

AC 2008-1318: THE REGIONAL ECONOMIC IMPACT OF THE PROPOSED CAPITAL IMPROVEMENT OF THE SOUTH WEST SEWER DISTRICT IN SUFFOLK COUNTY – A STUDENT ASSISTED PROJECT.

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Abstract

Rt 110 Redevelopment Corporation is a non-profit community development organization. The corporation provided a community research grant to the Architecture and Construction Management department to study the economic impact of capital improvement of South West Sewer District in Suffolk County, New York. The department used the grant to include undergraduate students to expose them to community based construction research. The paper describes outcome of the project. The planned \$25 million capital improvement yearly to the South West Sewer District in Suffolk County will create jobs during both the construction phase and once the project becomes operational. Direct expenditures associated with the project will be injected into the New York State economy and the Long Island economy in general and Suffolk County economy in specific and will undergo several rounds of re-spending so that their ultimate impact is a multiple of the original expenditure. This is the so called multiplier or ripple effect. Direct spending associated with such construction and infrastructure projects have unusually large multipliers because it caters to the needs of both the citizenry and will be utilized by a broad array of local businesses and industries, which include - retail establishments, manufacturing units, restaurants and hotels, service sector entities like educational institutions, research centers and service businesses like telecommunication, medical, legal, entertainment and technology firms. Therefore, any expansion of the Suffolk Sewage System on route 110 of the Suffolk County will have a disproportionately large positive impact on the regional economy. The paper will document the rationale and process of economic impact analysis.

Overview of the proposed Capital Improvement

The planned \$25 million capital improvement yearly to the South West Sewer District in Suffolk County will create jobs during both the construction phase and once the project becomes operational. Direct expenditures associated with the project will be injected into the New York State economy and the Long Island economy in general and Suffolk County economy in specific and will undergo several rounds of re-spending so that their ultimate impact is a multiple of the original expenditure. This is the so called multiplier or ripple effect. Direct spending associated with such construction and infrastructure projects have unusually large multipliers because it caters to the needs of both the citizenry and will be utilized by a broad array of local businesses and industries, which include - retail establishments, manufacturing units, restaurants and hotels, service sector entities like educational institutions, research centers and service businesses like telecommunication, medical, legal, entertainment and technology firms. Therefore, any expansion of the Suffolk Sewage System on route 110 of the Suffolk County will have a disproportionately large positive impact on the regional economy.

An Overview of the Methodology Used

The foregoing expenditures will be injected into the Suffolk County economy and will undergo several rounds of re-spending. Therefore their ultimate economic impact will be a multiple of the original expenditure. For example, construction workers spend their

wages in local supermarkets. These supermarkets in turn buy merchandise from other Suffolk County firms and the process continues through several more rounds.

This secondary economic impact can be estimated by applying an input-output model of the local economy. The following analysis uses the Regional Input-Output Modeling System or RIMS II, developed by the Bureau of Economic Analysis of the U.S. Commerce Department. The model traces the inter-industry flow of business activity on Long Island. It contains multipliers for output, earnings and employment. (See Appendix)

- The output multipliers demonstrate how much Suffolk County's total output of goods and services, its gross metropolitan product, increases in response to each dollar of spending associated with the proposed project.
- The earnings multipliers demonstrate the increase in Suffolk County earnings associated with each dollar of spending for the proposed project.
- The employment multipliers indicate how many secondary jobs are likely to be created throughout the Suffolk County economy in response to each million dollars of spending on the proposed project.

The multipliers are industry specific. Therefore, it is possible to determine how each of Suffolk County's major industries will be affected by the proposed project. For purposes of analysis, it has been assumed that all spending during the construction and permanent phases of operation remains within the Suffolk County economy and is subject to the multiplier process. In reality, some leakage occurs as when construction workers spend their earnings off Suffolk County or when construction firms purchase supplies from vendors located off Long Island. This leakage is generally relatively minor and should not materially affect the findings.

Although the model pertains to the NY State economy and Long Island economy as a whole, the greatest positive impact is likely to occur in nearby communities in Suffolk County and especially so for regional economy around Route 110. The mix of economic activity in each of these communities is shown below. The industries most likely to benefit include retail trade, food services and accommodations. However, all industries will benefit to some extent. In this study we only look into the impact on the regional economy and not the impact on NY State's economy as a whole.

