

# **ECONOMIC AND FINANCIAL IMPACT ASSESSMENT**

of a

Change in Residency Requirements  
in the

City of Detroit, Michigan

*Submitted by:*

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*November 1, 1999*

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# Executive Summary

## ***Project Team and Goals of the Analysis***

Anderson Economic Group (AEG) was commissioned in June of 1999 to evaluate the economic and financial impact of ending the residency requirement for Detroit City employees. This report summarizes the findings of that analysis.

Patrick L. Anderson, Managing Director of AEG, directed the study. Mr. Anderson has over 15 years experience in evaluating the economy and public finances of the state of Michigan and its cities. His background before founding AEG included serving as Economist for Manufacturers National Bank of Detroit (now Comerica), AVP for Alexander Hamilton Life Insurance Company, Deputy Budget Director for the State of Michigan, and Chief of Staff of the Department of State. He is the author of over 50 published monographs, studies, and articles on economic issues, including a number of analyses of the Detroit-area economy.

Ian K. Clemens, consultant with AEG, assisted on the data collection, modeling, and analysis. Mr. Clemens received a degree in Mathematics from the Massachusetts Institute of Technology, and has been a consultant with AEG since 1998, where his projects have included economic impact assessments, city business climate and budget comparisons, and demographic analysis.

## ***Residency Requirements and City Finances***

Detroit, like many other cities in Michigan and across the country, currently imposes a residency requirement on its employees. A bill currently in the Michigan legislature, which would prohibit local governments from imposing such requirements or including them in collective bargaining agreements.<sup>1</sup> According to a legislative analysis, the bill would affect negatively the City's finances, by "reducing the income tax revenue collected by ... cities that levy a city income tax."<sup>2</sup>

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<sup>1</sup> Senate Bill 198, which passed the Senate on May 5 of 1999 by a 24-14 vote.

The bill provides in pertinent part:

Sec. 2. A public employer shall not require, by collective bargaining agreement or otherwise, that a person reside within a specified geographic area or within a specified distance or travel time from his or her place of employment as a condition of employment or promotion by the public employer. This section does not apply if the person is a volunteer or paid on-call fire-fighter, an elected official, or an unpaid appointed official.

Sec. 3. This act applies only to employment contracts entered into, renewed, or renegotiated after the effective date of this act, in accordance with the prohibition against impairment of contracts provided by section 10 of article I of the state constitution of 1963.

<sup>2</sup> "Bill Analysis", 4-20-99; Senate Fiscal Agency, Lansing Michigan. A second analysis, recapping arguments pro and con, again repeated the notion that, especially in "unattractive" cities, that some employees would likely move out a city that no longer imposed a residency requirement.

The greater metropolitan area surrounding the City of Detroit is the 8<sup>th</sup> largest in the country, accounting for over 5.2 million people, of which over 4.3 million are in the immediate Detroit Metropolitan area.<sup>3</sup> A network of freeways allows direct access to most parts of the Metropolitan area, as well as surface streets connecting with all areas. Thus, employees of the City of Detroit are able to easily relocate in other urban and suburban areas within commuting distance of their places of work.

The City has endured a serious loss in population and economic base over the past three decades. At the last decennial census, the City barely maintained a population over 1 million. Most private and governmental estimates of the current population indicate a continuing decline, although the City believes the population remains above 1 million.<sup>4</sup> Past surveys of City employees, and the undeniable demographic evidence from other workers, strongly suggests that some City employees would relocate outside the City, if the City could not enforce a residency requirement.

### **Major Assumptions**

A change in the residency law would result in an acceleration in the trend of population loss in the City of Detroit.<sup>5</sup> We anticipate that, should the law prohibit the City from enforcing a residency requirement on its approximately 18,000 municipal workers, about 25% of those workers would relocate outside the City, over a 5-year period. Most of that adjustment would occur in the first two years.

We assume that, for every worker that leaves, his or her household will leave as well. For every four families of municipal workers that leave, one additional household will also leave.

These are very conservative assumptions, particularly the key assumptions about migration and the "multiplier" effect.<sup>6</sup> The findings of this analysis probably understate the total impact on retail and residential activity, earnings, employment, and tax revenue in the City.

### **Findings**

A change in the residency law results in a loss of major tax revenue to the City of Detroit. This loss occurs because the decline in City workers resident in the City, especially

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<sup>3</sup> Bureau of Census, Current Population Estimates, MA-96-8. The Detroit-Flint-Ann Arbor area is considered a CMSA by the Census; the Detroit PMSA accounted for 4.3 million people in 1996; the Ann Arbor and Flint PMSAs had 530,000 and 436,000 people, respectively

<sup>4</sup> Part of the dispute lies in the under-numerated portions of society, which are disproportionately concentrated in cities like Detroit. The results of this analysis apply whether the City is above or below the 1 million mark, as it focuses on the *change* in tax revenue from current, unambiguous levels.

<sup>5</sup> See the section entitled *A Note on the 2000 Census* for a discussion of the Detroit population.

<sup>6</sup> In particular, most economic impact studies in this area use a "multiplier" in similar cases of 2.0 or more, rather than the 1.25 in this study. Some multiplier is needed because the loss of one family's tax revenue, retail purchases, and income will necessarily ripple through the rest of the City's economy, resulting in additional reductions.

The use of conservative assumptions is discussed in the text in the subsection entitled *Conservative Assumptions*, and an extensive list of base data, assumptions, and parameters are in the appendix entitled *Assumptions*.

Police and Fire employees, encourages others to leave the City as well. This loss in resident population carries with it declining retail activity, as well as reducing property values and the attractiveness of many City neighborhoods.

We modeled separately the effect of these demographic and economic changes on the major tax revenue sources for the City. These include:

- Income taxes for residents, nonresidents, and businesses; using the reductions in tax rates for personal income taxes required under the recently passed Public Act;
- Utility user taxes for resident worker households, and other households and businesses; and
- Property taxes, including both real (buildings and property) and personal.

For each major tax revenue source, an elimination of the residency requirement would result in a reduction in revenue.<sup>7</sup> The total annual direct cost, in major source tax revenue, would be approximately \$21 million. This includes just major tax sources for the City--not revenue sharing, federal or state funds, or other sources that may also be negatively affected by the change--and assumes that the City's economy has received most, but not all, of the effects of a change in the residency requirement.<sup>8</sup>

The following table summarizes the impact, in fiscal year 2002-2003, of a change in the residency requirement:

**Table 1: Effect of Residency Law Change in Fiscal Year 2002-2003**

Change in Major Source Tax Revenue	Change in City Workers Maintaining City Residency	Change in Number of Resident Workers	Change in Population
-\$21.7	-4,396	-5,495	-15,332

*Source: AEG projections; base data from City of Detroit, Census Bureau, and other sources. Table shows changes from baseline projection.*

**Other Factors Not Included**

The City would also realize other losses, which we did not model. These include:

- Reductions in State Revenue Sharing, especially as the "formula" moves towards a per-capita basis;
- Additional reductions in revenue for service income for enterprise funds,

<sup>7</sup> The overall municipal income tax revenue declines, though the revenue from nonresidents actually increases for a while, due to the number of City workers who migrate outside the City for their residence (reducing resident income taxes), but retain their City jobs (thus increasing nonresident income tax revenue.)

<sup>8</sup> Some economic changes would occur even before a change went into effect; others would take effect as employees changed their plans, and still others would wait until they changed their residences. As noted below, it is difficult to precisely state in which years the full effect takes place. Accounting differences--such as fiscal year/calendar year offsets--also can affect the timing.

- which would likely outstrip reductions in service costs;
- Continued subsidies to enterprise funds, which would have to be carried on a smaller revenue base;
  - Any changes in Federal Aid due to lower population;
  - Any reduction in the general economic growth rate, including income growth, in the City; and
  - Other important factors that are difficult to quantify, such as the loss of the comfort of knowing that Police and Fire workers are living nearby; the attendant increases in crime; and the disruption in the general improving trend of Detroit.

The exclusion of these other factors makes the results we project quite conservative. Were we to exhaustively model all identifiable factors, the revenue loss we project would certainly be larger.

### ***Comparing Results to Current Budget and Past Analysis***

The results of this analysis were compared to a previous analysis of the issue, done by economist Michael Thompson in 1985.<sup>9</sup> This analysis, adjusted for the higher price levels, lower tax rates, and larger municipal share of the Detroit economy, produced an estimate of annual direct tax revenue losses to the City of Detroit equivalent to \$24 million, once the effects of the migration had occurred. The similar results support the findings of this analysis. A comparison with the previous study is in an appendix entitled *Comparison with Previous Analysis*.

The projections were also compared with the current (fiscal year 1998-1999) budget, for major tax revenues. We project changes in revenue for major taxes that support general fund activities, with 1999 estimates that match very closely the budgeted figures for the City in the current fiscal year. A reconciliation of the projections with the current budget is in an appendix entitled *Reconciliation of Forecast with Budget*.

### ***Exhibits***

The following exhibits illustrate the findings:

1. The exhibit *Population Changes in Southeastern Michigan* illustrates the profoundly different population trends in the City of Detroit and the areas surrounding it in recent years. The City has declined in population relative to its less densely-populated suburbs. This migration, which has taken place for a variety of reasons, is a good indication of the location preferences of many municipal workers. A change in the residency requirement for municipal workers--which have been prevented by ordinance from moving outside the City boundaries--would inevitably result in some changes in their

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<sup>9</sup> Michael S. Thompson, "The Economic Impact of the Relaxation of the Residency Requirement of the City of Detroit," paper, no date but believed to be 1985.

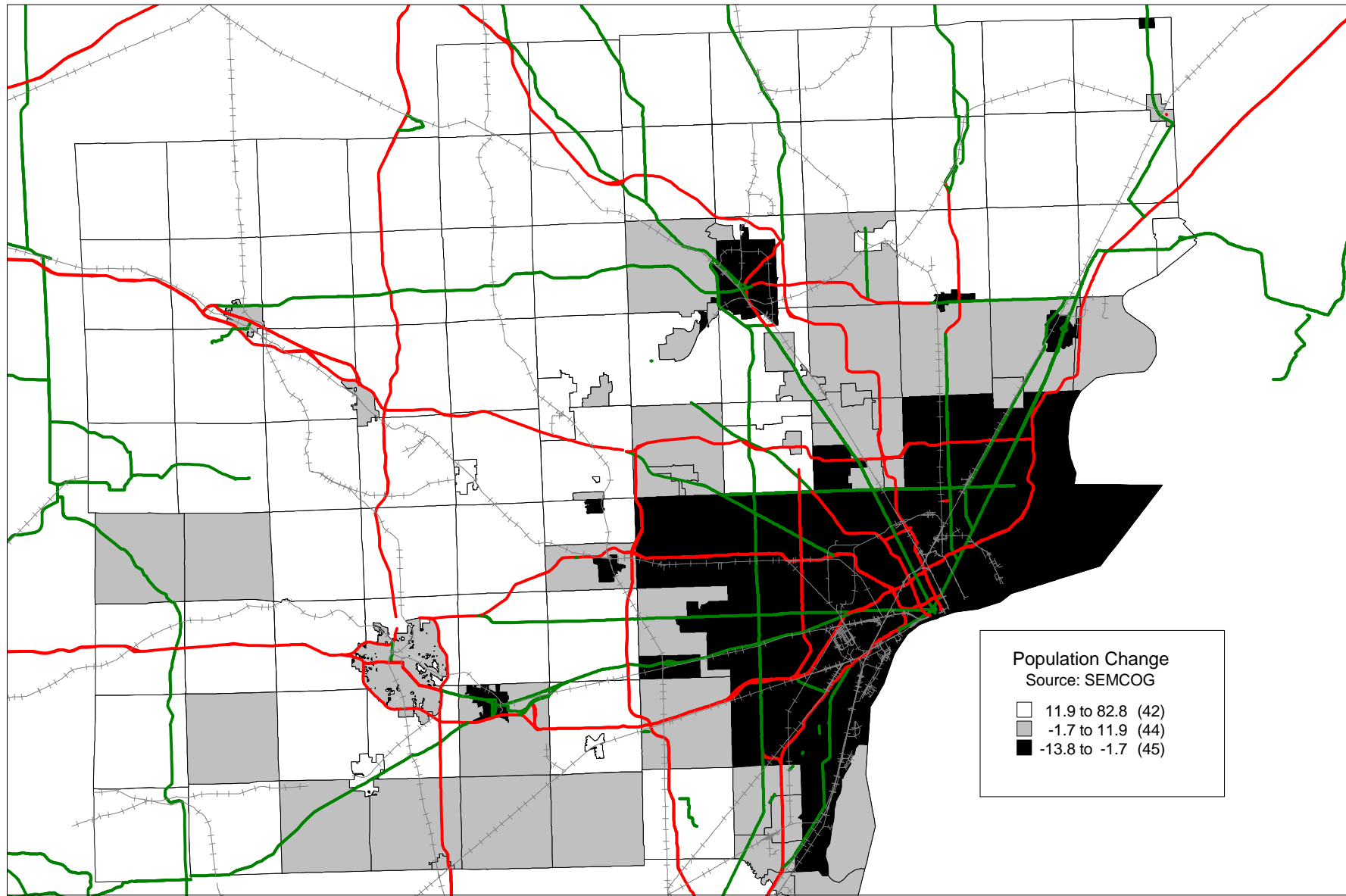
locations.

