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**A REVIEW AND FORECAST OF THE ONONDAGA
COUNTY ECONOMY**

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Executive Summary

The purpose of this paper is to review the economy of Onondaga County and to offer a forecast of its future until the year 2035. This information will be used in forming a plan to improve the quality of Onondaga Lake. Understanding the past and the forecastable future is crucial to the formation of this plan and to anyone with a stake in the county's future economic growth. To create this review and forecast, we used the REMI model, a multi-equation model of a local or regional economy and is a tool that is widely used in studies of this kind.

Our report was structured around five major questions:

- ***Do Alternative Measures of Local Economic Performance Always Move in the Same Direction?*** The REMI model allows us to look at three different ways to measure economic performance: output, personal income and employment. We found that while output and personal income tend to move closely, employment sometimes does not. This makes the choice of measurement of economic performance important.

- ***How Has the Composition of Output and Employment Changed?*** We found that he make-up of the county's economy is undergoing a shift away from manufacturing as the main source of output and employment to the services industry. Manufacturing is still extremely important to the economy, comprising 35 percent of the total output of the county in 1994. However, employment in manufacturing has been dropping at an average rate of 1.9 percent a year since 1969. In contrast, employment in the service sector has grown an average of 3.5 percent a year since 1969.

- ***What Are the Major Sources of Imports and Exports and How Have Trade Patterns Changed?*** Onondaga County exports totaled $8.54 billion in 1994 with most of these going to the rest of New York State and the rest of the world. Only a very small fraction of total exports goes to the rest of the MSA and this share has actually declined over the past six years. The distribution of the source of imports is very similar with most of the imports coming from the rest of the state and the world. The trade gap (exports - imports) has declined in recent years mainly due to a slight increase in the fraction of total expenditures purchased locally, which is called the regional purchasing coefficient (RPC) in the REMI model. This increase, however, is mainly due to the general shift in the economy towards the service sector, which has a higher coefficient than the manufacturing sector. There has been little change in the percentages purchased locally by the different sectors.

- ***How Has the Value of Real Estate Changed?*** We studied two separate series, one which examines the value of all real estate subject to the property tax and one which focuses on owner-occupied housing. There has been an increase in the value of all property subject to the property tax, according to the series compiled by the New

York State Board of Equalization. However, looking at the weighted repeat sales index compiled jointly by Fannie Mae and Freddie Mac, we find little change in the price of owner-occupied housing.

- ***What Are the Primary Factors that Drive the Onondaga County Economy?*** There are three primary forces that drive the economy:

  i. *The external economy*: employment and real disposable income in Onondaga County are highly correlated with movements in these variables for the United States economy, although Onondaga's share of the national aggregates has declined steadily since 1969. Onondaga County's share of the national population has declined more substantially and is much less correlated with movements in the United States population.

  ii *The profitability of local firms relative to the national average*: The profitability of local firms is close to or above the national average in most areas. Labor productivity is 30 percent higher than the national average, but fuel costs are much higher than the national average.

  iii. *Migration into and out of the county*. For the last two decades, more people have left the county than have moved here which has major effects on the supply of labor. The REMI model indicates that, on average, the real after tax is below what is available in the rest of the nation; furthermore, worker's in Onondaga County require an 18.3 percent higher real, after-tax wage to live in Onondaga County.

The other major portion of the paper provides a forecast of the Onondaga County economy from now until the year 2035. This forecast can be broken into two parts, a short-run forecast that runs into the early part of the 21st century and a long-run forecast that runs from the early part of the next century until the end of the forecast period. The short-run forecast for the county is somewhat more prosperous than compared to the early 1990s. Real income growth through the end of the decade is predicted to be twice the rate of growth during the early 1990s, However, long run prospects for the county are somewhat less encouraging. Growth in employment is expected to be half the growth rate experienced from 1969-1994 and a similar pattern emerges for real disposable income.

A Review and Forecast of the Onondaga County Economy

Introduction

The purpose of this paper is to review the economy of Onondaga County and offer a forecast of its future until 2035. The specific purpose of the paper is to provide background information critical to the determination of a plan to improve the quality of Onondaga Lake. These plans are expected to cost several hundreds of millions of dollars and have the potential to effect the future path of the economy. More generally, the up to date and comprehensive look at the local economy offered in this paper ought to be of value to many in the county with a stake in its future economic growth.

A critical ingredient in our overall effort is a widely employed model of local economies: the Regional Econometric Model, Inc., the REMI model.[1] The REMI model is a multi-equation model of a local or regional economy. Like most econometric models, it distinguishes between endogenous and exogenous variables; the endogenous are those predicted by the model and the exogenous are those determined outside the model. The predictions of the endogenous variables depend upon values of the exogenous variables assumed, e.g., future United States economic growth, and the parameters of the model. It is designed along the lines of many of the familiar econometric models of the national economy such as the DRI or Wharton models; the principal difference is the inclusion of equations that model the mobility of capital and labor among regions of the national economy. The REMI model is also unique in its estimation of a variety of data series that are not elsewhere available, e.g., gross regional product at the county level and local exports and imports. The model can be used to forecast a regional economy well into the 21st century and, most importantly, simulate the impact of various policies that impact the regional economy such as lake remediation plans.

A 14 sector version of the model has been developed by Regional Economic Modeling, Inc. specifically for this project. The model includes the analysis of ten industrial sectors (SIC 1 digit industries), three measures of government, and the agricultural sector. Although the model developed for this project includes information and forecasts about the rest of the Syracuse Metropolitan Statistical Area (MSA), the rest of the state, and, implicitly, the entire state of New York, the analysis in this report focuses on the Onondaga County economy.

The remainder of the report is divided into three sections. The next section examines the history of the Onondaga County economy from 1969-1994; important trends and the driving forces underlying these trends are identified. The historical analysis ends in 1994 because this is the last year for which many of the important data series used in the REMI model are available. The third section of the report includes a forecast of the economy. The final section summarizes the major conclusions of the report.

Review of the Onondaga County Economy: 1969-1994

Five sets of questions about the local economy are explored in this section. The first examines several different measures of the local economy and asks whether they paint a similar picture about the health of the economy. The next three focus on specific sectors of the economy: manufacturing; imports and exports; and real property. The fifth seeks to identify the most important factors that affect the local economy. Each is discussed in turn.

The data for most of the analysis are drawn from the information provided with the REMI model. Some of these data are drawn from publicly available sources and some are generated by procedures unique to REMI. Our discussion identifies the sources of the data employed and

provides a brief explanation of the methods used by REMI to generate some of the unique data series. A fuller explanation of the data generated by REMI is available in Treyz (1994).

Question 1: Do Alternative Measures of Local Economic Performance Always Move in the Same Direction?

A summary measure of the local economic performance is needed to gauge the impact of any policy change. Economic performance in local economies is normally measured in terms of employment and personal income because these are the aspects of the local economy on which data are most readily available. The REMI model provides estimates of two other measures: total output and gross regional product (GRP). This section compares these measures to determine the similarity of their movements. In so doing, we obtain a sense of whether the future analysis of a particular policy scenario is likely to be sensitive to the selection of the summary measure of economic performance. Table 1 contains these summary measures of economic performance..

Total output measures the value of goods and services produced in the economy. Total output overstates the net output or valued added of a local economy because it includes purchases of inputs used to produce a particular output. For example, output includes the total volume of sales by a local grocery and the value of any sales to the grocer by local suppliers, e.g., local baker. In this sense, total output double-counts the purchases of intermediate goods and services. Economists have long recognized this and prefer instead to use value-added or, equivalently, gross regional product to measure the net output of an economy. GRP equals total output less the value of purchases of intermediate goods and services used to produce final output. Gross domestic product is computed for both the nation and all 50 states by the federal government; however, the federal government does not compute this information for levels smaller than the state. The GRP numbers reported in this section are estimated by REMI.

The total output of economic goods and services produced within Onondaga County in 1994 is estimated to be $22.73 billion in 1992 United States dollars. Average annual rates of growth since 1969 equal 1.9 percent per year; growth was most rapid during the 1980s and total output actually peaked in 1990. The damaging effects of the 1991-1992 recession are most notable; output had still not returned to its pre-recession level by the end of 1994.

GRP in Onondaga County equaled $13.9 billion in 1994 in 1992 United States dollars; by comparison, United States GDP in 1993 was about $6.2 trillion. Although GRP is only about 61 percent of total output, GRP and output tend to move quite closely. Both increased at about the same annual average growth rate over the period 1969-1994, so it does not appear that the choice between GRP and total output will have much effect on the evaluation of a particular lake remediation policy.

The same conclusion holds true if one uses either of the two income measures in Table 1. Real disposable income equals total personal income earned by local residents less taxes and plus transfers; it equaled $8.49 billion in 1993 in terms of 1992 United States dollars. In per capita terms, real income in terms of 1992 US dollars was $17,948 in 1994 and more than $18,000 in 1994 current dollars. Real disposable income was about .189 of 1 percent of total United States real disposable income in 1993. Growth rates of total real disposable income and per capital income are similar to one another and to the growth rates of both total output and GRP.

The two most common measures of local economic performance relate to employment. Total employment equaled 294,880 in 1994, which was down from a peak of 307,050 in 1990, the year before the 1991-1992 recession. Private nonfarm employment, which also peaked in 1990, equaled 254,090 in 1994. Employment as a fraction of United States employment was .21 of 1 percent, which is larger than our share of the United States population and similar to our

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share of real disposable income. Note that growth rates for the employment variables are similar to one another, but they are lower than those for the other measures of aggregate activity. Employment growth rates are about 1.1-1.2 percent per year while the growth rates of output, GRP, and the income variables are 1.8-1.9 percent per year. The differences are particularly stark during 1989-1994, which includes the 1991-1992 recession. During this period private nonfarm employment declined at an average annual growth rate of -0.5 of 1 percent while the other aggregates actually increased.

Why might employment move at a different rate than total output or GRP and what difference does it make? The answer to the first question is that Onondaga County appears to be consistent with a larger trend noted by many analysts; labor productivity increased during the period so it was possible to increase output and at the same time reduce the total number of employees. Some of this increased productivity was brought about by the introduction of new capital and some by the infamous practice of "downsizing."

Why does it matter to a study of the economic impact of lake remediation projects? Since employment and total output do not always move simultaneously, policy-makers may have to choose between the two in deciding among policy options. Usually policy makers will favor employment measures. They do so for several reasons. First, they hope that the new employment will accrue to local residents. In fact, most economists believe that most new jobs ultimately accrue to new residents, although there is some evidence that local residents obtain some advantages (Bartik 1991). Second, a larger employment base usually increases the demand and, hence, the value of property, so land owners naturally prefer such policies. Third, small businesses that provide food, entertainment, and other types of locally produced goods and services usually benefit from higher employment levels because the new employees represent new

customers. As a consequence, focusing upon higher employment levels may be a perfectly

legitimate policy under certain circumstances; however, too much emphasis on short-term gains in

employment may be short-sighted if such emphasis makes local exporting firms less competitive in

the broader economy and less able to maintain or increase their payrolls in the longer run. Our

analysis will seek to highlight the tradeoffs that may exist among the specific policy alternatives to

be evaluated.

Question 2: How Has the Composition of Output and Employment Changed?

The general issue examined in this section is the composition of employment and output.