The Economic Impact of Construction

RIMS II multipliers for the construction industry were applied to the \$25 million in construction spending for the capital improvements to the South West Sewer District and attendant site work. The secondary economic impact has been analyzed separately to demonstrate the likely economic impact of the project during its construction phase. The multipliers used pertain specifically to Long Island's construction industry and are shown below. They suggest that each dollar of construction spending is likely to cause Long Island's output of goods and services to increase by more than \$1.88 including the original expenditure. This is equivalent to a net output increase of 88 cents. In response to each dollar of construction spending, Long Island earnings would increase by more than 50 cents. Each million dollars of construction spending would create more than 13 additional jobs in a broad array of Long Island industries.

Relevant Construction Multipliers

| Industry | Output Multipliers | Earnings Multipliers | Employment Multipliers |
|----------------------------------|--------------------|----------------------|------------------------|
| Agriculture, Forestry, Fisheries | .0086 | .0038 | .1874 |
| Construction | 1.0123 | .2644 | 6.2720 |
| Manufacturing | .1504 | .0349 | .8559 |
| Transportation | .0292 | .0093 | .2791 |
| Communications | .0209 | .0040 | .0476 |
| Utilities | .0147 | .0025 | .0280 |
| Wholesale Trade | .0702 | .0195 | .3719 |
| Retail Trade | .0890 | .0291 | 1.3253 |
| Finance | .0550 | .0138 | .1819 |
| Insurance | .0338 | .0099 | .1733 |
| Real Estate | .0966 | .0040 | .1290 |
| Hotels & Tourist Accommodations | .0123 | .0036 | .1753 |
| Personal Services | .0083 | .0033 | .1835 |
| Business Services | .1642 | .0606 | 1.3856 |
| Eating & Drinking Places | .0202 | .0061 | .3874 |
| Health Services | .0604 | .0245 | .6018 |
| Miscellaneous Services | .0390 | .0115 | .4786 |
| Households | <u>.0000</u> | <u>.0008</u> | <u>.0583</u> |
| Total | 1.8851 | .5056 | 13.1219 |

Source: RIMS II Input-Output Model

The Capital Improvements to the South West Sewer District. Construction expenditures totaling \$25 million for this project are likely to cause Long Island's output of goods and services to expand by more than \$47 million including the original expenditure. This is equivalent to a net output increase of about \$22 million. Long Island earnings are likely to increase by more than \$12.64 million and almost 328 secondary jobs could be created throughout the Long Island economy. The greatest impact would occur within the construction industry, where output could increase by some \$25 million. Construction industry earnings would rise by more than \$6.61 million and about 157 construction jobs would be created. However, all industries would benefit, including manufacturing firms and firms providing business services.

Economic Impact of Capital Improvements to South West Sewer District

| Industry | Output Increase* | Earnings Increase | Employment Increase |
|----------------------------------|------------------|-------------------|---------------------|
| Agriculture, Forestry, Fisheries | 215000 | 95000 | 4.685 |
| Construction | 25307500 | 6610000 | 156.8 |
| Manufacturing | 3760000 | 872500 | 21.3975 |
| Transportation | 730000 | 232500 | 6.9775 |
| Communications | 522500 | 100000 | 1.19 |
| Utilities | 367500 | 62500 | 0.7 |
| Wholesale Trade | 1755000 | 487500 | 9.2975 |
| Retail Trade | 2225000 | 727500 | 33.1325 |

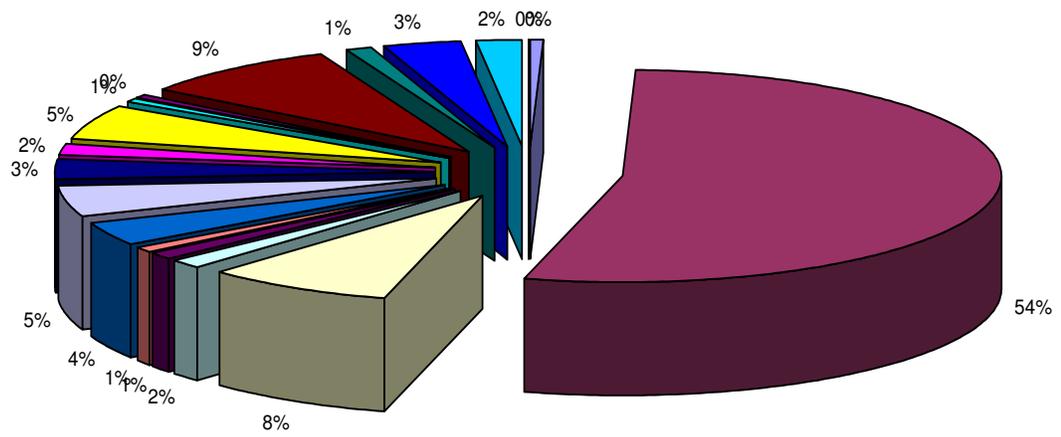
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|---------------------------------|-----------------|-----------------|-----------------|
| Finance | 1375000 | 345000 | 4.5475 |
| Insurance | 845000 | 247500 | 4.3325 |
| Real Estate | 2415000 | 100000 | 3.225 |
| Hotels & Tourist Accommodations | 307500 | 90000 | 4.3825 |
| Personal Services | 207500 | 82500 | 4.5875 |
| Business Services | 4105000 | 1515000 | 34.64 |
| Eating & Drinking Places | 505000 | 152500 | 9.685 |
| Health Services | 1510000 | 612500 | 15.045 |
| Miscellaneous Services | 975000 | 287500 | 11.965 |
| Households | 0 | 20000 | 1.4575 |
| Total | 47127500 | 12640000 | 328.0475 |