2. The exhibit *Projected Revenue Changes to the City of Detroit* shows the projected change in tax revenue for municipal income taxes, property taxes, and utility user taxes:
  - Resident and corporate income tax revenues would be significantly lower under the residency law change scenario. Non-resident income tax revenue would be higher, as many workers who change their residence would retain their employment within the City. This increase in non-resident income tax revenue does not offset the decline in resident income tax revenue, though, as the non-resident rate is half that of the resident rate.
  - Real estate taxes, which are a larger share of the City's revenue base, also produce a larger revenue loss compared with the base scenario.
  - Two smaller components of the City's revenues are also affected. Utility tax revenue grows less rapidly under the revenue law change scenario. In addition, Corporate Income tax revenue declines faster under the law-change scenario. This is partially due to a decline in the tax rate, which we have assumed will occur in both scenarios.
  - The total impact on the City's budget, after the effects of the migration have largely occurred, will be over \$21 million per year in direct revenue loss.
3. The exhibit entitled *Visual Outline of Economic Model* displays, in a graphical form, the structure of the model used to forecast the tax revenue changes to the City of Detroit. Note that changes in demographics, due to the change in law, drive changes in location, reduce the tax base, and result in lower tax revenues.

### **Conclusion**

While any economic impact study relies on projections and partial information, this study relies on a conservative methodology and avoids exaggerating benefits or excluding costs. Even using conservative assumptions, the rescission of the authority of the City to enforce a residency requirement for municipal workers would result in significant reduction in tax revenue. As the City is struggling to maintain thinly-balanced budgets, such a decline would result in significant damage to the City's economy and image.

# Detroit Area: Population Change by Minor Civil Division, 1990-98



Detroit: Change in Major Tax Revenue Due to Residency Law Change  
by Source & Total  
FY 2002-2003

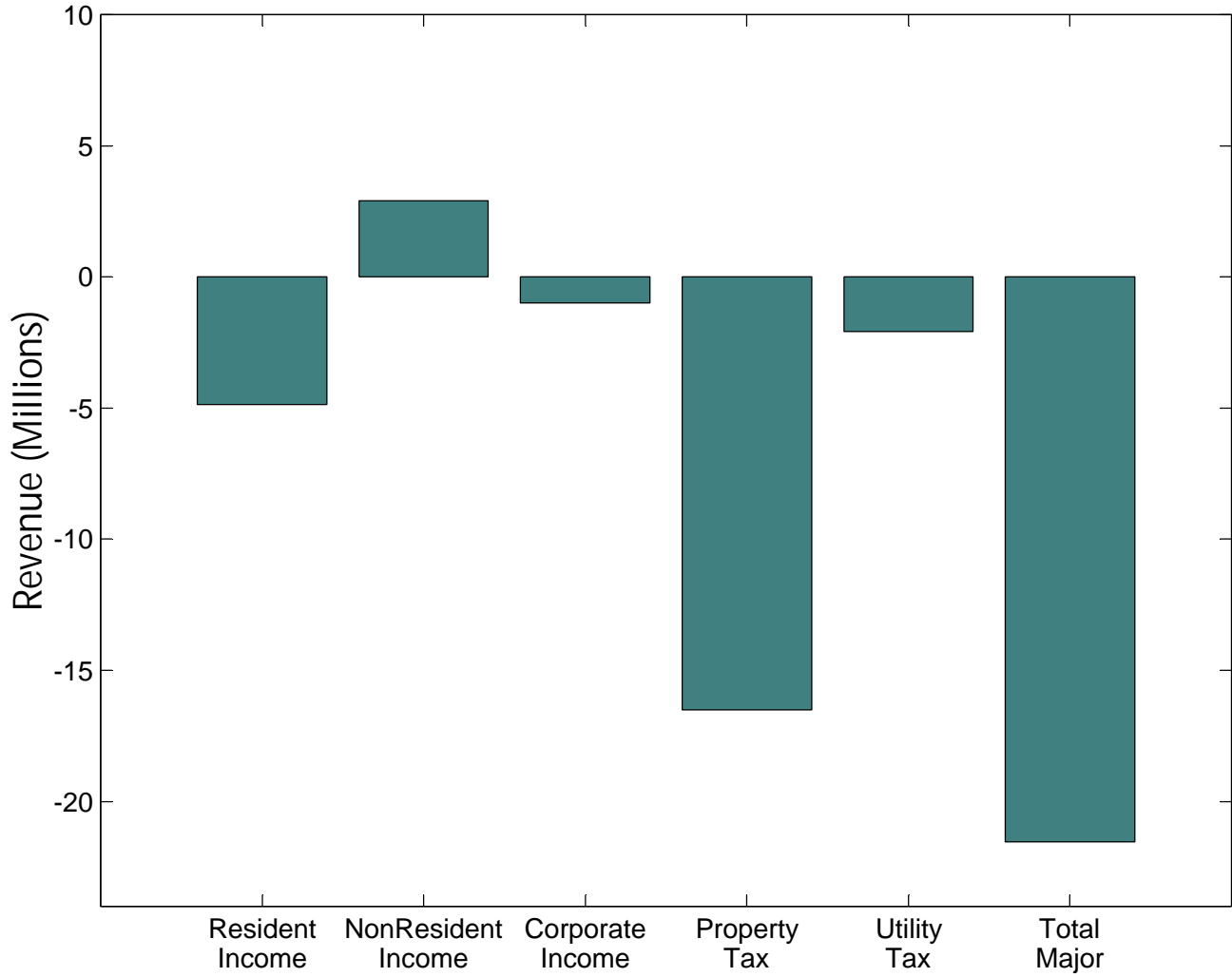
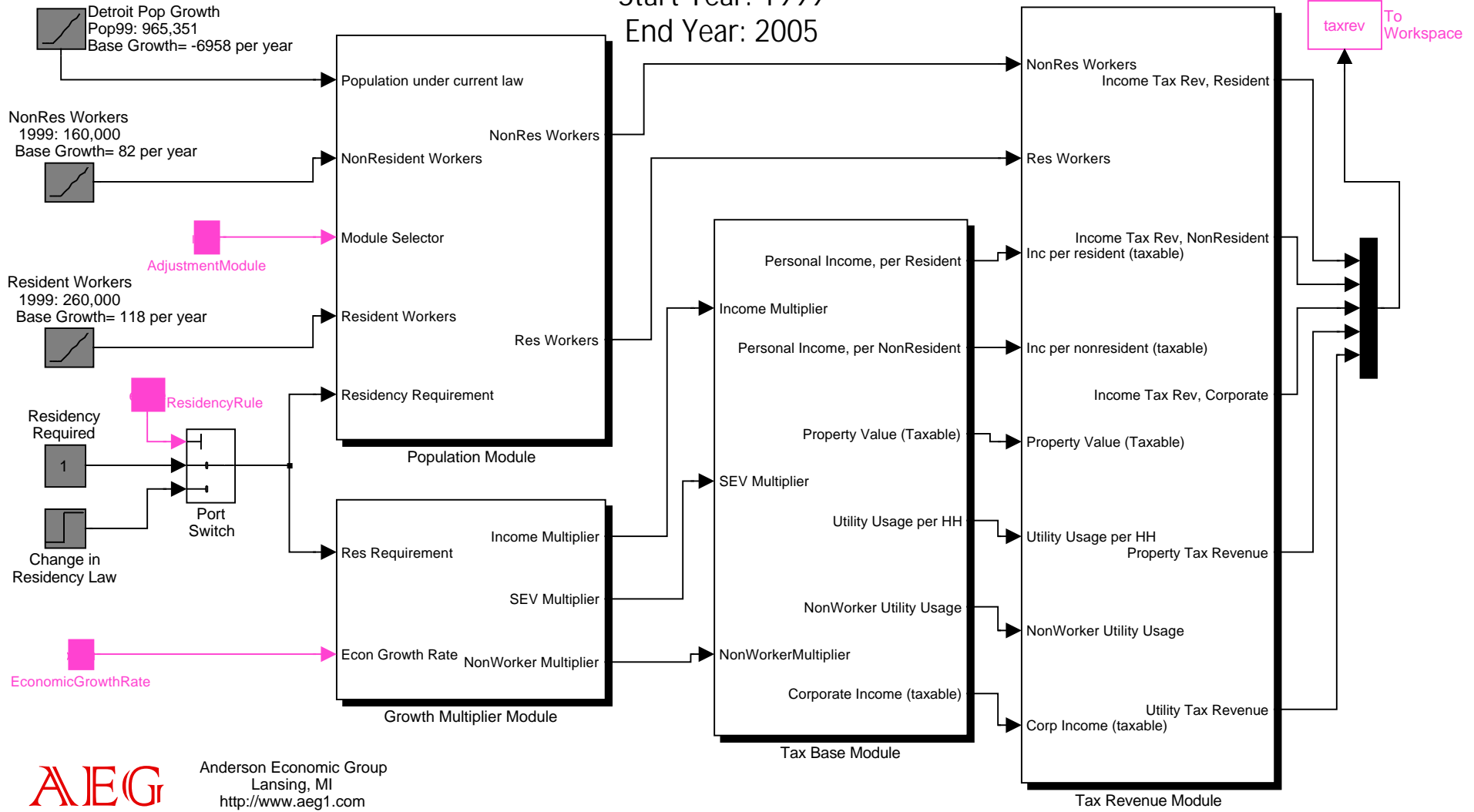


Figure 2: Projected Revenue Changes to the City of Detroit

**Initial Conditions**

# Detroit Labor Arbitration Revenue Model

Start Year: 1999  
End Year: 2005



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## Background

### Residency Requirement Issue

Detroit, like many other cities in Michigan and across the country, currently imposes a residency requirement on its employees. The City may be forced to end the requirement, or not enforce the existing requirement. Such a change could arise from a labor arbitration decision, or the enactment of a bill currently in the Michigan legislature, which would prohibit local governments from imposing such requirements or including them in collective bargaining agreements.<sup>10</sup>

The legislature is aware of the likely negative impact of the bill on the City's finances. According to a brief analysis of the bill provided by the Senate Fiscal Agency:<sup>11</sup>

#### **FISCAL IMPACT**

The bill would allow certain employees, as specified in the bill, to live outside of State or local unit boundaries, thereby reducing the income tax revenue collected by the State or cities that levy a city income tax. Depending on the degree to which city income tax collections changed, revenue sharing payments also could minimally change.

### The Detroit Area

The metropolitan area surrounding the City of Detroit is the 8<sup>th</sup> largest in the country, accounting for over 5.2 million people, of which over 4.3 million are in the Detroit Metropolitan area.<sup>12</sup> A network of freeways allows direct access to most parts of the Metropolitan area, as well as surface streets connecting with all areas. Thus, employees of the City of Detroit are able to easily relocate in other urban and suburban areas within commuting distance of their places of work.

The Census Bureau's official estimates for the population of the City of Detroit are contained in Table 2. The City fell below the 1 million mark after the 1990 Census,

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<sup>10</sup> Senate Bill 198, which passed the Senate on May 5 of 1999 by a 24-14 vote.