Which sectors have grown and which have declined? Do employment and output measures vary

substantially among sectors? To answer these questions output and employment trends among

four major sectors of the private nonfarm economy are examined: manufacturing (durables and

nondurables); services, trade (retail and wholesale); and all other sectors of private nonfarm. The

data are included in Table 2 for the 1969-1994 period. All are drawn from the REMI data base.

First, the manufacturing sector is still the dominant sector in terms of output, but its share

of total output and private nonfarm employment has declined substantially. Output by

manufacturers of durable and nondurable goods equaled $7.87 billion (in 1992 dollars), which

was 35 percent of total output of the county in 1994. Though still substantial, manufacturing is

far less important in terms of total output than it was in 1969. At that time the manufacturing

sector produced 41 percent of all output in Onondaga County. Employment in manufacturing and

manufacturing's share of total employment have also declined substantially. Employment in the

manufacturing sector has declined from 58,670 in 1969 to less than 36,000 in 1994. The average

annual rate of decline is -1.9 percent; the decline has been particularly sharp since 1989 (-3.6

percent).

Second, the services sector has risen dramatically and is now the dominant sector in terms of employment. Over 36 percent of total nonfarm private employment is in the services sector, up from 20 percent in 1969. The annual rate of growth of employment in the services sector has been 3.5 percent per year through the 1969-1994 period, which far exceeds the growth rates in the other sectors. Output in the services sector has also increased, averaging 3.7 percent per year. Even during the 1989-1994 period when employment in all other sectors declined, service employment continued to rise at more than 2.1 percent per year.

These two trends shed light on a question raised in the previous section: do output and employment growth usually move together? The answer is, yes, for all but the manufacturing sector in Onondaga County. The trends in the manufacturing sector drive home a potentially valuable lesson to policy-makers: focusing solely upon trends in total employment, especially in the manufacturing sector, may be a misleading indicator of the strength of the local economy.

Question 3: What Are the Major Sources of Imports and Exports and How Have Trade Patterns Changed?

Economic development policies often stress the need to stimulate export oriented businesses. These exports can be from Onondaga County to the rest of the MSA, the rest of the state, the rest of the nation, or the rest of the world. Alternatively, economic development policies encourage local consumers and businesses to "buy locally" and to substitute locally produced goods for goods imported from outside the local economy. Unfortunately, the efficacy of these policies is difficult to measure because export and import data at the local level are generally unavailable. The REMI model recognizes the potentially important role played by imports and exports. The model includes an elaborate set of steps to estimate data series on exports and imports by industry and to incorporate features within the model to capture their impacts on the local economy. A description of the import and export sectors within the REMI

model is contained in the appendix. Here attention is focused on the interpretation of the export and import data.

The distribution of exports from Onondaga County to three other regions and the distribution of imports to Onondaga County from these other regions are presented in Table 3. Total exports in 1994 (in 1992$) equal about $8.54 billion. A small fraction goes from the county to the rest of the MSA; the bulk of exports are split between the rest of the state and the rest of the country and world. Note that exports to the rest of the MSA are down sharply in the past six years. In 1994, imports exceed exports by about $1.9 billion, but the source of the imports is similar to the distribution of the exports. The trade gap has declined in recent years due to an increase in exports, especially to places outside New York State.

The primary determinants of imports are the regional purchase coefficients (R); estimates of these by industry and the average among all industries are reported in Table 4. Overall, the share of Onondaga County output purchased locally has increased. This would seem to be consistent with the story from Table 3; however, the regional purchasing coefficients for the four industry categories show little change. This occurs because the composition of output has also changed during this time period. The share of output generated by the manufacturing sector, with a small R, has declined in favor of the service sector, which has a larger regional purchasing coefficient.

Net exports (exports - imports) for Onondaga County relative to its GRP are reported for the four industry types in Table 5. Onondaga County continues to run a substantial trade deficit equal to about 15 percent of GRP, although the deficit has declined in recent years. The pattern is consistent with the trend toward increasing activity in the service sector and the declining importance of manufacturing. Service sector employment tends to be less export oriented

because included in this sector are the many aspects of the economy that provide services to local residents.

The importance and distribution of exports are also highlighted in Table 6, which shows the employment attributed to exports for all industries and the four sectors we highlight. Over 68,000 jobs are directly linked to exports. Greater than 24,000 jobs are associated with exports from the manufacturing sector; this represents about one third of export related employment and about 10 percent of all employment in the county. Note, however, that manufacturing's share of export oriented employment is down considerably from earlier years.

Question 4:   How Has the Value of Real Estate Changed?

An important measure of the strength of an economy is its wealth; a critical component of wealth is the value of real estate. Two data series are examined in this section to shed light on movements in the value of real estate in Onondaga County. The first is the value of all real estate subject to the property tax. This series is compiled each year by the New York State Board of Equalization. It is intended to estimate the market value of all real estate subject to the property tax. The second is a price index of single-family owner-occupied housing. This index is compiled from the joint Fannie Mae-Freddie Mac data base. It is a weighted repeat sales index that tracks changes in the sales prices of the same houses over time. Any house purchased at least twice with a mortgage that has been purchased by either Fannie Mae or Freddie Mac is represented in the data base. The index is converted to dollars by multiplying the base year of the index (1987) by the median sales price of existing housing sold in the Syracuse metropolitan area in 1987 as reported by the National Association of Realtors. Both series are reported in Table 7.

The total value of real estate subject to the property tax was $15.7 billion in 1994, the last year for which data are available. This amounts to about $33,000 per person. The value in 1994

is nearly four times the value of the property in 1977 and has grown at 7.7 percent per year during the period. The growth was especially strong during the period 1988 to 1992, averaging over 13 percent per year. During this period the market value of real estate is estimated to have risen by $6.1 billion, which is 50 percent larger than the increase in the previous eleven years.

The growth in the value of the real estate is driven by two factors. The first is the movement in the price of a standard bundle of real estate, which we refer to as the asset price of real estate; the second is the quantity of real estate, which includes the size of the property and its characteristics. The value of real estate is the product of the asset price and the quantity of real estate and is analogous to the value of a stock portfolio, which equals the price per share times the number of shares. Although an index of the asset price of all real estate akin to a price of a particular stock is not available, an index of the asset price of owner-occupied housing price is available. Furthermore, the index of the asset price of housing probably gives a good indication of trends in the asset price of real estate for a couple of reasons. First, owner-occupied housing represents a substantial portion of all real estate; and, second, competition among sectors of the real estate market tend to produce similar movements in the price of real estate among its various subsectors over the long-run.

A comparison of the housing price index to movements in the market value of real estate indicates that housing price appreciation explains only about two-thirds of the increase, 5.3 percent per year versus 7.7 percent. The gap between housing price appreciation is most stark between 1989 and 1993 when housing prices barely moved while the estimated market value of all taxable real estate increased by 8.6 percent per year.

Assuming that the two indexes provide accurate estimates of what they attempt to measure, the most obvious explanation for the divergence is that the quantity of real estate may

have increased during the period. This may have arisen from additional housing construction and new nonresidential construction; however, keep in mind that total population changed very little over the period and total employment grew relatively slowly as well. Another possibility is that the fraction of real estate subject to the property tax increased during this period, although many governments seem to be complaining these days of the high proportion of property within their borders that are tax-exempt. Of course, another possibility is that either the index of the market value of real estate or housing prices may be biased. These are interesting questions worthy of additional research, but they are beyond the scope of this particular research project.

Question 5:   What Are the Primary Factors that Drive the Onondaga County Economy?

The discussion thus far has been largely descriptive of the Onondaga County economy. Now attention shifts to the driving forces of the Onondaga County economy. Three sets of factors are highlighted. The first includes the economies of New York State and the United States. We are interested in the relationships among these three economies. The second focuses upon the factors that influence the demand for labor in Onondaga County. These are largely driven by the relative cost of labor, capital, and fuel and the relative productivity of labor in the Onondaga County economy. The third part examines the factors that affect the supply of labor to Onondaga County. Labor supply depends upon the real after tax wage earned by labor, employment opportunities, and the industry mix within the economy. Each is discussed in turn.

Factor Number One: The External Economy.   Onondaga County operates within a larger state, national, and even world economy. The county's economy is surely related to these larger economies; the issue is the stability and the magnitude of the relationships. Of particular importance are the relationships among the local, state, and national economies. It is surely true that an increase in the growth rate of the national economy, all else equal, increases the

demand for goods and services produced in the local economy and exported to the rest of the country. For example, an increase in the national economy increases the demand for air conditioners and automobiles, all else equal, which increases the demand for the products produced by the Carrier Corporation and Chrysler Corporation plants located in Syracuse. Furthermore, the greater is the importance of such manufacturing firms to our local economy, the stronger is the relationship between the local and the national economies. For example, the more dependent our local economy is upon export oriented firms like Carrier and Chrysler, the more responsive our economy will be to surges in the United States economy. Alternatively, the more dependent our economy is upon services, trade, and government employment, sectors that are less oriented to export production, the less dependent the local economy is to surges in the national economy. Similar statements apply to the relationship between the local economy and the New York State economy given our proximity to the rest of the state.

Table 8 describes employment, population and real disposable income in Onondaga county as a percentage of the United States. As we mentioned earlier, these percentages are generally less than 0.20 of 1 percent which indicates that Onondaga county is very small relative to the national economy as a whole. While Table 8 shows that Onondaga County has always been small relative to the United States, it also indicates that the county is smaller relative to the United States than it was in 1969. In 1969, employment, population and real disposable income were all greater than 0.20 of 1 percent of the national value. Since 1969, there has been a general decline in these statistics relative to the nation with the trend being most observable in the values of population and real disposable income. While this seems to support the conclusion that Onondaga County is very closely bound to the United States, it does not elaborate on the larger

question of the degree of the relationship of Onondaga county to the United States. In order to better address the question of degree, we employ some very simple statistical analysis.

We first determine the correlation between the levels of employment, population and real disposable income in Onondaga County over the period 1969-1994 to the levels for the same variables over the same period for the United States as a whole. The general expectation is that, based upon the values in Table 8, Onondaga county and the United States should be very highly correlated. For employment and real disposable income, this expectation is correct as the correlations between Onondaga County and the United States are 0.98 and 0.99 respectively.[2] These values indicate that employment and real disposable income in the county are almost perfectly correlated with the nation. However, population in Onondaga County and population in the United States are not highly correlated and in fact, are not closely correlated at all. The correlation between the two is 0.24.

To take this analysis one step further, we perform a simple regression analysis to determine how much of the change in employment, population and real disposable income is attributable to changes in the value for each in the United States as a whole. Our expectation is that a large portion of the changes in employment and real disposable income should be explained by changes in the national value. Based upon the results of the correlations, we expect that less of the changes in population in Onondaga County will be attributable to changes in the United States' population. These expectations were confirmed with the regression analysis, the results of which are in Table 8A. Over 95 percent of changes in employment in Onondaga County are explained by changes in the national level of employment, while almost 99 percent of changes in real disposable income in the county are explained by the national value. The explanatory power of these simple regressions documents the fact that growth in the local employment and real

disposable income is quite closely tied to movements of the national economy. Population, however, is not as closely tied to movements in the national population. Less than 1 percent of the variation in population in Onondaga county can be explained by population in the United States. In general, however, these results confirm the expectations that the local economy is strongly tied to the national economy. The results of this analysis are presented in Table 8A.

