Measuring the

Economic and Fiscal Contributions of Michigan's Latino Population

Steven R. Miller
Rubén O. Martinez
Amy Fuan

April, 2010

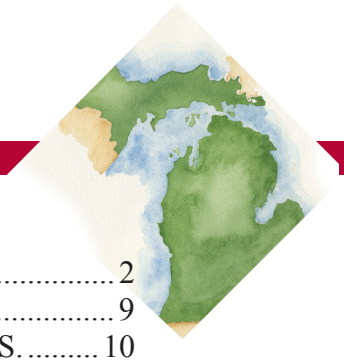
SAMORA RESEARCH JULIAN INSTITUTE

Committed to the

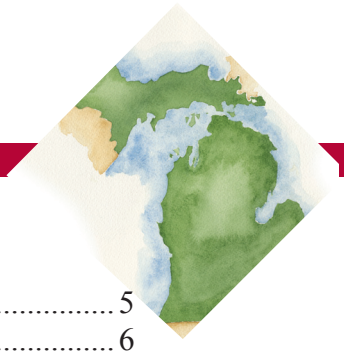
generation, dissemination and application of knowledge

Table of Contents

List of
Tables



List of
Figures



Executive Summary

This report presents the findings of an extensive research effort to track the economic and fiscal impacts of Michigan's Latino population. The findings suggest that Michigan's Latino population, though generally native-born citizens, have limited access to employment opportunities and institutions. Although this study does not focus on the causes of limited access and other barriers, it is hoped that it sets in motion dialogue to better understand challenges and opportunities of this progressively important segment of the population. The findings provide benchmarks from which progress in removing social and economic barriers can be measured.

Actual and projected demographic shifts in Michigan expose several concerns relative to the workforce. Michigan's population is getting older and by 2020, approximately 30% of the population will reach retirement age. Additionally, Michigan is losing a substantial portion of its young, skilled workforce. Both suggest that Michigan will face increasingly scarce labor resources in the coming years. However, one segment of the population continues to experience growth. The Latino population in Michigan continues to grow despite net outmigration of other population segments. For Michigan, the growing Latino population segment affords an opportunity to mitigate the impact of the coming labor shortfall created by the retirement of the Baby Boomers.

However, Latinos in Michigan face many challenges, even though they are much more likely to be U.S. born citizens than is the case in many other states. Approximately 71% of Michigan Latinos are native born, while 60% are native-born for the nation as a whole. Despite the predominance of native-born Latinos in Michigan, this segment faces formidable barriers to economic opportunities and social services. Latino workers systematically experience higher unemployment rates, earn less than their non-Latino counterparts, and are more likely to be concentrated in low-paying occupations. This segment tends to lack the occupational characteristics and educational attainment levels required to move up in the occupational structure. Additionally, Latinos generally reside in underserved neighborhoods, and their children are less likely to pursue and complete post-secondary education. Research suggests that exclusion from institutions common to most Americans contributes to the social and economic isolation of Latino households.

This study documents the economic differences between Latino and non-Latino households and workers within an economic impact framework. Measurement of fiscal impacts on state and local government budgets at the household level provides the first opportunity to gauge the Latino population's net contributions to state and local government. Based on data from 2005 through 2008, findings suggest that Latino households pay more in tax revenue than consumed in public services, but less than non-Latino households. Latino households directly contribute $1.82 to government revenue for every dollar of public service consumed versus $3.86 for non-Latino households. Only excludable public service expenditures are considered in this study; consumption of common goods such as infrastructure is not considered. We find that the difference is not

related to increased consumption of public services per household but rather to lower household income, which drives tax revenues.

Approximately 154,797 Latino workers contribute $25.2 billion in state output. However, these jobs generate additional jobs that impact Latino and non-Latino households alike. In addition to the direct jobs occupied by Latino workers, an additional 162,554 jobs are generated for a total state-wide employment impact of 317,351 Michigan jobs. Taking into consideration secondary impacts, the Latino workforce contributes approximately $48.4 billion to total state output.

Measuring the

Economic Impact of Michigan's Latino Population

Introduction

Latinos have been Michigan residents for more than a century, although in relatively low numbers. In the early part of the 20th century they came by train and later by car to work in manufacturing plants, agriculture, and other sectors of the economy. Some came as migrant farmworkers who settled out of the migrant stream into communities where they found regular employment. While many came as immigrants, others came as political refugees. The majority came from Mexico and the southwestern United States, especially Texas or by way of Texas, giving Michigan's Latino population a strong Mexican-American, or Chicano, presence.

Latinos have contributed to Michigan's economy both as members of the workforce and as entrepreneurs. In 2002, Michigan's nearly 10,000 Latino-owned businesses had sales and receipts of $3.1 billion and employed nearly 16,000 persons. In 2008, the purchasing power of Latinos was approximately $8.8 billion (Immigrant Policy Center, 2009). Today, Latino farmworkers are a key component of the state's agricultural and food systems industry, which has a $71.3 billion impact on the state's economy.

Although they have been a relatively small segment of the state's population, Latinos are increasing and becoming a larger population segment. Today, the largest concentrations are in Detroit and Grand Rapids, followed by concentrations in mid-sized cities such as Lansing, Pontiac and Saginaw, after which they are dispersed across other cities and rural communities.

This report provides baseline measures of the economic and fiscal impact of Michigan's Latino population, and sheds light on their contribution to the state in the context of important demographic changes that are increasingly evident across the nation. Given data limitations, however, we were unable to capture separately the impact of agricultural migrant workers. Most of these workers leave the state when seasonal employment ends. And while their expenditures may be limited, their presence in the state brings in millions of dollars from the Federal Government, especially in migrant education, that benefit the state's economy.

Two key demographic changes that are underway are the rapid growth of the Latino population and the aging of the Baby Boomer Generation, which is comprised of 78.2 million Americans born during the middle of the 20th century, beginning with the return home of military personnel at the conclusion of World War II.

The passage of the Baby Boomer generation into retirement will spawn a gradual decline in the working age population over the next twenty years. In Michigan, approximately 13% of the population is above retirement age today. Baby Boomers begin retiring in mass in 2010. By 2020, the percent of the population above retirement age could reach up to 30%. This "age wave" leaves behind a wake made up of a relatively larger Latino workforce. In

Michigan, this Latino workforce is mostly comprised of native-born Latinos, who are generally more integrated into their communities than their foreign-born counterparts (Pew Hispanic Center 2010). However, the Latino workforce is disproportionately low-skilled workers with low wages and benefits, ushering a need to carefully scrutinize how changes in Michigan's demographics are likely to impact the states' economy.

When compared to the nation, Michigan does not have a substantial Latino presence. Latest figures from the U.S. Bureau of the Census indicate that Latinos comprise approximately four percent of Michigan's population. This is compared to over 15% for the U.S. as a whole. In Michigan, and the United States as a whole, Latinos make up the greatest component of population growth since 2000. While Michigan's overall population growth since 2000 has not kept pace with the U.S., the growth of its Latino population largely reflects that of the U.S.

As shown in Table 1, the average annual total population growth in Michigan since 2000 has been only 0.1% compared to 1.0% for the U.S. In contrast, Michigan's Latino population has experienced 3.1% annual growth over this same period compared to 3.6% at the national level. In fact, Table 1 shows that Michigan would have experienced negative population growth since 2000 if not for the growth in the Latino population.

Table 1: Population Growth for Michigan and U.S. between 2000 and 2008

	2000 (000's)	2008 (000's)	Population Change (000's)	Annualized Growth Rate
US Total Population	281,422	304,060	22,638	1.0%
US Latino Population	35,306	46,944	11,638	3.6%
US Non Latino Population	246,116	257,116	11,000	0.5%
MI Total Population	9,938	10,003	65	0.1%
MI Latino Population	324	414	90	3.1%
MI Non Latino Population	9,614	9,589	-25	-0.0%

Source: U.S. Census, American Community Survey and 2000 Decennial Census

The relative growth of Michigan's Latino population brings into question the social and economic implications of Michigan's changing demographics. This study sets out to estimate the economic contribution of Michigan's Latino population and sets the groundwork for trending such impacts over time. This study does not purport to document the economic impact of Latino immigrants in Michigan, but rather to explore how established and immigrant Latino households and workers contribute to the economy and how they impact public revenues and expenses.

We will document characteristics of Michigan's Latino population using secondary data. The 2008 March Supplement, of the Current Population Survey (CPS) and the American Community Survey (ACS) are dominant resources used to enumerate Michigan's Latino population, incomes and consumption of public services. Additionally, the Bureau of Labor Statistics' Consumer Expenditure Survey is used to gauge the consumption patterns of Latino households relative to non-Latino households. Findings are used within standard economic multiplier analysis to form statewide economic impacts of Michigan's Latino population.

Literature Review

Many researchers have addressed the economic consequences of America's burgeoning Latino population. The 1970s saw the first signs of the coming immigration boom in the U.S. This generated expansive research around immigration impacts to address initial concerns about how immigrant workers and population impact labor markets and government budgets (Pedraza-Bailey 1990). Public opinions centered on how immigrant workers will push wages lower and shift employment opportunities away from indigenous workers by congesting labor markets, and on the popular belief that immigrants will tax public finance systems (Rothman and Espenshade 1992). Despite expansive research around this topic, a clear consensus has not emerged.

Most research suggests that initial concerns were unfounded, and that regions experiencing high growth in immigrant workers have not experienced wide-spread wage suppressions nor volatile public expenditures on the provision of social services (Borjas and Tienda 1987; Council of Economic Advisors 1986). As the Baby Boomers enter retirement, an increasingly scarce supply of qualified applicants will further alleviate wage-impact concerns about economic migrants. Social security, pensions, 401Ks and other retirement plans afford today's retirees much more spending potential than in the past, though there will be fewer workers in the labor force to provide goods and services. Indeed, at the national level, the ratio of 240 seniors (65+ years of age) per thousand working-age adults (25 to 64) is expected to increase to over 400 in the coming decades (Myers 2008).

Key to past studies is how immigrant workers impact local wages. Most studies have found no significant relationship between wages and immigrant workers (Grossman 1982). But, several studies found conflicting evidence. Early research indicated that immigration positively impacted labor markets (Chiswick 1978). However, declines in low-skilled wages along with research that indicated a negative correlation between immigration and wages of unskilled workers buoyed concerns that immigration suppresses local labor markets (Card 2005; Borjas 2003). But, the evidence remains controversial. Controlling for education and job experience, Borjas (2003) finds that regions with high immigration rates experience significant downward pressure on wages of unskilled workers, while others have found wages respond positively to immigration (Greenwood and Hunt 1995). No studies reviewed relate immigration impacts on wages to labor market conditions. While, no strong consensus has emerged on the impact of immigration on labor markets, research is ongoing.

Other researchers have looked at non-wage impacts of immigrants. James, Romine, and Zwanzig (1998) find that immigration propped housing prices in a number of cities that would have experienced population declines in the absence of immigration. Saiz (2003) finds immigrants contribute eight to eleven percent increases in rental rates of low quality rental units, which offsets relative housing price decreases in the same regions. He also finds that immigrant impacts in rental markets are likely greater than those in the labor market (2007). Cortes (2008) tracks the relationship between local prices of non-traded goods and services to low-skilled immigrants, finding that low-skilled immigration decreases the price of immigrant-intensive services and benefits the native population by decreasing the non-traded goods component of the cost of living. She also shows that low-skill immigrant

workers are imperfect substitutes for native low-skill workers. Partridge, Rickman and Ali (2008) find evidence that immigration helps revitalize high-poverty counties. Gans (2007), studying Arizona immigration, and the Fiscal Policy Institute (2007), studying immigration in New York, found that immigrants substantially contribute to state production. Kasarda and Johnson, Jr. (2006) additionally note the importance of secondary employment impacts of North Carolina's Latino population.

Several studies have looked at how immigrant populations impact public finances through contributions to government revenues and demand for public services. Two studies for New Jersey found that their immigrant population tended to contribute more to public revenues than they received through public services (Garvey, Espenshade, and Scully 2002; Collins 1991), and two studies in Texas came to similar conclusions (Weintraub 1984; Weintraub and Cardenas 1984). However, others have found immigrants to be net liabilities for endogenous populations (McCarthy and Valdez 1986; Muller and Espenshade 1985). These findings show that immigrant populations tend to consume public services, such as subsidized housing, income assistance and others, in greater proportion than non-immigrant populations.

The study of the economic impact of Latinos, however, is not the same as the study of the impact of immigrants. Immigration continues to be a significant component of the Latino population, but overall, the nation's Latino population is an established component of the population (Suro and Passel 2003). This study takes the view that Latino households and workers are integrated into the state economy, albeit a socially stratified one.

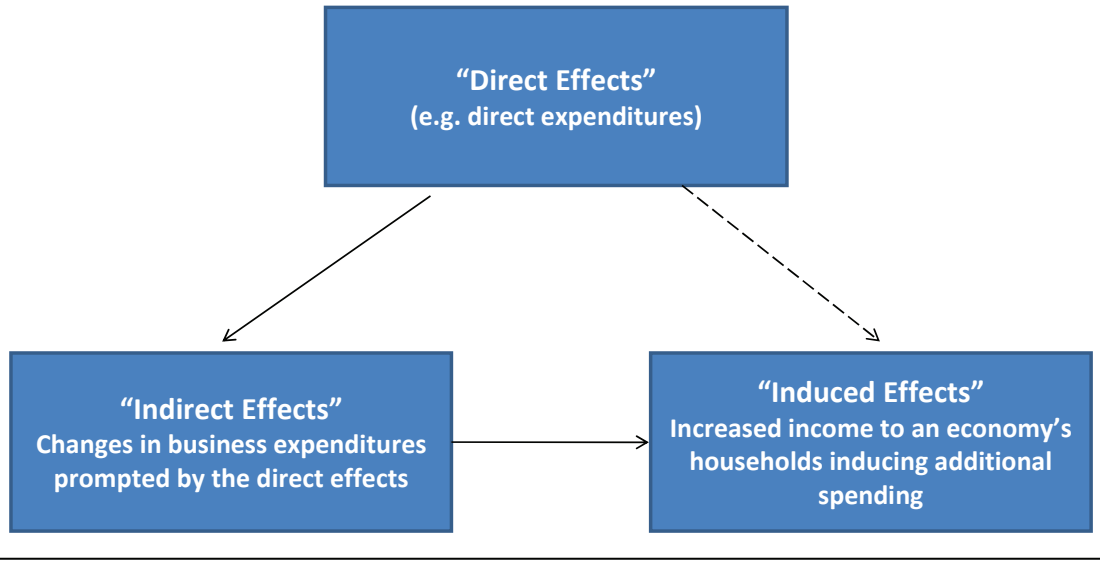
Scope of Impact Study and Data Sources

The model for estimating the economic impact of Michigan's Latino population follows approaches commonly applied in other regions (Gans 2007; Kielkopf 2000; Decker, Deichert, and Gouveia 2008; Kasarda and Johnson 2006). These studies employ standard economic multiplier analysis to estimate economy-wide impacts of a given population based on their contributions to the economy through consumption of goods and services (demand) and their contributions to production as employees and business owners (supply). Economic multipliers are derived using the IMPLAN Pro 2.0 (Minnesota IMPLAN Group Inc. 2004a) economic impact modeling software for Michigan.

Impact Analysis for Planning (IMPLAN) is a well-documented standard linear economic impact system that relates direct expenditures and employment to economy-wide macroeconomic activities known as indirect and induced effects. As the macroeconomic outcomes are generally multiples of the direct investment, this method is often referred to as a multiplier analysis. To validate the IMPLAN outcomes, a second modeling framework was developed using the Regional Economic Models Inc. (REMI) Policy Insight (REMI 2009) model for Michigan. The REMI model generalizes the IMPLAN model outcomes. Finding comparable results between the two modeling frameworks provides evidence relative to the robustness of the economic impact estimates (For more details on the two modeling systems, please see the Appendix I and Appendix IV).

Economic multipliers measure the direct, indirect, and induced effects arising from Latino workers. Here, direct effects measure the direct value of purchases of Latinos (demand) or the direct contribution of Latino workers toward productive output (supply), depending on the economic impact being measured. Indirect effects arise from inter-industry transactions that arise from the direct effects. Induced effects measure the economic activity generated from the combined household income of Latino workers and those workers impacted through the direct effects and indirect effects. In essence, economic multipliers recognize the interrelatedness of sectors with the economy, where a change in one sector will have ripple effects in other sectors, as shown in Figure 1 (For a more detailed description of the multiplier effects and the calculations that generate these measures see Appendix I).

Figure 1.
The Multiplier Effect

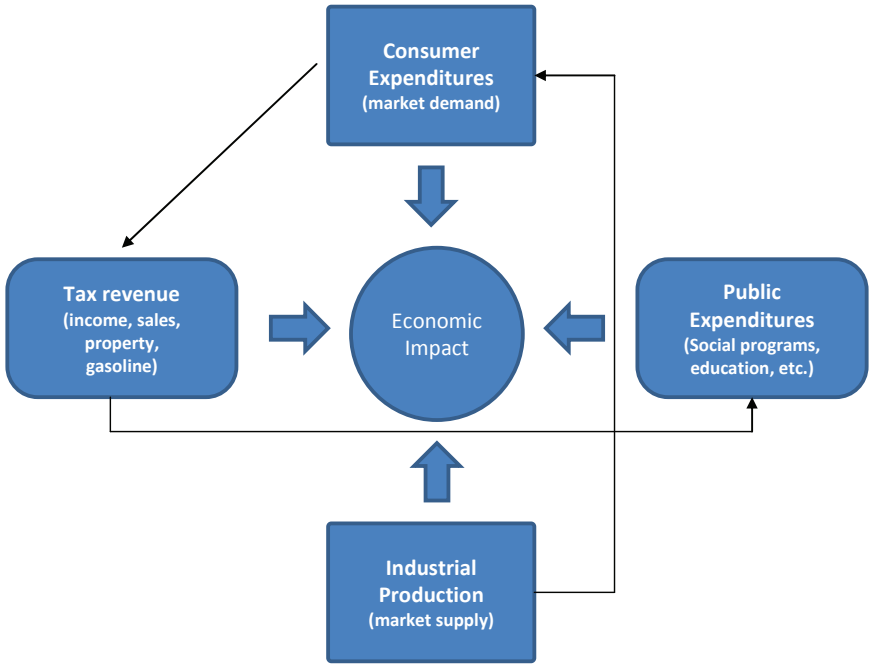


The total economic impact is calculated as the sum of the direct, indirect and induced effects and is generally measured in dollar value of output. The multiplier is simply calculated as the ratio of the total economic impact to the direct effects. While the total economic impact is generally calculated in terms of regional output, its interpretation is not limited to the value of transactions generated within the economy. Using the assumption of fixed ratios of employment to output for each industry, the three economic effects can be restated in terms of employment, labor income, and value added, where value added provides a measure of the contribution of labor and local capital to total output.

Following Kasarda and Johnson (2006), who gauged the North Carolina economic contribution of the Latinos, four basic elements are modeled, as depicted in Figure 2. Consumer expenditures reflect local Latino household purchases as well as purchases from households benefiting through induced effects. Industrial production reflects direct and indirect production attributed to Latino workers. Earnings contribute to consumer expenditures that further generate induced production through household demand for goods

and services. Tax revenue is assumed to arise from household income.[1] Public revenues from taxes are then used to deliver public goods and services, such as roads, education, social services, and others.

Figure 2.
The Major Elements of an Economic Impact



Considerations of consumer expenditures take into account Latino household spending patterns relative to Michigan's population as a whole. The Consumer Expenditure Survey (CEX), collected by the U.S. Census Bureau for the Bureau of Labor Statistics, provides detailed spending by category. Statistics allow the comparison of spending patterns of Latino households to non-Latino households. Furthermore, spending categories are broken out into those categories that generate sales and excise tax revenues and those that do not. Estimated sales and excise tax revenues are generated for comparisons of net contribution to state revenues.