The bill provides in pertinent part:

Sec. 2. A public employer shall not require, by collective bargaining agreement or otherwise, that a person reside within a specified geographic area or within a specified distance or travel time from his or her place of employment as a condition of employment or promotion by the public employer. This section does not apply if the person is a volunteer or paid on-call fire-fighter, an elected official, or an unpaid appointed official.

Sec. 3. This act applies only to employment contracts entered into, renewed, or renegotiated after the effective date of this act, in accordance with the prohibition against impairment of contracts provided by section 10 of article I of the state constitution of 1963.

<sup>11</sup> "Bill Analysis", 4-20-99; Senate Fiscal Agency, Lansing Michigan. A second analysis, recapping arguments pro and con, again repeated the notion that, especially in "unattractive" cities, that some employees would likely move out a city that no longer imposed a residency requirement.

<sup>12</sup> Bureau of Census, Current Population Estimates, MA-96-8. The Detroit-Flint-Ann Arbor area is considered a CMSA by the Census; the Detroit PMSA accounted for 4.3 million people in 1996; the Ann Arbor and Flint PMSAs had 530,000 and 436,000 people, respectively.

dropping from the 7<sup>th</sup> largest city in the nation to the 10<sup>th</sup>. Its loss of 57,000 residents in the 1990-1998 period placed it as one of the largest population-losing cities in the country, with a rank of 197 out of 218 cities with population over 100,000.

**Table 2: Population Estimates for the City of Detroit**

Place Name	1998 Population Estimate	1990 Census	Change	Change (%)	Rank 1998	Rank 1990	Rank by % Change
Detroit city, MI	970,196	1,027,974	-57,778	-5.6	10	7	197

*Source: US Census Bureau, Report SU-98-1*

### A Note on the 2000 Census

The census figures for the City of Detroit, like those of every other large area, are estimates subject to error. In particular, urban areas have historically been undercounted. The combination of a population near to 1 million, and the existence of state statutes that establish certain rights for cities over 1 million, has led to more than the usual amount of scrutiny of Detroit's figures.

However, the exact number of residents is not critical for this analysis. The effects of a *change* in resident workers paying taxes is the goal of this analysis, and we have quite firm figures for tax revenue and the number of filers. Thus, the effects of a change in the residency requirement on major source tax revenue would be the same, regardless of whether the City has slightly over or slightly under 1 million residents.

# Methodology

## General Methodology

In conducting this evaluation, AEG interviewed City officials, reviewed economic, demographic, and financial data, and consulted previous research on the topic. Building on past work on the economy and finances of the City of Detroit and the State of Michigan, we then prepared a model tracing the effects of residency of City workers on the population, economy, tax base, and finances of the City.

Using this model and additional information, we project the direct, indirect, and induced effects of a change in the residency requirement. These changes include:

- Changes in the resident population of the City;
- Changes in the number of resident and nonresident workers in the City;
- Changes in the number of municipal workers residing in the City;
- Changes in property values and other tax bases; and
- Changes in property tax and income tax revenue;

The methodology used was conservative, and avoided the common errors of exaggerating benefits and undercounting costs that have undermined other economic impact analyses. A summary of data sources, equations, and model notes are included in this report, along with explanatory narrative and a discussion of the limits of the methodology.

## Assessing Economic Change

The starting point of any impact assessment is identifying the change that “impacts” the surrounding economy. In this case, the direct economic change we consider is a change in the requirement that City employees reside in the City. We place the economic effects of the change as beginning in the calendar year 2000. In fact, some of the effects are already starting; the potential for a change in the requirement is undoubtedly already affecting employee plans regarding future location decisions.

## Direct, Indirect, and Induced Benefits

Economic Impact analysis is a tool of applied economics, which estimates the total economic effect of a specific change in a local or regional economy.<sup>13</sup> These impacts are generally broken down into three categories.

- Direct effects are those directly attributable to the change. In this case, direct effects would include the effects of employees and their families relocating.
- Indirect effects are those that emerge indirectly from the change. This would include reductions in spending in the area by former resident employees, reductions in tax

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<sup>13</sup> A good, brief summary of techniques are in Glen and Burton Weisbrod, *A Primer on Economic Impact Analysis*, Boston, MA, Economic Development Research; available on the web at <http://www.edrgroup.com/B23.html>. See also, by the same authors: "Assessing the Economic Impact of the Transportation Projects: How to Choose the Appropriate Technique for your Project," National Research Council, Transportation Research Circular No. 477, October 1997.

revenue from higher property values, and other effects that occur as a result of the change.

- Induced effects are those that do not occur indirectly or directly from the change, but as a result of behavior induced by the change. Migration outside the City by municipal employees, particularly police and fire employees, would induce some other residents to leave. This reduction in police presence would likely result in an increase in crime and reduction in property values. This, in turn, would result in fewer dollars spent in restaurants and shops, and a further reduction in new income and earnings.

Induced benefits are the hardest to predict and measure, as they by their nature cannot be directly identified. We have taken a very conservative approach toward induced effects.

### Assessing Costs and Benefits

Properly identifying all costs and benefits is the key to proper analysis. In this case, we are careful to identify the likely effects, both cost and benefit, to a change in residency requirements. We have excluded from the analysis sources of revenue that were tied directly to specific fees for specific services, or which primarily financed enterprise funds.

### ***Specific Methodology of this Evaluation***

#### Financial Impact

This analysis goes beyond typical economic impact analyses, and includes an explicit financial impact assessment for the City of Detroit. The City is a financial entity on its own, with particular sources of revenue, expenditure items, and budget constraints.

The economy of the City—more precisely the geographic and demographic area around the City—strongly influences the City as a separate financial entity. In this analysis, we link the economy of the City with its finances.

#### Revenue Sources Included

The most obvious direct connection between the economy of the City and its finances is through tax revenue. Many types of taxes are levied by the City, and through other state and local governments, which affect its finances. In addition to direct taxes, fee revenue and various state programs that result in direct aid to the City, or indirect aid, also should be considered.

We modeled separately the effect of these demographic and economic changes on the major tax revenue sources for the City. These include:

- Income taxes for residents, nonresidents, and businesses; using the reductions in tax rates for personal income taxes required under the recently

passed Public Act;

- Utility user taxes for resident worker households, and other households and businesses; and
- Property taxes, including both real (buildings and property) and personal.

For each major tax revenue source, the residency law change would result in a reduction in revenue.

### ***Other Factors Not Included***

The City would also realize other losses, which we did not model. These include:

- Reductions in State Revenue Sharing, especially as the "formula" moves towards a per-capita basis;
- Additional reductions in revenue for service income for enterprise funds, which would likely outstrip reductions in service costs;
- Continued subsidies to enterprise funds, which would have to be carried on a smaller revenue base; and
- Any changes in Federal Aid due to lower population.
- Any reduction in the general economic growth rate, including income growth, in the City.
- Other important factors that are difficult to quantify, such as the loss of the comfort of knowing that Police and Fire workers are living nearby; the attendant increases in crime; and the disruption in the general improving trend of Detroit.

The exclusion of these other factors makes the results we project quite conservative. Were we to exhaustively model all identifiable factors, the revenue loss we project would certainly be larger.

### ***Past Analyses and Current Budget Comparisons***

#### **Comparison with Current Budget**

The projections were also compared with the current (fiscal year 1998-1999) budget, for major tax revenues. We project changes in revenue for major taxes that support general fund activities, with 1999 estimates that match very closely the budgeted figures for the City in the current fiscal year. A reconciliation of the projections with the current budget is in an appendix entitled *Reconciliation of Forecast with Budget*.

Note that the projections will not match exactly the City budget, even if they are extremely accurate. The projections are based on trend rates of economic, demographic, and tax base growth. The key point in this analysis is the difference that a change in residency would create, assuming that these other assumptions continue to hold.

## Comparison with Past Analysis

The results of this analysis were compared to a previous analysis of the issue, done by economist Michael Thompson in 1985.<sup>14</sup> This analysis, adjusted for the higher price levels, lower tax rates, and larger municipal share of the Detroit economy, produced an estimate of annual direct tax revenue losses to the City of Detroit equivalent to \$24 million, once the effects of the migration had occurred. The similar results support the findings of this analysis. A comparison with the previous study is in an appendix entitled *Comparison with Previous Analysis*.

Note that the previous analysis, even when adjusted, should not match exactly the analysis this time. Differences in relative prices and the share of the economy represented by municipal workers are two factors for which we have approximately corrected. There are other factors as well. The current analysis is based on a more sophisticated and comprehensive model, which provides more detail on individual items.

## Conservative Assumptions

In general, the assumptions used in this analysis are much more conservative than those used in the Thompson analysis. Two key behavioral parameters bear particular mention:

1. The multiplier used in this analysis is a smaller 1.25, rather than the 2.0 figure used by Thompson. This multiplier reflects the fact that direct earnings of City residents are spent more than once in the City, each time generating additional tax revenue for the City.<sup>15</sup> Typical multipliers for local impacts range from 1.4 to 3, and Thompson's use of the 2.0 figure is not unusual.<sup>16</sup> The 1.25 multiplier effect used in this model is quite conservative.<sup>17</sup>
2. The assumed migration of City employees used in this analysis is also smaller. Thompson assumed 34%, based on both survey data and an analysis of Census data on comparable households.<sup>18</sup>

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<sup>14</sup> Michael S. Thompson, "The Economic Impact of the Relaxation of the Residency Requirement of the City of Detroit," paper, no date but believed to be 1985.

<sup>15</sup> For example, assume that 70% of the dollars earned are spent in the local area. The first person spends 70% of a dollar in the City; the recipients of those dollars spend 70% of that portion of the original dollar in the City (70% of .70, or 49 cents), and the next recipient spends 70% of that portion (70% of 49 cents, or 34 cents. Even after just three rounds, in this example, the loss of expenditures was 70 cents + 49 cents + 34 cents, or \$1.53. This is equivalent to a multiplier of 1.53. Thus, our use of the 1.25 multiplier is quite conservative.

<sup>16</sup> Thompson cites regional multipliers from 1.41 to 3.07. More recent input-output model results from the US BEA RIMS II models also typically indicate multipliers of 2 or more in other urban areas.

<sup>17</sup> We implement the multiplier by having the migration of City workers induce the migration of other workers, with the City thus losing the positive effects of some of their income. This is again a conservative approach.

<sup>18</sup> The survey data was from a Market Opinion Research poll of City workers from 1974, which estimated 57% of the police and 62% of the fire employees would migrate. As noted by Thompson, this estimate is subject to the usual qualifications about survey data.

The Census data analysis was based on employed individuals that reside in the tri-county area, and who migrated between 1975 and 1980. This indicated net migration, in personal income classes of \$25,000 annual earnings and up, between 21% and 33%. Net migration among persons with lower personal income was much lower; persons with personal income below \$15,000 had net migration of 9%, and those with

We implement the multiplier effect by assuming that for every 4 city employees and their households that migrate out of the City, 1 additional household will also migrate out.<sup>19</sup>

The reasons for this induced effect are clear:

- City employees are a significant portion of the middle class in the City, and the exodus of a portion of the middle class in a residential neighborhood always has a negative effect on property values, encouraging others to leave as well.
- Some residents prefer neighborhoods where many homeowners are police and fire employees. The sudden migration of those homeowners—who were a major attraction in terms of added safety—would certainly encourage others to migrate as well.
- The City of Detroit has endured a particular difficulty with abandoned and tax-reverted property. The City acknowledges it has technical custody of approximately 46,000 parcels of tax-reverted property, and has mounted an effort recently to demolish many abandoned homes, securitize tax receivables from non-tax-paying properties, and restructure the tax collection apparatus in conjunction with Wayne County.<sup>20</sup> This tremendous backlog of properties, many of which are poorly maintained or dangerous, means that much migration out of the City will not be offset by migration back into the City. Instead, it will likely generate internal migration, with City homeowners trading one property for a better one, with new residents not replacing those in the worst ones.

Thus, the induced migration assumption of 25% is well supported by the economic conditions in the City, as well as the effects of expenditure multiplication.<sup>21</sup>

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income between \$15,000 and \$20,000 had net migration of 12%.

See Thompson, tables 1 and 2.

<sup>19</sup> Thus, multiplying 4 households by 1.25 produces 5 households (4 + 1), and all their attached earnings and tax revenue.