Table 8A. Relationship between Employment, Population, and Real Disposable Income in Onondaga County and the United States			
	Employment	Population	Real Disposable Income
Correlation between Onondaga County and the United States	0.98	0.21	0.99
Percentage of Variation in Onondaga County Explainable by the United States (in percent)	95.9	0.61	98.9

Factor Number Two: Relative Profitability of National Industries.   A second set of factors depends upon the profitability of doing business in Onondaga County relative to other parts of the country. The greater the opportunity for a firm to be profitable in Onondaga County, the more likely it will locate in the county, all else equal. The REMI model offers insights about the relative profitability of an important class of firms, which it labels as national industries. In our particular version of the REMI model, these are represented by manufacturing firms that produce durable and nondurable goods and services. A brief explanation of the derivation of relative profitability in the REMI model, its role in the REMI model, and recent trends in the measures of relative profitability and its components are reviewed in this section.

The computation of relative profitability for what REMI refers to as national or export oriented firms begins with the observation that the price received by export oriented firms for their products are largely determined by the global market for their products. As such, the

relative profitability of a particular national industry in a particular location is driven by the cost of

doing business in the location relative to other locations because the price they receive for their

output is independent of the location of the industry. For example, the price that the Carrier

Corporation receives for a new air conditioner is independent of where it manufactures the air

conditioners; so the reason for choosing to produce within Onondaga County is dictated by the

cost of doing business here versus other parts of the country. The REMI model includes a

measure of the relative profitability of doing business in Onondaga County for the two

manufacturing industries; the index of relative profitability depends upon the cost of labor, the

cost of capital, the cost of fuel costs, and the relative productivity of local workers relative to

workers in the rest of the country.

Relative profitability plays an important role in the REMI model. An increase in the cost

of business in industry i in a particular region decreases the relative profitability of that industry in

that location. This decline in relative profitability then reduces both the share of exports from the

region and the regional purchasing coefficient for the industry in that location. The size of these

responses has been estimated by REMI. The elasticity of both the export share and the import

share with respect to a moving average of relative profitability is 1.83. That is, a 10 percent

increase in the cost of doing business, reduces the shares of exports and imports by 18.3 percent.

The reductions in the export share and the regional purchasing coefficient then have negative

multiplier effects on the rest of the economy, which REMI tries to measure.

The REMI estimates of the relative profitability for both the durable and the nondurables

goods producing industries and their components are presented in Table 9 for the period 1969-

1994. Several patterns emerge from a review of these data. First, Onondaga County has been

and remains a relatively profitable place in which to do business. The index for durable goods

was 1.11 in 1994, which is about where it has stood over the 25 year period. The advantage of the local economy in the production of nondurable goods is lower at 1.01, but the relative profitability index for nondurables has increased steadily during the period. Second, the reason for a favorable relative profitability measure is the productivity of labor. Local labor productivity is estimated via the REMI model to be 30 percent higher in the durable goods industry than the national average and 11 percent above average in the nondurable goods industry. This higher than average productivity more than offsets the fact that total factor costs, including labor, are slightly above the national average.[3]

The third pattern is a disturbing one; fuel costs rose steeply during the 1989-1994 period relative to the national average. The average annual growth rate in local fuel prices during this period was nearly 2 percent above the national average annual growth rate. Although the share of total costs attributable to fuel are typically small and vary among industries, the trend does suggest that relatively energy intensive firms find Onondaga County less attractive than they did historically. More generally, such a trend would seem to increase the cost of coping with the relatively harsh winters experienced in upstate New York.

The REMI estimates for fuel costs are not derived from data for Onondaga County. They are based upon data for New York State; however, the trends are consistent with anecdotal evidence with which we are familiar. In an effort to identify more accurately movements in the cost of fuel within the county, data were obtained from Niagara Mohawk. The average price of electricity (cents per kilowatt hour) for the period 1977-1995 is presented in Table 10 for three classifications of users: household; commercial; and, industrial. These data show a rather steady pattern of price increase; growth rates thru 1989 were between 6 and 7 percent per year. The most rapid period of acceleration in local prices actually occurred during the late 1970s and early

1980s, but this was also the period in which utility costs rose substantially all across the nation due to the two major oil crises. After a pause in the mid-1980s, the rate of increase in electric prices in Onondaga County has resumed to its earlier levels. Prices are over 50 percent higher in Onondaga County in 1995 than they were in the late 1980s. Data provided by Niagara Mohawk about the price of natural gas shows a similar pattern. These prices rose by one-third more than the United States average between 1988 and 1995 (3.00 percent a year versus 2.26 percent per year). The rise in local natural gas prices between 1993 and 1995 exceeded the growth in United States gas prices by nearly 75 percent (1.91 percent per year versus 1.10 percent per year).

Factor Number Three: Migration and the Supply of Labor. Migration in the REMI model is the key to the analysis of changes in the population and labor supply of a particular region. There are four types of migration in the REMI model: international migration, migration of retirees, migration of former military personnel and their dependents and economic migration. International migrants are noncitizens of various ages who were born outside the United States and enter the country. Retirees are those people who are over the age of 65, regardless of their actual employment status. Former military personnel and their dependents are those people of any age who have not been a civilian for more than a year. These three types of migration are largely determined by factors outside of or exogenous to the model and are generally unaffected by policy simulations of the type planned for this study.

The main way to change population and labor supply in a region is through economic migration. Economic migrants are those people under age 65 who have been civilians for more than a year. The flow of economic migrants into or out of a region is assumed to be dependent upon the economic conditions in the region relative to other areas and the relative level of amenities in the region relative to others. Economic conditions include expected wages and the

probability of employment. Amenity levels include the quality of the environment or other aspects of the quality of life that may lead someone to alter his or her willingness to reside in a particular region. For example, people are assumed to be willing to accept a lower wage to live in an environment with better weather and cleaner air than they would require for a region with worse weather and more pollution *holding all other factors constant*.

Annual data regarding the flow of economic migrants into a local economy are not tabulated by the federal government; however, REMI uses a reasonable procedure to estimate the size of this population. It begins by using the BEA estimate of population as the known population for the year. REMI determines economic migration by finding the difference between this known population and what is estimated to be the population for the year without economic migration. The REMI estimate of what it believes population to be in that year is the total population of an area at the beginning of the year plus births and less deaths. Estimates of the number of births and deaths can be made given information about the age distribution of the population. The other three components of migration, international migrants, retired migrants, and returning military personnel, are then subtracted from the REMI estimate of population. These components are estimated using recent trends. The next step is to subtract out total military personnel and their dependents and what is referred to as the "special population" which would include people that would not get counted in any other measures such as those that are institutionalized. Before 1980, the United States Census Undercount, which corrects for mistakes made in the Census figures before 1980, must also be subtracted. The final component to be subtracted is the residual adjustment which is created by REMI to correct for some estimation error.

The REMI model also includes an equation that explains future changes in the number of economic migrants. These changes depend upon changes in three measures of economic conditions: relative real wages (*RWR*); relative employment opportunity (*REO*); and relative industrial mix (*RWM*). The changes also depend upon changes in the level of amenities available in the area such as might be brought about by a major improvement or reduction in the quality of the environment.

This function is represented in REMI by the following equation:

$$NECM_t = \ln \lambda_k + \sum_{j=1}^{3} \delta_j \ln REO_{t+1-j} + \sum_{j=4}^{6} \delta_j \ln RWR_{t+1-j} + \sum_{j=7}^{9} \delta_j \ln RWM_{t+1-j}$$

$NECM_t$ is the ratio of economic migration to the natural labor force of the region, λ_k and the δ_j are the parameters of the model. *REO* is real economic opportunity, the relative probability of getting a job in the region relative to getting a job in the United States as a whole. As *REO* increases, the probability of getting a job in the region increases relative to the United States. This has a positive effect on economic migration because migration into the area will increase as people seek out increased opportunities of employment. *RWR* is the real, after-tax wage, relative to the United States and which is independent of regional industrial mix. The relationship between economic migration and *RWR* is positive. As the wage in a region increases relative to the United States, people will come to the area seeking out a better economic life through a job with a higher real wage. *RWM* is the relative wage mix of high-paying jobs to low-paying jobs, the wage in a region accounting for regional industrial mix relative to the same for the United States. *RWM* also exerts a positive influence on economic migration because as *RWM* increases, there has been an increase in the mix of high-paying jobs to low-paying jobs. This increase will make the

region more attractive to economic migrants looking for better economic opportunities and specifically, a better chance at getting a higher paying job.

The coefficients of the economic variables (the δ_j parameters) in the equation explain the responsiveness of economic migration to changes in the labor market conditions noted above. They have been estimated using historical data for regions all over the country; these parameters are the same for all versions of the REMI model. The constant term in this model, $\ln \lambda_k$, is designed to measure the value of the amenities in the region relative to the United States. This term represents the quality of life of a region as it compares to the United States. An increase in this term will cause an increase in economic migration as people seek out a better quality of life. This parameter varies among economic regions; for example, a specific parameter has been estimated by REMI for Onondaga County. It is held constant for any forecast unless a specific policy scenario is hypothesized to alter its value.[4]

Once estimated the full equation serves as a tool with which to estimate the importance of a particular environmental improvement; more specifically, the REMI model reports the wage premium or discount workers require to live and work in a particular region.[5] This is known within the REMI model as the compensating differential. It explains the amenity value of the region in terms of a relative, real wage and represents the amount by which the real wage needs to be above or below the national average in order to keep people from migrating into or out of the area. If the compensating differential is equal to one, then the area has the same amenity values as the national average and no one will be motivated to move for economic reasons. If the area is amenity poor and the quality of life is lower relative to the national average, then the compensating differential is greater than one and vice versa. The compensating differential minus

unity can be viewed as the percentage premium or discount workers need in order to be attracted to a particular region. It will play a critical role in our analysis of the lake remediation plans.

Migration in Onondaga County. The regional constant for Onondaga County is -0.0592, which implies a compensating differential of 1.183. Workers in Onondaga County require an 18.3 percent wage premium above the national average wage rate in order to live in the county. Recall this is the real after-tax wage, which adjusts for both the local tax burden and for variations in the cost of living over time and relative to the rest of the country. Other interesting aspects of economic migration to and from Onondaga County include the size and rate of economic migration as well as the movements in the economic determinants of such migration; movements in RWR and REO are particularly important to note. This information is included in two tables. Table 11 contains information about population and the its components; it is designed to see the manner in which economic migration is computed within the REMI model. Table 12 contains the factors used in the REMI econometric model to explain economic migration over time and the number predicted by the REMI migration equation for Onondaga County.

Consider the size and rate of economic migration affecting Onondaga County. Outmigration is the norm. The average annual number of economic migrants is estimated to be 4,376 during the 1971-1994 period. The size of the outmigration was larger in the 1971-1977 period than in the 1977-1989 period and the average amount during the 1989-1994 period. The rate of outmigration (migrants/population) over the entire period is -1.0 percent. After some decline from the mid-1970s to the mid-1980s, it has returned to the rates observed through much of the early 1970s.