Production impacts are modeled using the March Supplement of the Current Population Survey (CPS) collected by the U.S. Census Bureau. The CPS provides detailed occupational and industrial breakout of Latino workers which allow for gauging contributions to state output and household income. The CPS provides the input necessary to gauge production impacts by industry, where the economy has heterogeneous responses to changes across various industries. Wages are further used to gauge income impacts and income tax generation.

[1] This omits business tax impacts as they relate to Latino workers' contributions to corporate profits and the sustainability of Michigan's general business base.

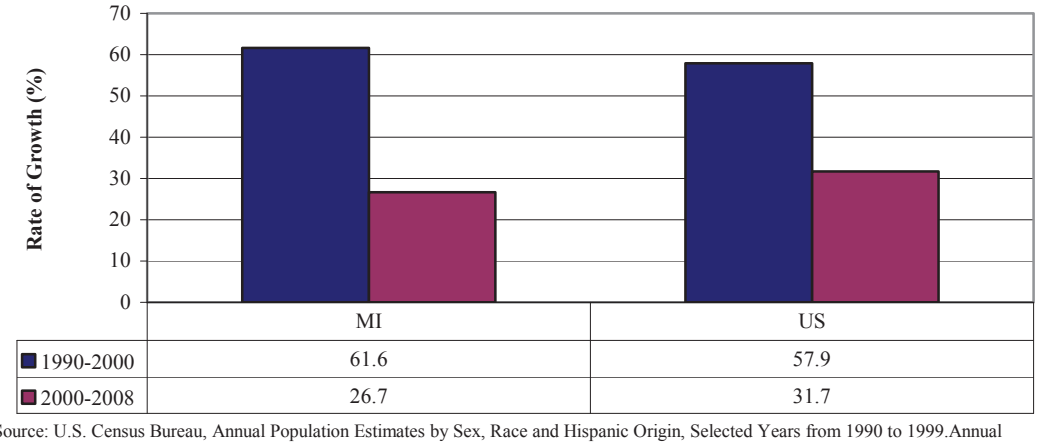
A combination of consumption and production components of the analysis contributes to the estimated governmental fiscal impact of Latino households that includes both direct and indirect public revenues and expenditures. Consideration of tax revenues and public expenditures require measuring differentials in the rates of tax generation and public services consumed by Michigan's Latino population relative to the non-Latino population. The Current Population Survey is used to document wages, income taxes and public services consumed. Sales tax estimates are derived from the Consumer Expenditure Survey.

All components are interrelated within the analytical framework. Employment generates income that, in turn, spawns consumption. Income and consumption drive public revenues that drive government expenditures that further drive employment. Industries are fully linked such that changes in the production output of one industry impacts the level of production of allied industries. To exemplify, a reduction in output of the auto sector will decrease the demand for tires, fabricated metal and other inputs required to make automobiles. As these secondary firms respond to changes in demand, they adjust their labor hours, investment and other activities that translate to economy-wide impacts.

Latino Population Statistics

During the decade of 1990, as shown in Figure 3, Michigan and the U.S. both experienced substantial growth in their Latino populations. According to the U.S. Bureau of the Census, Michigan's Latino population was approximately 202,000 in 1990. That number rose to over 413,000 in 2008. In contrast, Michigan's total population growth since 1990 has only been 7.4%. Latinos have made significant contributions to population growth in Michigan, and many Michigan communities would have experienced negative population growth over the last decade if not for the Latino population.

Figure 3. Growth in Latino Population since 1990 for Michigan and U.S.



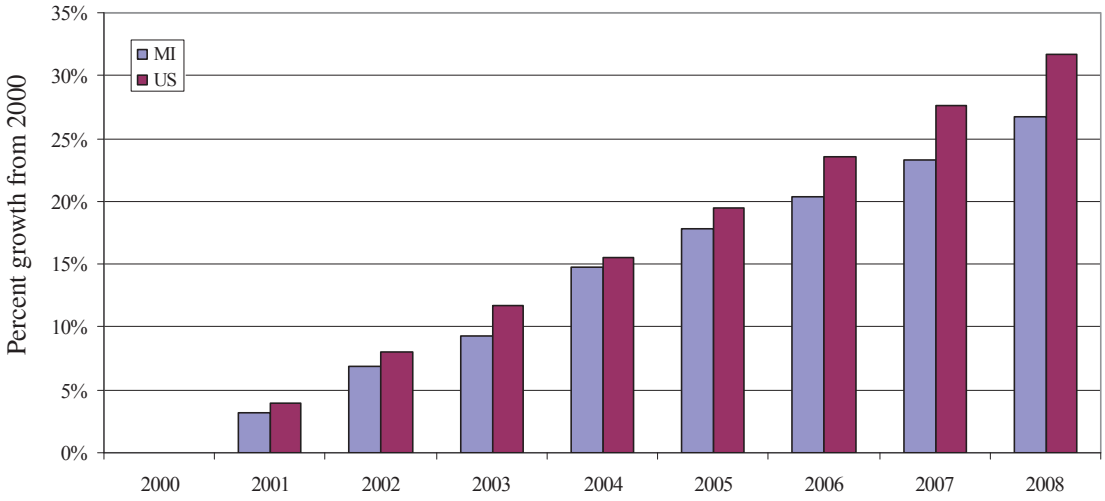
	MI	US
1990-2000	61.6	57.9
2000-2008	26.7	31.7

Source: U.S. Census Bureau, Annual Population Estimates by Sex, Race and Hispanic Origin, Selected Years from 1990 to 1999.Annual Population Estimates by Sex, Race and Hispanic Origin, Selected Years from 2000 to 2008.

Growth since 2000 continues to occur, but not at the rates seen in the 1990s. The Latino population grew faster in Michigan than for the U.S. in the 1990s, but over the past eight years, Michigan's Latino population growth has trailed the nation. This is partially a reflection of the overall anemic population growth in Michigan since 2000.

The U.S. Census Bureau provides annual estimates of population growth by ethnicity. We use these figures to form estimates of cumulative growth rates since 2000. Figure 4 provides the cumulative growth rates of the Latino population in the U.S and Michigan from 2001 to 2008 relative to 2000 as baseline. As evident, the difference between Michigan's and the U.S.'s growth rates of Latinos has steadily widened over time. Much of this difference can be attributed to relative concentrations of Latinos in southwest states. Additionally, Michigan's relatively weak economy over most of the current decade means economic opportunities are also relatively weak, making Michigan a less attractive destination for immigrants and mobile populations.

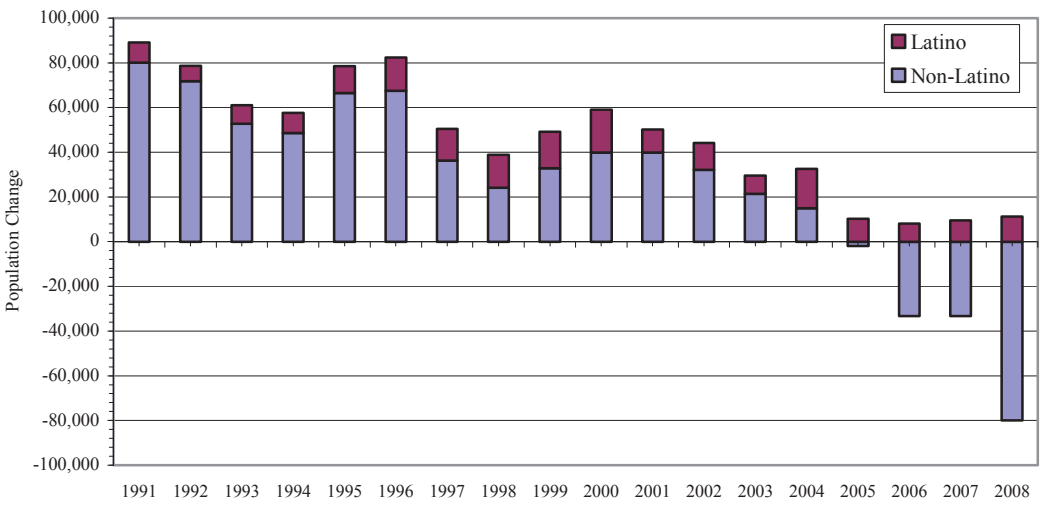
Figure 4. 2001-2008 Growth in Latino Population for U.S. and Michigan (Based on 2000)



Scource: Annual Population Estimates by Sex, Race and Hispanic Origin, Selected Years from 2000 to 2008.

In recent years, Michigan's Latino population growth remained positive despite net declines in total state population. Figure 5 provides the U.S. Census Bureau's estimates that show that non-Latino population change in Michigan has been negative since 2004. Michigan has had to grapple with the economic fallout of a declining population. Some communities have been hit harder than others. Outmigration has left a multitude of unoccupied residential structures, high foreclosure rates, and dwindling tax base and economic activity in Flint and Saginaw, while Ann Arbor, Grand Rapids, and Holland experience healthy growth. Regardless, the Latino population has provided offsetting impacts that have mitigated these outcomes to some extent.

Figure 5. Latino and Non-Latino Contributions to Michigan



Source: U.S. Census Bureau, Annual Population Estimates by Sex, Race and Hispanic Origin, Selected Years from 1990 to 1999. Annual Population Estimates by Sex, Race and Hispanic Origin, Selected Years from 2000 to 2008.

As shown in Table 2, Michigan's Latino population is somewhat more likely to be native born than they are at the national level. According to the U.S. Census, 311,053 of the 401,009 Latino residents in Michigan are U.S. citizens. Accordingly, 283,700 are native to the U.S. and 27,353 are naturalized citizens. While 77.6% of Michigan's Latinos are U.S. citizens, 71.4% of U.S. Latinos are citizens. Furthermore, while immigration is a sizable component of Latino population change, a significant component is growth from within.

Table 2. Place of Birth, Citizenship Status and Year of Entry, 2007

	Michigan				U.S.			
	Hispanic or Latino		**Total population**		**Hispanic or Latino**		**Total population**	
Total population	401,009	*100%*	10,071,822	*100%*	45,427,437	*100%*	301,621,159	*100%*
Native	283,700	*71%*	9,462,365	*94%*	27,360,576	*60%*	263,561,465	*87%*
Foreign born	117,309	*29%*	609,457	*6%*	18,066,861	*40%*	38,059,694	*13%*
Naturalized U.S. citizen*	27,353	*23%*	285,770	*47%*	5,085,338	*28%*	16,181,883	*43%*
Not a U.S. citizen*	89,956	*77%*	323,687	*53%*	12,981,523	*72%*	21,877,811	*57%*
Entered 2000 or later*	44,577	*38%*	186,494	*31%*	5,383,925	*30%*	10,542,535	*28%*
Entered 1990 to 1999*	41,997	*36%*	189,541	*31%*	5,600,727	*31%*	11,189,550	*29%*
Entered before 1990*	30,735	*26%*	233,422	*38%*	7,082,210	*39%*	16,327,609	*43%*

Source: U.S. Census Bureau, 2007 American Community Survey
* Percents are percent of foreign-born residents

Table 2 also shows that, while most Michigan Latinos are U.S. citizens, the component that is not tends to be newer entrants into the U.S. Approximately 74% of Michigan's foreign-born population entered the U.S. since 1990, compared to 61% for the U.S.

Similar to the U.S. as a whole, Michigan Latinos are slightly more mobile than their non-Latino counterparts. As shown in Table 3, a greater proportion of Latino residents indicate they lived in a different house one year ago than non-Latino residents for both the U.S. and Michigan. Additionally, Michigan Latinos are more likely to relocate from other counties.

Approximately 14% of Michigan Latinos indicate that they moved from a different county over the last year versus 11% for the U.S.

Table 3. Mobility among Latinos and Total Population for Michigan and U.S.

	Michigan				U.S.			
	Hispanic or Latino		**Total population**		**Hispanic or Latino**		**Total population**	
RESIDENCE 1 YEAR AGO								
Population 1 year and over	392,143	*100%*	9,945,300	*100%*	44,439,263	*100%*	297,545,149	*100%*
Same house	308,224	*79%*	8,513,177	*86%*	36,217,999	*82%*	249,937,925	*84%*
Different house in the U.S.	78,036	*20%*	1,392,342	*14%*	7,643,553	*17%*	45,821,953	*15%*
Same county	52,939	*14%*	895,077	*9%*	5,510,469	*12%*	27,969,244	*9%*
Different county	25,097	*6.4%*	497,265	*5.0%*	2,177,524	*4.9%*	17,555,164	*5.9%*
Same state	16,470	*4.2%*	358,031	*3.6%*	1,333,178	*3.0%*	10,116,535	*3.4%*
Different state	8,627	*2.2%*	129,289	*1.3%*	844,346	*1.9%*	7,438,629	*2.5%*
Abroad	5,882	*1.5%*	49,727	*0.5%*	533,271	*1.2%*	1,785,271	*0.6%*

Source: U.S. Census Bureau, 2005-2007 Averages, American Community Survey

Table 4 compares socio-economic characteristics of Michigan's Latino population to those of the U.S. This table shows disparities between Latinos and non-Latinos for both Michigan and the U.S. and suggests that the Latino experience in Michigan is not the same as that experienced throughout the U.S.

Table 4. Population and Employment Characteristics of Latino and Non-Latino Populations for Michigan and U.S.

	Michigan		U.S.	
	Latino	Non-Latino	Latino	Non-Latino
Population	394,627	10,094,027	44,019,880	298,757,310
Median Age	27	36	26	37
Population 16 years and over	265,697	7,915,981	30,527,055	233,658,279
In labor force	68.6%	63.5%	67.6%	64.7%
Civilian labor force	68.5%	63.5%	67.2%	64.2%
Employed	59.9%	57.5%	62.0%	60.0%
Unemployed (percent of civilian labor force)	12.6%	9.4%	7.8%	6.6%
Self Employed**	5,208	350,193	1,450,186	10,693,495
Farm Self-Employed**	1,371	48,691	109,483	1,888,565
Percent with High School or Higher	65%	87%	59%	84%
Percent with Bachelor's or Higher	14%	25%	12%	27%
Households	109,641	3,864,307	11,954,408	111,609,629
Family Households	81,902	2,581,357	9,324,438	74,666,842
Female Head of Household	19,078	475,310	2,199,611	13,951,204
Average HH Size	3.1	2.6	3.5	2.6
Average Family Size	3.5	3.1	3.9	3.2
Median Household Income	$38,187	$48,642	$39,852	$50,007
Housing Tenure				
Occupied Housing Units	109,641	3,864,307	11,954,408	111,609,629
Owner-occupied housing units	56.50%	75.10%	49.50%	67.30%
Owner cost is more than 30% of income	35.50%	29.00%	44.40%	29.70%
Renter-occupied housing units	41.50%	24.90%	50.50%	32.70%
Rent is more than 30% of income	46.20%	47.60%	52.10%	45.70%

Source: U.S. Census Bureau, 2005-2007 Averages, American Community Survey
**Source U.S. Census Bureau, 2008 Current Population Survey

Mirroring the nation, Michigan's Latino population is younger than the overall state population. The median age of Michigan's Latino population is 27 years, whereas the median age of non-Latino Michigan residents is 36 as of 2007. In addition, while Latinos are more likely to participate in the labor force, they are also more likely to be unemployed (Kayitsinga 2007). The Michigan Latino workforce experiences greater difficulty gaining employment relative to non-Latinos than for the nation as a whole. Furthermore, Michigan Latinos are less likely to be self-employed, as only 3.6% of Michigan's Latino labor force indicated self-employment or farm self-employment compared to 7.6% for the U.S.

It is well documented that the educational attainment of the Latino population tends to be below that of non-Latinos (Chapa and De La Rosa 2004). This is true in Michigan, as the educational attainment of the Latino population is markedly lower than for the non-Latino population, particularly non-Latino Whites (Kayitsinga 2007). However, Michigan's Latino population is more likely to attain a high school diploma or a bachelor's degree relative to Latinos in the U.S. But, the educational attainment gap between Latinos and non-Latinos limits economic opportunities for Latinos, as is evident in concentrations of Latino workers in low-skilled jobs, lower average wages and lower rates of employment.

In comparison to households at the national level, Latino households are more likely to be family households. Such is the case in Michigan, where approximately 74.7% of Michigan Latino households are family households compared to 66.4% for non-Latino households. The percent of non-Latino households that are family households in the U.S. nearly mirrors that of Michigan. However, the percentage of female family householders is markedly higher for Latino family households than for non-Latino households. About 17.4% of Michigan's Latino households are female-headed, compared to 12.3% for non-Latino households. This compares favorably against U.S. statistics that indicate 18.4% of Latino households are female head of household.

With regard to household or family size, the average Latino household or family is slightly larger than the average non-Latino in both Michigan and the nation. Two factors could account for the differences of the average size between Latino and non-Latino. First, Latino households are more likely to have children under age 18 than non-Latino households. This is a simple reflection of the lower median age of Latino residents. Second, Latino households are more likely to include extended family members than are non-Latino households. Similar to national figures, the typical non-Latino household size is 2.6 persons and family size is 3.1 in Michigan. However, Michigan's Latino household and family sizes are smaller compared to U.S. Latino figures. A typical Latino household in Michigan is 3.1 persons and family size is 3.5 persons. This noticeable disparity could be attributed to the immigration characteristics of Michigan. Strong familial, kinship, and ethnic ties in communities of origin often trigger chain migration which are largely responsible for household size differentials (Kasarda and Johnson Jr 2005). The larger proportion of native-born Latinos in Michigan than for the nation helps explain the difference of household and family sizes between Michigan and the U.S.

Additionally, Latino families tend to experience higher poverty rates compared to non-Latino families. As shown in Table 5, approximately 9.8% of non-Latino families are living in poverty, compared to approximately 20% for Latino families for both Michigan and the U.S.

Large contrasts exist when comparing Latino families to non-Latino families and when comparing Latino individuals to non-Latino individuals. In many cases, Latino families are twice as likely to be victims of poverty as non-Latino families. The difference reflects the large gaps of family income and access to opportunities for economic gain. For example, as shown in Table 4 above, Latino families in Michigan had a three-year average, median income of $38,187, compared to $48,642 for non-Latino families, for 2005-2007.

Table 5. Poverty Rates for Latinos and Total Population for Michigan and U.S.

	Michigan		U.S.	
	Hispanic or Latino	Total population	Hispanic or Latino	Total population
All families	20.0%	9.8%	19.3%	9.8%
With related children under 18 years	26.0%	15.5%	24.1%	15.1%
With related children under 5 years only	25.7%	17.0%	23.7%	16.2%
Married-couple family	11.1%	4.2%	13.0%	4.8%
With related children under 18 years	14.8%	5.8%	15.7%	6.6%
With related children under 5 years only	12.3%	4.8%	14.6%	6.2%
Female householder, no husband present, family	41.2%	30.6%	38.1%	28.6%
With related children under 18 years	46.3%	39.5%	45.3%	36.9%
With related children under 5 years only	48.6%	47.1%	50.1%	45.5%
All people	23.3%	13.7%	21.5%	13.3%
Under 18 years	29.7%	18.9%	28.2%	18.3%
Related children under 18 years	29.1%	18.4%	27.8%	17.9%
Related children under 5 years	33.3%	21.3%	30.5%	21.1%
Related children 5 to 17 years	27.4%	17.4%	26.6%	16.7%
18 to 64 years	20.3%	12.7%	17.9%	11.9%
65 years and over	10.0%	8.4%	19.7%	9.9%

Source: U.S. Census Bureau, 2005-2007 Averages, American Community Survey

Michigan's Latino and non-Latino households are more likely to own the houses they live in compared to the U.S. However, Michigan Latino households are less likely to be overly burdened by the cost of home ownership. Most lenders consider a homeowner spending more than 30% of income on housing to be financially burdened. As Table 4 shows, 35.5% of Michigan Latino homeowners bear ownership in excess of 30% of their income, compared to 49.5% for the nation's Latinos. Because home ownership is higher in Michigan, the proportion of housing units that are renter occupied is lower. Like that for owner-occupied units, Michigan Latinos are less likely to be burdened by rent expense as measured by the percent paying more than 30% of income on rent.