<sup>20</sup> The City participated in the development of some of the recently-enacted Public Acts, which reform the General Property Tax Act and make specific other provisions for handling the existing backlog of homes. The author helped draft many of these Acts, as part of a Hudson Institute project to improve urban housing.

<sup>21</sup> This assumption is further buttressed by the fact that we assume only one worker per household, when many households are now two-earner households. In such households, the release of the residency requirement on one worker may lead to both workers moving outside the city, increasing the negative effects on the city.

## A: Appendix A: Model Assumptions and Parameters

### 1. Population Module

#### Brief Description:

Calculates population changes from 1999-2005 based on residency law; i.e., with or without a residency requirement for city employees.

#### Parameters and Assumptions:

<u>Assumptions</u>	<u>Value</u>	<u>Explanation / Source</u>
Average HH Size	2.79	June 1999 number. Source: SEMCOG Population and Household Estimates for June 1999.
Population Under Current Law (1999)	965,351	June 1999 number. Source: SEMCOG Population and Household Estimates for June 1999.
Resident Workers	260,000	Based on 243,742, which was the number of tax returns processed for the 1997 accounting period. These returns may include more than one taxpayer. Growth assumption is recent trend. Source: City of Detroit.
Non-Resident Workers	160,000	Based on 145,644, which was the number of tax returns processed for the 1997 accounting period. These returns may include more than one taxpayer. . Growth assumption is recent trend. Source: City of Detroit.
City Employees	18,073	June 1999 number. Source: Salary Analysis Statistics Table, City of Detroit.

<u>Parameters</u>	<u>Value</u>	<u>Explanation / Source</u>
Direct Migration Factor	23-35 %	This factor drives the migration rate of current city employees over the six-year period. Each of these employees is assumed to belong to a household (for HH size, see above "Average HH Size"). This employee, after migration, is assumed to remain employed by the City of Detroit.
Induced Migration Multiplier	25%	Induced migration as a percentage of direct migration; i.e., for every four city-employed workers that leave, one other worker will leave the city, who after migration, does not remain employed in the city.
Adjustment Modules		Adjustment modules all assume a decreasing percentage of city employees and total migration within 6 years.
Number of working adults per City Employee (i.e., an employee of the city) household	1.0	AEG parameter estimate.

Number of working adults per City worker household      1.0      AEG parameter estimate.

## 2. Growth Multiplier Module

### Brief Description:

This model calculates multiplier values for the model period, 1999-2005, for three economic growth rates: Income, SEV, and "NonWorker" Economic growth

### Input Assumptions & Parameters:

<i>Parameters</i>	<i>Value</i>	<i>Explanation / Source</i>
Economic Growth Rate	5%	AEG parameter estimate of nominal income growth in the Detroit region. "Nominal" growth includes both real growth and inflation. This is a trend estimate for the entire region; actual growth will vary by year and vary among municipalities in the region. Comparative figures: 10-year median household income growth, Detroit PMSA, 4.9% (at last census); annual change in total personal income, Detroit PMSA, 4.4% (1997); Michigan Personal Income Growth, annual rate, 1998 IV quarter, 9.1%.
SEV Growth Rate (Residency required)	4%	AEG parameter estimate based on historical data. Detroit SEV growth rates for 1995-2000 fiscal years was 7.9%.
SEV Growth Rate (Residency not required)	2%	AEG parameter estimate based on historical data. Detroit SEV growth rates during period 1981 to 1994 fiscal years was .82%.
NonWorker Growth Rate	Varying	Average of Economic and SEV growth. This rate drives corporate income and Nonworker utility usage growth.

### 3. Tax Base Module

Brief Description:

This model applies various growth rate multipliers to the tax base values.

Input Assumptions & Parameters:

<u>Assumptions</u>	<u>Value</u>	<u>Explanation / Source</u>
Resident Income	\$34,526	1998 estimate of average income for a Detroit household; 1999 average earnings \$35,384. Source: MapInfoDATA, 1998 and 1999. As a model-simplifying assumption, average earnings of city employees were assumed to equal the average income for a Detroit resident. The actual average income for a city employee as of June 1999 was \$33,997. Source: Salary Analysis Statistics Table, City of Detroit. Cross-checked with Detroit Income tax return data to ensure comparability.
NonResident Income	1.5xRes	Assumed to be 1.5x the resident income: \$51,789. The estimated average income in 1998 for Wayne County cities surrounding Detroit was \$58,300. Source: MapInfoDATA, 1998. Median Household Income estimates for other Wayne County cities in 1999: Allen Park, \$55,994; Dearborn and Dearborn Heights, \$51,382 and \$52,381; Livonia, \$71,504; Redford, \$51,157; Lincoln Park, \$39,974. Of these, Livonia had the largest growth between 1990 and 1999; a gain of 20,000 residents. Source, MapinfoDATA 1999. Cross-checked with Detroit Income tax return data to ensure comparability.
Corporate Income	\$1562	(Millions). AEG value derived from City of Detroit Budget Book, FY 1998-99.
Annual Taxed Household Utility Usage	\$1500	(Dollars per household). AEG estimate. The Utility Tax is levied on telephone, gas, and electricity services.
City SEV	\$7,567	(Millions). Source: City of Detroit Budget Book, FY 1998-99.
Annual NonWorker Taxed Utility Usage	\$842	(Millions). AEG value derived from City of Detroit Budget Book, FY 1998-99.
<u>Parameters</u>	<u>Value</u>	<u>Explanation / Source</u>
Taxable Income Factor (Resident)	90%	% of resident personal income that is taxable. AEG parameter estimate derived from actual budget numbers.
Taxable Income Factor (NonResident)	85%	% of nonresident personal income that is taxable. AEG parameter estimate derived from actual budget numbers
SEV to TV multiplier	87.6%	Taxable values cannot exceed the statewide inflation rate of the prior year. Therefore, the SEV here differs from the TV.

## 4. Tax Revenue Module

### Brief Description:

This module aggregates tax revenue from corporate, resident & Nonresident income tax, property taxes, & utility excise taxes.

### Parameters & Assumptions:

<u>Assumptions</u>	<u>Value</u>	<u>Explanation / Source</u>
Resident Income Tax Rate	3 % to .4%	Scheduled to decline to 2% at .1% a year, under certain conditions. Due to fiscal year / tax year definition differences, model rate schedule is not equivalent to fiscal year rates.
Non-Resident Income Tax Rate	1.5 % to 1.2%	Scheduled to decline under certain conditions with the Resident Income Tax.
City Homestead Property Tax Rate	3.815	City property taxes are levied on residences and businesses. Assumed to remain constant.
Utility Tax Rate	5 %	
Corporate Income Tax Rate	.9% to .3%	Scheduled to phaseout from 1.9% at .1% a year, under certain conditions. Source: City of Detroit Budget, Fiscal Year ending June 30, 2000.
Corporate Income Tax Collection Rate	93%	AEG parameter estimate.
Resident Income Tax Collection Rate	0 %	AEG parameter estimate.
Non-Resident Income Tax Collection Rate	95 %	AEG parameter estimate.
Homestead Property Tax Collection Rate	1 %	AEG parameter estimate.
Utility Tax Collection Rate	90 %	AEG parameter estimate.

**5. Budgeted Tax Revenue, Fiscal Year 1998-1999**

<u>Assumptions</u>	<u>Value</u>
Net Property Tax	\$188,606,656
Net Income Tax	\$368,000,000
Utility Tax	\$54,750,000

## Appendix B: Data Tables: Tax Revenue Reports

The following sets of data tables summarize four different scenarios. Each scenario contains information on the changes in major source tax revenue for the City of Detroit, assuming a change in the residency requirement.

We analyzed a baseline case, plus four different scenarios. The scenarios differed in their assumptions about:

1. The pattern of the migration (much like a decay, amortization, or depreciation schedule, assigning certain shares of the decline to certain years); and
2. The cumulative share of City workers that migrate outside the City.

The one baseline and four comparison scenarios were:

- No migration. This is the baseline case, against which other scenarios were compared. It assumes that the City continues to enforce a residency requirement.
- A 35% migration, accomplished in straight-line fashion.
- A 30% migration, accomplished in a 1/t pattern.
- A 25% migration, accomplished in compound-growth pattern. (This scenario is the basis for our summary data.)
- A 23% migration, accomplished in two years.

As discussed in the section *Comparison with Past Analysis*, these scenarios are much more conservative than those assumed in past analyses. As indicated in detail on the following pages, assuming a different adjustment pattern did not significantly alter the findings over the next few years.

# Detroit Model Reporter

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## 1/t Migration: Tax Revenue Differences

(Reductions shown as negative numbers)

<u>Fiscal Year</u>	<u>Total Change</u>	<u>Income Tax, Res</u>	<u>Income Tax, NonRes</u>	<u>Income Tax, Corp</u>	<u>Property Tax</u>	<u>Utility Tax</u>
1999	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2000	\$ (5,402,892)	\$ (2,019,873)	\$ 1,208,718	\$ (271,995)	\$ (3,778,132)	\$ (541,610)
2001	\$ (10,679,865)	\$ (3,276,011)	\$ 1,960,082	\$ (529,181)	\$ (7,782,952)	\$ (1,051,803)
2002	\$ (16,090,769)	\$ (4,291,674)	\$ 2,567,880	\$ (769,516)	\$ (12,025,039)	\$ (1,572,420)
2003	\$ (21,679,819)	\$ (5,138,373)	\$ 3,074,480	\$ (990,814)	\$ (16,515,424)	\$ (2,109,687)

## Compound Growth Migration: Tax Revenue Differences

(Reductions shown as negative numbers)

<u>Fiscal Year</u>	<u>Total Change</u>	<u>Income Tax, Res</u>	<u>Income Tax, NonRes</u>	<u>Income Tax, Corp</u>	<u>Property Tax</u>	<u>Utility Tax</u>
1999	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2000	\$ (5,965,476)	\$ (3,180,473)	\$ 1,903,330	\$ (271,995)	\$ (3,778,132)	\$ (638,206)
2001	\$ (11,181,386)	\$ (4,303,051)	\$ 2,574,133	\$ (529,181)	\$ (7,782,952)	\$ (1,140,335)
2002	\$ (16,362,604)	\$ (4,844,195)	\$ 2,897,958	\$ (769,516)	\$ (12,025,039)	\$ (1,621,812)
2003	\$ (21,660,815)	\$ (5,099,397)	\$ 3,050,889	\$ (990,814)	\$ (16,515,424)	\$ (2,106,069)

## Quick Drop Migration: Tax Revenue Differences

(Reductions shown as negative numbers)

<u>Fiscal Year</u>	<u>Total Change</u>	<u>Income Tax, Res</u>	<u>Income Tax, NonRes</u>	<u>Income Tax, Corp</u>	<u>Property Tax</u>	<u>Utility Tax</u>
1999	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2000	\$ (6,382,827)	\$ (4,039,746)	\$ 2,416,768	\$ (271,995)	\$ (3,778,132)	\$ (709,722)
2001	\$ (11,400,072)	\$ (4,750,851)	\$ 2,841,848	\$ (529,181)	\$ (7,782,952)	\$ (1,178,936)
2002	\$ (16,346,196)	\$ (4,810,236)	\$ 2,877,371	\$ (769,516)	\$ (12,025,039)	\$ (1,618,777)
2003	\$ (21,544,767)	\$ (4,863,683)	\$ 2,909,342	\$ (990,814)	\$ (16,515,424)	\$ (2,084,187)

## Straight-Line Migration: Tax Revenue Differences

(Reductions shown as negative numbers)

<u>Fiscal Year</u>	<u>Total Change</u>	<u>Income Tax, Res</u>	<u>Income Tax, NonRes</u>	<u>Income Tax, Corp</u>	<u>Property Tax</u>	<u>Utility Tax</u>
1999	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2000	\$ (5,646,982)	\$ (2,524,171)	\$ 1,510,898	\$ (271,995)	\$ (3,778,132)	\$ (583,582)
2001	\$ (11,204,427)	\$ (4,351,094)	\$ 2,603,276	\$ (529,181)	\$ (7,782,952)	\$ (1,144,477)
2002	\$ (16,843,721)	\$ (5,824,415)	\$ 3,484,687	\$ (769,516)	\$ (12,025,039)	\$ (1,709,438)
2003	\$ (22,534,010)	\$ (6,865,394)	\$ 4,107,633	\$ (990,814)	\$ (16,515,424)	\$ (2,270,010)

## **Appendix C: Reconciliation of Forecast with Budget**

The following analysis illustrates how the model forecast for major tax revenues matches up closely with the revenues expected for the City budget for the 1998-99 fiscal year.