What causes the outmigration? The two main factors at work in Onondaga County, according to the REMI model, are relative economic opportunity (*REO*) and the relative real

wage (*RWR*). *RWR* is 1.11, which means that real after-tax wages are 11 percent above the national average; however, the amount is below the 18.3 percent premium predicted by the REMI model to generate zero outmigration. *REO* has also contributed to the outmigration. *REO* increased steadily thru the 1980s and peaked in 1990; however, it has declined since then. As long as *REO* is at or below unity and *RWR* is below the compensating differential (18.3 percent), outmigration can be expected to continue.

A REMI-Based Forecast of the Onondaga County Economy

The purpose of this section is to present and analyze REMI based forecasts of the Onondaga County economy. The forecast actually begins in 1995 because the primary data underlying the REMI model (BEA data) are available only through 1994. Annual forecasts extend to 2035. Forecasts are available for all of the variables for which historical information is provided, although our attention focuses on the aggregate measures presented in Tables 1 and those other variables that shed light on the predicted future trends in the local economy.

The REMI forecast, like any forecast, is based upon two fundamental information sets. The first is the model itself. The second includes information about the exogenous variables that drive the model. The REMI forecast is primarily based on the moderate forecast produced by the Bureau of Labor Statistics (BLS) American Workforce: 1992-2005 projections (Bureau of Labor Statistics 1993). For years after 2005 the BLS moderate-growth labor force participation rates and the Census Bureau's middle population projections for the United States are used to forecast the labor force. Short-run adjustments are also made using the latest short-term forecast from the University of Michigan's Research Seminar in Quantitative Economics.

Our discussion of the forecast begins with a review of the predictions from the baseline REMI forecast for the primary economic aggregates. Then the driving forces underlying the forecasts are reviewed; as noted above, these include the United States economy, the relative profitability of local firms, and the incentives for economic migration.

Baseline REMI Forecast

Several patterns emerge from the baseline forecast presented in Table 13. First, the remainder of the 1990s is predicted to be an improvement over the first part of the decade. Output and GRP are estimated to grow beyond 2 percent per year through the rest of decade. Employment also is also expected to grow by at least 1 percent per year on average, which is surely an improvement over the employment declines noted in the early part of the decade. Real disposable income grows slightly less than output and GRP; growth in real disposable income per capita also exceeds that for employment

Second, the long-term forecast is less rosy. Growth rates for each of the aggregate measures of economic activity are predicted to decline beyond the year 2000. Furthermore, growth rates are lower beyond 2010 than they are for the first decade of the 21st century. The first decade is roughly comparable to the average experience of the 1969-1989 period, but growth rates beyond 2010 are substantially lower than that historical experience.

Third, the trend toward more services related employment and less manufacturing employment is expected to continue. This conclusion is evident in Table 14, which includes the forecasts and annual expected growth rates for both output and employment in four industry categories. Some modest manufacturing employment gains are noted in 1995 as the economy is predicted to recover from the 1991-1992 recession, but the long-run forecast for manufacturing is a continuation of the same steady decline experienced in the 1969-1994 period. Manufacturing

employment declines by -0.8 percent per year between 1995-2000 and even more so beyond the year 2000. Manufacturing output, on the other hand, is projected to grow, which reflects the assumption of continued improvements in labor productivity and capital investment per employee. In fact, the projected growth rates exceed the experience of the 1969-1994 period. Services employment is also predicted to grow steadily; by the year 2035 nearly 50 percent of all employment is slated to be in the services industry.

Factors that Affect the Forecast

Forecasts of the Onondaga County economy are driven by three sets of factors. The first is the United States economy. Indeed, as noted on the bottom portion of Table 13, the REMI forecasts for Onondaga County for the period 1995-2005 are similar to the BLS forecasts for the same period. Local GRP is forecast to increase by 1.9 percent per year on average between 1995 and 2005. The Bureau of Labor Statistics, on the other hand, forecasts that the national GRP will increase by 2.3 percent per year on average over the same period. Measures of income and employment growth for Onondaga County are estimated by REMI to move at rates quite similar to those estimated by BLS for the United States. The dependence of the local economy on the national economy is an important feature of the REMI model to keep in mind; less optimistic forecasts for the United States economy will produce less optimistic predictions for the local economy; the opposite holds as well.

A second potentially important determinant of the future of the local economy is the relative profitability of local firms active in the production of exports. Only modest changes in the relative profitability of these firms is forecast (Table 15), which is partially a result of the design of the REMI model. For example, fuel costs are not endogenous and productivity is largely dictated by the long-run BLS forecasts about worker productivity. Similarly, the cost of capital does not

change much because the baseline forecast does not include changes in the rate of interest or in the taxation of capital. The only component that shows any significant change is labor costs. They are estimated to grow more rapidly than the national average, but the growth is small and has little impact on relatively profitability. Without a substantial improvement in the relative profitability of these firms, the demand for labor will change very little.

The third factor pertains to changes in the population, most notably those stemming from changes in the rate of economic migration. Economic migration is the primary cause of year-to-year changes in the supply of labor available to Onondaga County. Out-migration is slated to continue through the entire forecast period (Table 16). The outflow is in approximately 3,400 people per year in the late 1990s, which represents a decline in the labor force of about -0.6 percent per year. The forecast of outmigration actually shows an increase in the first part of the next decade. The modest decline in the economic migration is the primary reason that the relative employment rate (*REO*) shows some modest improvement in the late 1990s and that the cost of labor increases during the forecast period. However, absent a substantial rise in the relative wage rate (*RWR*) or a larger increase in *REO*, outmigration will continue. Changes will only occur if the demand for labor increases substantially, and the forecast reveals little likelihood of this occurring.

Population is expected to grow only slightly. The expected growth rate is 0.3 of 1 percent per year until 2010; population increases by about 22,000 by 2010. Beyond 2010, population growth is even slower. Population is the only measure slated to grow at a substantially slower rate than the United States. Population growth for Onondaga County is estimated to be about 0.3 of 1 percent per year during the 1994-2005 period while United States population growth is estimated to be 0.8 percent per year.

Conclusions

The primary purpose of this paper is to review the recent historical experience of the

Onondaga County economy and to provide a long-run forecast. Heavy reliance is placed upon

the REMI model. This model is an integral part of our approach and aspects of the model are

described throughout the paper.

Highlights of the Review

The discussion of the recent history of the economy is organized around five questions:

1. **Do Alternative Measures of Local Economic Performance Always Move in the Same Direction?** The answer to this question is, no. Output, gross regional product (GRP), and real income do tend to move closely together, but employment measures sometimes do not. For example, employment has declined substantially in recent years as total output increased. This is an important issue because policy-makers may have to decide which among the various output measures best summarizes the economic impact of various lake remediation strategies.

2. **How Has the Composition of Output and Employment Changed?** Like many parts of the Northeast and the rest of the rustbelt, Onondaga County has experienced substantial declines in manufacturing employment and substantial increases in employment in the services industry. Output in both sectors has continued to increase owing to the improvements in the productivity of labor, especially in the manufacturing industries.

3. **What Are the Major Sources of Imports and Exports and How Have Trade Patterns Changed?** The average regional purchasing coefficient for the entire economy has increased slightly even though the regional purchasing coefficients among the major industrial sectors have changed relatively little in either direction. This paradox is explained by the previous point: the composition of the economy has moved away from manufacturing industry, which has relatively low regional purchasing coefficients, toward services, which has relatively higher regional purchasing coefficients. Exports have increased, but the trade gap (exports minus imports) remains substantial.

4. **How Has the Value of Real Estate Changed?** Two different series are reviewed in order to answer this question. The market value of all real estate subject to the property tax, as estimated by New York state, shows considerable increase in the recent past. This contrasts markedly with movements in the price of owner-occupied

housing over the same period. For example, movements in housing prices were quite small between 1989 and 1993 while the value of all taxable real estate increased by 8.6 percent per year over the same period.

5. **What Are the Primary Factors that Drive the Onondaga County Economy?**
Three sets of factors are discussed. The first is the external economy. Although the national economy still exhibits a positive influence on the local economy, its share of United States activity has declined from 0.245 to 0.200 of the national economy during the past 25 years. The second is the profitability of local firms relative to national averages as estimated by the REMI model. Owing to the relative productivity of the local labor force, the profitability of local firms is close to or slightly above the national average. The only clear outlier is the cost of fuel, which is much higher here than in other parts of the country. Third, migration patterns play a major role in the local supply of labor. Outmigration has been the rule rather than the exception for the past 20 years or so. It appears that, on average, both the real after-tax wage available to workers and employment opportunities are lower here than elsewhere in the country, on average. According to the REMI estimates, workers require an 18.3 percent higher real after-tax wage to reside in Onondaga County; unfortunately, the current differential is less than this, which suggests that outmigration will remain the norm.

Forecasts

The baseline REMI forecast suggests that the remainder of the 1990s will be relatively prosperous compared to the early 1990s. Real income growth is predicted to be about 2 percent per year more than twice the rate of growth during the early 1990s. Total nonfarm private employment growth averages over percent per year in the late 1990s, but grows less rapidly than the rest of the nation. The total level of employment reaches the level attained prior to the 1991-1992 recession by the end of the decade.

The long-run prospects for the economy are less sanguine. The growth rate in private employment averages about 0.6 of 1 percent and per year during the first decade of the 21st century. This is about half the growth rate experienced in Onondaga County between 1969-1994 and half the national growth rate predicted by the Bureau of Labor Statistics for the period 1994-

2005. A similar pattern emerges for real disposable income. Population growth maintains a

growth rate of 0.3 of 1 percent per year for the forecast period.

Appendix
Modeling Exports and Imports in the REMI Model

Imports and exports within the REMI model are determined by a mixture of econometrically estimated parameters and REMI predicted variables. Regions import and export to other regions in the model as well as to the rest of the United States and the rest of the world. Our particular model is a three area model, which allows trade flows to be modeled within three areas of the state: Onondaga County, the rest of the Syracuse Metropolitan Area (Cayuga, Madison, Oswego Counties), and the rest of New York State.

The REMI model includes two critical but reasonable assumptions regarding the nature of trade: i) trade is open among all regions within the model; and, ii) household consumption patterns are identical among regions. Another critical assumption is the distinction between national industries and regional industries. National industries mainly produce in order to sell their output outside the region; the markets in which they participate are highly competitive and the price at which they can sell their output is fixed by national and international competitive. These national industries become more profitable and productive if their costs can be reduced. Regional industries are primarily in the business of supplying goods and services to firms and consumers within the region. They have some freedom to "set prices" based on costs within the region.

Imports

The first step in understanding either imports or exports is understanding how output within a region is determined. The basic equation for determining output for industry *i* is:

$$Q_i = R_i^* D_i + S_{ui}^* XFG_{ui} \tag{A-1}$$

where R_i is the regional purchase coefficient and represents the proportion of local demand supplied locally by the industry; S_{ui} is the regional share of interregional and international trade for the industry and XFG_{ui} is the level of interregional and trade in the United States and international trade. The imports into the area for this industry can be explained simply as that which is demanded by the industry which is not locally supplied:

$$M_i = 1 - R_{hi}^{*} D_i, \qquad\qquad\qquad \textbf{(A-2)}$$

where R_{hi} is the local demand supplied locally by all industries. It is clear that understanding imports within the REMI model requires an understanding of R, the regional purchase coefficient, which measures the proportion of local demand supplied locally.