This section shows that attributes of Michigan's Latino population differ from non-Latinos. Additionally, Michigan Latinos and Latino households exhibit differences from their national counterparts. Michigan Latinos are more likely to be U.S. citizens and slightly more educated, but are more likely to be unemployed. While these factors contribute to the economic outcomes of Michigan's Latino population, explaining the sources of these differences is beyond the scope of this study. The next section looks at occupations and industry participation of Michigan's Latino workforce.

Production

A core component of the productivity impact under this study requires breaking out Latino workers into their occupations and industries employment. Differences across industry and occupations relate relative productivity impacts of Latino workers and expand our insight of Michigan's Latino population. This section first compares occupations then compares industries in which Michigan's workforce is engaged. Table 6 provides 2008 current population estimates of the occupations of Latino and non-Latino workers in Michigan and provides comparisons with the nation. One segment left out of this analysis is the migratory agricultural worker. Efforts to include this segment in the analysis went beyond the scope of this study.

Table 6. Occupational Distribution and Employment of Latinos and Non-Latinos for Michigan and U.S. (excluding Michigan)

		Counts			Percent of Employment			Percent of Occupation	
		Latino	Non-Latino	Total	Latino	N-Latino	Total	Latino	N-Latino
U.S. Excluding Michigan	Total Civilian Employment	21,654,767	127,716,503	149,371,270	100%	100%	100%	14%	86%
	Mgt., bus. & Fin.	1,606,995	19,877,324	21,484,319	7%	16%	14%	7%	93%
	Professional and related	2,153,131	28,448,425	30,601,556	10%	22%	20%	7%	93%
	Services	5,152,610	20,221,032	25,373,642	24%	16%	17%	20%	80%
	Sales and related	2,060,384	14,901,095	16,961,479	10%	12%	11%	12%	88%
	Office & administrative support	2,623,571	17,508,496	20,132,067	12%	14%	13%	13%	87%
	Farming, fishing & Forestry	501,323	629,552	1,130,875	2%	0%	1%	44%	56%
	Construction & extraction	3,042,454	6,666,492	9,708,946	14%	5%	6%	31%	69%
	Installation, maint. & repair	717,925	4,365,648	5,083,573	3%	3%	3%	14%	86%
	Production	1,975,431	7,471,880	9,447,311	9%	6%	6%	21%	79%
	Transp & material moving	1,820,943	7,626,559	9,447,502	8%	6%	6%	19%	81%
Michigan	Total Civilian Employment	154,795	4,872,022	5,026,817	100%	100%	100%	3%	97%
	Mgt., bus. & Fin.	9,668	674,468	684,136	6%	14%	14%	1%	99%
	Professional and related	8,391	978,195	986,586	5%	20%	20%	1%	99%
	Services	50,199	828,117	878,316	32%	17%	17%	6%	94%
	Sales and related	11,139	517,559	528,698	7%	11%	11%	2%	98%
	Office & administrative support	10,936	634,755	645,691	7%	13%	13%	2%	98%
	Farming, fishing & Forestry	5,531	33,811	39,342	4%	1%	1%	14%	86%
	Construction & extraction	16,055	233,271	249,326	10%	5%	5%	6%	94%
	Installation, maint. & repair	7,329	187,427	194,756	5%	4%	4%	4%	96%
	Production	24,165	470,224	494,389	16%	10%	10%	5%	95%
	Transp & material moving	11,382	314,195	325,577	7%	6%	6%	3%	97%

Source: Bureau of the Census: 2008 March Supplement, Current Population Survey

The first set of columns of Table 6 provides workforce counts in each occupation while the second set of columns calculates the percent of total labor force engaged in each respective occupation. Relative to the nation, Michigan Latino workers are more likely to take on occupations in service and production fields and less likely to take on occupations in professional, administrative, and construction fields. For the nation as a whole, the distribution of Latino workers more closely reflects the distribution of occupations as a whole than it does in Michigan. This suggests that Michigan's Latino workforce does not have similar levels of access across occupations as their national counterparts. While the reasons behind this are beyond the scope of this study, they come into play when one considers the importance of further integrating the Latino workforce both in Michigan and across the country.

Two occupations exhibit disproportionately low presence of Latino workers; management, business and financial occupations, and professional and related occupations. While these occupations make up approximately 34% of Michigan's workforce, only 11% of Michigan's

Latino workers fill these occupations. Three occupations disproportionately draw in Latino workers; services, construction, and production occupations. These sectors make up approximately 32% of the workforce, but 58% of the Latino workforce.

Because the distribution across occupations can be partially attributed to differences in the industrial makeup of Michigan's economy relative to the nation's, the third set of columns in Table 6 calculates the percent of the Latino and non-Latino workforce that make up each occupation. This provides an alternate view of the relative distributions of occupations. As shown by the percent of occupations, Latino workers make up about three percent of Michigan's workforce, but supply approximately 14% of the agricultural-related occupations, about six percent of construction and service related occupations and about five percent of production occupations. Once again, we see that management and professional occupations are under-represented by Latino workers.

Comparing Michigan's ethnic and occupational mix to the nation reveals some commonalities and some differences. There exist similar scarcities of Latino workers in management and professional occupations. Similarly, Latino workers are over-represented in agricultural occupations. However, Latino workers are much more likely to take on construction occupations at the national level than in Michigan.

Table 6 indicates, remarkably well, that Latino occupations in Michigan are distributed very differently than for the nation.[2] While the distribution of occupations that Michigan's Latino workers undertake tend to differ from their national counterparts, Table 7 indicates that the industries that Michigan Latinos tend to work in more closely mirror that of the nation. Similar to occupations, the distribution of employment across industries tends to reflect Michigan's overall economy. However, the distribution of Latino workers and total Michigan employment diverges significantly for the leisure and hospitality industries. Latino workers dominate this industry, which currently employs only eight percent of Michigan's workforce. Latino workers appear to be shut out of public administrative roles and are disproportionately rare in educational and health-related services.

Comparing ethnic proportions by occupations, shown in the third set of columns in Table 7, reveals a couple of interesting irregularities. While Latinos make up three percent of Michigan's workforce, they make up about six percent of the agricultural industry workforce and about eight percent of leisure and hospitality workers. Once again, public administration stands out as a sector not well represented by Latino workers.

[2] Since the Current Population Survey represents a sampling, the findings in Table 4 may constitute sampling errors. To gauge the robustness of the findings, Tables 6 and 7 were replicated for years 2008, 2007 and 2006 and findings were averaged. The three-year simple averages provided similar distributions as those reported in Tables 6 and 7. However, the three year averages indicate that construction occupations may be over represented in the 2008 survey and production under represented. However, we favor using the results from the latest year for the development of the model.

Table 7. Occupational Distribution and Employment of Latinos and Non-Latinos by Industry for Michigan and U.S. (excluding Michigan)

		Counts			Percent of Employment			Percent of Occupation	
		Latino	Non-Latino	Total	Latino	N-Latino	Total	Latino	N-Latino
U.S. Excluding Michigan	Total Civilian Employment	21,654,767	127,716,503	149,371,270	100%	100%	100%	14%	86%
	Ag, forestry, fishing & hunt.	532,781	1,719,274	2,252,055	2%	1%	2%	24%	76%
	Mining	92,722	647,189	739,911	0%	1%	0%	13%	87%
	Construction	3,115,957	8,761,503	11,877,460	14%	7%	8%	26%	74%
	Manufacturing	2,458,711	13,461,033	15,919,744	11%	11%	11%	15%	85%
	Wholesale and retail trade	3,032,063	18,296,662	21,328,725	14%	14%	14%	14%	86%
	Transportation and utilities	1,172,764	6,793,561	7,966,325	5%	5%	5%	15%	85%
	Information	342,613	3,284,393	3,627,006	2%	3%	2%	9%	91%
	Financial activities	1,109,887	9,177,675	10,287,562	5%	7%	7%	11%	89%
	Professional and business srvc.	2,321,959	14,110,509	16,432,468	11%	11%	11%	14%	86%
	Educational and health services	3,163,904	28,407,100	31,571,004	15%	22%	21%	10%	90%
	Leisure and hospitality	2,483,090	11,054,509	13,537,599	11%	9%	9%	18%	82%
	Other services	1,209,975	5,816,756	7,026,731	6%	5%	5%	17%	83%
	Public administration	618,341	6,186,339	6,804,680	3%	5%	5%	9%	91%
Michigan	Total Civilian Employment	154,795	4,872,022	5,026,817	100%	100%	100%	3%	97%
	Ag, forestry, fishing & hunt.	4,097	63,447	67,544	3%	1%	1%	6%	94%
	Mining		12,261	12,261	0%	0%	0%	0%	100%
	Construction	8,986	303,596	312,582	6%	6%	6%	3%	97%
	Manufacturing	31,374	917,074	948,448	20%	19%	19%	3%	97%
	Wholesale and retail trade	22,781	687,713	710,494	15%	14%	14%	3%	97%
	Transportation and utilities	6,482	298,470	304,952	4%	6%	6%	2%	98%
	Information	1,797	63,163	64,960	1%	1%	1%	3%	97%
	Financial activities	5,512	252,054	257,566	4%	5%	5%	2%	98%
	Professional and business srvc.	10,539	453,755	464,294	7%	9%	9%	2%	98%
	Educational and health services	20,360	1,013,961	1,034,321	13%	21%	21%	2%	98%
	Leisure and hospitality	33,441	386,624	420,065	22%	8%	8%	8%	92%
	Other services	8,037	246,001	254,038	5%	5%	5%	3%	97%
	Public administration	1,389	173,903	175,292	1%	4%	3%	1%	99%

Source: U.S. Census Bureau: 2008 March Supplement, Current Population Survey

Comparing the industry and ethnicity mix between Michigan and the rest of the nation shows similar disparities as found for occupations. Michigan's Latino workforce shares with the nation a disproportionate presence in agricultural occupations. However, the rest of the nation does not have such a disproportionately high presence of Latino workers in leisure and hospitality industries, but, in contrast to Michigan, Latino workers are readily found in the construction industry.

Tables 8 and 9 provide average median wage and salary earnings by occupation and by industry, respectively. Single-year estimates for 2008 generated substantial variation in earnings estimates, so three-year averages (2006-2008), removing significant outliers,[3] were generated to develop more robust estimates of earnings. Findings suggest that Latino workers earn less than their non-Latino counterparts at the national level by an average of $9,833 per year, and by $7,541 in Michigan.

As shown in Table 8, some occupations posit substantial income gaps between Latino and non-Latino workers at both the national and state level.[4] At both the national and state level, Latino workers tend to earn substantially less in managerial and construction occupations relative to non-Latino workers. In particular, Michigan production and installation occupations tend to have disproportionate gaps in earnings for Latinos relative to non-

[3] Three average median wages by occupations and seven by industries were dropped because a statistically insignificant number of observations lead to misleading median incomes.

[4] It is important to recognize that these gaps are not necessarily indicative of systematic wage discrimination. Estimates provided here do not take into consideration differences in personal abilities, job responsibilities, or job tenure necessary to expose wage discrimination.

Latinos. However, Michigan Latinos in four occupations enjoy higher earnings relative to non-Latinos. These include transportation, agricultural, and administrative occupations.

Table 8. Average Median Earnings by Occupation for Latinos and Non-Latinos in Michigan and U.S., 2006-2008

		Median Earnings		
		Latino	Non-Latino	Total
U.S. Excluding Michigan	Total Civilian Employment	22,500	32,333	30,667
	Management, business, and	42,667	54,333	53,000
	Professional and related	36,333	44,178	43,667
	Service occupations	16,533	17,667	17,020
	Sales and related occupations	19,800	26,500	25,467
	Office and administrative	24,333	26,333	26,013
	Farming, fishing, and	15,667	17,000	16,000
	Construction and extraction	21,600	33,733	29,333
	Installation, maintenance,	30,667	39,000	37,147
	Production occupations	21,667	30,100	28,291
	Transportation and material	23,333	26,167	25,667
Michigan	Total Civilian Employment	23,460	31,001	30,800
	Management, business, and	42,000	54,667	54,351
	Professional and related	45,333	45,000	45,000
	Service occupations	15,000	14,250	14,350
	Sales and related occupations	19,882	24,967	24,633
	Office and administrative	30,333	27,833	27,833
	Farming, fishing, and	13,500	12,000	12,667
	Construction and extraction	23,333	33,260	32,804
	Installation, maintenance,	23,228	40,333	40,667
	Production occupations	23,333	33,025	31,667
	Transportation and material	28,000	25,333	26,307

Source: Authors' calculation from U.S. Census Bureau: 2008, 2007 & 2006 March Supplement, Current Population Survey

Table 9 shows that the largest wage gaps by industry occur in manufacturing with a Michigan wage gap of about $16,214 per year. Additionally, Latino median wages trail total wages by $11,760 in the construction industry, by $5,555 in information industries and by $9,667 in professional and business services. These gaps are reflective of the gaps at the national level as well. Large wage gaps also exist in the information and the education and health services sectors in Michigan. However, Latinos working in Michigan's agricultural, transportation, financial and hospitality sectors appear to command modest premiums in wages.

Table 9. Average Median Earnings for Latinos and Non-Latinos by Industry, 2006-2008

		Median Earnings		
		Latino	Non-Latino	Total
U.S. Excluding Michigan	Total Civilian Employment	22,500	32,333	30,667
	Agriculture, forestry,	16,000	21,000	18,333
	Mining	38,967	49,334	48,480
	Construction	22,000	35,667	30,667
	Manufacturing	23,667	38,952	36,000
	Wholesale and retail trade	20,333	25,333	24,667
	Transportation and utilities	30,400	40,000	39,000
	Information	33,667	41,333	40,667
	Financial activities	30,000	40,333	39,001
	Professional and business	21,667	38,800	36,333
	Educational and health services	25,000	31,667	30,667
	Leisure and hospitality	15,867	15,167	15,361
	Other services	18,333	23,777	22,533
	Public administration	40,000	43,667	43,333
Michigan	Total Civilian Employment	23,460	31,001	30,800
	Agriculture, forestry,	11,333	13,500	13,500
	Mining		55,000	55,000
	Construction	21,667	34,333	33,427
	Manufacturing	26,120	43,667	42,333
	Wholesale and retail trade	18,728	24,600	24,229
	Transportation and utilities	43,667	41,000	40,791
	Information	29,500	36,000	35,055
	Financial activities	39,333	36,500	36,333
	Professional and business	25,000	35,500	34,667
	Educational and health services	23,000	29,667	29,667
	Leisure and hospitality	15,667	14,000	14,070
	Other services	23,388	24,944	24,911
	Public administration	42,000	45,334	45,667

Source: Authors' calculation from U.S. Bureau of the Census: 2008, 2007 & 2006 March Supplement, Current Population Survey

Tables 1 through 9 will be used to catalog Michigan's Latino workers within the model. The production component of the model anticipates Latino workers by industry. IMPLAN imputes output impacts by industry employment from a combination of state and national labor productivity estimates. Induced effects, those transactions arising from household income, will be tempered by wage differentials making up direct labor employment.

Consumer Expenditures

Consumer expenditures make up the market demand side of the analysis. Like the industry production component, consumer expenditures create ripple effects in the economy. One person's expenditure is another's income, and businesses receiving payments, in turn, purchase inventories, pay wages, and other business expenses. Similar to production impacts, spending generates a direct effect that induces secondary effects analogous to the indirect and induced effects described in the previous section.

However, when modeling economic impacts within an input-output model, it is important to recognize that the market demand side of the analysis is merely the other side of the market supply analysis. Simultaneously modeling the production impacts and the consumer expenditure impacts within a social accounting matrix framework will result in double counting some impacts because the production impacts take into consideration the induced effects of Latino employment. Hence, economic impacts will be primarily modeled from a production perspective, but income direct effects will be adjusted to account for wage differentials between Latino and non-Latino workers by industry.

The Bureau of Labor Statistics commissions the U.S. Census Bureau to conduct the Consumer Expenditure Survey (CEX), which uses interview surveys and self-administered diaries to document spending patterns by U.S. residents (U.S. Department of Labor 2007). The interview survey collects data on the types of expenditures households recall over three or more months. Each household unit is interviewed once per quarter for five consecutive quarters. Demographic information is collected during the initial interview that allows tabulations by demographic characteristics. In addition, individuals are asked to recall expenditures over the prior month. Subsequent interviews ask respondents to recall expenditures over the prior three months. The purpose of the diary survey is to obtain expenditure data on small, frequently purchased items, which are normally difficult to recall. Two separate questionnaires make up the diary survey: A Household Characteristics Questionnaire and a Record of Daily Expenses. The survey is self-administered and individuals document their expenditures over two consecutive one-week periods. The two surveys are aggregated to form a comprehensive description of household expenditures. Generally, the interviews are completed by 30,000 households per year while approximately 15,000 households participate in the diary surveys. Unfortunately, the CEX cannot be delineated by state (Bureau of Labor Statistics 2009, Chapter 16).

We use the Hispanic response breakout to compare spending patterns of Latino households to non-Latino households. As anticipated, Latino households report earning lower income, on average, than non-Latino households. Nationally, non-Latino households indicated average annual earnings of $63,091 compared to $48,330 for Latinos. Additionally, Latino households (3.2 persons) tend to be larger than non-Latino households (2.5 persons); reflecting similar findings from the CPS. Because Latino households tend to command lower incomes, they also tend to spend a greater proportion of their total income than non-Latino households. The 2007 CEX estimates the average Latino household spends 87% of its after-tax income, compared to 82% for non-Latinos (See Appendix II).

Comparing CEX data to CPS data for the state and nation provides verification that the sample in the CEX is representative of that of the CPS. With regard to home ownership, the CPS indicates Latino home ownership rates of 56.5% and 49.5% for Michigan and the U.S., respectively, and 75.1% and 67.3% for non-Latinos respectively. This compares favorably with CEX estimates that indicate 51% and 66% ownership rates for Latinos and non-Latinos, respectively, at the national level. However, estimates of median household incomes differ substantially between the CEX and CPS. Table 10 provides comparisons of median household incomes. While the CEX does not report state-specific tabulations, Table 10

shows that the CPS estimates are systematically higher than CPS estimates. Differences in the concepts of income and economic units between CEX and CPS approaches contributes to the estimate difference (Henry and Day 2005). However, the Department of Labor suggests that CPS data generate more precise measures of income (Department of Labor 2009). Therefore, we scale expenditures accordingly.

Table 10. Reported Median Household Incomes for Latino and Non-Latino Households for Michigan and U.S.

	MI		U.S.	
	Latino Households	Non-Latino Households	Latino Households	Non-Latino Households
2007 CPS	$ 38,000	$ 48,766	$ 40,000	$ 49,980
2007 CEX	NA	NA	$ 48,955	$ 61,774

CPS=Current Population Survey; CEX=Consumer Expenditure Survey

Since, the CEX only reports findings at the national level, spending estimates can only be inferred from national spending characteristics. Gauging expenditure impacts requires the assumption that state spending patterns of Latino and non-Latinos are reflective of national spending patterns. Using CPS estimates of household income to scale CEX expenditures, we allocate expenditures based on CEX estimates of the proportion of income allocated to each spending category. The resulting total expenditures are applied to sales and excise tax estimates as a component of the fiscal impacts of Michigan's Latino population – discussed in the next section.

Fiscal Impacts of Michigan's Latino Population

This section focuses on measuring the fiscal impact of Michigan's Latinos. Fiscal impacts arise through direct contributions to government revenues and direct consumption of public services. Measurement requires isolating public revenues and expenditures into component parts that can be measured on a per-unit basis. We select household units as the basis of the fiscal analysis. That is, public revenues (taxes) and consumption of public goods and services are estimated at the household level. However, not all public revenue and expense sources can be accounted for on a per household basis. While household payments of taxes are relatively straightforward to estimate, many public expenditures cannot be allocated on a per-household or per resident basis. Expenses such as road construction and maintenance, administration costs, police and law enforcement, and others are characterized as (nonexcludable) public goods that benefit all without exclusion, and there exists no satisfactory way of allocating their costs. Therefore, we do not attempt to model shared revenues and expenses, but rather model contributions and draws on government budgets via modes that we can attribute on a per-household or -resident basis. We collect such measures for Michigan's Latino and non-Latino populations to compare the net contributions to government budgets across the two demographic groups.