The projection does not need to match exactly, only to indicate the likely *change* that would occur if the residency requirement could no longer be enforced on City workers.

## Reconciliation: Budget & Projections for Current Period

### City of Detroit Projected Revenue

<u>Source</u>	<u>1998-99</u>
Resident Income Tax	229
NonResident Income Tax	105
Corporate Income Tax	<u>29</u>
Municipal Income Tax	363
Property Tax	189
Utility Tax	<u>56</u>
<b>Total Major Taxes</b>	<b>608</b>

### City of Detroit Budgeted Revenue

<u>Source</u>	<u>1998-99</u>
Resident Income Tax	
NonResident Income Tax	
Corporate Income Tax	<u></u>
Municipal Income Tax	368
Property Tax	188
Utility Tax	55
<b>Total Major Taxes</b>	<b>611</b>

*Note: Breakdown of municipal income tax collections in model is based on actual filings;  
City Budget does not include detail on resident, nonresident, and corporate income tax.*

## **Appendix D: Comparison with Previous Analysis**

The following analysis begins with the results found by Thompson in his 1985 analysis of the likely effects of a loss of residency. Thompson's assumptions were less conservative than those used here; in particular, he used a multiplier of 2.0 (rather than the 1.25 here) and expected over 30% of the employees to migrate. The section *Comparison with Past Analysis* discusses the Thompson analysis and the differences in assumptions.

As detailed in the attached worksheets, Thompson's 1985 results, properly corrected for relative prices and the scale of the municipal workforce, are quite similar to ours. This provides an independent verification of the general findings of this report.

**Comparable Past Analyses: Thompson (1985)**

Number of Likely Migrating City Employees:		6,506
Average Annual Tax Revenue Impact Per Employee:		\$ 1,227.33
Total Annual Revenue Impact on City of Detroit, 1985		\$ 7,984,998.04
Price Deflator: (Adjusts to 2000 dollars)	(a)	<u>1.47</u>
Direct Revenue Impact in 2000 dollars		\$ 11,716,373.53
Multiplier (Thompson p. 20); Generates Indirect Effects		<u>2.0</u>
<b>Direct and Indirect Revenue Impact</b>		<b>\$ 23,432,747.06</b>
Correction for Lower Income Tax Rates (divide)	(b)	1.15
Corrections, higher municipal workforce proportion (mult ( c )		<u>1.19</u>
<b>Adjusted Total Impact in Current Period</b>		<b>\$ 24,259,271.99</b>

(a) Deflator to change from 1985 to 2000 dollars

<i>Implicit Price Deflator, 1985 IIIQ</i>	78.76
<i>Implicit Price Deflator, 1998 IIIQ</i>	112.84
<i>estimated 2000 IIIQ at 1.2% per annum</i>	<u>115.6</u>
Price deflator from 1985 to 2000:	1.467298235

(b) Income and corporate tax rates were higher in the 1980's than projected over the next ten years; Municipal workforce was a smaller share of overall workforce;

<i>Resident Income Tax Rate, 1985:</i>	3.00%
<i>Resident Income Tax Rate, 2002:</i>	<u>2.60%</u>
Ratio	1.15

*Lower tax rates means the revenue impact would be smaller during future years.*

( c )

<i>Residents income tax returns filed, 1985</i>	283837
<i>Residents income tax returns filed, 1995</i>	<u>237611</u>
Ratio	1.19

*This larger share of municipal workers means the revenue impact of similar migration would be larger during future years.*

Comparable Past Analyses: Thompson (1985)

Direct City Tax Revenue Loss Per Family  
(Thompson Table 6)

	<u>Police</u>	<u>Fire</u>	<u>Other</u>	<u>weighted average</u> (a)
Income Tax	\$ 604	\$ 607	\$ 443	
Property Tax	\$ 831	\$ 834	\$ 609	
<u>Utility</u>	<u>\$ 76</u>	<u>\$ 76</u>	<u>\$ 57</u>	
<i>Total</i>	<i>\$ 1,511</i>	<i>\$ 1,517</i>	<i>\$ 1,109</i>	<i>\$ 1,227.33</i>

Employees Migrating (Thompson Table 5)

<u>Police</u>		<u>Fire</u>		<u>Other</u>		<u>Total</u>		
<u>number employed</u>	<u>share migrating</u>	<u>number employed</u>	<u>share migrating</u>	<u>number employed</u>	<u>share migrating</u>	<u>number employed</u>	<u>share migrating</u>	<i>percent</i>
3,779	2,295	1,347	807	12,357	3,404	17,483	6,506	37%

(b)

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(a) Weighted by number of employees in each category. Also could be weighted by number migrating. The latter weighted average would be: \$ 1,301.41

(b) Current Detroit statistics indicate 18,374 employees in 1985.

## **Appendix E: Graphical Description of Forecast Model**

The following figures illustrate graphically the comprehensive model used to forecast economic and demographic changes in the City, and the resulting changes in major tax revenues.

The model simulates the workings of the City's economy as follows:

1. We make assumptions about the number of workers, trend economic growth rate, population, and other variables. These are shown along the left side of the graphical illustration of the model.
2. We make a few parameter adjustments, which introduce a change. In this case, we change the residency rule from residency required (the current, or base case), to residency no longer required.
3. We project population based on these assumptions and parameters. The population module, and the sub-modules beneath it, project population and migration.
4. The growth multiplier module calculates growth multipliers for the City economy, under different scenarios.
5. The tax base module takes the economic growth--calculated earlier--and the population--also calculated earlier--and calculates the tax bases for the major City taxes.
6. The tax revenue module calculates tax revenue to the City, using the tax revenue calculated earlier, assumed tax rates, and other factors.
7. This tax revenue is reported back, in dollars per year, per tax. The difference in the tax revenue stream, between the base case (residency required) and the law-change scenarios, is the direct tax revenue effect on the City.

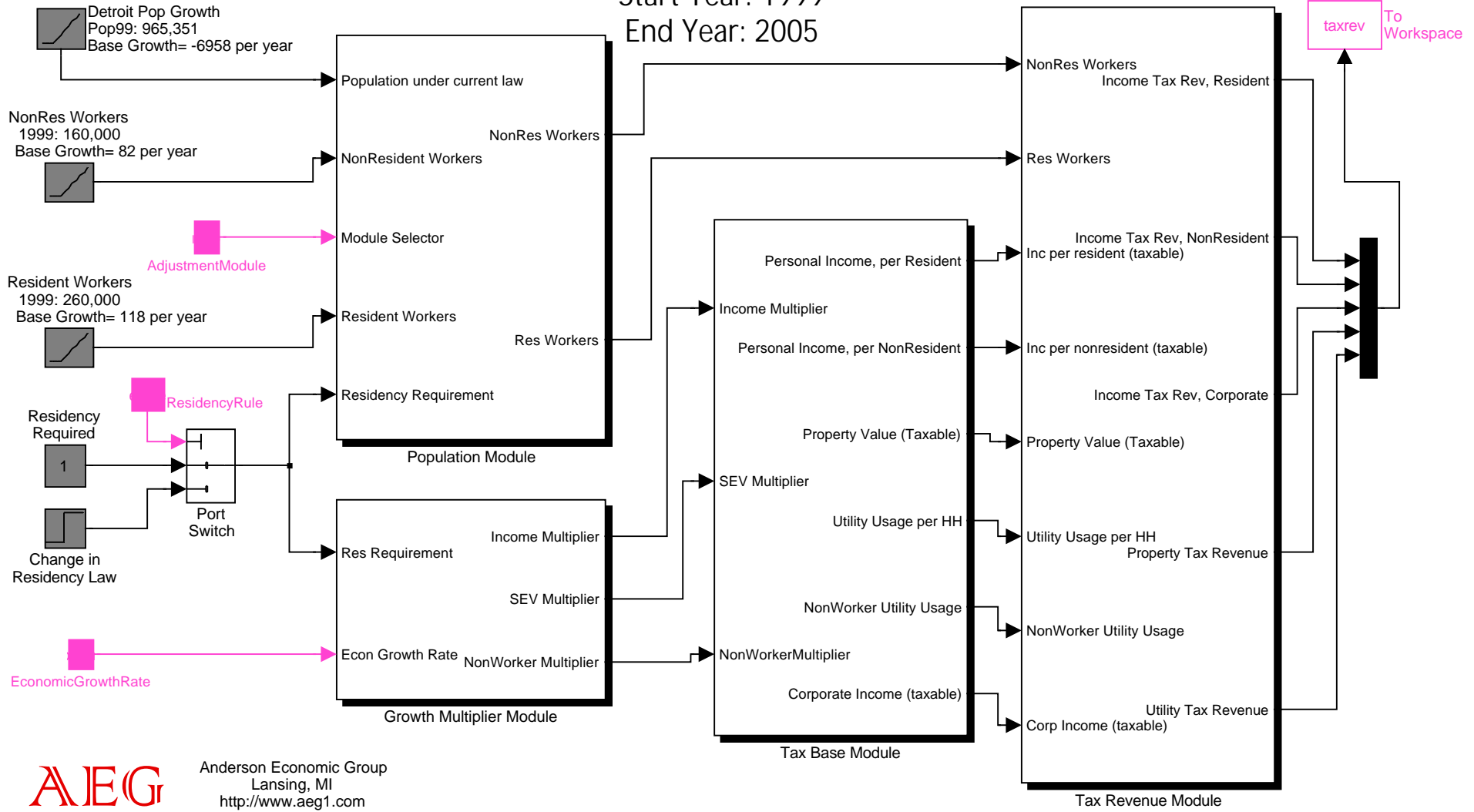
The various assumptions and parameters are discussed in the appendix entitled *Assumptions*.

**Initial Conditions**

# Detroit Labor Arbitration Revenue Model

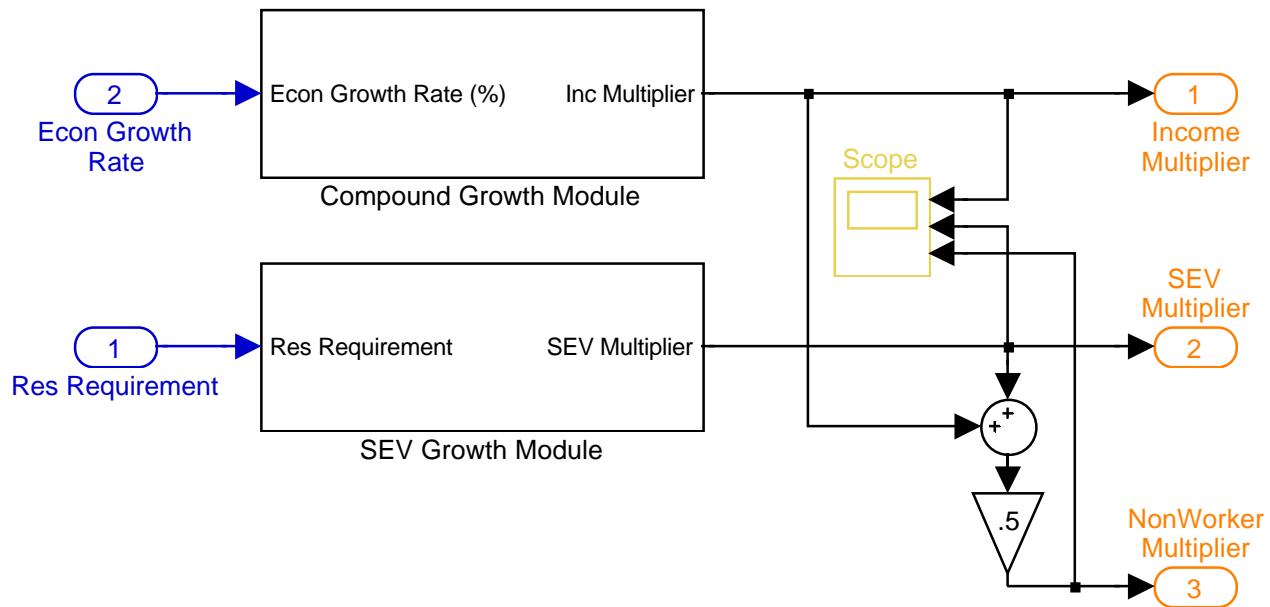
Start Year: 1999

End Year: 2005



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

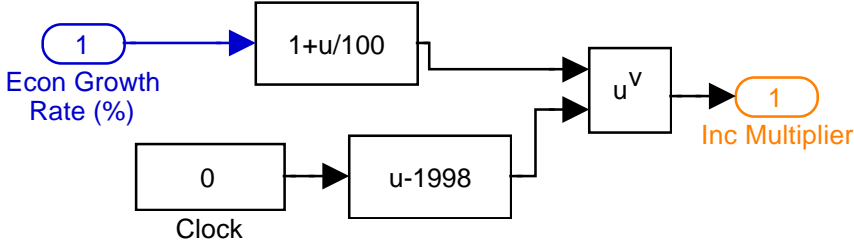
# Detroit Model/Growth Multiplier Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