*Including original expenditure; Source: Consultant's computations based on RIMS II multipliers.

Tax Benefits to Suffolk County (Direct, Indirect and Induced tax benefits). The Suffolk County tax receipts from this project can be expected in terms of sales tax, property tax, and additional taxes revenues attributable to the increased economic growth of the region from commercial and industrial sectors. Even at 5% tax revenues per annum on the \$25 million capital investment, it will yield \$1,250,000 in tax revenue. If the project life is expected to be 25 years, it projects an incremental revenue gain to Suffolk County of \$31.25 million. This study did not take into account the revenues generated by the NY State and regional linkage organizations like MTA as a result of this project.

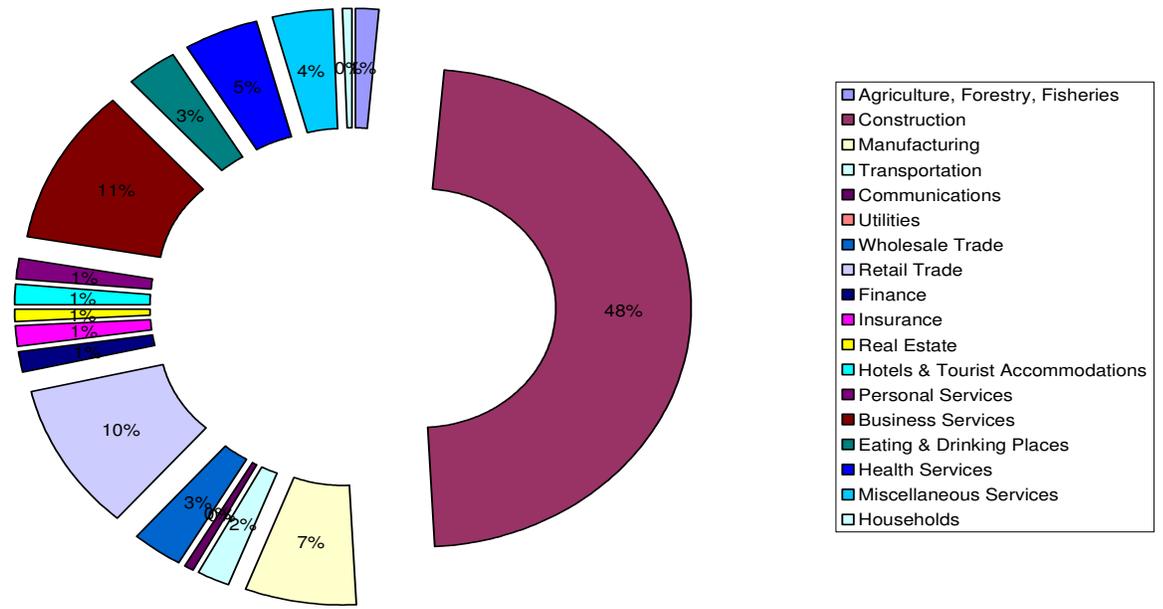
In final analysis, the planned \$25 million capital improvement to the South West Sewer District will create in Suffolk County an economic impact to the tune of \$ 4,71,27,500 in output increase, \$ 1,26,40,000 in earning increases and \$1,250,000 in tax revenues. This is a total of \$ 61 million and 328 new jobs impact in the year of project implementation. Over the next 25 years of expected project life, the total yield from this capital investment can be projected at approximately \$ 91 million to the regional economy.