Public Revenue

Several public revenue sources are considered, including property tax payments, sales and use taxes, and various excise taxes, personal income taxes and business taxes. Different sources are used to estimate each public revenue source, as described below. Estimates of revenues are generated for Latino households and non-Latino households to facilitate comparisons. Several data-sources are used including the Census of Governments, the Consumer Expenditure Survey (CEX), the Current Population Survey (CPS) and the American Community Survey (ACS), Department of Transportation reports, and various state reports on program and agency budgets. Four public revenue sources are modeled; property taxes, sales and use taxes, select excise taxes, and personal income tax. Government enterprises such as publicly-owned utilities are not modeled on the assumption that their costs are covered by revenues generated on a per-household basis.

Property Taxes

Property tax revenues are generated from two sources; homestead property owners and non-homestead property owners. While renters do not pay property taxes directly, they afford property owners, who lease or rent their properties, funds to pay property taxes through rent income. Property owners pay property taxes directly and such payments are recorded by several statistical reporting agencies including the Bureau of the Census, the Michigan Department of Treasury and the Bureau of Labor Statistics. The average Michigan homestead millage rate in 2007 was 32.66 and 51.38 for non-homesteaders, indicating that renters pay higher property tax rates than non-renters (Department of Treasury 2008a). Estimates of the annual property tax expenses for Latino and non-Latino households are generated from the 2008 CPS, and compared to the 2007 CEX and 2007 CPS. Because property tax revenues are built up, the sum of Latino and non-Latino property tax payments for both renters and homeowners are compared to the residential component (Lockwood 2007) of total property tax revenues for Michigan (U.S. Bureau of the Census 2008b).

The 2008 CPS asks respondents to disclose annual property taxes. The first row of Table 11 provides average property tax costs for Latino and non-Latino homeowners in Michigan. This table reveals that Latino homeowners pay about $170 less on average per year than non-Latino homeowners. When compared to the differential between self-reported property values of Latino and non-Latino homeowners, the difference appears low. The median value of Latino-owned homes in Michigan is approximately 75% of those of non-Latinos, and a typical Latino homeowner pays about 92% of the reported property tax of non-Latino homeowners. However, Michigan effectively caps property tax growth with Proposition A that benefits long-term homeowners. Further, since Michigan's Latino population is more mobile than the non-Latino population, Latinos effectively pay a disproportionate share of the state's property tax. Proposition A distorts property tax burden, placing a greater burden on new homeowners; of which Latinos make up a disproportionate share.

Table 11. Michigan Property Ownership and Annual Taxes for Latino and Non-Latino Households

	Latino Households		Non-Latino Households	
	N	Mean Property Tax	N	Mean Property Tax
Own	82,953	$ 2,070	2,916,620	$ 2,120
Not Own*	49,721	$ 2,691	918,671	$ 2,756
All	132,674	$ 2,427	3,835,291	$ 2,353

*Property Tax is imputed
Source: U.S. Bureau of the Census: 2008 March Supplement, Current Population Survey and authors' calculations

While renters do not generally pay property taxes directly, they do pay indirectly through the rent payments. Owners of residential property that is not owner-occupied or is not the primary residence of the owner are charged an additional 18 mills over homestead properties. This implies that for two identical properties – one homestead, the other non-homestead – the non-homestead property will have a higher property tax burden. The 18-mill levy on non-homestead properties constitutes approximately an additional thirty percent burden over homestead property taxes.

We could not find a satisfactory approach to estimating a tax base of rental property from which to apply appropriate property tax millage to estimate implicit property taxes paid by renters. As an alternative to estimating tax revenue from rental property values, tax rates reported in the CPS for homeowners were scaled up by a factor of 1.3 as the implicit renter property tax cost. The weakness in this approach is that it assumes the property values of renter-occupied residences are on par with owner-occupied properties. Table 11 shows the per-household expected property tax payments for Latino and non-Latino households.

Aggregating property tax payments across owners, non-owners and across Latino and non-Latino households provides 2008 residential property tax revenue estimate of $8.8 billion, which is consistent with estimates provided by the Treasury (Lockwood 2007) adjusted for the proportion of property taxes generated by residential property. Because a greater proportion of Michigan Latino households are renters, Latino households generate more property tax revenues than non-Latino households. The average annual property tax contribution of Latino households is $2,427 versus $2,353 for non-Latinos.

Sales and Use Taxes

We use the Latino household breakout of the CEX to estimate the relative sale taxes generated from Latino and non-Latino households for Michigan. According to the CEX, Latino households spend approximately 86% of before tax income compared to 78% for non-Latino households. The difference can largely be explained by differences in household income. High-income households are known to set aside a greater proportion of income to savings than low-income households do (Leff 1969). Additionally, low-income households tend to allocate a greater proportion of total expenditures on necessities like housing and food

prepared at home (Tan 2000). This second expectation materializes in the CEX data. Latino households, who tend to have lower incomes, tend to spend a greater proportion of their total expenditures on non-discretionary spending items such as food and shelter. For the U.S. Latino households, 14.3% of household expenditures were for food and 37.5% were for housing, compared to 12.1% and 33.7% respectively for non-Latinos.

Recognizing differences in spending patterns is important when estimating the relative contributions of Latino and non-Latino households to state sales and use tax revenue. Michigan levies a statewide general sales and use tax of six percent. However, this sales tax is not exacted on all consumer purchases. In particular, groceries are generally not subject to Michigan sales tax, but meals prepared outside of the home are taxed. Services are also generally not taxable. In addition to the state sales and use tax, the state also levies special excise taxes for certain purchases that include gasoline, tobacco, and alcoholic beverages. Sales tax is generally levied on the combined sales price, and excise tax where excise taxes are imposed. The CEX provides sufficient expenditure breakouts for discerning differences in sales use tax and excise tax generation in Michigan.

Average annual expenditures of Latino and non-Latino households in Michigan is calculated as the median household income reported by the CPS times the proportion of before-tax income spent, provided by the CEX. The calculated average annual expenditures are then allocated to expenditure categories using category shares of total expenditures for Latino and non-Latino households. Sales tax revenue is calculated as the sum-product of sales-taxable expenditures times the Michigan sales tax rate of six percent[5] (See Appendix II).

The 2008 CPS provides that median Latino household income in Michigan is $35,700, while $46,458 for non-Latino households. Additionally, the CPS reports approximately 132,674 Latino households and 3,835,291 non-Latino households in Michigan. Hence, Latino households make up approximately 2.5% of the total personal income in Michigan. Sales and use tax generation is calculated by summing sales-taxable total expenditures times the sales tax rate of six percent across the 74 CEX spending categories. The combined sales and use tax estimated only generated $4.9 billion. This is approximately 25% short of Michigan's sales and use tax revenue for 2007 of $6.6 billion (Department of Treasury 2008a). Such a shortage can be generated by a number of problems in estimation including unreported income, sales and use tax generated by out-of-state visitors, and measurement errors. However, an ad-hoc adjustment is used to scale estimates of sales and use tax up to the stated value of $6.6 billion. On a per-household basis, Latino households pay $1,298 in sales and use taxes while non-Latino households pay $1,670 per year.

Table 12 compares per-household contributions to sales and use taxes in Michigan. Latino households tend to earn less than non-Latino households and therefore, tend to contribute less sales tax than non-Latino households. However, because Latino households tend to spend a greater proportion of their income, their effective rate of tax burden from sales & use tax is higher than non-Latino families.[6]

[5] Additionally, some spending categories that are made up of a combination of sales taxable and non-sales taxable transactions are adjusted heuristically.
[6] Differing mix of spending categories also contributes to this difference.

Table 12. Michigan Sales & Use Taxes by Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Median Household Income	$ 35,700	$ 46,458
Expected Sales & Use Tax Contributions	$ 1,298	$ 1,670
Effective Rate of Taxation	3.66%	3.59%

Source: U.S. Bureau of the Census: 2008 March Supplement, Current Population Survey and authors' calculations

Excise Taxes

Three excise tax categories are modeled in this section; motor fuels taxes, motor vehicle taxes and alcohol consumption taxes. Various data sources were used to discern contributions per households as discussed below.

Motor Fuels Tax

Michigan levies three taxes on gasoline sold in Michigan. Two taxes are established on a volume basis and the Michigan sales tax applies to the value of purchase. The Michigan motor fuels tax imposes an excise tax of $0.19 per gallon of gasoline. In addition, a 7/8 cent per gallon environmental tax is added to the excise tax. Additionally, the transaction price of gasoline, which includes excise taxes, is then subject to Michigan's standard $0.06 sales tax. The sales tax component is reported in the prior section, but the sales tax base of gasoline is discussed here.

Estimates of total gallons of gasoline consumed are provided by the Michigan Department of Energy, Labor and Economic Growth (2008), estimates of excise tax revenues were collected from the Michigan House Fiscal Agency (2008), relative household expenditures on motor fuels is reported by the CEX, and average gas prices were calculated as $2.83 per gallon. The CEX provides that Latino households tend to spend a greater proportion of their income on motor fuels than non-Latino households do. To facilitate calculations, all motor fuels expenditures are assumed to be for regular, unleaded gasoline. Federal motor fuel tax revenues are excluded from the analysis, while the Michigan motor fuels tax and the environmental tax are included in the calculations. General sales tax applied to the purchase of gasoline was calculated and applied in the prior section.

The Michigan Department of the Treasury reports that motor fuels taxes collected in 2008 totaled $1.04 billion. According to the CEX adjusted to Michigan incomes, Michigan Latino and non-Latino households spent an average of $2,676 and $2, 961, respectively for motor fuels in 2007. Dividing by the average cost of gasoline of $2.83 suggests that Latino households consumed 945 gallons versus 1,046 gallons for non-Latino households in 2007. Multiplying this by the excise tax rate and the number of households provides total contributions through motor fuels tax for Latino and non-Latino households in Michigan.

Table 13 shows the relative household contributions to government revenue through motor fuels taxes. Expenditures of Latino households generated approximately $188 per household versus $208 for non-Latino households. The difference reflects lower household incomes of

Latino households that more than offsets Latino households higher marginal propensity to consuming motor fuels.

Table 13. Motor Fuels Excise Tax Paid by Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Per-Household Consumption of Gasoline (Gallons)	945	1,046
Per-Household Expenditures	$ 2,675.63	$ 2,960.79
Per-Household Motor Fuels Excise Taxes	$ 188	$ 208

Source: Authors' calculations (see text)

Motor Vehicle Tax

Michigan motor vehicle taxes are levied on a per-vehicle basis. These registration fees are based on suggested retail value for model years 1984 and newer vehicles, or based on the vehicle's weight for model years before 1984. Currently the registration fee of a new vehicle is $33 plus $5 for every thousand dollars above $7,000 base list price. The annual renewal decreases by 10% per year for the first three renewals, and remains constant beyond year four.

Rather than building tax revenue equations up, we use average tax per Michigan vehicle estimates to allocate expenditures based on household ownership of vehicles. Average annual registration fees of $90 are calculated using estimates of the total number of private vehicle registrations and revenues reported by the Federal Highway Administration (2007a, 2007b). These figures are provided in Table 14. The CEX reports that Latino households, on average, own 1.6 vehicles in comparison to 1.9 vehicles for non-Latino residents. Hence, the average vehicle registration fee for Latino households of $144 is smaller than for non-Latino households of $171.

Table 14. Average Motor Vehicle Excise Taxes by Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Average Number of Vehicles	1.6	1.9
Average Annual Excise Tax Per Vehicle	$ 90.00	$ 90.00
Per-Household Motor Vehicle Taxes	$ 144.00	$ 171.00

Source: Authors' calculations (see text)

Alcohol and Tobacco Taxes

Other purchase-related revenues considered include the sale of alcoholic beverages and taxes pm the sale of tobacco products. As one of 18 "control states" of alcoholic beverages, Michigan government manages the sale and distribution of certain alcohol beverages in the state. The state acts as the state's wholesaler and distributor, collecting product mark-ups and excise taxes on the sale of alcoholic beverages. Net revenues in Michigan Liquor Purchase Revolving Fund totaled $155 million in 2008 (Michigan Liquor Control Commission 2008). This value represents the net revenues from mark-ups and the state

liquor tax, which varies across products. Additionally, Michigan's $2.00 per pack tax on tobacco products generated $1.13 billion in tobacco tax revenues in 2007.

We estimate the Latino population's contribution to state alcohol revenues and tobacco tax collections using national spending patterns to allocation total revenues between Latino and non-Latino purchases. The CEX provides spending shares of U.S. Latino and non-Latino households on alcoholic beverages and tobacco products. As shares of total expenditures, Latino households are less inclined to purchase alcoholic beverages and tobacco products. Latino households spend about 0.60% and 0.40% of total expenditures on alcohol and tobacco compared to 0.90% and 0.70% for all population groups. Using these shares to determine total expenditures in Michigan, Latino households purchase approximately 1.70% of alcoholic beverages and 1.50% of tobacco products in Michigan. On a household basis, Latino households generate approximately $146 in alcohol and tobacco tax and alcohol wholesale margins, while non-Latino households generate approximately $320.

Table 15 presents per household contributions to tobacco tax collections and Liquor Purchase Revolving Fund net revenues. As indicated from the CEX, Latino households consume less tobacco and alcohol than non-Latino households, and therefore, contribute less to these revenue categories per household.

Table 15. Tobacco Excise Taxes and Liquor Purchase Revolving Fund for Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Tobacco		
Total Expenditures	$ 25,422,203	$ 1,631,910,631
Percent of Expenditures	1.5%	98.5%
Tobacco Tax	$ 16,713,698	$ 1,072,891,302
Per-Household Tax	$ 126	$ 280
Alcohol		
Total Expenditures	$ 40,367,378	$ 2,290,808,224
Percent of Expenditures	1.7%	98.3%
Alcohol Tax	$ 2,689,028	$ 152,599,665
Per-Household Tax	$ 20	$ 40

Source: Authors' calculations (see text)

Personal Income Tax

Michigan income tax is calculated on a flat rate of 4.35% of state taxable income. Individual and jointly-filed Michigan taxes start with the federal adjusted gross income and provides exemptions equal to $3,400 for each person filed as a dependent (Ballard 2003 p. 519; Department of Treasury 2008b). Other exemptions apply, including those for residents over 65 years of age and those with disabilities. However, we abstract from these additional exemptions.[7] Using CPS estimates of household income and family size, we calculate the contribution of Latino households to state personal income tax collections.

[7] Because Michigan's Latino population tends to be younger, the age exemption will tend to over-inflate non-Latino households' contribution to tax revenue.

According to the 2008 March Supplement of the CPS, approximately 132,674 Michigan households report having at least one spouse with Latino lineage (U.S. Bureau of the Census 2008a). These households report median household income of $35,700 for 2007 and have three exemptions on average. In addition, there are approximately 3,835,291 non-Latino households in Michigan with median household income of $46,458 and 2.5 exemptions on average. Michigan provides exemptions of $3,400 for every exemption claimed on federal tax forms. Using median household income to proxy for adjusted gross income, and subtracting the mean value of exemptions per household provides average state adjusted gross income of $25,432 for Latino households and $38,060 for non-Latino households. Simple tax calculations provide that Latino households generally pay about $1,106 in personal income versus $1,656 for non-Latino households. Total personal income tax generated is estimated at $6.5 billion, which matches that reported by the Michigan Department of Treasury for 2007 (Department of Treasury 2008a).

Table 16 shows that Latino households generally pay $550 less in state personal income tax than non-Latino households. The difference is the result of lower household income and larger family sizes that increases the exemptions of Latino households relative to non-Latino households in Michigan.

Table 16. Personal Income Tax by Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Households	132,674	3,835,291
Median Household Income	$35,700	$46,458
Average Number of Exemptions	3.0	2.5
Median Taxable Income	$25,432	$38,060
Average Household Income Tax	$1,106	$1,656

Source: U.S. Bureau of the Census: 2008 March Supplement, Current Population Survey and authors' calculations

Public Revenue Conclusions

Not all public revenues have been captured in this section. However, the dominant resident sources of revenues and factors that influence the value of such contributions have been accounted for in the estimates. Some revenue sources not captured include tuition paid at public institutions of higher education, entry fees to state parks, and contributions to unemployment insurance fund and federal allocations based on head counts. Additionally, contributions to the state unemployment insurance fund have not been enumerated.

Table 17 summarizes the fiscal revenue calculations, showing that non-Latino households tend to contribute about $1,070 more toward fiscal revenues than Latino households, based on the revenue categories considered in this section.

Table 17. Per-Household Fiscal Revenues Summary

	Latino Households	Non-Latino Households
Personal Income Tax	$ 1,106	$ 1,656
General Sales Tax	$ 1,298	$ 1,670
Motor Vehicle Tax	$ 144	$ 171
Motor Fuel Tax	$ 188	$ 208
Alcoholic Beverages	$ 20	$ 40
Tobacco Products	$ 126	$ 280
Property Taxes Home Owners	$ 2,427	$ 2,353
Per Household Revenue Generation	**$ 5,309**	**$ 6,377**

Source: Consumer Expenditure Survey

Fiscal Expenditures

This section documents public expenditures on a household basis. To be included in this section, public expense has to be attributable to a household or individual. Hence, public services, which are directly attributable to individuals, dominate the discussion. Such public expenditures include consideration of USDA Supplemental Nutrition Programs, Medicaid, childcare assistance programs, housing subsidies, and K-12 education.

Supplemental Nutrition Programs

Several social program expenditures were considered as public expenditures by which to gauge Latino direct fiscal impacts. Notably, the USDA social service programs, Women, Infants, and Children (WIC), the food stamp (SNAP), and the Free School Lunch programs were scrutinized. Statistics are available through the CPS to estimate the allocations, but we found that in Michigan, the programs are largely federally funded (Carr et al. 2006; USDA: Supplemental Nutrition Assistance Program 2009), though administrative costs are shared between Michigan and the federal sources. Arguably, the administrative costs cannot be attributed to any individual participant, but should be treated as a fixed cost of providing such public services. We therefore assume that administrative costs of these programs are not allocable to participants, while traceable costs are pass-through funds from federal sources.

While not directly attributable to state expenses, the March Supplement of the 2008 CPS indicates that Latino households have a greater incidence of utilizing supplemental nutrition programs. Table 18 shows that approximately 13.4% of Latino households draw food stamp benefits compared to 9.0% for non-Latino households. Additionally, Latino households are more likely to draw from WIC programs, with 10% of households indicating participation compared to 2.1% for non-Latino households.[8]

[8] Results were compared to and consistent with the 2007 March Supplement of the CPS.

Table 18. Supplemental Nutrition Program Benefits Received by Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Households	132,674	3,835,291
Receive Food Stamps	17,762	343,946
Percent Receiving Food Stamps	13.4%	9.0%
Receive WIC	13,200	81,062
Percent Receiving WIC	10.0%	2.1%

Source: U.S. Bureau of the Census: 2008 March Supplement, Current Population Survey and authors' calculations

Medicaid

Medicaid represents a formidable state expense (Goddeeris 2003). StateHealthFacts.org of The Henry J. Kaiser Family Foundation assembles multiple data sources to provide estimates of total health care expenditures. In particular, they report that in 2007, Michigan paid approximately $4,199 per Medicaid enrollee in benefits. This value excludes the federal share of expenditures, which is currently set at 69.58% (The Henry J. Kaiser Family Foundation 2008). StateHealthFacts reports that in 2006, Michigan had 1,226,710 enrollees in Medicaid. The CPS estimates 2008 enrollees as 1,150,156; 82,414 Latino and 1,067,742 non-Latino. Table 19 shows the estimated number of enrollees and estimated cost per household.

We use CPS enrollment statistics with StateHealthFacts state investment per enrollee statistics to calculate the expected Medicaid costs of Latino residents. Table 19 shows that Latino individuals and households are about twice as likely to receive Medicaid benefits. Using flat state expenditures of $4,199 per enrollee, we estimate that per-household Medicaid expenditures are $2,606 for Latino households and $1,169 for non-Latino households.