This module outputs 3 different multipliers

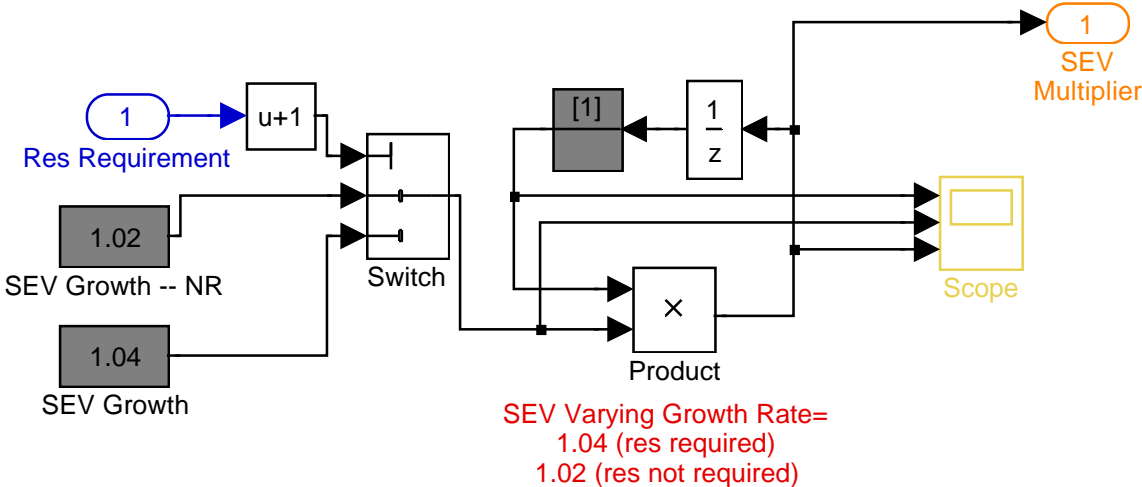
# Economic/Growth/Compound Growth Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

Straightforward output of compounded economic growth.

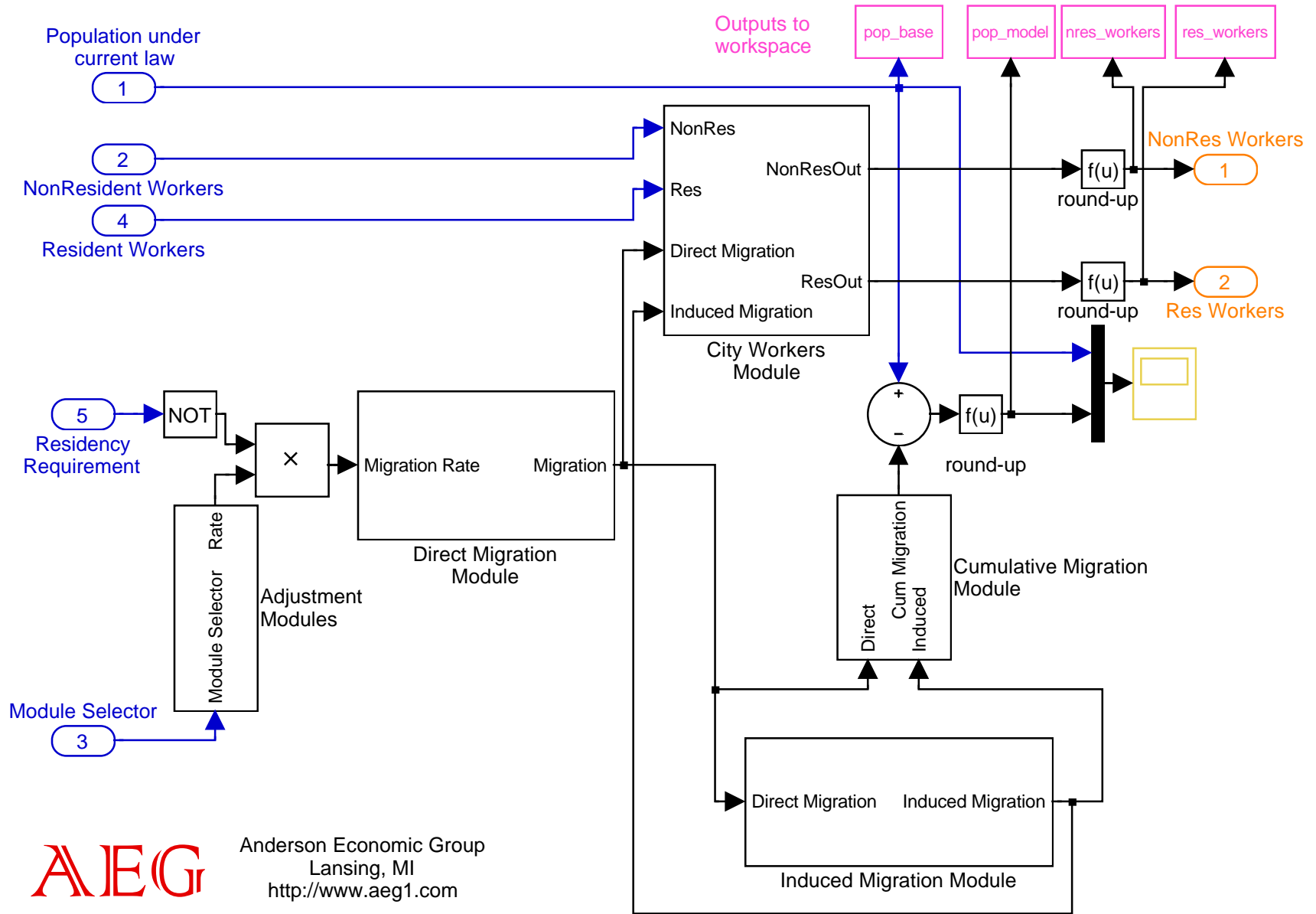
# Economic/Growth/SEV Growth Module



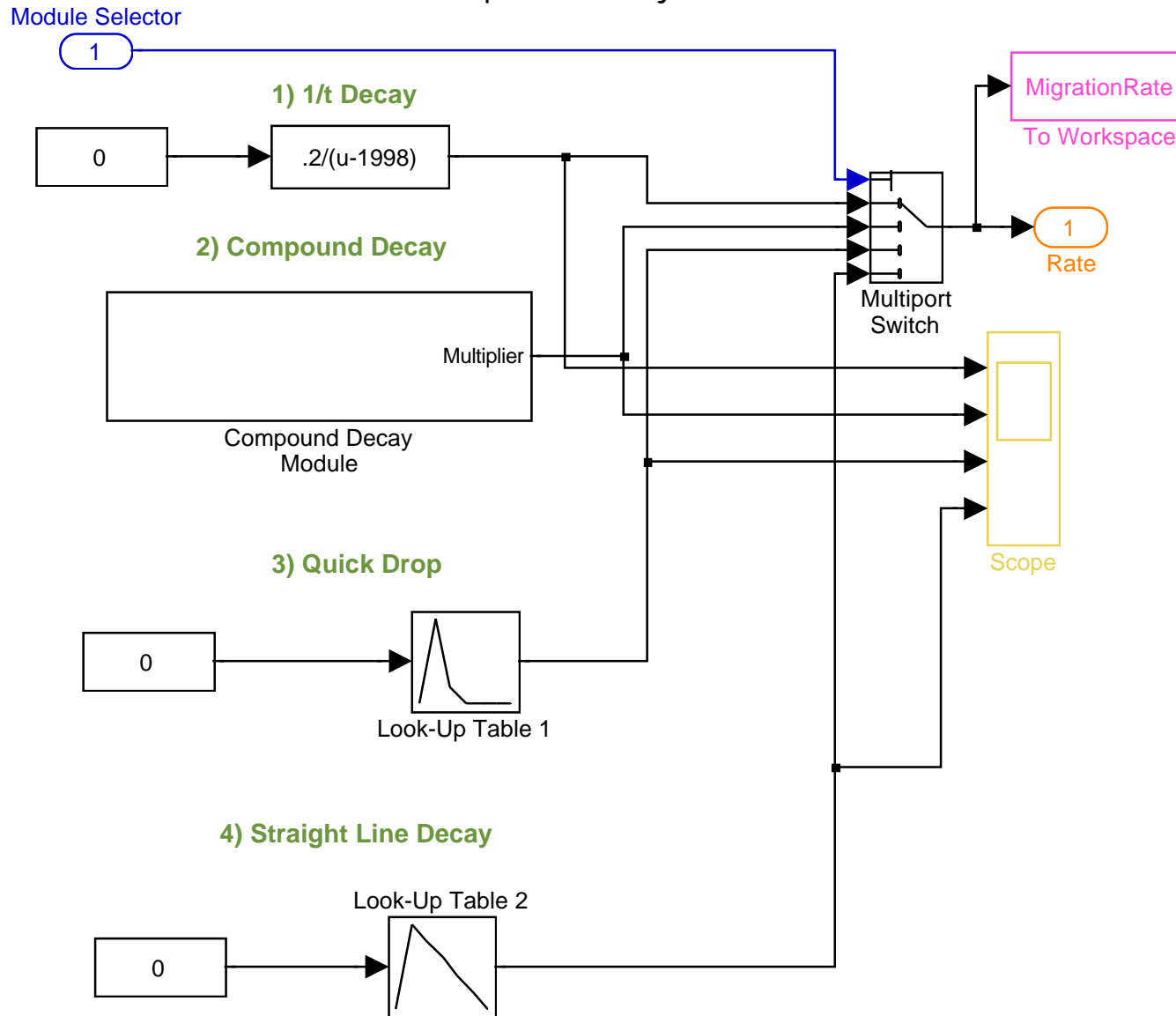
Anderson Economic Group  
 Lansing, MI  
<http://www.aeg1.com>

This Module outputs an SEV multiplier based on residency requirements.