The R for national industries is a function of relative profitability, regional purchase coefficients for the United States and industry mix. The more profitable the national industry is within a region, the more firms of that type can be expected to move to that region and increase output within that region for both local and national markets. The regional purchase coefficients for the United States determine the share of United States demand met by domestic versus imported products. The more the United States imports to meet demand, the less United States firms will be producing. Finally, if an industry within a region is growing relative to national growth in that industry, that region's share of output in that industry should increase. The R for a particular local industry is determined as a function of regional GRP relative to the United States (both current and lagged one period) and relative sales price. A higher level of current GRP should mean a higher level of regional supply while a higher relative price should decrease the R.

Exports

Exports within the REMI model follow directly from the discussion on imports. Exports from region k to another area depend upon the amount of imports demanded by the area and the share of these imports that can be supplied by industries from area k; that is,

$$XFG_i = S_i^* XFG_{ui} \qquad \textbf{(A-3)}$$

where S_i is the share of imports into other areas by the ith industry and XFG_{ui} is the amount of imports from the ith industry demanded in all other regions. As the regional supply coefficient, R, is the key to understanding imports, S, the export share, is the key to understanding the export side of the equation for exports. For the national industries, S is again a function of relative profitability and industry mix. For the local industries, S, is merely a function of relative price. The logic for why these are important in determining S follow from above.

Endnotes

1. A full discussion of the REMI model is presented in *Regional Economic Modeling: A Systematic Approach to Economic Forecasting and Policy Analysis*, Kluwer Academic Publishers, 1993.

2. A perfect correlation is indicated by a value of 1.00. Variables with no correlation to one another have a correlation of 0.00.

3. Although the REMI model does not identify the specific reasons for the higher than average labor productivity, the likely causes are higher than average amounts of capital per worker and a labor force with higher than average skills and education. Corroboration of the REMI estimates and the identification of the sources of the productivity advantage are important areas for further research.

4. Indeed, this parameter will be critical to our analysis of various lake remediation plans because it will be used to capture the benefits of any particular lake remediation plan.

5. It is computed as follows. Assume that the relative economic opportunity (*REO*) and relative wage mix (*RWM*) are equal to 1, then the equation becomes: $NECM = \ln \lambda_k + 0.351 \ln RWR$. In equilibrium, net economic migration is 0, so the above equation can be solved for the value of *RWR*, i.e., $RWR = e^{-\ln \lambda k / .351}$.

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Table 1.   Comparison of Various Measures of Economic Activity

Year	Output (billions of 1992 dollars)	Total GRP (billions of 1992 dollars)	Total Employment (thousands)	Total Private Non-Farm Employment (thousands)	Real Disposable Personal Income (billions of 1992 dollars)	Real Disposable Income Per Capita (dollars)	Population (thousands)	PCE Price Index
1969	14.22	8.71	224.73	189.27	5.38	11,460	469.8	28.7
1970	14.13	8.72	223.21	186.13	5.57	11,773	473.1	30.0
1971	14.77	9.09	225.74	188.45	5.77	12,213	472.5	31.6
1972	15.30	9.37	228.54	191.49	5.88	12,515	469.9	32.7
1973	16.21	9.89	237.09	198.37	6.14	13,061	469.8	34.3
1974	16.10	9.88	242.06	202.26	6.11	13,031	468.6	37.6
1975	15.31	9.56	232.33	192.39	6.10	13,023	468.6	40.3
1976	15.95	9.91	233.85	195.70	6.28	13,407	468.6	42.2
1977	16.39	10.06	239.38	201.14	6.43	13,776	466.7	44.8
1978	17.28	10.58	247.85	208.76	6.61	14,203	465.6	47.6
1979	17.56	10.69	252.95	213.80	6.74	14,541	463.4	51.8
1980	17.07	10.42	250.03	210.60	6.80	14,661	463.6	57.2
1981	17.22	10.45	250.68	212.19	6.84	14,787	462.9	61.4
1982	17.04	10.37	249.06	210.83	6.87	14,836	463	65.0
1983	17.89	10.82	252.38	214.22	7.09	15,282	464.1	68.2
1984	19.49	11.61	264.06	227.00	7.61	16,313	466.8	70.5
1985	20.30	12.11	273.96	236.66	7.73	16,431	470.2	72.8
1986	20.66	12.41	278.56	240.76	8.05	17,198	467.9	74.9
1987	21.02	12.70	284.82	245.99	7.94	17,029	466.3	77.8
1988	22.18	13.40	295.12	255.55	8.09	17,214	469.8	81.3
1989	22.52	13.62	300.21	259.95	8.18	17,430	469.6	85.8
1990	22.89	13.91	307.05	265.91	8.38	17,830	469.8	90.2
1991	22.27	13.57	298.77	258.11	8.29	17,548	472.5	94.0
1992	22.58	13.72	294.64	254.33	8.43	17,790	473.9	96.5
1993	22.61	13.76	294.81	254.45	8.45	17,787	475	99.2
1994	22.73	13.86	294.88	254.09	8.49	17,948	473.3	101.4

Annual Growth Rates
(in percent)

1969 to 1977	1.8	1.8	0.8	0.8	2.2	2.3	-0.1	5.6
1977 to 1989	2.6	2.5	1.9	2.1	2.0	2.0	0.1	5.4
1989 to 1994	0.2	0.3	-0.4	-0.5	0.7	0.6	0.2	3.4
1969 to 1994	1.9	1.9	1.1	1.2	1.8	1.8	0.0	5.0

Source: REMI Output.

Table 2. Output and Employment by Selected Industries

Year	Output in Billions of 1992 Dollars				Employment in Thousands			
	Manufacturing	Services	Trade	Other	Manufacturing	Services	Trade	Other
1969	5.94	1.76	2.14	4.39	58.67	38.50	48.42	43.68
1970	5.80	1.80	2.15	4.39	54.95	38.99	48.43	43.77
1971	5.89	2.00	2.20	4.69	51.24	42.50	48.57	46.14
1972	6.08	2.06	2.33	4.84	51.28	44.06	49.54	46.62
1973	6.52	2.14	2.40	5.14	53.19	45.81	50.57	48.80
1974	6.51	2.14	2.36	5.09	53.76	47.04	52.01	49.45
1975	5.89	2.17	2.30	4.95	45.87	48.37	51.49	46.66
1976	6.05	2.26	2.48	5.16	46.79	49.39	52.82	46.70
1977	6.32	2.38	2.42	5.27	48.45	51.05	53.57	48.07
1978	6.57	2.54	2.59	5.58	50.04	53.55	55.85	49.31
1979	6.63	2.61	2.67	5.65	51.42	55.12	57.55	49.70
1980	6.49	2.65	2.54	5.39	49.79	56.40	55.88	48.54
1981	6.64	2.76	2.55	5.27	50.05	58.57	55.04	48.53
1982	6.41	2.79	2.51	5.33	46.83	59.84	55.15	49.02
1983	6.87	2.96	2.63	5.43	46.22	62.78	55.95	49.26
1984	7.64	3.23	2.85	5.78	49.25	67.81	58.44	51.50
1985	7.79	3.43	3.00	6.08	48.47	72.45	62.08	53.65
1986	7.64	3.58	3.21	6.23	45.16	75.61	64.60	55.39
1987	7.53	3.70	3.24	6.56	43.33	79.24	65.58	57.84
1988	7.87	3.95	3.38	6.98	43.97	82.52	67.46	61.60
1989	8.06	3.99	3.49	6.97	44.25	83.54	69.88	62.29
1990	7.99	4.13	3.61	7.17	42.68	87.75	72.14	63.34
1991	7.74	4.06	3.44	7.02	40.03	86.75	69.88	61.44
1992	7.92	4.25	3.40	7.01	39.17	89.24	68.08	57.84
1993	7.84	4.35	3.45	6.97	37.80	91.84	67.01	57.80
1994	7.87	4.38	3.52	6.95	36.92	93.01	67.06	57.11
			Annual Growth Rates (in percent)					
1969 to 1977	0.8	3.8	1.6	2.3	-2.4	3.5	1.3	1.2
1977 to 1989	2.0	4.3	3.0	2.3	-0.8	4.1	2.2	2.2
1989 to 1994	-0.5	1.9	0.2	-0.1	-3.6	2.1	-0.8	-1.7
1969 to 1994	1.1	3.7	2.0	1.8	-1.9	3.5	1.3	1.1

Source: REMI Output.

Table 3. Onondaga County Trade Flows
(billions of 1992 dollars)

Year	Total Exports	Exports to: Rest of Syracuse MSA	Rest of New York State	Rest of U.S. and World	Total Imports	Imports from: Rest of Syracuse MSA	Rest of New York State	Rest of U.S. and World	Exports Less Imports
1969	4.89	0.54	3.26	1.09	9.06	0.06	2.80	6.20	-4.16
1970	4.85	0.55	3.24	1.07	8.90	0.06	2.74	6.09	-4.05
1971	5.00	0.59	3.28	1.13	9.02	0.07	2.76	6.19	-4.02
1972	5.26	0.61	3.33	1.31	9.34	0.06	2.83	6.44	-4.08
1973	5.71	0.66	3.43	1.62	9.95	0.07	2.92	6.96	-4.24
1974	5.75	0.66	3.33	1.76	9.80	0.07	2.85	6.88	-4.05
1975	5.47	0.66	3.12	1.69	8.65	0.07	2.69	5.89	-3.18
1976	5.74	0.72	3.18	1.85	8.91	0.07	2.74	6.09	-3.16
1977	6.02	0.71	3.25	2.05	9.34	0.07	2.75	6.51	-3.32
1978	6.36	0.76	3.37	2.24	9.63	0.08	2.84	6.72	-3.27
1979	6.50	0.75	3.41	2.34	9.61	0.08	2.87	6.66	-3.11
1980	6.39	0.72	3.33	2.34	9.19	0.07	2.82	6.29	-2.79
1981	6.51	0.70	3.37	2.44	9.13	0.07	2.82	6.24	-2.62
1982	6.31	0.72	3.35	2.24	8.78	0.07	2.79	5.93	-2.47
1983	6.65	0.73	3.56	2.35	9.24	0.07	2.91	6.26	-2.59
1984	7.29	0.75	3.90	2.64	10.16	0.07	3.16	6.93	-2.88
1985	7.50	0.78	4.03	2.70	10.30	0.08	3.22	7.01	-2.80
1986	7.49	0.77	4.12	2.60	10.12	0.07	3.22	6.83	-2.63
1987	7.56	0.78	4.15	2.63	10.14	0.07	3.25	6.82	-2.58
1988	7.95	0.84	4.33	2.78	10.55	0.08	3.36	7.11	-2.59
1989	8.17	0.33	4.86	2.98	10.86	0.06	3.32	7.49	-2.69
1990	8.24	0.37	4.96	2.91	10.85	0.05	3.35	7.44	-2.61
1991	8.12	0.24	4.85	3.04	10.35	0.05	3.24	7.06	-2.23
1992	8.36	0.22	4.89	3.25	10.52	0.05	3.24	7.23	-2.16
1993	8.40	0.20	4.89	3.31	10.47	0.05	3.21	7.21	-2.07
1994	8.54	0.19	4.92	3.43	10.44	0.05	3.22	7.17	-1.90

Annual Growth Rates
(in percent)

1969 to 1977	2.59	3.44	-0.02	7.88	0.38	1.98	-0.19	0.62	
1977 to 1989	2.55	-6.36	3.34	3.11	1.26	-2.03	1.55	1.17	
1989 to 1994	0.90	-11.28	0.27	2.83	-0.80	-3.26	-0.59	-0.87	
1969 to 1994	2.23	-4.21	1.65	4.58	0.57	-0.99	0.56	0.58	