Table 19. State Medicaid Expenditures per Latino and Non-Latino Household

	Latino Households	Non-Latino Households
Population	394,627	10,094,027
Individual Medicaid enrollment	82,414	1,067,742
Percent of Individuals	21%	11%
Households	132,674	3,835,291
HH Medicaid enrollment	38,172	551,511
Percent of HH	29%	14%
Total Medicaid Cost	$ 346,056,386	$ 4,483,448,658
Cost per Household	$ 2,608	$ 1,169

Source: CPS enrollment figures, StateHealthFacts state investment per enrollee figures, and authors' calculations

Child Care Assistance

Michigan provides low-income families child-care assistance to encourage employment outside of the home. This program especially impacts single-parent families that may otherwise have low incentives to engage in out-of-home employment due to the high cost of childcare. Under this program, the Michigan Department of Human Services provides subsidized payments for childcare services rendered to low income households. Maximum hourly rates are established across multiple criteria (Department of Human Services 2009). Using the range between the maximum and the minimum-maximum billing rates, and assuming approximately 30-hour average care provision, we estimate that the average billing rate per week is $85.00 per child.

CPS data for Michigan is too scant to generate reliable results, so the 12 states that make up the North Central Regional Center for Rural Development were used to estimate enrollment in childcare assistance programs.[9] CPS data provides estimates of the number of households receiving state sponsored childcare assistance and the average number of children enrolled per household. Less than one percent of both Latino and non-Latino households benefit from childcare assistance. The results suggest that Latino household's utilization of publicly-sponsored childcare is negligible. Table 20 shows childcare assistance per demographic group, indicating that Latino households are substantially less likely to seek or secure state-sponsored childcare assistance. On a per-household basis, Latino households consume $4.38 in childcare assistance per year and non-Latino households consume just under $40.

Table 20. Child Care Assistance by Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Households	132,674	3,835,291
Receiving Childcare Assistance	137	35,898
Percent Receiving Childcare Assistance	0.1%	0.9%
Total Child Care Assistance	$ 582,250	$ 152,566,500
Per-Household Childcare Assistance	$ 4.38	$ 39.78

Source: U.S. Bureau of the Census: 2008 March Supplement, Current Population Survey and authors' calculations

Housing Subsidies

Sharon Stern (2000) of the U.S. Bureau of the Census provides a detailed study around valuing housing subsidies used in this section. Estimating the value of housing subsidies is not straightforward. Subsidies can be paid directly or can be assumed through government provisions of public housing projects. Stern estimates that enrollees receive a mean value of subsidized housing of $175 per month. We apply the March Supplement of the 2008 CPS to estimate the number of households receiving subsidized housing in Michigan. Non-Latino households that do not own their residence are more than twice as likely to receive subsidized housing as Latino households. In 2007, approximately 1,203 Latino residents

[9] The North Central Regional Center for Rural Development (NCRCRD) is comprised of North and South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana and Ohio.

received housing assistance compared to 50,501 for non-Latinos. Subsidy provisions are assumed for 12 month for each recipient.

Table 21 provides estimated per-household consumption of public housing. As opposed to housing subsidies, Latinos are more likely to consume public housing services than non-Latinos. Approximately 1.4% of Latino households benefit from public housing compared to 1.3% for non-Latino households. Overall, the per-household provision of public housing for Latino households is $85.43, compared to $77.78 for non-Latino households.

Table 21. Households Receiving Housing Subsidies or Public Housing by Latinos and Non-Latinos

	Latino Households	Non-Latino Households
Households	132,674	3,835,291
Receiving Housing Subsidies	1,203	50,501
Percent Receiving Housing Subsidies	0.9%	1.3%
Total Housing Subsidies	$ 2,526,300	$ 106,052,100
Per-Household Housing Subsidies	$ 19.04	$ 27.65
Receiving Housing Subsidies	1,889	49,721
Percent Receiving Housing Subsidies	1.4%	1.3%
Total Housing Subsidies	$ 11,334,000	$ 298,326,000
Per-Household Housing Subsidies	$ 85.43	$ 77.78

Source: U.S. Census Bureau: 2008 March Supplement, Current Population Survey and authors' calculations

As shown in Table 21, non-Latino households are more likely to benefit from housing subsidies. While less than one percent of Latino households receive housing subsidies, about 1.3% of non-Latino households do. This results in the average consumption of $19.04 in housing subsidies per Latino household and $27.65 for non-Latino households.

Similarly, Michigan provides public housing administered through the Public Housing Authority (PHA). The PHA is a decentralized network of local agencies providing low-rent and Section 8 housing. Valuing the consumption of public housing requires careful consideration of the market value of housing services rendered (Stern 2000). Such an analysis is beyond the scope of this project. However, we apply broad estimates provided by Sharon Stern to assess public provisions of public housing by demographic.

K-12 Education Expenditures

K-12 education makes up a sizeable component of government expense in the provisions of services. It is also difficult to allocate costs on a per-student basis, as sought in this analysis. Much of the complexity arises from the need to separate fixed and variable costs and discerning when a fixed cost becomes a variable cost. Many fixed costs, such as facilities, are fixed over a range of students but then becomes variable as the number of students warrants an addition or subtraction of facilities. Additionally, while additional students impose expenses on school systems, student counts are used in federal formula allocations of

education funding.[10] Hence, school enrollment becomes a variable revenue source as well as a variable cost in the state K-12 system.

We use the Census Bureau's Government Finance Statistics to estimate costs and revenues on a per-student basis (U.S. Bureau of the Census 2009). We apply 2008 March Supplement CPS counts of children under the age of 18 to allocate costs and revenues to Latino and non-Latino households on a household basis.

Table 14 of the Census report *Public Education Finances, 2007* was used to discern variable costs from fixed costs. This table calculates per pupil costs across many revenue and cost categories for the U.S. as a whole. Per-pupil costs are based on total costs divided by number of students. Hence, it only represents an average cost, not a marginal cost. We assume that average costs equal marginal costs for variable cost categories, and we exclude fixed costs from the analysis.[11] Table 8 of the Census report *Public Education Finances, 2007* provides aggregate expenditures per pupil per state, but provides minimal categorical breakout. Hence, categorical expenditures reported in Table 14 of that report are scaled to Michigan per-pupil aggregate expenditures reported in Table 8. Appendix III categorizes the expenditure categories into fixed and variable categories for calculation in this section.

The Government Finance Statistics indicates that Michigan per-pupil expenditures in 2007 were $9,912. In addition, total expenditures of expenditure categories deemed variable (Shown in Appendix III) indicate that approximately 24% of total K-12 expenditures can be classified as a variable cost. This suggests that the per-pupil variable cost of education is approximately $2,781. We assume all federal contributions are formula derived, based on number of students. Michigan enrolled 1,700,665 students in 2007, and federal sources contributed $1,541.8 million. This calculates to $906.60 federal dollars per student. The net public cost per pupil is simply the difference between the variable cost and the federal revenue, or $1,874.

As shown in Table 22, the March Supplement of the 2008 CPS provides household counts of children enrolled in K-12 programs. Approximately 69,539 Latino households had children under the age of 18 in 2007, compared to just under 1.3 million non-Latino households. Latino households with children averaged 2.05 children per household, while non-Latino households average 1.87 children. Based on these estimates and in terms of overall households, Latino households consume $2,014 while non-Latino households consume $1,152 for educational services.

[10] As well as state allocations to the school district level. Since this is a statewide analysis, only federal allocations are considered.

[11] Fixed costs include many grey categories that can be classified as variable cost in the long run. We delineated fixed cost on the assumption that the time frame was less than a year.

Table 22. K-12 Education Characteristics by Latino and Non-Latino Households

	Latino Households	Non-Latino Households
Households	132,674	3,835,291
Number of HH with Children < 18 yrs	69,539	1,258,901
Mean Number of Children	2.05	1.87
Variable public costs of K-12	$396,378,605	$6,553,048,776
Federal Revenue Allocations	$129,223,634	$2,136,363,488
Net Public Cost	$267,154,971	$4,416,685,288
Per Household Public Cost	$2,014	$1,152

Source: U.S. Census Bureau: 2008 March Supplement, Current Population Survey and authors' calculations

Fiscal Expenditures Conclusion

According to the Census of Governments, state and local governments spent $9.89 billion on social services for the fiscal year 2005-2006. Our analysis captures the allocation of $5.5 billion of these expenditures, or just over 50% of total social welfare service payments. The difference of $4.39 billion represents administrative costs, which cannot be directly allocated to individuals and social programs that we have not modeled. Not distributing administrative costs of social programs does not present a problem with the final analysis, as these expenses remain mostly constant over small changes in the number of social services recipients. Such administrative costs are deemed fixed. However, we acknowledge that not all variable-expensed social service expenditures are captured within this analysis.

Table 23 summarizes the per-household fiscal consumption of public expenditures. Latino households tend to consume more of the public expenditures tracked than non-Latino households. Two significant components drive this result. First Latino families are younger and generally more apt to have school-aged children. Hence, Latino household consumption of K-12 educational expenditures tends to be relatively high. Second, Latino households are more likely to utilize Medicaid program benefits. Once again, though Latino households are more likely to consume WIC and Food Stamps benefits, the direct benefits are generally regarded as a pass-through from federal government funds. State expense is largely limited to administrative overhead of these two programs and not directly allotable to individual recipients.

Table 23. Per-Household Fiscal Expenditures Summary

	Latino Households	Non-Latino Households
Food stamps	$ -	$ -
WIC	$ -	$ -
Medicaid	$ 793.00	$ 356.00
Child Care Assistance	$ 4.00	$ 40.00
Housing Subsidies	$ 19.00	$ 27.65
Public Housing	$ 85.43	$ 77.78
Education (K-12)	$ 2,014.00	$ 1,152.00
Per-Household Public Expenditures	**$ 2,916.00**	**$ 1,652.00**

Summary of Fiscal Impacts of Michigan's Latino Population

This section has found that Latino households tend to contribute less to state revenues and tends to consume more public services than non-Latino households. However, Latino households contribute more revenue to the state than they draw from the state through consumption of public services. Table 24 summarizes the revenues and expenditures described in this section.

Table 24. Per-Household Fiscal Revenue and Expenditures Summary

	Latino Households	Non-Latino Households
Per Household Revenue Generation	$ 5,309.00	$ 6,377.00
Per-Household Public Expenditures	$ 2,916.00	$ 1,652.00
Per-Household Net Public Revenues	$ 2,393.00	$ 4,725.00
Ratio Revenue/Cost	1.82	3.86

Economic Impact of Michigan's Latino Population

While Michigan's Latino population contributes directly to Michigan's fiscal health, it also contributes indirectly through the economic impacts on the state's economy. To fully understand the fiscal contributions of Latino residents, we must also consider how Latino households contribute to production and consumption of goods and services provided in Michigan. In this section, we consider the direct and indirect economic impacts of Michigan's Latino population and relate these economic outcomes to indirect fiscal outcomes.

This section addresses consumer expenditures and industrial production components of the economic impact model depicted in Figure 2 above. The discussion starts with a description of the impact modeling software and methodology. The next section discusses the direct effects specifications used in the model for estimating the economy-wide impacts. The final section concludes with a discussion of how the economic impacts materialize into indirect fiscal impacts.

Economic Impact Model Description

This section employs the Minnesota IMPLAN Group Inc. model for economic impact evaluation, IMPLAN Pro. 2 (Minnesota IMPLAN Group Inc. 2004). This is a general application economic impact evaluation model based on a common economic construct known as a social accounting matrix (SAM). The SAM is a comprehensive accounting system that identifies all the monetary transactions between the sectors in an economy. The SAM consists of a square matrix (number of columns equals number of rows) in which cells represent individual sectors as both buyers and sellers. Each row represents the revenue earned by the corresponding sector while each column represents its expenditures (Isard et al. 1998, 283). This construct builds a closed system that represents transactions within and amongst all sectors: inter-industry transactions; transactions between industries and government; transaction between industries and households; transaction between households

and government; and the purchases and sales between the state economic sectors and the rest of the world.

IMPLAN provides industry detail to 528 different industry categories including agricultural, goods-producing, and service-providing industries. Institutions are broken out into households by income group, federal, state and local government sectors, and by import and export markets. The SAM also provides household and government purchases of goods and services. Additional transactions are recorded within the SAM, including transactions across households, government transfers to households and household transactions to government in the form of taxes and fees. Because the social accounting system examines all the aspects of a local economy, it provides a comprehensive snapshot of the economy and its spending patterns.

An input-output (I-O) model is used to track transactions across industries and institutions that make up the SAM. The I-O framework was first described by Francois Quesnay in 1758 and developed by Wassily Leontief (1960). The structure supports demand-driven responses, where changes in output in one industry materialize in changes in the production of other related industries. To exemplify, an increase in production of automobiles will prompt an increase in production of intermediate inputs like tires, electronic harnesses and other goods that go into the production of automobiles. The beneficiaries of these direct transactions will increase their demand for inputs used in their respective production processes. Additionally, automobile producers, and those producing inputs will increase demand for workers to produce these goods. The households that enjoy enhanced employment opportunities earn and spend more on goods and services and taxes. Such household impacts generate additional direct and secondary transactions across the economy. The extent to which an initial stimulus generates secondary transactions is hindered by the degree of purchases made outside the state. Industries that purchase inputs from local suppliers generate greater secondary transactions than industries that tend to purchase inputs produced outside the state, holding all else constant.[12]

I-O models have become staple economic impact models for regional analysis (Blakely and Bradshaw 2002). They provide a systematic and intuitive approach to estimating economy-wide impacts of a change in the local economy. The linear transactions that define a SAM are generalized in a set of multipliers that capture the full extent of transactions associated with any changes in the level of production in an industry given (Coughlin and Mandelbaum 1991). Initial changes in the economy, called direct effects, set off a chain of secondary transactions called indirect and induced effects. Economy-wide impacts, called total effects, are simply the sum of direct, indirect, and induced effects described in Figure 1.

$$\textit{Total Effect} = \textit{Direct Effect} + \textit{Indirect Effect} + \textit{Induced Effect} \qquad (1)$$

Direct effects also drive the secondary transactions, indirect effects and induced effects. In this analysis, the direct effect is the value of production generated from the Latino workforce. The indirect effect is the value of secondary inter-industry transactions in response to direct

[12] Miller and Blair (1985) and Isard et al. (1998) provide comprehensive reviews of the SAM and I/O methodologies.

effects. The induced effect is the value of transactions resulting from changes in income in response to direct effects. Because the relationships are linear, the direct, indirect and induced effects can be specified as multiples of the direct effect and equation (1) can be restated as,

$$Total\ Effect = Direct\ Effect + k_1 \bullet Direct\ Effect + k_2 \bullet Direct\ Effect, \quad (1.1)$$

or simplified as,

$$Total\ Effect = (1 + k_1 + k_2) \bullet Direct\ Effect, \quad (1.2)$$

where k_1 and k_2 greater than or equal to zero. More simply, Equation (1.2) can be restated as,

$$Total\ Effect = k \bullet Direct\ Effect, \quad (2)$$

where $k = (1 + k_1 + k_2)$. Equation (2) says that the total effect is some multiple of the direct effect, where the multiplier takes a positive value equal or greater than one. The minimum value the multiplier can take, one, reflects the intuitive result that if the economy's output of automobiles expands by $1 million dollars, the economy will expand at least by $1 million dollars. However, if the indirect and induced effects are not equal to zero, this $1 million increase in output will spur other industries to expand output of goods and services and will generate household income that are applied to the purchase of goods and services in the economy; generating a total economic impact greater than the initial $1 million expansion.

Generally, the economic multiplier is specified as a ratio of the total to direct effects. Rearranging equation (2) provides,

$$k = \frac{Total\ Effect}{Direct\ Effect}, \quad (3)$$

where the multiplier, *k,* encompasses all the direct, indirect and induced effects for a given industry and denotes the impact of a change in direct effects on the total economic system.[13] Each industry in a region is characterized by its own multiplier *k*. Industries with expansive localized production chains will tend to have higher multipliers than industries that rely on suppliers outside of the modeling region. When there is adequate supply within the state, the state has more potential to retain the total effects of the industry. However, when producers have to depend on suppliers outside the state, leakage occurs and part of the total effect is lost.

The I-O impact evaluation model requires several restrictive assumptions. First, the model imposes constant returns to scale, such that a doubling of output requires a doubling of all inputs. Second, technology is fixed with no substitution. These two assumptions impose that

[13] Type SAM multipliers are used in this analysis with household, state and local government, enterprises, capital and inventory additions/deletions endogenized. See Minnesota IMPLAN Group Inc. 2004. *IMPLAN Professional Version 2.0: 3rd Ed.* Stillwater, MN: MIG, Inc.

an increase in industry output requires an equal and proportionate increase in all inputs. Additionally, supply is assumed perfectly elastic such that there are no supply constraints. This final assumption also asserts that all prices are fixed, such that an increase in demand for any commodity will not result in a price changes for that industry. I-O models have been criticized on the grounds that some of these assumptions are overly restrictive and the magnitude of the bias generated by these assumptions are greater the larger the industry direct effects are relative the overall size of the industry (Coughlin and Mandelbaum 1991). Despite this criticism, I-O models have become a standard by which economic impact assessment generated.

Direct Effects of the Latino Workforce

By specifying direct effects by industry, the analysis is able to recognize the different economic outcomes of each industry. Each industry has distinct multipliers that represent each industry's indirect and induced effects. An IMPLAN model using 2006 data for Michigan was specified along the industry detail provided by the March Supplement of the CPS and detailed in Table 7, above. Employment, output and labor income multipliers provided by IMPLAN are specified in Table 25. Additionally, the second set of columns in Table 25 specifies conversion factors that relate one direct job to output and labor income direct effects. These conversion factors represent the amount of output and labor income earned per employee of the respective industry and are provided by IMPLAN (For a more detailed discussion of the methods used to calculate multipliers see Appendix 1).

Table 25. Model Multipliers and Direct Effect Conversion Factors

	Multipliers			Conversion Factors	
	Employment	Output	Labor Income	Output	Labor Income
Agriculture, forestry, and fishing	1.441	1.740	2.274	81,771	13,694
Mining	2.991	1.813	2.141	349,899	81,601
Construction	1.997	2.024	1.969	136,627	46,922
Manufacturing	3.634	1.963	2.456	413,517	84,981
Wholesale and retail trade	1.568	1.829	1.696	88,103	36,241
Transportation and utilities	2.301	1.764	1.894	236,106	67,069
Information	2.639	1.799	2.209	268,713	60,824
Financial activities	2.154	1.604	2.119	277,495	45,579
Professional and business	1.859	2.000	1.646	108,013	57,673
Educational and health services	1.604	2.003	1.639	79,704	41,480
Leisure and hospitality	1.387	1.966	1.964	52,909	17,888
Other services	1.433	1.987	1.813	59,391	23,632
Public administration	1.500	1.875	1.352	71,100	58,993

Employment direct effects are specified in Table 7 above and reproduced in Table 26. These values are supplied to a spreadsheet model for processing total impacts. To exemplify the calculations used to estimate total employment, total output, and total labor income, we consider the agriculture, forestry, and fishing employment sector in Table 6. Latino workers' direct effect to this industry is employment of 4,097 workers. Using the employment multiplier specified above, total employment arising from these jobs is 5,904 total jobs. The

direct effect is 4,097 jobs while the indirect and induced effects are the additional 1,807 jobs that arise through secondary transactions.

