			
knowledge and cultural endowments	*(see section VI)*		
Total Net Additional Taxes to State of Michigan			*unknown*

Appendix C: About Anderson Economic Group

FIRM PROFILE

Anderson Economic Group, L.L.C. specializes in providing consulting services in economics, finance, public policy, and market assessments. Our approach to work in these fields is based on our core principles of professionalism, integrity, and expertise.

We insist on a high level of integrity in our analyses, together with technical expertise in the field. For these reasons, work by Anderson Economic Group is commonly used in legislative hearings, legal proceedings, and executive strategy discussions.

PAST CLIENTS

Since our founding in 1996, our analyses have helped publicly-held corporations, private businesses, governments, and non-profit organizations. Our work has included markets throughout the United States, as well as in Canada, Mexico, and Barbados. Recent Anderson Economic Group clients include:

Governments

- State of Michigan
- State of Wisconsin
- State of North Carolina
- Oakland County, Michigan
- City of Detroit, Michigan
- Detroit-Wayne County Port Authority
- City of Norfolk, Virginia
- City of Fort Wayne, Indiana
- City of Cincinnati, Ohio
- Collier County, Florida

Businesses

- General Motors Corporation
- PG&E Generating
- Beck's North America
- SBC and SBC Ameritech
- The Detroit Lions
- Kmart Corporation
- Toyota, Honda, Ford, Mercedes-Benz, BMW and Lincoln-Mercury dealers, or their associations.
- Labatt USA
- W. Grant & Sons
- Taubman Centers, Inc.

Nonprofit and Trade Organizations

- International Mass Retailers Association
- Hudson Institute
- Michigan Chamber of Commerce
- Telecommunications Association of Michigan
- Michigan Catholic Conference
- Automation Alley
- Michigan Retailers Association
- American Automobile Manufacturers Association
- Michigan State University
- Wayne State University
- Van Andel Institute

QUALITY ASSURANCE POLICY

Anderson Economic Group follows a written quality assurance program, based on the elements of ISO 9000. Among the quality assurance steps we insist upon are the use of a sound, written methodology; documentation of important sources; file organization and retention schedules; proper summarization of technical work; and high quality standards for written reports and graphics.

PROJECT TEAM

The project team was headed by Patrick L. Anderson. Ilhan K. Geckil and Scott D. Watkins contributed to the report, as did additional staff. Profiles of project team members are below.

Patrick L. Anderson. Mr. Anderson founded Anderson Economic Group in 1996, and serves as a Principal in the company. In this role he has successfully directed projects for state governments, cities, counties, nonprofit organizations, and corporations in over half of the United States.

Mr. Anderson has written over ninety articles published in periodicals such as *The Wall Street Journal, The Detroit News, The Detroit Free Press, American Outlook, Crain's Detroit Business*; and monographs published by the Mackinac Center for Public Policy, The Economic Enterprise Foundation of Detroit, the Ethan Allen Institute in Vermont, and the Heartland Institute of Chicago. His book *Business Economics and Finance* was be published by CRC Press in August 2004.

Mr. Anderson is a graduate of the University of Michigan, where he earned a Masters degree in Public Policy and a Bachelors degree in Political Science. He has been a member of the National Association for Business Economics since 1983.

llhan K. Geckil. Mr. Geckil is an Economist with Anderson Economic Group with a background in applied economics, industrial organization, statistics, and public finance. He has contributed to projects for clients in automotive and beer industries; retailers; and local and state governments. Additionally, he provides economic forecasts for Bloomberg's monthly economic survey.

Prior to joining Anderson Economic Group, Mr. Geckil worked as an Assistant Consultant for PDF Corporation in Istanbul, Turkey. He holds a Masters degree in Economics from the Eli Broad Graduate School of Management at Michigan State University, and a Bachelor degree in Economics from KOC University in Istanbul, Turkey.

Scott D. Watkins. Mr. Watkins is the Director of Marketing and Administration at Anderson Economic Group. In this role he oversees the firm's administrative staff and procedures and implements marketing strategies. Mr. Watkins also works as a Consultant on projects involving policy analysis and market assessments. Among the clients for whom he has worked are General Motors Corporation, the State of Wisconsin, SBC Ameritech, Michigan Chamber of Commerce, Michigan Retailers Association, and the City of Detroit.

Mr. Watkins is a graduate of Michigan State University with a B.A. in Marketing from Eli Broad College of Business and a B.A. in International Relations from the James Madison College.