Source: REMI Output

Table 4. Onondaga County Aggregate RPC and by Industry

Year	Total RPC	RPC by Industry[a]			
		Manufacturing	**Services**	**Trade**	**Other**
1969	0.38	0.08	0.72	0.83	0.60
1970	0.38	0.08	0.72	0.82	0.59
1971	0.40	0.08	0.72	0.82	0.60
1972	0.40	0.08	0.71	0.81	0.59
1973	0.39	0.08	0.71	0.81	0.59
1974	0.39	0.08	0.71	0.81	0.59
1975	0.41	0.08	0.71	0.81	0.58
1976	0.41	0.08	0.71	0.81	0.57
1977	0.41	0.08	0.71	0.81	0.57
1978	0.41	0.08	0.71	0.81	0.58
1979	0.42	0.08	0.71	0.81	0.58
1980	0.42	0.08	0.71	0.81	0.58
1981	0.42	0.08	0.71	0.80	0.59
1982	0.43	0.08	0.71	0.81	0.59
1983	0.43	0.08	0.72	0.81	0.60
1984	0.43	0.08	0.72	0.81	0.61
1985	0.44	0.08	0.73	0.82	0.62
1986	0.45	0.08	0.73	0.82	0.63
1987	0.46	0.08	0.73	0.82	0.63
1988	0.46	0.08	0.73	0.82	0.64
1989	0.46	0.08	0.73	0.82	0.63
1990	0.46	0.08	0.73	0.82	0.64
1991	0.47	0.08	0.73	0.82	0.63
1992	0.46	0.08	0.73	0.81	0.63
1993	0.47	0.08	0.73	0.81	0.63
1994	0.46	0.08	0.72	0.80	0.62
Mean	0.43	0.08	0.72	0.81	0.60
Median	0.42	0.08	0.72	0.81	0.60
Maximum	0.47	0.08	0.73	0.83	0.64
Minimum	0.38	0.08	0.71	0.80	0.57

Annual Growth Rates
(in percent)

1969 to 1977	0.88	0.14	-0.22	-0.30	-0.56
1977 to 1989	0.97	-0.13	0.27	0.10	0.87
1989 to 1994	0.32	-0.95	-0.20	-0.41	-0.42
1969 to 1994	0.81	-0.21	0.02	-0.13	0.15

Source: REMI Output.

[a]The RPC for each subgroup represents the weighted average of the RPCs for specific industries within the subgroup; the weights equal the GRP of the industry relative to that for the subgroup.

Table 5.   Onondaga County Net Exports Relative to GRP

| Year | Total | By Industry[a] | | | |
		Manufacturing	Services	Trade	Other
1969	-0.57	-1.19	-0.02	0.00	-0.55
1970	-0.55	-1.16	-0.02	0.00	-0.55
1971	-0.52	-1.17	-0.02	0.00	-0.48
1972	-0.51	-1.10	-0.02	0.00	-0.51
1973	-0.50	-1.02	-0.02	0.00	-0.53
1974	-0.48	-1.03	-0.02	0.01	-0.46
1975	-0.39	-0.87	-0.02	0.01	-0.39
1976	-0.37	-0.81	-0.01	0.02	-0.39
1977	-0.38	-0.76	-0.01	0.01	-0.44
1978	-0.35	-0.70	0.00	0.02	-0.43
1979	-0.33	-0.65	0.01	0.02	-0.41
1980	-0.31	-0.61	0.01	0.03	-0.38
1981	-0.29	-0.58	0.01	0.03	-0.35
1982	-0.27	-0.57	0.02	0.03	-0.33
1983	-0.27	-0.57	0.03	0.03	-0.33
1984	-0.28	-0.61	0.03	0.02	-0.31
1985	-0.26	-0.57	0.04	0.03	-0.30
1986	-0.24	-0.55	0.04	0.03	-0.28
1987	-0.23	-0.53	0.05	0.03	-0.28
1988	-0.22	-0.51	0.06	0.03	-0.27
1989	-0.22	-0.49	0.06	0.02	-0.30
1990	-0.21	-0.49	0.07	0.03	-0.28
1991	-0.18	-0.42	0.07	0.03	-0.26
1992	-0.18	-0.39	0.07	0.03	-0.27
1993	-0.17	-0.37	0.08	0.03	-0.27
1994	-0.15	-0.33	0.08	0.03	-0.26

Source: REMI Output.

[a]Calculated as Exports(Industry)-Imports(Industry)/GRP(Industry).

Table 6. Onodaga Employment Generated by Exports

(in thousands of people)

Year	Total	By Industry			
		Manufacturing	**Services**	**Trade**	**Other**
1969	55.026	34.630	8.889	4.298	7.209
1970	53.355	32.431	9.046	4.459	7.419
1971	52.299	30.249	9.823	4.461	7.766
1972	53.902	30.712	10.390	4.775	8.025
1973	56.704	32.398	10.924	4.873	8.508
1974	58.036	33.049	11.243	5.087	8.657
1975	54.264	28.648	11.823	5.272	8.521
1976	56.066	29.556	12.132	5.557	8.821
1977	58.791	30.900	12.803	5.792	9.296
1978	61.396	32.181	13.480	6.145	9.591
1979	63.454	33.301	13.981	6.395	9.777
1980	62.847	32.355	14.458	6.283	9.752
1981	63.616	32.581	15.054	6.132	9.849
1982	61.284	30.165	15.354	5.948	9.817
1983	61.370	29.543	16.115	5.835	9.877
1984	64.771	31.422	17.298	5.860	10.191
1985	65.990	30.885	18.509	6.152	10.444
1986	65.001	28.653	19.361	6.425	10.561
1987	65.494	27.588	20.530	6.359	11.018
1988	67.503	28.087	21.278	6.519	11.618
1989	68.818	28.532	21.806	6.626	11.854
1990	69.408	27.653	22.822	6.861	12.072
1991	67.868	26.167	22.896	6.687	12.118
1992	67.771	25.821	23.786	6.620	11.544
1993	68.026	25.026	24.777	6.599	11.624
1994	68.700	24.618	25.585	6.800	11.697

Annual Growth Rates
(in percent)

1969 to 1977	0.83	-1.42	4.56	3.73	3.18
1977 to 1989	1.31	-0.66	4.44	1.12	2.03
1989 to 1994	-0.03	-2.95	3.20	0.52	-0.27
1969 to 1994	0.89	-1.37	4.23	1.84	1.94

Source: REMI Output Variables 205-214.

Table 7. Property Values and Housing Prices

Year	Total Market Value of Property (in dollars)	Annual Growth Rate (in percent)	Housing Price Index	Growth Rate (in percent)	Ratio of Growth Rates
1977	4,247,306,038		31,639		
1978	4,633,897,579	8.7	34,340	8.2	1.06
1979	5,068,146,302	9.0	39,046	12.8	0.70
1980	5,492,122,356	8.0	40,899	4.6	1.73
1981	5,962,329,657	8.2	45,309	10.2	0.80
1982	6,463,596,557	8.1	43,696	-3.6	-2.23
1983	6,511,424,585	0.7	46,067	5.3	0.14
1984	6,804,775,249	4.4	52,020	12.2	0.36
1985	7,073,124,275	3.9	57,456	9.9	0.39
1986	7,342,268,369	3.7	63,333	9.7	0.38
1987	8,031,733,691	9.0	68,900	8.4	1.07
1988	8,800,043,969	9.1	74,515	7.8	1.17
1989	10,206,339,848	14.8	77,437	3.8	3.86
1990	11,705,009,493	13.7	79,049	2.1	6.65
1991	12,865,670,232	9.5	81,963	3.6	2.61
1992	14,910,425,413	14.7	82,714	0.9	16.17
1993	15,010,118,634	0.7	81,605	-1.4	-0.49
1994	15,727,322,286	4.7	77,967	-4.6	-1.02

	Annual Growth Rates (in percent)		
1977 to 1989	7.3	7.5	
1989 to 1994	8.6	0.1	
1977 to 1994	7.7	5.3	

Source: New York State Assessor and Freddie Mac.

Table 8. **The Relationship between the Local Economy and the National Economy**

Year	Total Employment as a Percentage of the United States	Total Population as a Percentage of the United States	Real Disposable Personal Income as a Percentage of the United States
1969	0.247	0.233	0.230
1970	0.245	0.232	0.229
1971	0.247	0.229	0.228
1972	0.243	0.225	0.223
1973	0.241	0.222	0.217
1974	0.242	0.220	0.217
1975	0.235	0.218	0.213
1976	0.231	0.215	0.211
1977	0.228	0.212	0.209
1978	0.226	0.210	0.205
1979	0.224	0.206	0.204
1980	0.220	0.204	0.204
1981	0.218	0.202	0.201
1982	0.218	0.200	0.200
1983	0.218	0.199	0.201
1984	0.219	0.198	0.203
1985	0.221	0.198	0.200
1986	0.220	0.195	0.201
1987	0.219	0.192	0.196
1988	0.220	0.192	0.193
1989	0.220	0.190	0.192
1990	0.221	0.188	0.193
1991	0.217	0.187	0.190
1992	0.213	0.186	0.188
1993	0.209	0.184	0.185
1994	0.204	0.182	0.182

Source: REMI output.