Capital Improvement Impact on Output Increase



| | | | |
|----------------------------------|-------------------|--------------------------|---------------------------------|
| Agriculture, Forestry, Fisheries | Construction | Manufacturing | Transportation |
| Communications | Utilities | Wholesale Trade | Retail Trade |
| Finance | Insurance | Real Estate | Hotels & Tourist Accommodations |
| Personal Services | Business Services | Eating & Drinking Places | Health Services |
| Miscellaneous Services | Households | | |

Capital Improvement Impact on Regional Employment



Appendix

Economic Multipliers

The economic multiplier is an important tool in regional economic impact analysis. The idea stems from economic base theory, which classifies goods and services sold outside the region's boundaries as "exports", and hence, basic. Conversely, goods and services produced by the non-basic sector are consumed within the region's boundaries. Expansion of the basic sector of the economy necessarily entails added production in these support industries, particularly in terms of intermediate inputs, all of which adds to the overall development of a regional economy.

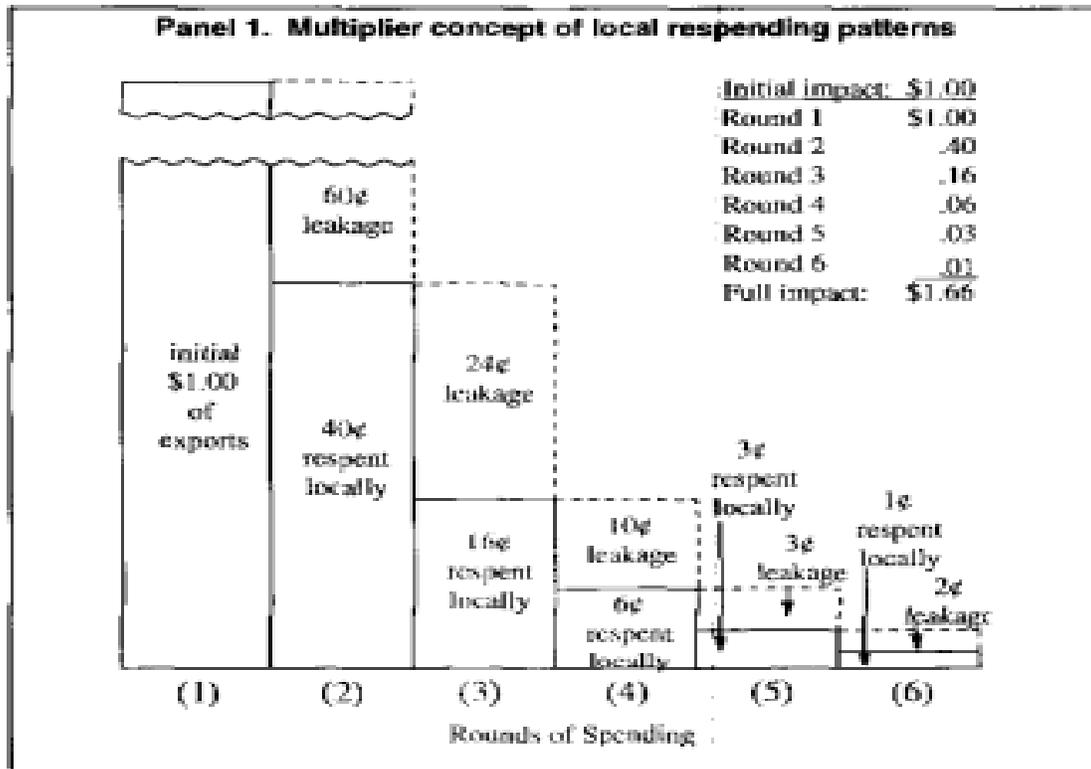
Over the years, economic analysts have refined economic base theory to account for how expansion of final demand for basic sector output -- in the form of increased exports, sales to government, final investment, and consumption demand -- translates into changes in the greater regional economy. The link is the economic multiplier.

The economic multiplier summarizes the cumulative (direct, indirect, and induced) effect of an initial change in final demand plus the resulting series of successive rounds of spending within the local economy. It is the ratio between the total change in spending and the initial change in final demand (or the income or employment implied by it).

This phenomenon is illustrated in Panel 1. In this simple economy, the firm producing the goods for export or delivery to other final demand sectors uses the proceeds to pay for labor, intermediate inputs, and the other costs of doing business. Of the revenue received, some proportion, say 40 percent, is spent by the business and local residents for goods and services (including local taxes). The remaining 60 percent, in a sense, "leaks out". This leakage, in the form of savings, tax payments to authorities outside the local region, and payments for imports, represents money no longer available for expenditure in the local economy.

Suppose the basic sector in this economy increases exports by \$1.00. This \$1.00 represents the direct change in final demand. Later rounds in the cycle produce less additional spending than earlier ones due to leakages. For example, during the second round of spending, 40¢ will be re-spent in the local economy generating additional business activity, and the other 60¢ will leak out. In the third round, 16¢ will be re-spent locally and 24¢ will leak out, and so on.