Table 26. Direct Employment Effects

	Employment*	Median Earnings**	
	Latino	Level	% of Industry
Total Civilian Employment	154,795	$31,001	76%
Ag, forestry, fishing & hunt.	4,097	$13,500	84%
Mining	NA	$55,000	NA
Construction	8,986	$34,333	65%
Manufacturing	31,374	$43,667	62%
Wholesale and retail trade	22,781	$24,600	77%
Transportation and utilities	6,482	$41,000	107%
Information	1,797	$36,000	84%
Financial activities	5,512	$36,500	108%
Professional and business srvc.	10,539	$35,500	72%
Educational and health services	20,360	$29,667	78%
Leisure and hospitality	33,441	$14,000	136%
Other services	8,037	$24,944	94%
Public administration	1,389	$45,334	92%

* 2008 CPS
** 2006-2008 3-year average of CPS

Additionally, these 4,097 workers generate $335,015,787 (4097*81771) in direct output effects. This output generates total economic output of $582,927,469 (335,015,787 * 1.740). Analogously, direct labor income is $56,104,318 before adjusting for earnings differential of 1.03 in Table 26. Once accounting for differences in earnings, the direct labor income effect is $57,636,769. This direct effect generates economy-wide income of $131,081,690. The employment, output, and labor income effects occur simultaneously and are considered in isolation when modeling outcomes. However, the model recognizes that employment, income, and output interact when specifying the total effects.

Induced Public Revenues and Expenditures

Induced public revenues and expenditures accrue on a household basis as described above. However, such induced fiscal impacts arise from secondary transactions not necessarily from payments and consumption of Latino households. Therefore, an additional step is required to extrapolate such expenditures across secondary transactions.

We postulate that households respond to economic opportunity (Greenwood et al. 1991; Treyz et al. 1993; Treyz, Rickman, and Shao 1991; Harris and Todaro 1970). This migration is not limited to the Latino population, but as demand for workers increases or decreases, the population responds accordingly by moving their household to regions where employment opportunities exist. Because population migration responds to changes in economic opportunities, we posit a simple assumption that households respond one-to-one to changes in employment. To operationalize this assumption, we first recognize that the March

Supplement of the CPS for 2008 indicates that the average Michigan household has 1.3 workers. We divide the indirect and induced employment attributed to the Latino workforce by average number of workers per household to estimate the number of households impacted by the Latino workforce. The total number of households is multiplied by public revenues and costs per household to estimate the induced public revenues and expenditures.

Economy-Wide Impacts of Latino Labor Force

This section reports the findings from the modeling exercise described above, starting with estimates of the economy-wide impacts. Table 27 is generated using the multipliers and conversion factors described in Table 25, and direct employment effects and wage adjustments in Table 26. While Latino workers make up approximately three percent of the workforce, they provide employment for 6.3% of Michigan's employed workforce[14] with typical wage rates of $34,986 per year. That is, the total economic impact of the Latino workforce is greater than its direct effects, and the average spin-off job created through indirect and induced effects, pays annual wages of $35,944; which is less than the average wage of Latino workers.

From Table 27, implicit multipliers can be calculated that represent the sum total of all multiplicative relationships that generate economy-wide impacts. Table 28 restates the sum of direct and total effects with implied multipliers calculated as the ratio of total to direct effects. We see that IMPLAN provides that the distribution of Latino workers across industries generate sizeable multiplier effects around two. This is partially attributed to the high proportion of Latino workers in manufacturing jobs that has an employment multiplier of 3.63.

Table 27. Direct and Total Effects of Latino Workers

	Direct Effects			Total Effects		
	Employment	Output ($Million)	Labor Income ($Million)	Employment	Output ($Million)	Labor Income ($Million)
Agriculture, forestry,	4,097	335	58	5,905	583	131
Mining	NA	NA	NA	NA	NA	NA
Construction	8,986	1,228	273	17,945	2,485	538
Manufacturing	31,374	12,974	1,645	114,002	25,468	4,041
Wholesale and retail trade	22,783	2,007	638	35,721	3,671	1,082
Transportation and utilities	6,483	1,531	465	14,914	2,700	881
Information	1,797	483	69	4,742	869	152
Financial activities	5,512	1,530	272	11,875	2,453	576
Professional and business	10,539	1,138	357	19,592	2,277	587
Educational and health services	20,359	1,623	655	32,657	3,251	1,073
Leisure and hospitality	33,441	1,769	877	46,396	3,478	1,722
Other services	8,037	477	120	11,517	948	218
Public administration	1,389	99	75	2,083	185	102
Total	154,797	25,193	5,260	317,351	48,369	11,103

[14] Based on CPS estimates of 5,026,817 Michigan workers.

Table 28. Implicit Economic Impact Multipliers

Economic Impacts	Direct Effects	Total Effects	Calculated Multiplier
Employment	154,797	317,351	2.05
Output ($ Million Nominal)	25,193	48,369	1.92
Labor Income ($ Million Nominal)	5,260	11,103	2.02

Finally, Table 29 shows the direct, induced plus indirect (henceforth, referred to as induced) and total fiscal effects of Latinos in Michigan. Direct fiscal effects are broken out into revenue and cost groups, with the revenue group at the top. All are reported in aggregate values across all households. Direct effects are simply re-presentations of the findings discussed above. The ratio of public revenues to public costs remains unchanged as both household costs and revenues are simply multiplied by the number of Latino households.

Indirect and induced effects are combined and represent the household impacts of spin-off jobs from the direct employment of Latino workers. The ratio of public revenues to public costs is higher than that of the direct effects. This is because the induced effects accrue to both Latino and non-Latino households that respond to changes in employment opportunities in Michigan. While the direct ratios of public revenues to public expenditures of Latino households is 1.82, once we account for all secondary effects, this ratio increases to 2.50.

Table 29. Direct, Indirect plus Induced and Total Fiscal Impacts

	Direct Fiscal Effects	Induced fiscal Effects	Total Fiscal Effects
Public Revenues			
Personal Income Tax	$ 146,776,185	$ 203,160,433	$ 349,936,618
General Sales Tax	$ 172,215,176	$ 205,681,210	$ 377,896,386
Motor Vehicle Tax	$ 19,105,056	$ 21,106,841	$ 40,211,897
Motor Fuel Tax	$ 24,930,582	$ 25,718,939	$ 50,649,521
Alcoholic Beverages	$ 2,689,028	$ 4,856,216	$ 7,545,245
Tobacco Products	$ 16,713,698	$ 34,074,327	$ 50,788,024
Property Taxes Home Owners	$ 171,702,756	$ 198,712,963	$ 370,415,719
Property Taxes non-Home Owners	$ 150,258,095	$ 93,611,325	$ 243,869,420
Education (K-12)	$ 267,154,971	$ 146,473,908	$ 413,628,879
Variable public costs of K-12	*$ 396,378,605*	*$ 217,323,763*	*$ 613,702,368*
Federal Revenue Allocations	*$ 129,223,634*	*$ 70,849,854*	*$ 200,073,489*
Public Expenditures			
Foodstamps	$ -	$ -	$ -
WIC	$ -	$ -	$ -
Medicaid	$ 105,270,353	$ 45,943,072	$ 151,213,424
Child Care Assistance	$ 582,250	$ 4,789,296	$ 5,371,546
Housing Subsidies	$ 2,526,300	$ 3,395,484	$ 5,921,784
Public Housing	$ 11,334,000	$ 9,683,744	$ 21,017,744
Public Revenues	$ 704,390,576	$ 786,922,254	$ 1,491,312,830
Public Expenditures	$ 386,867,873	$ 210,285,503	$ 597,153,377
Net State Revenues	$ 317,522,702	$ 576,636,751	$ 894,159,453
Ratio Revenue/Expenditures	1.82	3.74	2.50

Adding the direct and induced fiscal effects provides estimates of the total fiscal impact of Michigan's Latino population. Provided the revenues and expenditures tracked in this report, Michigan's Latino population contributes more in public resources than directly consumed. Additionally, the Latino population initiates secondary impacts that further contribute more public revenue than expenditures. Overall, the Latino population contributes $2.50 for every one dollar of public expenditure.

Conclusions

This study documents the Michigan Latino population's contribution to economic production, consumption of goods and services, and their contribution to overall economic output. In additional, a model of fiscal impact that relates Latino households' contributions to public revenue and public expenditures are investigated along with secondary fiscal revenues and expenditures to better understand how Latino households impact net state and local government revenues. Standard economic impact multipliers are used to gauge secondary impacts or ripple effects of Latino workers and households.

While Michigan has experienced a recent upsurge in the number of Latino residents, this growth is lower than the pace experienced at the national level. Much of this is attributed to the location choice of the majority of U.S. and immigrant Latinos to western and southern states. However, some of this effect can be attributed to limited employment opportunities in Michigan, as Michigan's Latino population growth has ebbed considerably following recent contractions in the U.S. auto sector. Regardless of the decline in Latino population growth, the Latino population in Michigan continues to grow, despite the net outmigration of non-Latino residents. Many Michigan communities would experience net reduction in population if not for the in-migration of Latinos.

Latinos make up approximately 3.1% of Michigan's labor force. The majority of these workers are U.S. residents that are integrated into the Michigan workforce. A numeric minority component is comprised of non-U.S. residents who are likely to be less educated and possess fewer marketable skills. Relative to this group, research provides conflicting evidence as to how immigration impacts local labor markets. A body of literature suggests that low-skill immigrant workers depress the low-skill wages. However, another body of evidence notes that such immigrant workers revitalize local economies, increasing the demand for workers and thereby raising wage rates. We conclude that Latino workers do not negatively impact Michigan's wages because the vast majority of them are U.S. residents and the evidence of an adverse impact by immigrants is non-conclusive.

However, Latino workers tend to earn less than their non-Latino counterparts and experience higher unemployment rates. When comparing Latino wages to non-Latino wages by occupation or by industry, we find that Latino workers, on average, command about 76% of the wages of non-Latino workers. However, this varies by industry and occupation where Latino workers in some categories earn premiums on average. In addition to generating lower earnings when employed, Latino workers are about 30% more likely to be unemployed than non-Latino workers nationally.

We also find that Latino workers tend to be concentrated in certain occupations and industries. Relative to the U.S., Michigan Latino workers tend to occupy services and production occupations and are scarce in professional and sales related occupations. Similar industry breakouts are evident with a relatively high percentage of Latino workers occupying manufacturing and leisure and hospitality industries, and fewer in information, financial and administrative services industries.

Our findings suggest that Michigan's Latino population do not share the same access to economic opportunities as non-Latinos. Latino workers in Michigan tend to be concentrated in select industries and occupations that tend to provide lower incomes. In addition, those with the fortune to hold high-level positions tend to earn less than their non-Latino counterparts. Several factors beyond the scope of this project may contribute to these outcomes, but the results suggest unequal overall access to employment opportunities.

Unequal earnings opportunities negatively impacts Latino households' potential contributions to government revenue. Michigan's tax system is driven directly and indirectly by earnings. The relatively low earnings of Latino workers translates into lower personal income tax receipts, sales and use tax generation and property tax of Latino households. Furthermore, lower household income increases the demand for public services. However, Latino demand for public services as a result of need is partially offset by reduced access to public services. Latino households, especially immigrant households, are less likely to seek public assistance. Regardless, Latino households are more likely to receive Medicaid benefits, as access to jobs providing health benefits is often limited.

Using standard multiplier analysis that takes into consideration secondary impacts or ripple effects throughout the economy, each Latino worker generates an additional 1.05 Michigan jobs. In addition, for every dollar earned by a Latino worker, an additional $1.02 dollars is paid in labor income. Overall, Michigan's Latino population contributes 317,351 jobs to the state economy with earnings of $11.1 billion and output totaling $48.4 billion.

The direct and secondary impacts of Michigan's Latino population contribute to both public revenues and expenditures, which are measured on a household basis. Direct fiscal revenue calculations take into consideration revenues generated from property, sales and use, various excise, and personal income taxes generated at the household level. Alternatively, direct fiscal expenditures take into consideration per-household consumption of public services including, Medicaid, childcare and housing subsidies, public housing and K-12 education. This report shows that direct revenues from Latino households exceed direct expenditures, but the difference is smaller than that of non-Latino households. On average, Latino households generated $1.82 for every dollar of consumption of public services compared to $3.86 for non-Latino households. However, once we take into consideration secondary impacts the total ratio becomes $2.50 for every dollar of public expenditure.

With the impending demographic shifts that will occur over the next several decades, the integration of Latinos into higher paying jobs will help off-set losses that will stem from the retirement of the Baby Boomers. Michigan's preferential tax treatment of retirees posits real fiscal concerns. However, the Latino workforce is confined in low-skill, low-pay occupations and industries, limiting the fiscal contributions of this workforce segment.

The new wave of retirees command substantial purchasing from a shrinking labor pool of workers. The Latino segment of the workforce will be able to offset workforce losses to retirement only if provided equal access to human capital-building opportunities. That integration will require greater access to human capital-building opportunities for the Latino segment of the workforce and more effective school systems that can position Latinos for lifelong human capital development. This segment of Michigan's workforce is an increasingly important component of Michigan's economy. Not confronting the obstacles to fully assimilate this segment into high-skilled occupations and high-pay industries will surely limit Michigan residents' opportunities to compete in the new economy.

Bibliography

Ballard, Charles. 2003. Overview of Michigan's Revenue System. In *Michigan at the Millennium*, edited by C. Ballard, P. N. Courant, D. C. Drake, R. C. Fisher and E. R. Gerber. East Lansing, MI: Michigan State University Press.

Blakely, Edward J., and Ted K. Bradshaw. 2002. *Planning Local Economic Development: Theory and Practice*. 3rd ed. Thousand Oaks, CA: Sage Publications.

Borjas, George J. 2003. The Labor Demand Curve is Downward Sloping: Reexamining the Impact of Immigration on the Labor Market. *Quarterly Journal of Economics* 118 (4):1335-1374.

Borjas, George J., and Marta Tienda. 1987. The Economic Consequences of Immigration. *Science* v235:p645(7).

Bureau of Labor Statistics. 2009. *BLS Handbook of Methods*, *US Department of Labor*. Washington, D.C.: US Department of Labor.

Card, David. 2005. Is the New Immigration Really So Bad? *Economic Journal* 115 (507):F300-F323.

Carr, Alethia, Jon Houserman, Damita Zwieback, Janet Hunter, Stan Bien, Kristi Broessel, Rose Mary Asman, Bonnie Detweiler, Ron Wingate, and Michelle McElhinny. 2006. *WIC Special Cost Study*. Lansing, MI: Michigan Department of Community Health.

Chapa, Jorge, and Belinda De La Rosa. 2004. Latino Population Growth, Socioeconomic and Demographic Characteristics, and Implications for Educational Attainment. *Education and Urban Society* 36 (2):130-149.

Chiswick, Barry R. 1978. The Effect of Americanization on the Earnings of Foreign-born Men. *The Journal of Political Economy* 86 (5):897-921.

Collins, Nancy. 1991. *Do Immigrants Place a Tax Burden on New Jersey Residents?* Princeton, NJ: Department of Economics, Princeton University,.

Cortes, Patricia. 2008. The Effect of Low-Skilled Immigration on U.S. Prices: Evidence from CPI Data. *Journal of Political Economy* 116 (3):381-422.

Coughlin, Cletus C., and Thomas B. Mandelbaum. 1991. A Consumer's Guide to Regional Economic Multipliers. *Review* 73 (1):19-32.

Council of Economic Advisors. 1986. *The Economic Effects of Immigration*. Washington D.C.: U.S. Government Printing Office.

Decker, Christopher S., Jerry Deichert, and Lourdes Gouveia. 2008. *Nebraska's Immigrant Population Economic and Fiscal Impacts*. Omaha, NE: Office of Latino/Latin American Studies: University of Nebraska at Omaha.

Department of Energy Labor and Economic Growth. 2008. *Michigan Energy Overview*. Lansing, MI: Michigan Public Service Commission.

Department of Human Services. *Child Development and Care Hourly Rates* 2009 [cited 08/09/2009. Available on-line: http://www.michigan.gov/dhs/0,1607,7-124-5453_5529_7149-15332--,00.html.

Department of Labor. 2009. *Frequently Asked Questions (FAQ's)*. Printing Office 2009 [cited October 10 2009]. Available on-line: http://www.bls.gov/cex/csxfaqs.htm.

Department of Treasury. 2008a. *Annual Report of the Michigan State Treasurer: Fiscal Year 2006-2007*. Lansing, MI: State of Michigan.

———. *New Developments for Tax Year 2008*. State of Michigan 2008b [cited 08/08/2009. Available on-line: http://www.michigan.gov/taxes/0,1607,7-238-43513_44135-182669--,00.html.

Federal Highway Administration: U.S. Department of Transportation. *State Motor-Vehicle Registrations -2007: Table MV1* 2007a [cited 08/08/2009. Available on-line: http://www.fhwa.dot.gov/policyinformation/statistics/2007/mv1.cfm.

———. *State Motor-Vehicle Registrations -2007: Table MV2* 2007b [cited 08/08/2009]. Available on-line: http://www.fhwa.dot.gov/policyinformation/statistics/2007/mv1.cfm.

Fiscal Policy Institute. 2007. *Working for a Better Life: A Profile of Immigrants in the New York State Economy*. New York, NY: Fiscal Policy Institute.

Gans, Judith. 2007. *The Economic Impacts of Immigrants in Arizona*. Tucson, AZ: Udall Center for Studies in Public Policy: The University of Arizona.

Garvey, Deborah L., Thomas J. Espenshade, and James M. Scully. 2002. Are Immigrants a Drain on the Public Fiscal State and Local Impacts in New Jersey. *Social Science Quarterly* 83 (2):537-553.

Goddeeris, John H. 2003. Health Care in Michigan. In *Michigan at the Millennium*, edited by C. Ballard, P. N. Courant, D. C. Drake, R. C. Fisher and E. R. Gerber. East Lansing, MI: Michigan State University Press.

Greenwood, Michael J., and Gary L. Hunt. 1995. Economic Effects of Immigrants on Native and Foreign-Born Workers: Complementarity, Substitutability, and Other Channels of Influence. *Southern Economic Journal* 61 (4):1076-1097.

Greenwood, Michael J., Gary L. Hunt, Dan S. Rickman, and George I. Treyz. 1991. Migration, Regional Equilibrium, and the Estimation of Compensating Differentials. *The American Economic Review* 81 (5):1382-1390.

Grossman, Jean Baldwin. 1982. The Substitutability of Natives and Immigrants in Production. *The Review of Economics and Statistics* 64 (4):596-603.

Harris, John R., and Michael P. Todaro. 1970. Migration, Unemployment and Development: A Two-Sector Analysis. *The American Economic Review* 60 (1):126-142.

Henry, Eric L., and Charles D. Day. 2005. A Comparison of Income Concepts: IRS Statistics of Income, Census Current Population Survey, and BLS Consumer Expenditure Survey. *Special Studies in Federal Tax Statistics*:149-157.

House Fiscal Agency. 2008. *State of Michigan Revenue: Source and Distribution*. Lansing, MI.

Immigration Policy Center. 2009. *New Americans in the Great Lakes State*. Washington, DC: The Immigration Policy Center.

IMPLAN Pro 2.0.1025 (Software). Minnesota IMPLAN Group Inc., Stillwater, MN.

Isard, Walter, Iwan J. Azis, Matthew P. Drennan, Ronald E. Miller, Sidney Saltzman, and Erik Thorbecke. 1998. *Methods of Interregional and Regional Analysis*. Brookfield, VT: Ashgate.

James, Franklin J., Jeff A. Romine, and Peter E. Zwanzig. 1998. The Effects of Immigration on Urban Communities. *Cityscape: A Journal of Policy Development and Research* 3 (3):171-192.