Table 9. Profitability in Manufaturing Relative to Rest of United States

Year	Durable Manufacturing							Nondurable Manufacturing						
	Total Factor Costs	Labor Costs	Fuel Costs	Capital Costs	Intermediate Inputs	Factor Productivity	Index of Relative Profitability	Total Factor Costs	Labor Costs	Fuel Costs	Capital Costs	Intermediate Inputs	Factor Productivity	Index of Relative Profitability
1969	0.97	0.93	1.08	1.02	1.00	1.19	1.08	1.09	1.17	1.08	1.02	1.00	1.01	0.97
1970	0.97	0.93	1.08	1.02	1.00	1.21	1.08	1.08	1.14	1.08	1.02	1.00	1.02	0.98
1971	0.98	0.95	1.10	1.03	1.01	1.23	1.08	1.10	1.17	1.10	1.03	1.02	1.03	0.97
1972	1.00	0.97	1.10	1.03	1.01	1.22	1.07	1.12	1.22	1.10	1.03	1.01	1.05	0.97
1973	1.00	0.97	1.10	1.03	1.01	1.24	1.08	1.12	1.25	1.10	1.03	1.01	1.05	0.97
1974	1.00	0.98	1.11	1.02	1.00	1.26	1.09	1.12	1.22	1.11	1.02	1.00	1.04	0.97
1975	1.00	0.98	1.12	1.02	1.00	1.24	1.08	1.10	1.19	1.12	1.02	1.01	1.05	0.97
1976	1.01	1.01	1.06	1.01	1.00	1.23	1.08	1.12	1.26	1.06	1.01	1.01	1.02	0.96
1977	1.00	0.98	1.06	1.01	1.00	1.21	1.08	1.10	1.21	1.06	1.01	0.99	1.01	0.97
1978	1.00	0.99	1.04	1.01	0.99	1.22	1.08	1.10	1.22	1.04	1.01	0.99	1.00	0.97
1979	0.99	0.98	1.05	1.00	0.99	1.20	1.08	1.08	1.18	1.05	1.00	0.99	1.00	0.98
1980	0.99	0.98	1.01	1.00	0.99	1.19	1.08	1.07	1.17	1.01	1.00	0.98	1.01	0.99
1981	0.98	0.96	1.06	1.00	0.99	1.17	1.08	1.07	1.15	1.06	1.00	0.98	1.01	0.99
1982	0.98	0.97	1.04	1.00	0.99	1.17	1.08	1.05	1.12	1.04	1.00	0.98	1.03	1.00
1983	0.99	0.98	1.01	1.00	0.99	1.20	1.08	1.06	1.14	1.01	1.00	0.99	1.06	1.00
1984	1.00	0.99	1.05	1.00	0.99	1.21	1.09	1.08	1.17	1.05	1.00	0.99	1.08	1.01
1985	1.00	0.99	1.01	1.00	0.99	1.23	1.09	1.07	1.16	1.01	1.00	0.99	1.09	1.01
1986	1.01	1.01	1.02	1.00	0.98	1.25	1.10	1.07	1.15	1.02	1.00	0.99	1.11	1.02
1987	1.00	0.99	1.03	1.00	0.98	1.27	1.11	1.06	1.12	1.03	1.00	0.99	1.09	1.02
1988	0.98	0.97	1.05	1.00	0.98	1.28	1.11	1.06	1.13	1.05	1.00	0.99	1.11	1.03
1989	0.98	0.96	1.09	1.01	0.99	1.27	1.11	1.06	1.11	1.09	1.01	0.99	1.06	1.01
1990	0.99	0.97	1.14	1.01	0.99	1.28	1.11	1.06	1.11	1.14	1.01	0.99	1.09	1.02
1991	0.99	0.97	1.14	1.02	0.99	1.30	1.12	1.06	1.09	1.14	1.02	0.99	1.10	1.02
1992	0.99	0.96	1.18	1.02	0.99	1.30	1.12	1.07	1.11	1.18	1.02	0.99	1.11	1.02
1993	1.00	0.98	1.19	1.02	0.99	1.30	1.11	1.07	1.12	1.19	1.02	0.99	1.11	1.02
1994	1.00	0.98	1.19	1.02	0.99	1.30	1.11	1.09	1.15	1.19	1.02	0.99	1.11	1.01

Annual Growth Rates
(in percent)

Year														
1969 to 1977	0.39	0.74	-0.28	-0.08	-0.11	0.21	0.00	0.15	0.50	-0.28	-0.09	-0.13	-0.04	0.00
1977 to 1989	-0.13	-0.20	0.27	-0.01	-0.07	0.40	0.25	-0.30	-0.72	0.27	-0.01	-0.03	0.45	0.30
1989 to 1994	0.33	0.34	1.78	0.16	0.00	0.40	0.04	0.52	0.75	1.78	0.16	0.05	0.85	0.11
1969 to 1994	0.13	0.21	0.40	0.00	-0.07	0.34	0.13	0.01	-0.04	0.40	0.00	-0.05	0.37	0.17

Source: REMI Output.

Table 10.   Trends in Local Electric Rates by User Type

(cents per kilowatt hour)

Year	Residential	Commercial	Industrial
1969	2.2	1.6	0.9
1970	2.3	1.8	1.0
1971	2.4	1.9	1.1
1972	2.6	2.0	1.2
1973	2.6	2.0	1.2
1974	2.9	2.6	1.8
1975	3.4	3.1	2.4
1976	3.4	3.2	2.4
1977	3.9	3.7	2.9
1978	3.9	3.7	2.8
1979	4.3	4.3	3.4
1980	4.9	5.0	4.1
1981	5.8	6.2	5.2
1982	6.4	6.8	5.7
1983	6.9	7.1	5.8
1984	6.8	7.0	5.6
1985	7.3	7.2	5.8
1986	7.6	7.4	5.9
1987	7.7	7.3	5.7
1988	8.0	7.4	5.7
1989	8.2	7.7	5.9
1990	8.9	8.4	6.6
1991	9.6	9.0	6.9
1992	10.6	10.0	7.9
1993	11.2	10.3	7.8
1994	11.9	10.8	7.8
1995	12.1	10.7	7.4

	Annual Average Growth Rates (in percent)		
1969 to 1977	7.16	10.48	14.63
1977 to 1989	6.19	6.11	5.92
1989 to 1993	7.80	7.30	7.00
1969 to 1995	6.56	7.31	8.10

Source: Niagara Mohawk.

Table 11. Population and the Derivation of Economic Migration

Year	Total Population[a]	Population before Migration: Under 65	Population before Migration: Over 65	International Migrants	Elderly Migrants	Returning Miltary Personnel	Census Undercount	Total Military and Dependents	Total Special Population[b]	Residual Adjustment	Residual Economic Migration	Rate of Residual Migration (in percent)
	+	-	-	-	-	-	-	-	-	-	-	=
1971	472,500	418,080	44,287	2,079	205	1,835	1,202	2,771	9,478	-594	-6,842	-1.4
1972	469,900	416,897	44,716	1,680	210	870	1,114	2,516	9,163	-206	-7,060	-1.5
1973	469,800	413,916	45,405	1,684	218	759	643	2,571	8,849	-55	-4,189	-0.9
1974	468,600	413,629	45,976	1,540	227	315	581	2,465	8,535	86	-4,753	-1.0
1975	468,600	411,862	47,045	2,170	234	288	509	2,421	8,221	409	-4,559	-1.0
1976	468,600	411,479	47,696	1,594	238	42	649	2,414	7,907	414	-3,833	-0.8
1977	466,700	411,468	48,230	1,759	244	56	489	2,369	7,592	294	-5,801	-1.2
1978	465,600	408,783	49,269	2,304	246	73	554	2,264	7,278	485	-5,656	-1.2
1979	463,400	407,465	50,045	2,287	256	190	397	2,276	6,964	478	-6,958	-1.5
1980	463,600	404,616	50,827	3,016	267	-87	295	2,216	6,650	360	-4,560	-1.0
1981	462,900	404,300	51,948	2,339	273	-115	0	2,187	6,335	88	-4,455	-1.0
1982	463,000	403,368	52,649	1,990	281	-88	0	2,144	6,021	77	-3,443	-0.7
1983	464,100	402,796	53,655	2,267	290	-23	0	2,120	5,707	-116	-2,596	-0.6
1984	466,800	403,550	54,399	2,193	300	-24	0	1,696	5,393	-266	-440	-0.1
1985	470,200	405,871	55,668	2,205	309	-30	0	1,654	5,079	-63	-492	-0.1
1986	467,900	408,256	57,099	2,095	319	-48	0	1,654	4,764	19	-6,257	-1.3
1987	466,300	405,817	57,746	2,180	328	17	0	1,570	4,450	-220	-5,588	-1.2
1988	469,800	403,965	58,545	1,893	338	159	0	1,488	4,136	-31	-693	-0.1
1989	469,600	407,181	59,706	2,133	346	86	0	1,469	3,822	-633	-4,510	-1.0
1990	469,800	406,636	60,640	2,370	355	300	0	1,292	3,507	290	-5,590	-1.2
1991	472,500	406,565	61,317	2,362	364	363	0	1,390	3,507	-476	-2,892	-0.6
1992	473,900	408,430	61,963	2,957	372	787	0	1,313	3,507	-235	-5,194	-1.1
1993	475,000	409,060	62,644	2,896	381	434	0	1,257	3,507	123	-5,303	-1.1
1994	473,300	409,237	63,405	2,739	390	270	0	1,205	3,507	144	-7,597	-1.6

				Annual Growth Rates (in percent)							Annual Averages	
1971 to 1977	-0.2	-0.3	1.4	-2.8	2.9	-58.0	-15.0	-2.6	-3.7		-5,291	-1.1
1977 to 1989	0.1	-0.1	1.8	1.6	2.9	3.6	-11.6	-4.0	-5.7		-3,958	-0.9
1989 to 1994	0.2	0.1	1.2	5.0	2.4	22.8	-8.0	-4.0	-1.7		-5,181	-1.1
1971 to 1994	0.0	-0.1	1.6	1.2	2.8	-8.3	-11.3	-3.6	-4.3		-4,553	-1.0

Source: REMI Output

[a]This is the BEA estimate of population.

[b]This includes the institutionalized population in the county.

Table 12. Factors that Influence Economic Migration

Year	Predicted Economic Migration	Real Relative Wage Rate (RWR)	Relative Wage Mix (RWM)	Relative Economic Opportunity (REO)
1971	-7,112	1.052	1.026	1.019
1972	-6,287	1.067	1.026	1.015
1973	-5,814	1.070	1.024	1.016
1974	-5,055	1.077	1.025	1.024
1975	-6,586	1.071	1.014	1.006
1976	-7,687	1.078	1.013	0.996
1977	-6,249	1.087	1.016	0.999
1978	-5,341	1.095	1.018	1.001
1979	-5,271	1.097	1.020	1.003
1980	-5,789	1.100	1.021	0.994
1981	-6,710	1.092	1.021	0.993
1982	-6,178	1.096	1.023	1.001
1983	-5,001	1.103	1.027	1.003
1984	-3,403	1.127	1.028	1.004
1985	-2,887	1.125	1.025	1.013
1986	-2,111	1.139	1.021	1.018
1987	-2,307	1.126	1.016	1.023
1988	-3,621	1.111	1.016	1.023
1989	-3,227	1.113	1.013	1.029
1990	-1,743	1.118	1.010	1.041
1991	-1,729	1.127	1.010	1.025
1992	-3,073	1.115	1.011	1.021
1993	-4,936	1.103	1.011	1.012
1994	-5,635	1.110	1.011	1.000

Source: REMI Output.

Table 13. Forecasts of Various Measures of Economic Activity

Year	Output (billions of 1992 dollars)	Total GRP (billions of 1992 dollars)	Total Employment (thousands)	Total Private Non-Farm Employment (thousands)	Real Disposable Personal Income (billions of 1992 dollars)	Real Disposable Income Per Capita (1992 dollars)	Population (thousands)	PCE Price Index
1995	23.17	14.11	298.31	257.55	8.73	18,442	473.41	103.77
1996	23.75	14.43	301.18	260.74	8.95	18,873	474.23	105.85
1997	24.37	14.77	304.61	264.49	9.17	19,277	475.59	108.17
1998	24.94	15.09	307.66	267.89	9.37	19,622	477.34	110.73
1999	25.50	15.42	310.73	270.68	9.54	19,904	479.17	113.33
2000	26.07	15.76	313.73	273.41	9.71	20,179	480.96	115.97
2001	26.64	16.09	316.52	275.93	9.87	20,446	482.65	118.65
2002	27.21	16.43	319.37	278.52	10.03	20,717	484.28	121.38
2003	27.75	16.75	321.99	280.88	10.20	20,984	485.87	124.16
2004	28.28	17.07	324.32	282.96	10.35	21,240	487.31	126.98
2005	28.78	17.37	326.42	284.83	10.50	21,494	488.62	129.86
2006	29.42	17.73	328.31	286.77	10.64	21,726	489.89	132.79
2007	29.91	18.02	330.30	288.66	10.79	21,957	491.20	135.83
2008	30.38	18.29	331.72	289.96	10.92	22,160	492.60	138.94
2009	30.86	18.58	333.06	291.18	11.04	22,353	494.04	142.12
2010	31.36	18.87	334.49	292.52	11.17	22,546	495.56	145.38
2011	31.85	19.15	335.90	293.83	11.31	22,746	497.23	148.73
2015	33.52	20.14	338.80	296.51	11.82	23,369	505.96	163.06
2025	37.34	22.42	341.16	298.11	13.11	24,523	534.39	205.29
2035	42.73	25.63	355.59	310.23	14.90	26,475	562.62	257.54

Annual Growth Rates (in percent)

1995 to 2000	2.4	2.2	1.0	1.2	2.1	1.8	0.3	2.2
1995 to 2005	2.2	2.1	0.9	1.0	1.8	1.5	0.3	2.2
2001 to 2010	1.8	1.7	0.6	0.6	1.3	1.0	0.3	2.3
2011 to 2035	1.0	1.0	0.2	0.2	1.0	0.5	0.4	1.9

BLS Forecasts for the United States (in percent)

1994 to 2005	N.A.	2.3	1.2	1.3	1.9	1.2	0.8	4.0

Source: REMI Output and Bureau of Labor Statistics.

