

APPENDIX C  
METHODOLOGY FOR DERIVING FUNDING BALANCE ESTIMATES

Appendix C  
Derivation of Funding Balance Estimates From Report Table 4-1

**Sales and Use Tax Derived from Northern Virginia - \$60.4 million.**

This figure was taken from table 3.3 of the Virginia State Department of Revenue Annual Report for fiscal 1988, P. 42, Sales Tax distribution. \$60.4 million is one-half of the total of the Local 1% shown on the table from Northern Virginia Localities. The total of \$120.7 million for Northern Virginia represents 29.8% of \$405 million, the total State collections of the local 1% tax.

**Motor fuels tax derived from Northern Virginia - \$148.6 million.**

Because the motor fuels tax is collected from the wholesaler as the fuel enters the State, there are no point-of-sale tax collection data for this tax. Nor are there any locality-specific consumption data. Therefore, it was necessary to compute this figure from the input-output based sales tax model for Virginia. The U.S. input-output table for 1983 identifies as a separate sector (there are 80 sectors overall) the petroleum refining sector. (Motor fuel makes up over 90% of this sector, with the remainder being heating oil and miscellaneous refined products.) There are two sources of taxable motor fuels purchased in the model - Business and Consumer. The model produces estimates of the dollar amounts spent on motor fuels by consumers and businesses in Northern Virginia.

The business portion is calculated by applying the technical coefficients from the input-output table to the estimated outputs by industry in Northern Virginia. The Local industrial outputs were estimated from detailed payroll totals by industry for each Northern Virginia Locality as reported in the Census Bureau's "County Business Patterns" for 1986. The U.S. ratio of Payroll to output for each industry from the 1983 U.S. Input-Output table was assumed to hold for Northern Virginia businesses.

The consumer portion is calculated by applying the U.S. ratio of Personal Income to motor fuel purchases from the same input-output study to the Personal Incomes in each Northern Virginia locality. The consumption shares were then adjusted by an income elasticity so that the shares varied from the U.S. average according to per capita income in Northern Virginia localities relative to the U.S. per capita income. An income elasticity of 0.55 (estimated by the Interindustry Forecasting Project at the University of Maryland) was assumed. This means that if per capita person income is twice as high in Northern Virginia as in the U.S., per capita fuel consumption will be 55% higher. (Note that the model normalizes all the consumption shares proportionately so that the overall elasticity of saving with respect to income is 1.5, a value often assumed in the economics literature.)

Using fiscal 1988 actual income and employment data (real output was assumed to grow at the same rate as employment from 1986 to 1988), the model totals fuel expenditures from all sources for the entire state. An effective tax rate is applied which results in actual 1988 motor fuels tax collections. The Statewide total for the motor fuels tax collection in fiscal 1988 was \$581.1 million according to figures provided by Ralph Davis, chief Economist of the Virginia Department of Motor Vehicles. The same statewide effective tax rate is then applied to the model's estimate of motor fuel expenditures in Northern Virginia. The result is \$148.6 million. This value is 25.6 percent of total Virginia collections of the motor fuels tax. Since Northern Virginia accounts for just under a third of the State's income and one fifth of its population, this is a reasonable result.

As an additional check, the 1987 Census of Retail Trade for Virginia was consulted. (Geographic Area Series RC87-A-47). The figures for calendar 1987 in Table 5, page 14-19 show that 25.1 percent of statewide sales of establishments classified as service stations come from service stations in Northern Virginia localities. This check reconfirms that our estimate is reasonable.

**Tolls - \$7.8 million**

Tolls accounted for \$7.8 million of the total. This is the reported toll income from the Dulles Toll Road, and is an actual receipts number.

**Other Dedicated Revenues - \$139.3 million**

Other dedicated revenues attributed to Northern Virginia totaled \$139.3 million. This amount is composed of several sources.

1. Motor vehicle license fees represent \$26.6 million, about 23.6 percent of the motor vehicle license fee receipts in the State for fiscal 1988. This amount was derived based on Department of Motor Vehicles City/County Vehicle Registration Counts. These data are broken down by city and county and by passenger and other vehicles.

2. Motor vehicle sales tax and car rental tax represents \$103.8 million. The methodology is the same as that for the motor fuels tax discussed above. In this case, however, the assumed income elasticity was 3.01 for motor vehicles. This represents about 38 percent of the statewide total of \$269.6 provided by the Department of Motor Vehicles (not including the car rental tax). The high income elasticity and the high incomes in Northern Virginia imply purchases of more expensive cars than in the rest of the State. This is relevant because the tax is ad valorem - 3 percent of the purchase price.

3. The remaining \$8.9 million comes from a range of minor revenues including drivers licence fees, various permits, weight violation liquidation damages, and other sundry items. These amounts were allocated on a per capita basis with Northern Virginia receiving \$8.9 million, or 22.3 percent of the statewide total of \$39.8 million.

4. Interest earnings of the Transportation Trust Fund are unallocated.

**Addendum: Calculation of Federal User Taxes - \$80.8 million**

The Federal Highway User Tax derived from Northern Virginia was derived from the \$148.6 million figure. The state gasoline tax rate is 17.5 cents per gallon, the federal rate is 9 cents - a ratio of 1.94. For special fuels the rates are 16 cents and 15 cents respectively, a ratio of 1.067. Assuming 12 percent of motor fuel consumed is special fuel (mainly diesel) the weighted average of the ratio of rates is 1.84. The Northern Virginia portion of the state tax, \$148.6 million is 1.84 times higher than the estimate of the Federal Tax of \$80.8 million.