Kasarda, J. D., and J. H. Johnson Jr. 2005. T*he Economic Impact of the Hispanic Population on the State of North Carolina.* Chapel Hill, NC: University of North Carolina, Frank

Hawkins Kenan Institute of Private Enterprise. Available on-line: http://www. kenanflagler. unc. edu/assets/documents/2006_KenanInstitute_HispanicStudy. pdf.
Kayitsinga, J. 2007. "The Well-Being of Latinos in Michigan." *NEXO*. 11(1): 1, 3-5, 13-15.
Kielkopf, James J. 2000. *Estimating the Economic Impact of the Latino Workforce in South Central Minnesota*. Mankato, MN: Center for Rural Policy and Development: Minnesota State University, Mankato.
Leff, Nathaniel H. 1969. Dependency Rates and Savings Rates. *The American Economic Review* 59 (5):886-896.
Leontief, W. W. 1960. *The Structure of the American Economy, 1919-1939*. New York: Oxford University Press.
Lockwood, Andrew. 2007. *The Michigan Property Tax Real and Personal 2006 Statistical Update*. Lansing, MI: Michigan Department of the Treasury: Office of Revenue and Tax Analysis.
McCarthy, Kevin F., and R. Burciaga Valdez. 1986. *Current and Future Effects of Mexican Immigration in California*. Santa Monica, CA: Rand Corporation.
Michigan Liquor Control Commission. 2008. *Annual Financial Report 2008*. Lansing, MI: Michigan Department of Energy, Labor and Economic Growth.
Miller, Ronald E., and P.D. Blair. 1985. *Input-Output Analysis: Foundations and Extensions*. New York, NY: Oxford University Press.
Minnesota IMPLAN Group Inc. 2004. *Implan Professional Version 2.0: 3rd Edition*. Stillwater, MN: MIG, Inc.
Muller, Thomas, and Thomas J. Espenshade. 1985. *The Fourth Wave: California's Newest Immigrants*. Washington D.C.: The Urban Institute Press.
Myers, Dowell. 2008. Immigrants' Contributions in an Aging America. *Communities & Banking*. 19 (3):3-5.
Partridge, M. D., D. S. Rickman, and K. Ali. 2008. Recent Immigration and Economic Outcomes in Rural America. *American Journal of Agricultural Economics* 90 (5):1326-1333.
Pedraza-Bailey, Silvia. 1990. Immigration Research: A Conceptual Map. *Social Science History* 14 (1):43-67.
REMI Policy Insight 9.5. *Regional Economic Models Inc*. Amherst, MA.
Rothman, Eric S., and Thomas J. Espenshade. 1992. Fiscal Impacts of Immigration to the United States. *Population Index* 58 (3):381-415.
Saiz, A. 2003. Room in the Kitchen for the Melting Pot: Immigration and Rental Prices. *Review of Economics and Statistics* 85 (3):502-521.
_____. 2007. Immigration and housing rents in American Cities. *Journal of Urban Economics*. 61: 345-371.
Stern, Sharon. 2000. Valuing Housing Subsidies: A Revised Method for Quantifying Benefits in a New Measure of Poverty. In *Annual Conference of the American Statistical Association*. Indianapolis, IN.
Suro, Roberto, and Jeffrey S. Passel. 2003. *The Rise of the Second Generation: changing Patterns in Hispanic Population Growth*. Washington D.C.: Pew Hispanic Center.
Tan, L. 2000. Spending Patterns of Public-Assisted Families. *Monthly Labor Review* 123 (5):29-35.

The Henry J. Kaiser Family Foundation. 2008. *Michigan: Medicaid Spending*. Menlo Park, CA: The Henry J. Kaiser Family Foundation.

Treyz, G. I., D. S. Rickman, and G. Shao. 1991. The REMI economic-demographic forecasting and simulation model. *International Regional Science Review* 14 (3):221.

Treyz, George I., Dan S. Rickman, Gary L. Hunt, and Michael J. Greenwood. 1993. The Dynamics of U.S. Internal Migration. *The Review of Economics and Statistics* 75 (2):209-214.

U.S. Census Bureau. 2008a. *March Supplement: Current Population Survey*. Washington, D.C.: U.S. Census Bureau.

———. 2008b. State and *Local Government Finances by Level of Government and by State: 2005-06*. Washington, D.C.: U.S. Census Bureau, Governments Division.

———. 2009. *Public Education Finances, 2007*. Washington, D.C.: U.S. Census Bureau: Governments Division.

U.S. Department of Labor. 2007. *Consumer Expenditure Survey: 2007*. Washington, D.C.: U.S. Department of Labor.

USDA. *Program data* (07/30/2009). Supplemental Nutrition Assistance Program, USDA, 08/08/2009 2009 [cited]. Available from http://www.fns.usda.gov/pd/snapmain.htm.

Weintraub, Sidney. 1984. Illegal Immigrants in Texas: Impact on Social Services and Related Considerations. *International Migration Review* 18 (3):733-747.

Weintraub, Sidney, and Gilberto Cardenas. 1984. *The Use of Public Services by Undocumented Aliens in Texas.* Austin, TX: Lyndon B. Johnson School of Public Affairs: University of Texas, Austin.

Modeling and Economic Multiplier Analysis

Input-output model, which was first described by Francois Quesnay in 1758 and developed by Wassily Leontief, has been widely used to quantitatively measure and predict the impact on the economy from the changes in industries, labors, consumers, government policies, and foreign suppliers over short periods of time.

The model in matrix form depicts the economy as a large number of industries. According to the model, the output of any industry is needed as an input in many other industries including the industry itself. These inter-industry relationships within an economy show how dependent each industry is on all others both as a consumer of their outputs and as a supplier of their inputs. Therefore, an economy in equilibrium is one in which the level of the output produced in each industry sufficiently satisfies the total demand of that product. In addition to documenting the transactions of the economy in equilibrium, the I/O model documents the industry responses to changes in demand. With simple transformations, such changes in demand can be represented as changes in employment and associated income, output, and payments to factor inputs. The input-output model reveals the total effects on the region's economy, as the sum of component responses generated from changes in industry activity. The purpose of this appendix is to briefly discuss the fundamental structure of input-output model and the concepts of economic multipliers as well as the calculations that generate these measures.

Economic models generally start with a set of underlying assumptions that break down complex relationships into a manageable set of associations. Several simplifying assumptions go into the I/O impact evaluation model. First, the model imposes that the production in every industry is subject to constant returns to scale, such that a doubling output requires a doubling of all inputs. This assumption foregoes recognized economies of scale and agglomeration effects that tend to specify an increase in productivity as the size of firm operations and economic activities increase. Second, technology is fixed with no substitution, which means each industry uses a fix input ration for the production of its output. This assumption restricts firms from substituting one input in place of another, in response to relative price changes of inputs. Third, each industry is assumed to produce only one homogenous commodity or service. Finally, supply is assumed perfectly elastic, implying there is no supply constraint. This final assumption asserts that all prices are fixed such that firms cannot change prices in response to changes in costs.

The economic activity in a particular area can be divided into a number of segments or industries. An open input-output model is constructed from the observed data, which depicted the monetary flows from each of the industries (as a producer) to each the industries (as a purchaser). We denoted X_i as the total output of industry i and X_{ij} as the input requirement from i to j. In addition to the n-industry, the open model contains an exogenously determined *final demand* denoted by Y_i which measures the demand for the product of i's industry, and *value added* denoted by V_i which is not produced by the n industries themselves. Table A.1 shows a fundamental structure of input-output model.

Output / Input	1	2	…	n	Final Demand	Gross Output
1	X_{11}	X_{12}	…	X_{1n}	Y_1	X_1
2	X_{21}	X_{22}	…	X_{2n}	Y_2	X_2
…	…	…	…	…	…	…
n	X_{n1}	X_{n2}	…	X_{nn}	Y_n	X_n
Value Added	V_1	V_2	…	V_n	-	V
Gross Outlay	X_1	X_2	…	X_n	Y	X

According to the assumption, in order to produce each unit of commodity in the j^{th} industry, the input provided by i^{th} industry must be a fixed amount. Fixed proportions allow the calculation of proportional cost unit production functions denoted as $a_{ij} = X_{ij} / X_j$ where $\sum_{i=1}^{n} a_{ij} < 1$ for j = 1, 2, …, n, and a_{ij} is referred to as a *direct input coefficient*. For an *n*-industry economy, the input coefficients can be arranged into a matrix $A = \left[a_{ij} \right]$, as Table A.1.1.

Output / Input	1	2	…	n
1	a_{11}	a_{12}	…	a_{1n}
2	a_{21}	a_{22}	…	a_{2n}
…	…	…	…	…
n	a_{n1}	a_{n2}	…	a_{nn}

In equilibrium, industry *i* is to produce an output plus the final demand just sufficient to meet the input requirements of the *n* industries. Therefore, the output level X_i must satisfy the following equations:

$$X_i = X_{i1} + X_{i2} + ... + X_{in} + Y_i$$

$$\text{or,} \quad X_i = a_{i1}X_1 + a_{i2}X_2 + ... + a_{in}X_n + Y_i$$

Furthermore, for the entire set of n industries, the output levels should satisfy the set of *n* linear equations:

$$\begin{aligned}
&(1 - a_{11})X_1 - a_{12}X_2 - ... - a_{1n}X_n = Y_1 \\
&-a_{21}X_1 + (1 - a_{22})X_2 - ... - a_{2n}X_n = Y_2 \\
&\quad ..... \\
&-a_{n1}X_1 - a_{n2}X_2 - ... + (1 - a_{nn})X_n = Y_n
\end{aligned}$$

This system of equations can be represented in matrix notation as,

$$(I - A)\mathrm{X} = \mathrm{Y}$$

If $(I - A)$ is nonsingular then the Leontief inverse matrix $(I - A)^{-1}$ can be found and the equations set will have the unique solution

$$X = (I - A)^{-1} Y$$

Each element in this inverse matrix is called *interdependency coefficient*, which represents the direct, indirect and induced requirements of industry i per unit of final demand for the output of industry j. Given the matrix of direct input coefficients, A, the input-output model will determine the effects of specified changes in final demand on gross output and expressed as the form of input-output multipliers.

In application, the total impact, or effect, is calculated as the sum of multiple components as,

$$Total\ Effect = Direct\ Effect + Indirect\ Effect + Induced\ Effect$$

Direct effects are the changes in the industries to which a final demand change was made. Indirect effects measure the changes in inter-industry purchases, which respond to the direct effects. Induced effects reflect changes in non-production segments spending. These include such measures as households' responses to changes in income and governments' changes in expenditures from changes in tax revenues. Because transactions are linear, total effects can be restated as,

$$Total\ Effect = k \cdot Direct\ Effect\ ,$$

or,

$$k = \frac{Total\ Effect}{Direct\ Effect}\ ,$$

The multiplier, k encompasses all the direct, indirect and induced effects for a given industry.

Several types of multipliers can be calculated. Three of the most frequently used are output, income and employment multipliers. The output multiplier for industry i measures the total effects on output in the economy brought by the change of one unit of final demand. Income and employment multipliers are derived by simple transformations of variables into income and employment terms using the ratios of employment and income per unit of output, respectively.

As stated above, the principles and concepts of I/O modeling and economic multiplier are straightforward but the processes of calculation and analysis are complex due to the large number of industries and the intricate relations amount them. In this study, we employ the economic impact assessment software system IMPLAN Pro 2.0 and IMPLAN Data Files to create local area *Social Accounting Matrices* and develop *Multiplier Models*.

Appendix I:

References

Chiang, A. C., F*undamental Methods of Mathematical Economics, Second Edition ,* McGraw-Hill, Inc., 1974.

Decker, C. S., *Nebraska's Immigrant Population Economic and Fiscal Impacts,* 2008.

Leontief, W. W., *the Structure of American Economy, 1919-1939,* Oxford University Press, New York, 1960.

Miller, R. E. and Blair, P. D. *Input-Output Analysis: Foundations and Extensions,* Prentice-Hall, Inc., New Jersey, 1985.

Minnesota IMPLAN Group Inc. *Implan Professional Version 2.0: 3rd Edition*. Stillwater, MN: MIG, Inc., 2004.

Richardson, H. W. *Input-Output and Regional Economics,* Redwood Press Limited, Wiltshire, 1972.

Schaffer, W. A. "Regional Impact Model", Regional Research Institute, West Virginia University, 1999.

Sales Taxable	Percent Taxable	Item	All consumer units	Non-Latino	Hispanic or Latino	Percent of Budget		Taxable Sales	
						Non-Latino	Latino	Non Latinos	Latinos
		Total Annual Expenditures	**$49,638**	**$240,542,931,525**	**$6,394,223,430**	**100.00%**	**100.00%**		
0	0%	Food	$6,133	$29,209,046,692	$914,120,807	12.14%	14.30%	$0	$0
0	0%	Food at home	$3,465	$16,456,729,046	$527,549,240	6.84%	8.25%	$0	$0
0	0%	Cereals and bakery products	$460	$2,213,009,779	$63,170,324	0.92%	0.99%	$0	$0
0	0%	Cereals and cereal products	$143	$671,111,585	$23,727,390	0.28%	0.37%	$0	$0
0	0%	Bakery products	$317	$1,542,532,844	$39,288,860	0.64%	0.61%	$0	$0
0	0%	Meats, poultry, fish, and eggs	$777	$3,612,746,503	$137,125,825	1.50%	2.14%	$0	$0
0	0%	Beef	$216	$999,500,626	$39,288,860	0.42%	0.61%	$0	$0
0	0%	Pork	$150	$703,670,286	$24,959,982	0.29%	0.39%	$0	$0
0	0%	Other meats	$104	$495,062,296	$15,561,470	0.21%	0.24%	$0	$0
0	0%	Poultry	$142	$640,983,701	$29,736,274	0.27%	0.47%	$0	$0
0	0%	Fish and seafood	$122	$580,416,626	$18,334,801	0.24%	0.29%	$0	$0
0	0%	Eggs	$43	$193,112,969	$9,244,438	0.08%	0.14%	$0	$0
0	0%	Dairy products	$387	$1,847,176,422	$56,699,217	0.77%	0.89%	$0	$0
0	0%	Fresh milk and cream	$154	$721,368,616	$25,884,425	0.30%	0.40%	$0	$0
0	0%	Other dairy products	$234	$1,131,184,363	$30,814,792	0.47%	0.48%	$0	$0
0	0%	Fruits and vegetables	$600	$2,812,142,545	$100,456,222	1.17%	1.57%	$0	$0
0	0%	Fresh fruits	$202	$941,999,017	$34,974,789	0.39%	0.55%	$0	$0
0	0%	Fresh vegetables	$190	$876,211,039	$35,282,937	0.36%	0.55%	$0	$0
0	0%	Processed fruits	$112	$534,901,502	$16,331,840	0.22%	0.26%	$0	$0
0	0%	Processed vegetables	$96	$458,396,338	$14,020,730	0.19%	0.22%	$0	$0
0	0%	Other food at home	$1,241	$5,971,653,796	$170,097,652	2.48%	2.66%	$0	$0
0	0%	Sugar and other sweets	$124	$605,132,026	$14,945,174	0.25%	0.23%	$0	$0
0	0%	Fats and oils	$91	$432,148,204	$13,866,656	0.18%	0.22%	$0	$0
0	0%	Miscellaneous foods	$650	$3,148,243,214	$84,124,382	1.31%	1.32%	$0	$0
0	0%	Nonalcoholic beverages	$333	$1,571,439,302	$53,155,516	0.65%	0.83%	$0	$0
0	0%	Food prepared by consumer unit on out-of-town trips	$43	$214,056,400	$4,159,997	0.09%	0.07%	$0	$0
1	100%	Food away from home	$2,668	$12,752,952,295	$386,417,493	5.30%	6.04%	$12,752,952,295	$386,417,493
1	100%	Alcoholic beverages	$457	$2,290,808,224	$40,367,378	0.95%	0.63%	$2,290,808,224	$40,367,378
0	0%	Housing	$16,920	$81,087,942,456	$2,399,393,785	33.71%	37.52%	$0	$0
0	0%	Shelter	$10,023	$47,673,470,501	$1,509,000,368	19.82%	23.60%	$0	$0
0	0%	Owned dwellings	$6,730	$32,745,060,792	$834,926,791	13.61%	13.06%	$0	$0
0	0%	Mortgage interest and charges	$3,890	$18,624,355,463	$556,052,923	7.74%	8.70%	$0	$0
0	0%	Property taxes	$1,709	$8,415,532,256	$187,662,084	3.50%	2.93%	$0	$0
0	0%	Maintenance, repairs, insurance, other expenses	$1,131	$5,705,173,072	$91,211,785	2.37%	1.43%	$0	$0
0	0%	Rented dwellings	$2,602	$11,365,524,951	$637,095,826	4.72%	9.96%	$0	$0
0	100%	Other lodging	$691	$3,563,519,408	$36,823,677	1.48%	0.58%	$0	$0
1	0%	Utilities, fuels, and public services	$3,477	$16,616,445,138	$504,438,146	6.91%	7.89%	$0	$0
1	100%	Natural gas	$480	$2,340,849,693	$58,239,957	0.97%	0.91%	$2,340,849,693	$58,239,957
1	100%	Electricity	$1,303	$6,207,264,295	$193,825,042	2.58%	3.03%	$6,207,264,295	$193,825,042
1	100%	Fuel oil and other fuels	$151	$772,511,784	$9,552,586	0.32%	0.15%	$772,511,784	$9,552,586
1	100%	Telephone services	$1,110	$5,227,341,966	$179,804,312	2.17%	2.81%	$5,227,341,966	$179,804,312
0	0%	Water and other public services	$434	$2,073,853,957	$63,016,250	0.86%	0.99%	$0	$0
0	0%	Household operations	$984	$4,858,335,451	$104,924,367	2.02%	1.64%	$0	$0
1	100%	Personal services	$415	$2,010,412,996	$53,617,738	0.84%	0.84%	$2,010,412,996	$53,617,738
1	100%	Other household expenses	$569	$2,847,922,455	$51,306,629	1.18%	0.80%	$2,847,922,455	$51,306,629
1	0%	Housekeeping supplies	$639	$3,073,234,856	$87,976,231	1.28%	1.38%	$0	$0
1	100%	Laundry and cleaning supplies	$140	$644,827,524	$26,192,573	0.27%	0.41%	$644,827,524	$26,192,573
1	100%	Other household products	$347	$1,710,176,036	$37,748,120	0.71%	0.59%	$1,710,176,036	$37,748,120
1	100%	Postage and stationery	$152	$717,596,646	$24,189,612	0.30%	0.38%	$717,596,646	$24,189,612
1	0%	Household furnishings and equipment	$1,797	$8,866,456,509	$193,054,672	3.69%	3.02%	$0	$0
1	100%	Household textiles	$133	$644,001,294	$17,256,284	0.27%	0.27%	$644,001,294	$17,256,284
1	100%	Furniture	$446	$2,166,931,860	$56,082,922	0.90%	0.88%	$2,166,931,860	$56,082,922