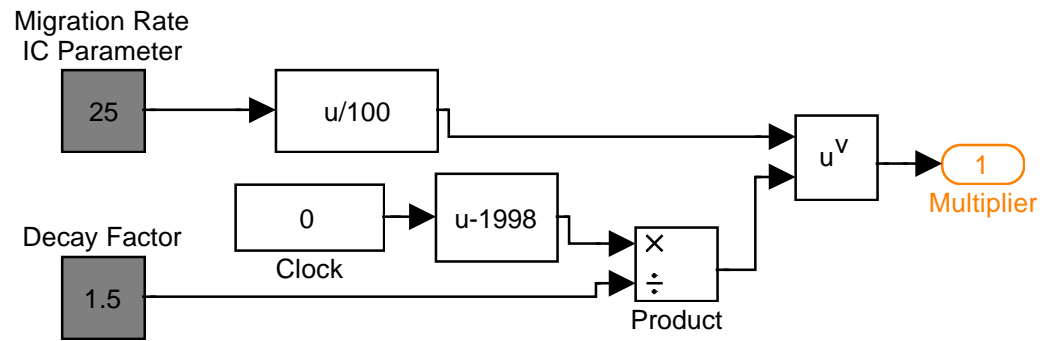
# Detroit Model/Population Module



# Population/Adjustment Modules

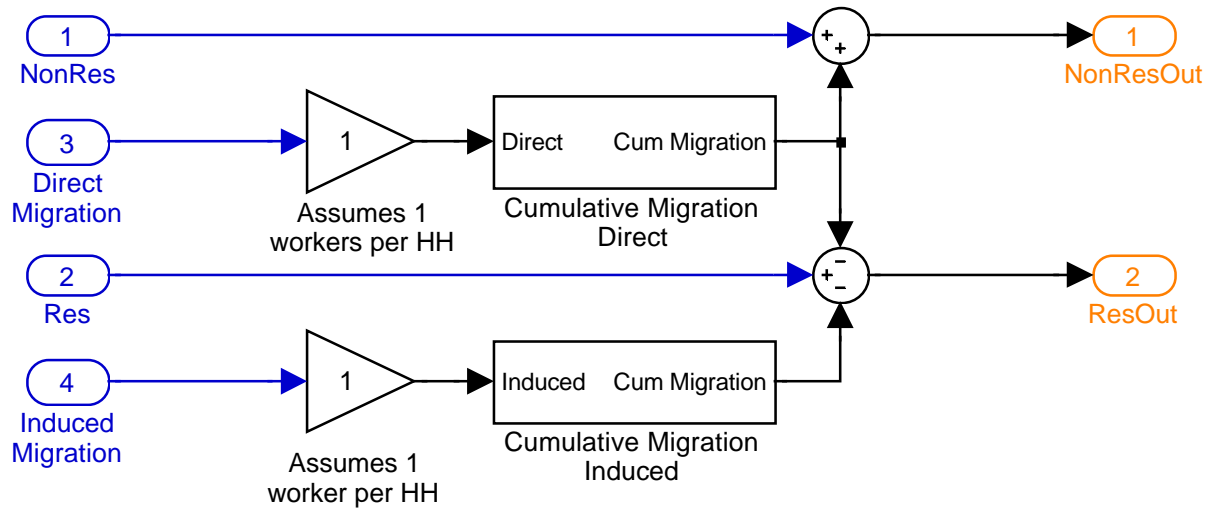


## Population/Adjustment/Compound Decay Module



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Lansing, MI  
<http://www.aeg1.com>

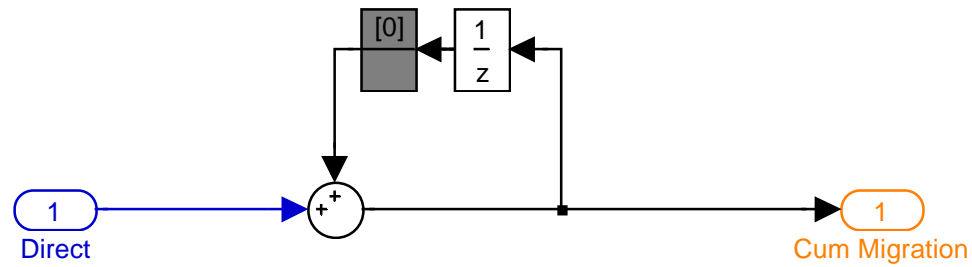
## Population/City Workers Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

Module adds directly migrating workers (those employed by the city who choose to move outside the city) to non-res workers and subtracts them from resident workers. Also subtracts induced migrants from resident workers, assuming that they no longer work or live in the city.

## Population/City Workers/Direct Cumulative Migration Module

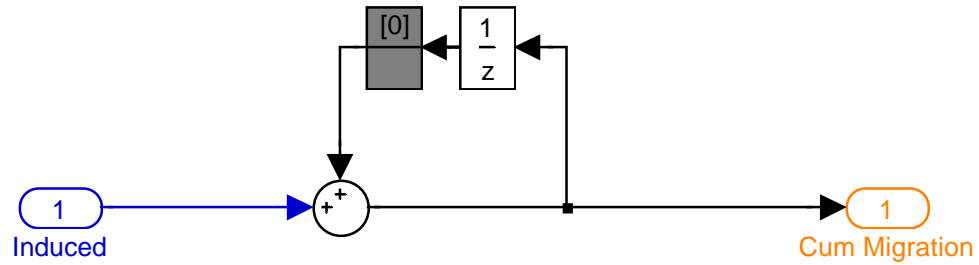


**AEG**

Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

This module  
computes cumulative  
direct migration

## Population/City Workers/Induced Cumulative Migration Module

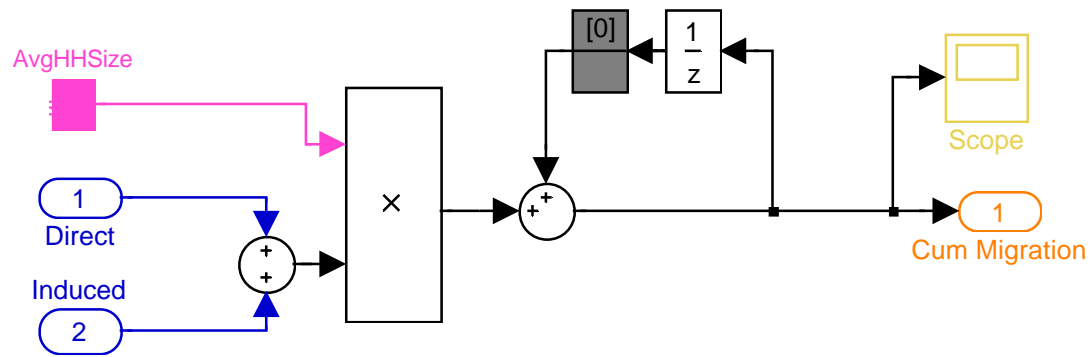


**AEG**

Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

This module  
computes cumulative  
induced migration

## Population/Cumulative Migration Module

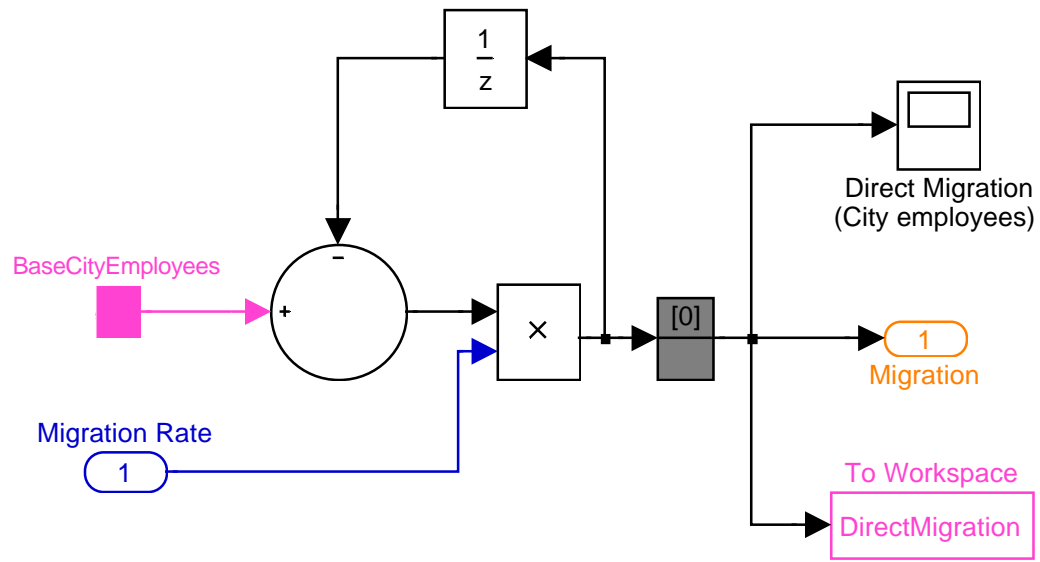


**AEG**

Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

This module  
computes cumulative  
total migration

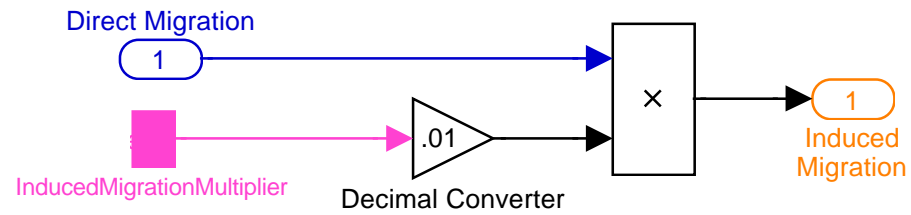
## Population/Direct Migration Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

Module applies migration rate  
to City of Detroit employees.