After six rounds, the increment in local spending is less than 1¢. When the increment in additional spending approaches zero, the cycle is complete. In this example, the cumulative effects of the initial (direct) increase in final demand (\$1.00) plus the successive rounds of re-spending (\$.66) within the local economy is \$1.66. The economic multiplier for this economy is 1.66 ($\$1.66 / \1.00).



Estimates of Economic Multipliers

For important sectors of New York's economy, we have calculated economic multipliers for two variables: **total income (TI)**, and **employment (EMP)**. Multipliers for **TI** report the change in the sum of employee compensation, proprietary income from self-employment, and other property income per \$1 of direct increase in regional income or payrolls. **EMP** multipliers account for the total change in full-time equivalent (FTE) jobs associated with the direct creation of an initial job to produce output going to final demand.

Following procedures used earlier in this series, the New York economy is divided into nine broad sectors: agriculture; mining; construction; services; manufacturing; transport and utilities; retail and wholesale trade; finance, insurance and real estate (FIRE); and other industry, which is mostly government. In turn, the 12 industry groups within the agricultural sector were organized into production agriculture and agricultural manufacturing categories.

Panel 2 below reports the economic multipliers estimated in this study. The **TI** multipliers for both the production agriculture and agricultural manufacturing industries compare favorably with those of the nonagricultural sectors. For example, the highest **TI** multiplier for a nonagricultural sector (construction) is 1.66, while the median for the production agriculture industries and agricultural manufacturing is 1.66 and 2.03, respectively. The **TI** multipliers for the production agriculture industries tend to be highest of all. Also notable is that two of the three largest **TI** multipliers come from the

dairy industry, reflecting its greater degree of integration within the overall New York economy.

With respect to **EMP** multipliers, the seven largest values are in the agricultural manufacturing industries. The median value for agricultural manufacturing industries is 2.10, while the medians for production agriculture and nonagricultural sectors are similar to one another at 1.45 and 1.51, respectively. Among the agricultural sector industries, the higher **EMP** multiplier values for agricultural manufacturing reflect the relatively higher labor intensity of processing activities compared with production agriculture. Also notable is the extremely large **EMP** multiplier value for dairy processing. At 3.53, it is almost twice as large as that for mining, the highest among the nonagricultural sectors.

| | <i>Total income (TI)</i> | <i>Employment (EMP)</i> |
|---|------------------------------|-----------------------------|
| <u>Production Agriculture Industries</u> | | |
| Dairy | 2.29 | 1.52 |
| Crops | 2.28 | 1.51 |
| Nursery and wood products | 1.78 | 1.39 |
| Poultry and livestock | 1.64 | 1.37 |
| <u>Agricultural Manuf. Industries</u> | | |
| Dairy | 2.61 | 3.53 |
| Grains | 2.16 | 2.58 |
| Confectionery | 1.72 | 2.11 |
| Fruits and vegetables | 1.67 | 2.09 |
| Meat | 1.65 | 1.99 |
| Miscellaneous foods | 1.49 | 2.00 |
| Beverages | 1.46 | 2.26 |
| Bakery products | 1.29 | 1.55 |
| <u>Other Economic Sectors</u> | | |
| Construction | 1.66 | 1.57 |
| Services | 1.48 | 1.39 |
| Other industry | 1.42 | 1.33 |
| Manufacturing (nonfood) | 1.41 | 1.62 |
| Retail and wholesale trade | 1.40 | 1.30 |
| Transport and utilities | 1.31 | 1.48 |
| Finance, insurance, and real estate | 1.19 | 1.54 |
| Mining | 1.09 | 1.82 |

Limitations of Multiplier Analysis

Multipliers are constructed based on a “snapshot” of a regional economy. That is, the feedstock for the economic multiplier is a pattern of economic transactions between firms and the final users of their products for a single year. This means that multipliers can go out of date as structural relationships between sectors change. Structural changes can emanate from technological developments, important shifts in relative prices, regional trade patterns, and several other sources. Another, and closely related, concern with multipliers is that they best represent the effects of small or marginal changes in deliveries to final demand in any one sector. Large shifts in a regional economic system

require a more detailed analysis before their effect on total income or employment can be measured.

Finally, these estimates rest on models utilizing local secondary data combined with coefficients from a national model. This procedure avoids the prohibitively high costs of conducting an exhaustive survey of transactions in a regional economy. However, reliance on this procedure requires the assumption that differences between the structure of the local economy and the national economy can be accurately measured. The restrictiveness of these assumptions are less severe as one progresses from a county-level economy to a state-level economy.