Sales Taxable	Percent Taxable	Item	All consumer units	Non-Latino	Hispanic or Latino	Percent of Budget		Taxable Sales	
						Non-Latino	Latino	Non Latinos	Latinos
1	100%	Floor coverings	$46	$237,801,863	$2,311,109	0.10%	0.04%	$237,801,863	$2,311,109
1	100%	Major appliances	$231	$1,155,672,256	$20,954,059	0.48%	0.33%	$1,155,672,256	$20,954,059
1	100%	Small appliances, miscellaneous housewares	$101	$480,836,575	$15,099,248	0.20%	0.24%	$480,836,575	$15,099,248
1	100%	Miscellaneous household equipment	$840	$4,181,212,660	$81,351,051	1.74%	1.27%	$4,181,212,660	$81,351,051
1	0%	Apparel and services	$1,881	$8,847,812,043	$307,223,477	3.68%	4.80%	$0	$0
1	100%	Men and boys	$435	$1,996,726,089	$83,045,865	0.83%	1.30%	$1,996,726,089	$83,045,865
1	0%	Men, 16 and over	$351	$1,617,445,367	$65,481,433	0.67%	1.02%	$0	$0
1	0%	Boys, 2 to 15	$84	$379,915,371	$17,410,358	0.16%	0.27%	$0	$0
1	100%	Women and girls	$749	$3,623,403,871	$97,991,039	1.51%	1.53%	$3,623,403,871	$97,991,039
1	0%	Women, 16 and over	$627	$3,050,603,039	$77,807,350	1.27%	1.22%	$0	$0
1	0%	Girls, 2 to 15	$122	$572,800,833	$20,183,689	0.24%	0.32%	$0	$0
1	100%	Children under 2	$93	$411,168,846	$21,570,354	0.17%	0.34%	$411,168,846	$21,570,354
1	100%	Footwear	$327	$1,499,197,049	$62,862,176	0.62%	0.98%	$1,499,197,049	$62,862,176
1	100%	Other apparel products and services	$276	$1,311,304,983	$41,908,117	0.55%	0.66%	$1,311,304,983	$41,908,117
1	0%	Transportation	$8,758	$41,988,474,717	$1,237,984,272	17.46%	19.36%	$0	$0
1	0%	Vehicle purchases (net outlay)	$3,244	$15,616,297,917	$443,116,710	6.49%	6.93%	$0	$0
1	100%	Cars and trucks, new	$1,572	$7,645,307,581	$195,828,004	3.18%	3.06%	$7,645,307,581	$195,828,004
1	100%	Cars and trucks, used	$1,567	$7,447,069,455	$237,427,973	3.10%	3.71%	$7,447,069,455	$237,427,973
1	100%	Other vehicles	$105	$524,555,531	$9,706,660	0.22%	0.15%	$524,555,531	$9,706,660
1	0%	Gasoline and motor oil	$2,384	$11,355,478,699	$354,986,405	4.72%	5.55%	$0	$0
0	0%	Other vehicle expenses	$2,592	$12,333,544,952	$389,036,750	5.13%	6.08%	$0	$0
0	0%	Vehicle finance charges	$305	$1,440,569,849	$48,379,224	0.60%	0.76%	$0	$0
1	75%	Maintenance and repairs	$738	$3,614,399,053	$85,819,196	1.50%	1.34%	$2,710,799,290	$64,364,397
0	0%	Vehicle insurance	$1,071	$4,945,940,873	$197,214,669	2.06%	3.08%	$0	$0
0	100%	Vehicle rental, leases, licenses, and other charges	$478	$2,332,000,528	$57,777,735	0.97%	0.90%	$0	$0
0	100%	Public transportation	$538	$2,683,153,149	$50,844,407	1.12%	0.80%	$0	$0
0	0%	Healthcare	$2,853	$14,396,226,977	$228,953,905	5.98%	3.58%	$0	$0
0	100%	Health insurance	$1,545	$7,834,600,797	$114,631,027	3.26%	1.79%	$0	$0
0	100%	Medical services	$709	$3,514,962,709	$72,106,613	1.46%	1.13%	$0	$0
1	50%	Drugs	$481	$2,450,943,404	$32,817,754	1.02%	0.51%	$1,225,471,702	$16,408,877
1	100%	Medical supplies	$118	$595,085,416	$9,552,586	0.25%	0.15%	$595,085,416	$9,552,586
0	0%	Entertainment	$2,698	$13,443,546,610	$257,919,810	5.59%	4.03%	$0	$0
0	100%	Fees and admissions	$658	$3,337,225,034	$48,687,371	1.39%	0.76%	$0	$0
1	100%	Audio and visual equipment and services	$987	$4,789,422,099	$125,570,278	1.99%	1.96%	$4,789,422,099	$125,570,278
1	100%	Pets, toys, hobbies, and playground equipment	$560	$2,810,957,136	$48,533,298	1.17%	0.76%	$2,810,957,136	$48,533,298
1	100%	Other entertainment supplies, equipment, and services	$493	$2,505,307,693	$35,282,937	1.04%	0.55%	$2,505,307,693	$35,282,937
1	100%	Personal care products and services	$588	$2,827,589,693	$81,042,903	1.18%	1.27%	$2,827,589,693	$81,042,903
1	100%	Reading	$118	$610,317,002	$5,854,810	0.25%	0.09%	$610,317,002	$5,854,810
0	100%	Education	$945	$4,817,466,489	$63,940,694	2.00%	1.00%	$0	$0
1	100%	Tobacco products and smoking supplies	$323	$1,631,910,631	$25,422,203	0.68%	0.40%	$1,631,910,631	$25,422,203
1	100%	Miscellaneous	$808	$4,040,895,320	$73,647,353	1.68%	1.15%	$4,040,895,320	$73,647,353
0	100%	Cash contributions	$1,821	$9,103,384,269	$166,862,099	3.78%	2.61%	$0	$0
0	0%	Personal insurance and pensions	$5,336	$26,254,156,257	$591,181,786	10.91%	9.25%	$0	$0
0	100%	Life and other personal insurance	$309	$1,592,179,206	$16,794,062	0.66%	0.26%	$0	$0
0	100%	Pensions and Social Security	$5,027	$24,661,342,402	$574,541,798	10.25%	8.99%	$0	$0

Appendix III:

K-12 Revenue and Expenditure Categories

Item	All school systems	FIXED	INCLUDABLE	VARIABLE COST
Elementary-secondary expenditure	11,352.50	0	0	0
Current spending	9,666.38	0	0	0
By function:				
Instruction	5,867.06	0	1	0
Support services	3,410.49	0	0	0
Pupil support services	516.07	1	1	0
Instructional staff support	472.90	0	1	1
General administration	182.03	1	1	0
School administration	535.18	0	1	1
Operation and maint. of plant	947.84	0	1	1
Pupil transportation	421.21	1	1	0
Other and nonspecified	335.25	0	1	1
Other current spending	388.83	0	1	1
By selected objects:				
Total salaries and wages1	5,922.59	0	0	0
Instructional salaries only	4,002.58	0	0	0
Support services salaries only	1,731.45	0	0	0
Total employee benefits1	1,972.90	0	0	0
Instructional benefits only	1,315.56	0	0	0
Support services benefits only	586.83	1	0	0
Capital outlay	1,322.52	1	0	0
Construction	1,038.71	1	1	0
Equipment	183.86	1	1	0
Instructional equipment only	45.95	1	1	0
Land & existing structures	99.96	1	1	0
Interest on debt	305.05	1	1	0
Payments to other governments	58.55	1	1	0

Ones on the last three column signifies inclusion in the respective category
Only includable variables used in calculations
Only variable costs are included in per-household impacts

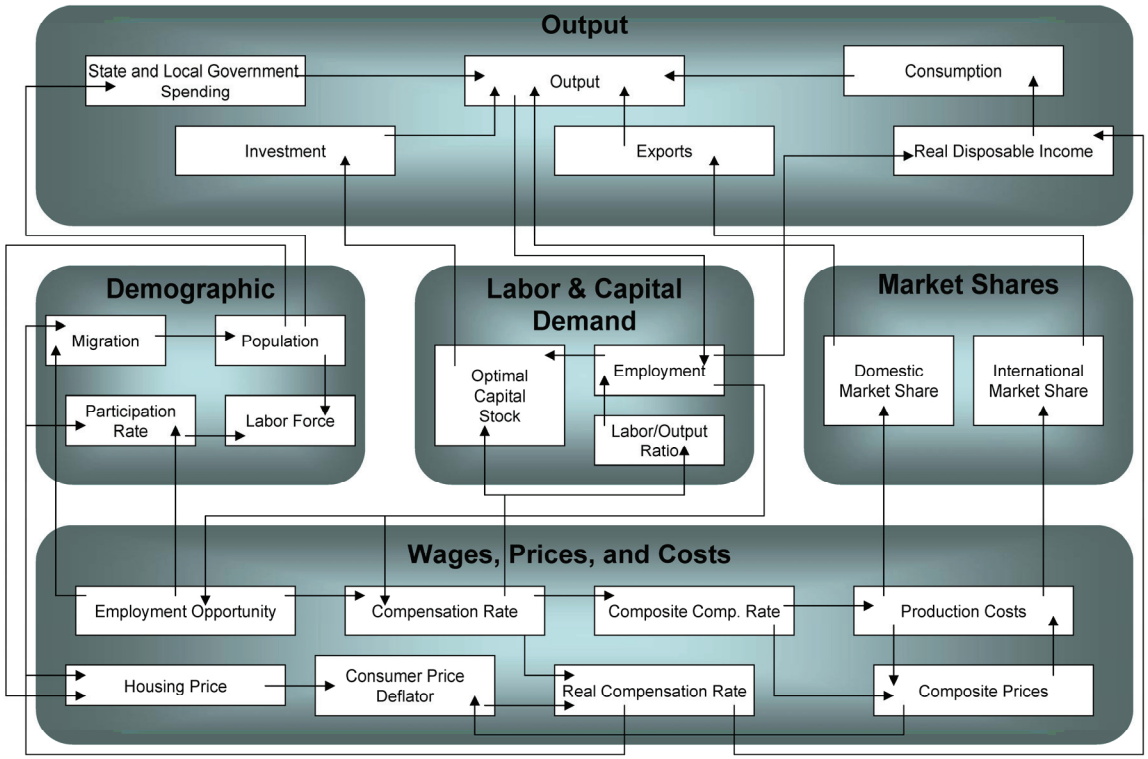
Alternative Model Structure

REMI PI is a structural economic policy analysis model, integrating input-output, computable general equilibrium, econometric and economic geography methodologies. The model is calibrated dynamically, providing forecasts of policy impacts as differences from baseline forecasts. Impacts arise from behavioral responses to changes in wage, price, and other economic factors.

Thousands of simultaneous equations make up the REMI model. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Wages, Prices and Costs, and (5) Market Shares. The blocks and their key interactions are shown in Figures A.IV.1 and A.IV.2.

Figure A.IV.1:

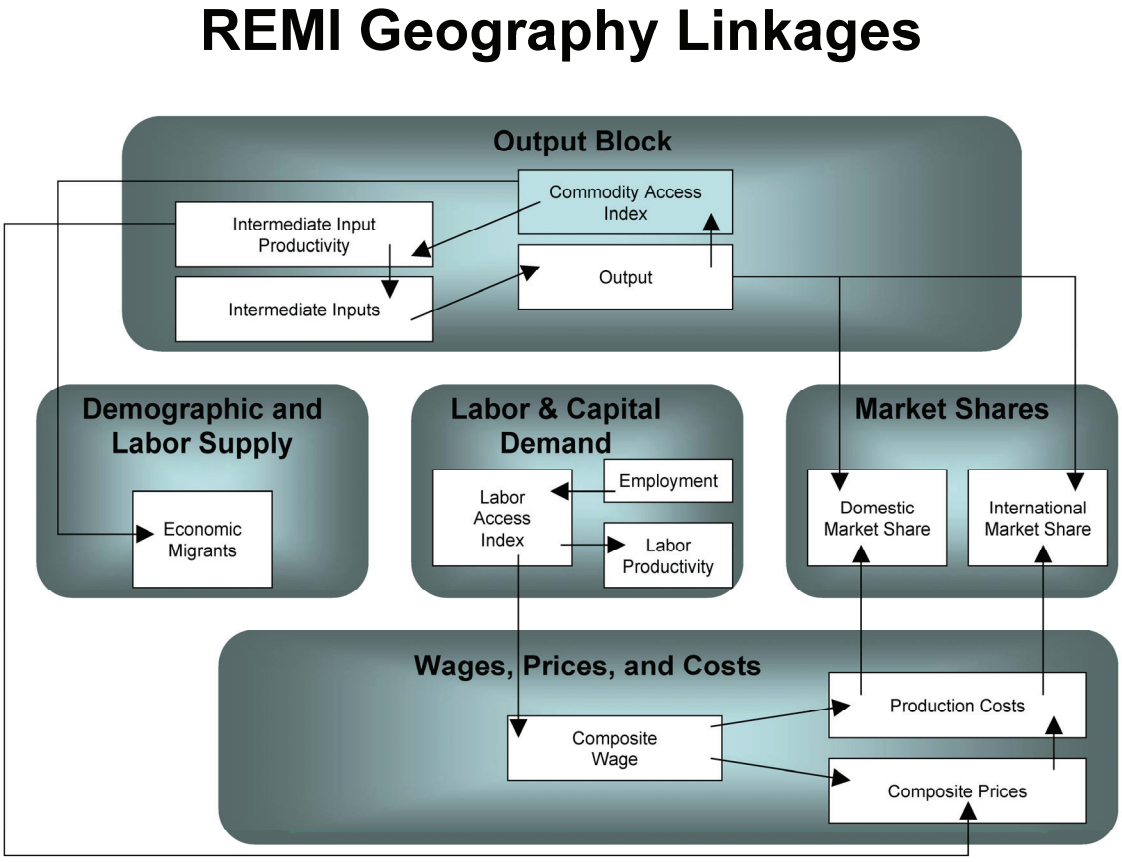
REMI Model Linkages



The Output Block is determined by the simultaneous relationships across output, demand, consumption, investment, government spending, import, product access, and export concepts. Output for each industry is determined by local and export demand. For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry and the relative cost of producing in the region relative to the U.S. and international regions. Consumption depends on real disposable income per capita, relative prices, differential income elasticities and population. Input productivity

influences the cost of production and depends on access to inputs. Capital stock adjusts to investment, which is governed by the difference between actual stock levels and profit maximizing levels of stock. And, government spending is determined on a per-resident basis, where residential impacts are driven partially by employment opportunities and relative wage rates in the region compared to the nation.

Figure A.IV.2.



The Labor and Capital Demand block considers optimal levels of labor and capital stock for a given level of output, where industry-specific labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to sufficiently-skilled labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital and fuel, along a profit-maximizing production schedule, while the demand for capital is driven by the optimal capital stock. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by fixed ratios of output per unit of labor and is determined by each industry.

The Demographic and Labor Supply block includes detailed demographic information about the region. Population data is given for age and gender, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment opportunities relative to the potential labor force and to changes in the real after tax compensation rate. Economic migration is determined by the relative real after tax compensation rate, relative employment opportunity and consumer access to variety.

The Wages, Prices and Cost block includes delivered prices, production costs, equipment cost, consumer prices, the price of housing, and the wage equation. Economic geography concepts account for the productivity and price effects of access to specialized labor, goods and services.

The Market Shares equations measure the proportion of local and export markets that are captured by each industry. These depend on relative production costs, the estimated price elasticity of demand, and effective distance between the home region and each of the other regions. The change in share of a specific area in any region depends on changes in its delivered price and the quantity it produces compared with the same factors for competitors in that market. The share of local and external markets then drives the exports from and imports to the home economy.

We employ the REMI model to compare economic impact outcomes to those generated within the IMPLAN, input-output modeling framework. Regional economist generally recognize that the REMI model tends to produce more conservative economic impact outcomes as REMI relaxes several restrictive assumptions of I-O models that contributes to larger multiplier effects.

I-O models generally assume that prices are fixed and do not respond to changes in demand or supply. Within a demand-driven economic impact modeling framework used here, this amounts to an assumption that supply of labor, capital, and inputs is perfectly elastic. To exemplify the difference, the I-O framework will assume that an infinite number of auto workers are available to fill labor demand in the presence of an increase in automobile production. Alternatively, REMI recognizes that the pool of skilled autoworkers is finite. As demand increases, wages will be bid up such that autoworkers eventually become more expensive to higher. Thereby the increase in wages will partially mitigate the economic impact of a sufficiently large increase in the auto sector.

However, the REMI model recognizes agglomeration economies. Agglomeration economies allow producers to increase productivity based on larger batch sizes, through shared inputs where costs are spread over multiple producers, and through specialization. Agglomeration effects have the potential to negate price changes in labor, capital, and intermediate inputs from a change in demand, thereby reverting REMI impact estimates toward I-O model estimates.

Table A.IV.1 Direct Employment Effects

	REMI Sector Code	Direct Employment Impact
Forestry et al.	4001	0
Agriculture	4002	-4097
Oil, gas extraction	4003	0
Mining (except oil, gas)	4004	0
Support activities for mining	4005	0
Utilities	4006	0
Construction	4007	-8986
Wood product mfg	4008	0
Nonmetallic mineral prod mfg	4009	-1497
Primary metal mfg	4010	0
Fabricated metal prod mfg	4011	0
Machinery mfg	4012	0
Computer, electronic prod mfg	4013	-1475
Electrical equip, appliance mfg	4014	0
Motor vehicle mfg	4015	0
Transp equip mfg. exc. motor veh	4016	-20128
Furniture, related prod mfg	4017	-2462
Miscellaneous mfg	4018	0
Food mfg	4019	-3593
Beverage, tobacco prod mfg	4020	-1127
Textile mills	4021	0
Textile prod mills	4022	0
Apparel mfg	4023	0
Leather, allied prod mfg	4024	0
Paper mfg	4025	-1092
Printing, rel supp act	4026	0
Petroleum, coal prod mfg	4027	0
Chemical mfg	4028	0
Plastics, rubber prod mfg	4029	0
Wholesale trade	4030	-2784
Retail trade	4031	-19997
Air transportation	4032	-810.25
Rail transportation	4033	-810.25
Water transportation	4034	-810.25
Truck transp; Couriers, msngrs	4035	-810.25
Transit, ground pass transp	4036	-810.25
Pipeline transportation	4037	-810.25
Scenic, sightseeing transp; supp	4038	-810.25
Warehousing, storage	4039	-810.25
Publishing, exc Internet	4040	0
Motion picture, sound rec	4041	0
Internet serv, data proc, other	4042	-1797
Broadcasting, exc Int; Telecomm	4043	0
Monetary authorities, et al.	4044	0
Sec, comm contracts, inv	4045	0
Ins carriers, rel act	4046	-3395
Real estate	4047	0
Rental, leasing services	4048	-2117
Prof, tech services	4049	-3706
Mgmnt of companies, enterprises	4050	0
Administrative, support services	4051	-6833
Waste mgmnt, remed services	4052	0
Educational services	4053	-7796
Ambulatory health care services	4054	0
Hospitals	4055	-4550
Nursing, residential care facilities	4056	-6587
Social assistance	4057	-1427
Performing arts, spectator sports	4058	-1403
Museums et al.	4059	0
Amusement, gambling, recreation	4060	0
Accommodation	4061	-2556
Food services, drinking places	4062	-29482
Repair, maintenance	4063	-2917
Personal, laundry services	4064	-2554
Membership assoc, organ	4065	-1212
Private households	4066	-1354
Public Sector	51	-1389

Source: Direct Employment Impacts are derived from the March Supplement of the 2008 Current Population Survey Industry sectors are established by REMI using the 65 industry break-out. The authors mapped CPS data into REMI industries

Table A.IV.1 specifies the direct effects used in the REMI model. Direct effects are specified in greater industry detail than provided in Table 7 of the text. However, the industry make up of Latino employment mirrors that used within the IMPLAN framework. We assume that in 2009, all Latino-held jobs in Michigan disappear. We then look at how the secondary impacts materialize.

Table 28 of the text provides employment impacts used to derive economic and fiscal impacts of Michigan's Latino population. Using the REMI model, we find very similar estimates employment impacts.

The REMI model for Michigan suggest the overall economic multiplier of Michigan's Latino population is 2.07; slightly higher than the 2.05 multiplier using IMPLAN. However, since REMI is a dynamic model, the total economic impact must be interpreted with caution. REMI recognizes that the economy does not change instantaneously. In 2010, the year of the experiment, the total job loss is lower than the long-term job loss. That is because producers adjust employment over time and the ripple effects of such adjustments take time to play out. As labor supply declines, wage contracts gradually are renegotiated based on changes in the supply and demand of workers. Capital stock changes in response to changes in market conditions. These changes take time to materialize.

REMI provides that initially, the economy shrinks by 1.75 for every Latino job. This gradually increases to 1.91 jobs for each Latino worker in 2015, and ultimately 2.07 jobs in 2025. We assert that 2025 represents the long-run equilibrium adjustment where the economy, once again comes to rest at a new state of normal operation.

This REMI experiment shows that the IMPLAN outcomes are representative of expected long-run impacts provided by REMI. Together, the results lend credence to the estimates generated in the text of this document.

The Julian Samora Research Institute is part of the College of Social Science at Michigan State University. Visit its webpage at: www.jsri.msu.edu

The Center for Economic Analysis is sponsored by the Michigan Agricultural Experiment Station, Michigan State University Extension, and the MSU Department of Agricultural, Food, and Resource Economics. Visit its webpage at: www.cea.msu.edu

Publication of this report was made possible with support from the DTE Energy Foundation

For More Information

Rubén O. Matinez, Director, Julian Samora Research Institute, (517) 432-1317 or rmartinez@jsri.msu.edu

Steven R. Miller, Director, Center for Economic Analysis, (517) 355-2153 or mill1707@msu.edu