Table 14. Output and Employment by Selected Industries

| Year | Output in Billions of 1992 Dollars | | | | Employment in Thousands | | | |
	Manufacturing	Services	Trade	Other	Manufacturing	Services	Trade	Other
1995	8.07	4.51	3.58	7.01	37.08	95.38	68.28	56.80
1996	8.26	4.65	3.65	7.19	36.84	98.00	68.61	57.28
1997	8.47	4.80	3.75	7.35	36.65	100.86	69.25	57.72
1998	8.64	4.94	3.84	7.52	36.35	103.60	69.89	58.05
1999	8.82	5.09	3.90	7.70	35.91	106.29	70.12	58.36
2000	9.00	5.23	3.97	7.88	35.54	109.02	70.14	58.70
2001	9.18	5.38	4.03	8.05	35.17	111.68	70.08	58.99
2002	9.36	5.52	4.10	8.23	34.79	114.42	70.05	59.27
2003	9.52	5.67	4.16	8.40	34.37	117.07	69.96	59.48
2004	9.69	5.81	4.22	8.57	33.93	119.65	69.76	59.62
2005	9.84	5.95	4.26	8.73	33.48	122.18	69.44	59.73
2006	10.13	6.08	4.34	8.88	33.20	124.64	69.18	59.74
2007	10.31	6.19	4.40	9.00	33.01	126.86	69.11	59.67
2008	10.49	6.30	4.47	9.13	32.63	128.90	68.91	59.53
2009	10.67	6.41	4.53	9.25	32.23	130.92	68.66	59.38
2010	10.85	6.53	4.60	9.38	31.84	132.96	68.46	59.26
2011	11.03	6.64	4.67	9.52	31.45	134.94	68.28	59.16
2012	11.20	6.75	4.74	9.65	31.05	136.95	68.18	59.10
2013	11.36	6.84	4.79	9.77	30.58	138.66	67.90	58.90
2014	11.50	6.93	4.85	9.88	30.09	140.19	67.49	58.63
2015	11.63	7.01	4.90	9.98	29.58	141.61	67.02	58.30
2025	12.96	7.85	5.43	11.09	24.66	155.01	62.67	55.77
2035	14.83	9.00	6.20	12.69	21.15	173.26	60.38	55.43

Annual Growth Rates
(in percent)

Year	Manufacturing	Services	Trade	Other	Manufacturing	Services	Trade	Other
1995 to 2000	2.2	3.0	2.1	2.3	-0.8	2.7	0.5	0.7
2001 to 2010	2.0	2.3	1.6	1.9	-1.2	2.1	-0.3	0.0
2011 to 2035	1.2	1.3	1.2	1.2	-1.7	1.0	-0.5	-0.3

Source: REMI Output.

Table 15.   Profitability in Manufacturing Relative to Rest of United States

	Durable Manufacturing							Nondurable Manufacturing						
Year	Total Factor Costs	Labor Costs	Fuel Costs	Capital Costs	Intermediate Inputs	Factor Productivity	Index of Relative Profitability	Total Factor Costs	Labor Costs	Fuel Costs	Capital Costs	Intermediate Inputs	Factor Productivity	Index of Relative Profitability
1995	0.998	0.977	1.194	1.018	0.987	1.296	1.114	1.088	1.154	1.194	1.018	0.990	1.108	1.013
1996	0.998	0.978	1.194	1.018	0.987	1.296	1.114	1.088	1.155	1.194	1.017	0.990	1.108	1.013
1997	1.000	0.980	1.194	1.018	0.987	1.296	1.113	1.089	1.158	1.194	1.017	0.991	1.108	1.012
1998	1.002	0.983	1.194	1.018	0.988	1.296	1.112	1.091	1.161	1.194	1.017	0.991	1.108	1.012
1999	1.003	0.985	1.194	1.018	0.988	1.296	1.112	1.092	1.164	1.194	1.017	0.992	1.108	1.011
2000	1.004	0.987	1.194	1.018	0.988	1.296	1.111	1.093	1.166	1.194	1.017	0.992	1.108	1.010
2001	1.005	0.988	1.194	1.018	0.988	1.296	1.111	1.094	1.168	1.194	1.017	0.992	1.108	1.010
2002	1.006	0.989	1.194	1.018	0.988	1.296	1.111	1.095	1.170	1.194	1.017	0.993	1.108	1.009
2003	1.006	0.990	1.194	1.017	0.988	1.296	1.111	1.095	1.171	1.194	1.017	0.993	1.108	1.009
2004	1.007	0.991	1.194	1.017	0.988	1.296	1.111	1.096	1.172	1.194	1.017	0.993	1.108	1.009
2005	1.007	0.991	1.194	1.017	0.988	1.296	1.111	1.096	1.172	1.194	1.017	0.993	1.108	1.009
2006	1.007	0.991	1.194	1.017	0.988	1.296	1.111	1.096	1.172	1.194	1.016	0.993	1.108	1.009
2007	1.007	0.992	1.194	1.017	0.988	1.296	1.111	1.096	1.173	1.194	1.016	0.993	1.108	1.009
2008	1.007	0.992	1.194	1.017	0.988	1.296	1.111	1.096	1.173	1.194	1.016	0.993	1.108	1.008
2009	1.007	0.992	1.194	1.016	0.988	1.296	1.111	1.096	1.174	1.194	1.016	0.993	1.108	1.008
2010	1.008	0.993	1.194	1.016	0.988	1.296	1.111	1.096	1.175	1.194	1.016	0.993	1.108	1.008
2011	1.008	0.994	1.194	1.016	0.988	1.296	1.110	1.097	1.176	1.194	1.016	0.993	1.108	1.008
2012	1.009	0.995	1.194	1.016	0.988	1.296	1.110	1.097	1.177	1.194	1.016	0.993	1.108	1.008
2013	1.010	0.996	1.194	1.016	0.989	1.296	1.110	1.098	1.179	1.194	1.016	0.994	1.108	1.007
2014	1.010	0.997	1.194	1.016	0.989	1.296	1.109	1.099	1.180	1.194	1.016	0.994	1.108	1.007
2015	1.011	0.998	1.194	1.016	0.989	1.296	1.109	1.099	1.181	1.194	1.016	0.994	1.108	1.007
2025	1.018	1.009	1.194	1.017	0.990	1.296	1.106	1.105	1.195	1.194	1.016	0.996	1.108	1.003
2035	1.019	1.011	1.194	1.017	0.990	1.296	1.105	1.106	1.198	1.194	1.016	0.996	1.108	1.003

Annual Growth Rates
(in percent)

	Durable Manufacturing							Nondurable Manufacturing						
1995 to 2000	0.13	0.20	0.00	-0.01	0.02	0.00	-0.04	0.10	0.21	0.00	-0.01	0.04	0.00	-0.06
2001 to 2010	0.03	0.05	0.00	-0.01	0.00	0.00	-0.01	0.02	0.06	0.00	-0.02	0.01	0.00	-0.02
2011 to 2035	0.05	0.07	0.00	0.00	0.01	0.00	-0.02	0.04	0.08	0.00	0.00	0.01	0.00	-0.02

Source: REMI Output.

Table 16. Population and Migration Trends

								Relative to United States Average		
Year	Total Population	Population Under 65 before Migration	Population over 65 before Migration	Total Migrants	Total Migrants Under 65	Economic Migrants	Migration Rate	Real Relative Wage Rate (RWR)	Relative Wage Mix (RWM)	Relative Economic Opportunity (REO)
1995	473,414	406,058	64,038	-1,379	-1,787	-4,906	-1.04%	1.11	1.01	1.01
1996	474,233	405,436	64,676	-531	-949	-4,056	-0.86%	1.11	1.01	1.02
1997	475,591	405,818	64,999	162	-265	-3,361	-0.71%	1.11	1.01	1.03
1998	477,337	406,805	65,267	696	260	-2,823	-0.59%	1.11	1.01	1.03
1999	479,171	408,313	65,433	859	414	-2,659	-0.55%	1.11	1.01	1.03
2000	480,956	409,682	65,813	901	446	-2,615	-0.54%	1.11	1.01	1.03
2001	482,647	411,144	66,062	888	421	-2,628	-0.54%	1.11	1.01	1.03
2002	484,281	412,589	66,257	888	410	-2,628	-0.54%	1.11	1.01	1.03
2003	485,872	413,805	66,651	876	389	-2,638	-0.54%	1.11	1.01	1.03
2004	487,309	415,152	66,904	722	226	-2,790	-0.57%	1.11	1.01	1.03
2005	488,624	416,246	67,285	570	65	-2,939	-0.60%	1.11	1.01	1.03
2006	489,889	417,242	67,720	394	-118	-3,072	-0.63%	1.11	1.01	1.03
2007	491,196	418,115	68,116	424	-94	-3,053	-0.62%	1.11	1.01	1.03
2008	492,603	418,486	69,076	494	-30	-2,990	-0.61%	1.11	1.01	1.03
2009	494,043	419,272	69,731	486	-41	-3,000	-0.61%	1.11	1.01	1.03
2010	495,555	420,016	70,457	523	-8	-2,969	-0.60%	1.11	1.01	1.04
2011	497,225	420,579	71,433	647	113	-2,849	-0.57%	1.10	1.01	1.04
2012	499,201	419,660	74,034	932	400	-2,571	-0.51%	1.10	1.01	1.04
2013	501,403	419,381	76,321	1,120	590	-2,382	-0.47%	1.10	1.01	1.04
2014	503,670	419,744	78,190	1,152	624	-2,347	-0.47%	1.10	1.01	1.04
2015	505,958	420,217	80,001	1,153	625	-2,349	-0.46%	1.10	1.01	1.04
2025	508,305	420,403	82,107	1,205	675	-2,298	-0.45%	1.10	1.01	1.05
2035	510,841	420,816	84,027	1,403	873	-2,103	-0.41%	1.10	1.01	1.05

	Annual Growth Rates (in percent)						Annual Averages			
1995 to 2000	0.3	0.2	0.5	118	-313	-3,403	-0.01	1.11	1.01	1.02
2001 to 2010	0.3	0.2	0.7	627	122	-2,871	-0.01	1.11	1.01	1.03
2011 to 2035	0.1	0.0	0.7							

Source: REMI Output.

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