## Population/Induced Migration Module

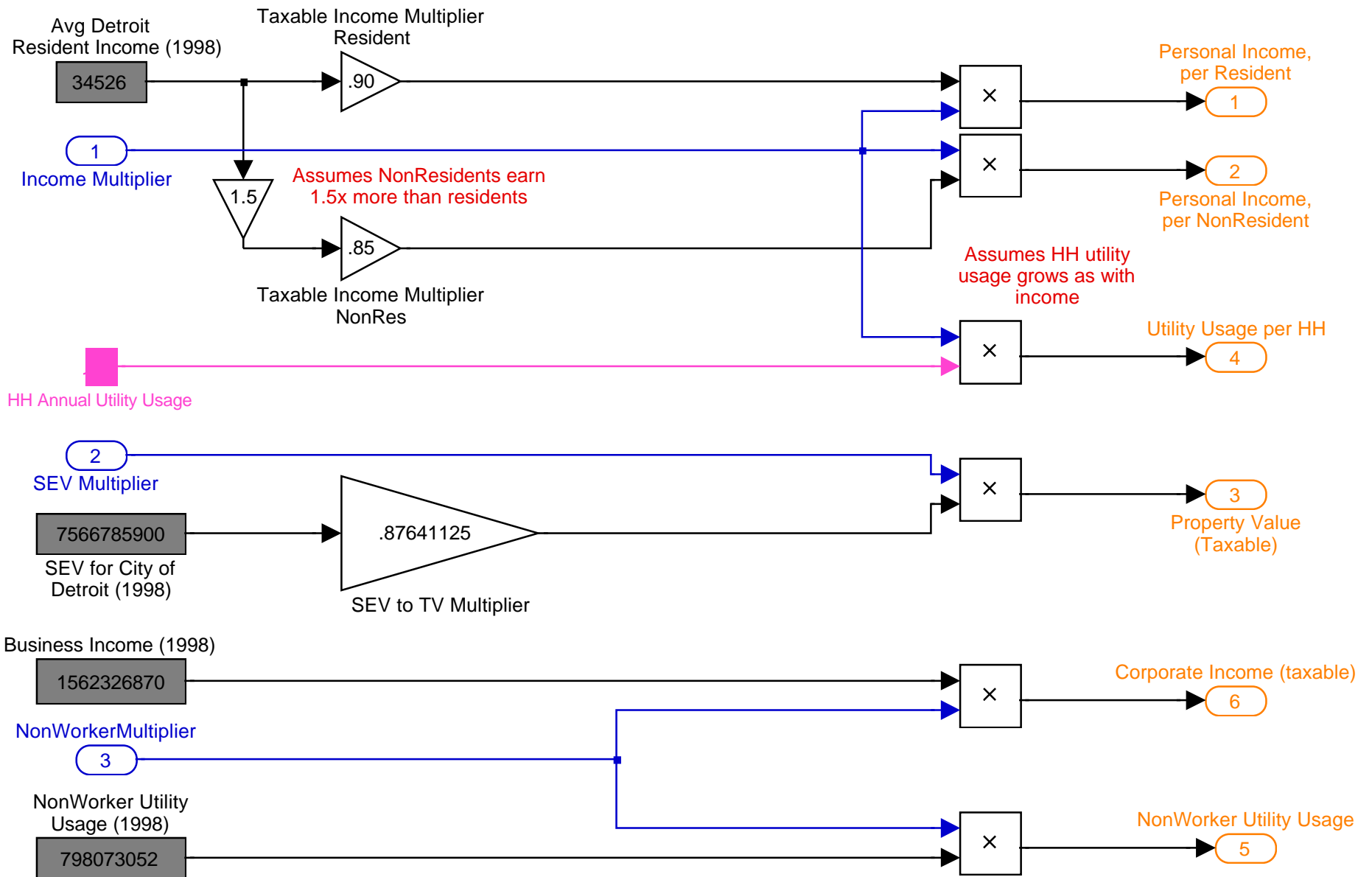


**A E G**

Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

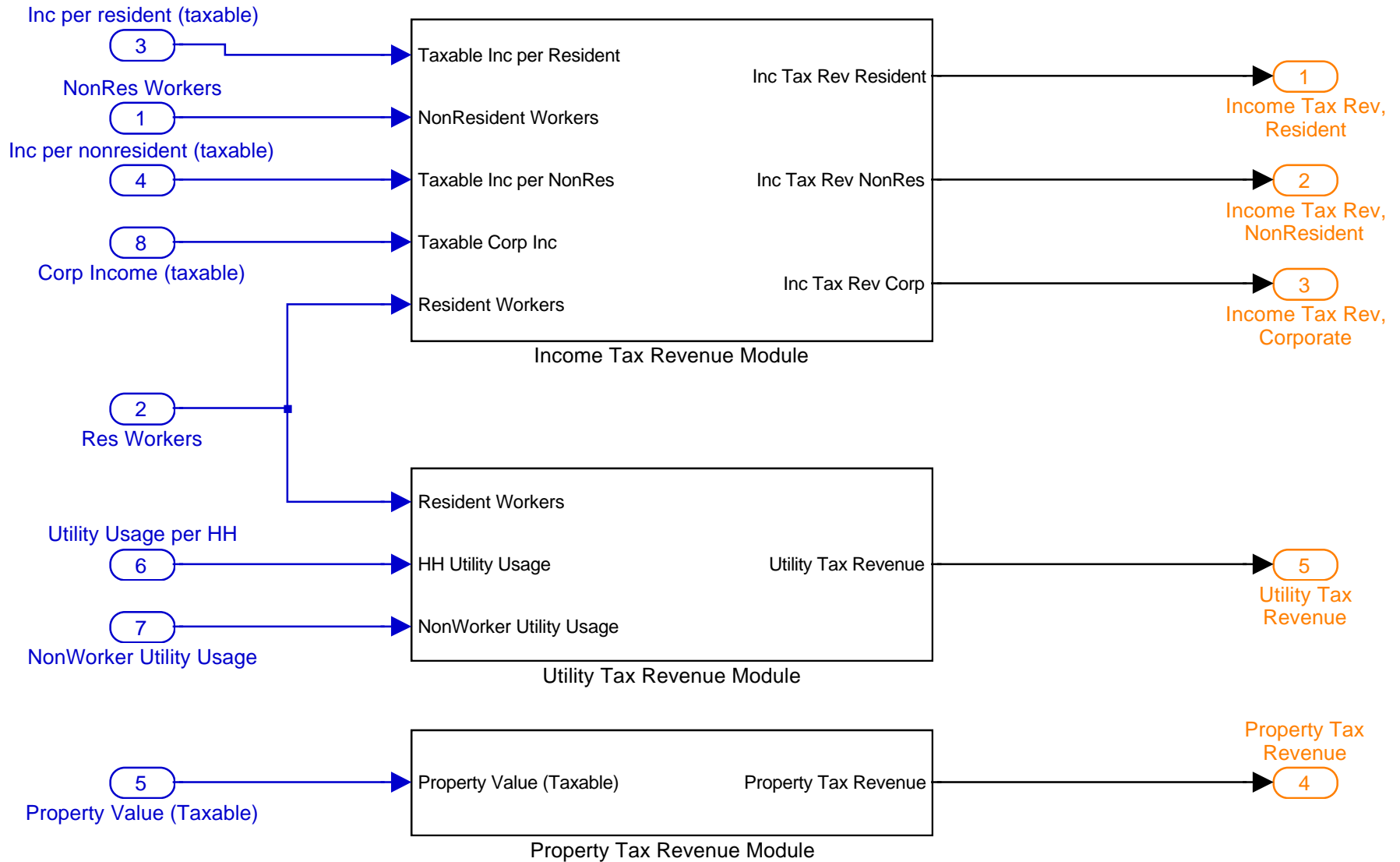
If multiplier is equal to 25, for every 4 city-employees that leave, one resident worker will leave.

# Detroit Model/Tax Base Module



This module applies growth rate multipliers to tax base numbers.

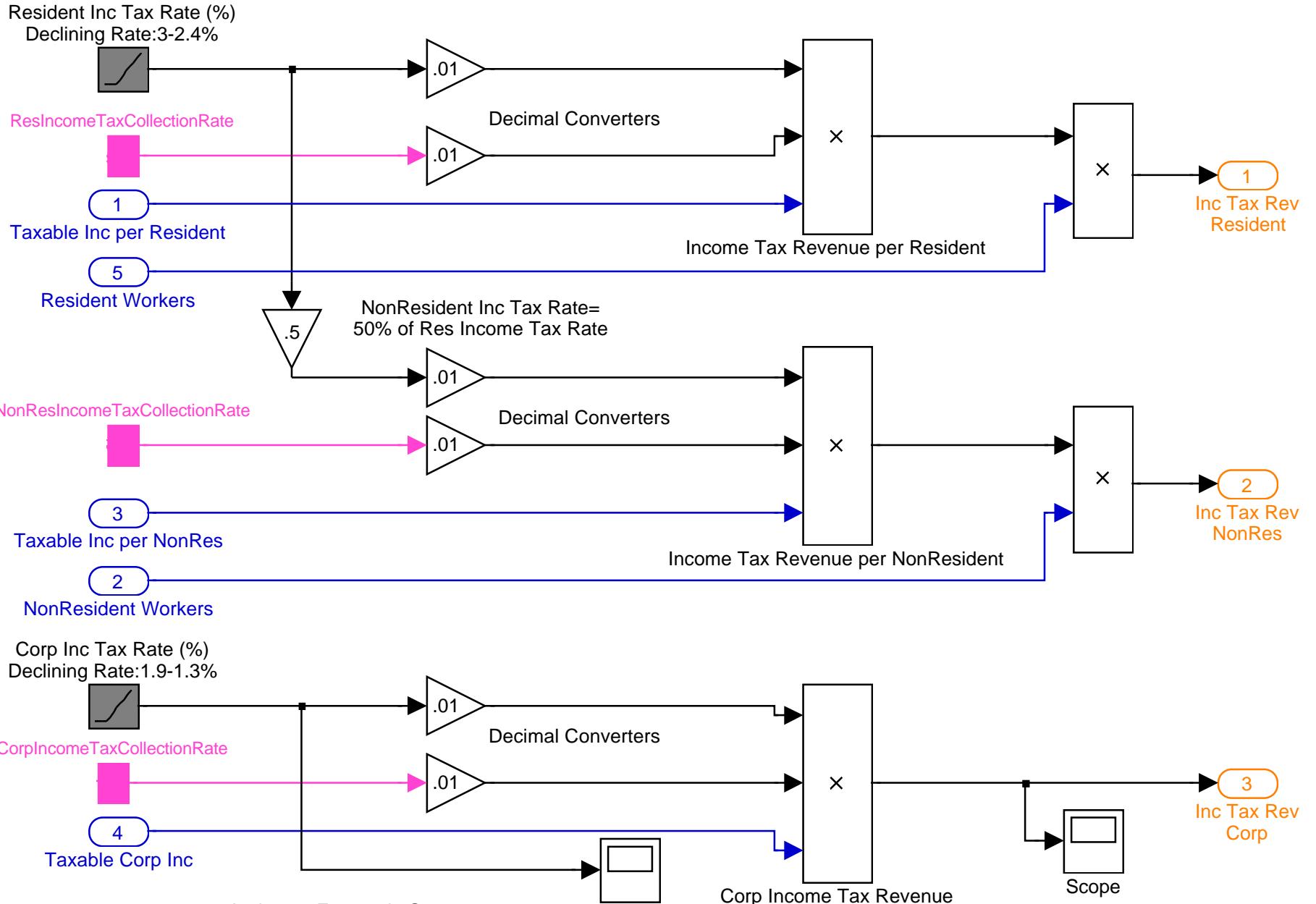
# Detroit Model/Tax Revenue Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

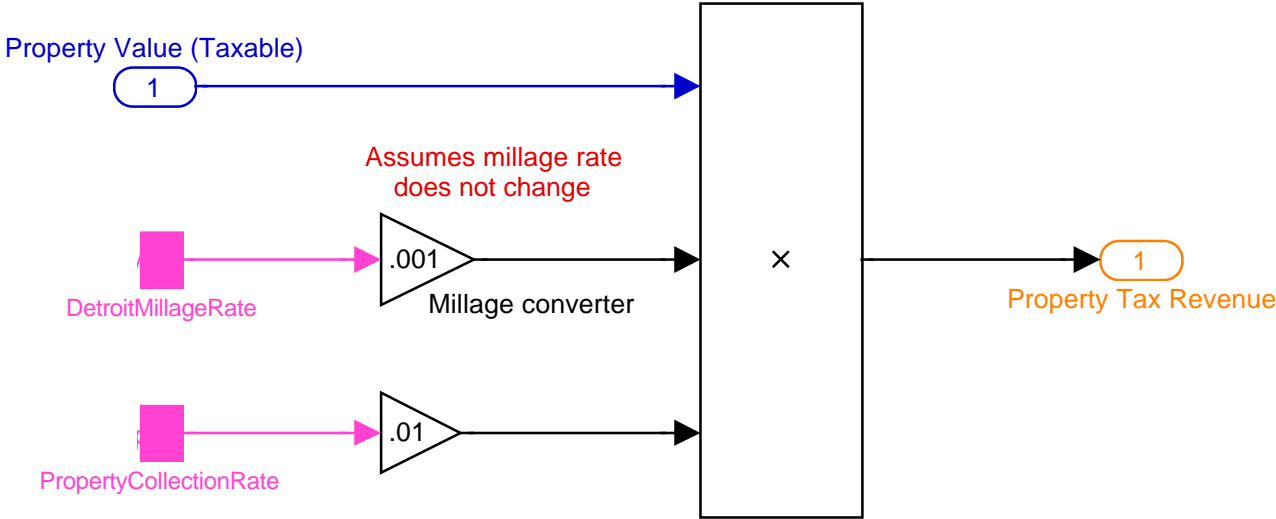
This module takes tax and collection rates, applies them to tax bases (taxable income for resident and nonresident workers, taxable value of property, and utility usage) and calculates tax revenue to the City.

# Tax Revenue/Income Tax Revenue Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

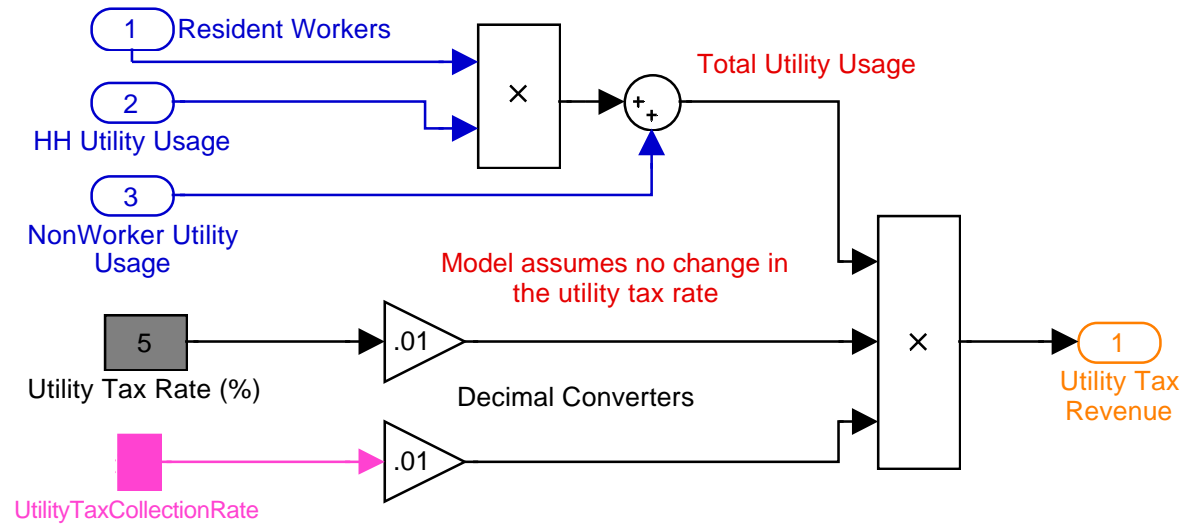
# Tax Revenue/SEV Revenue Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>

Module takes property values, millage rate, and collection rate, and calculates property tax revenue.

## Tax Revenue/Utility Tax Revenue Module



Anderson Economic Group  
Lansing, MI  
<http://www.aeg1.com>