

# **Economic Analysis of Governor Warner's Budget and Tax Reform Plan**

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Virginia Department of  
Planning and Budget  
Division of Economic and  
Regulatory Analysis

# Executive Summary

## Introduction

In late November, Governor Warner announced a tax reform plan that makes several changes to the overall tax structure in Virginia. The key features of the plan include:

- *Individual Income Tax:* Raising the personal and dependent care exemption, the standard deduction, and filing thresholds as well as making adjustment to the tax brackets and rate structure for the state's individual income tax;
- *Sales and Use Tax:* Reducing the sales tax on food by 1.5 cents and adding one cent to the sales and use tax;
- *Corporate Income Tax:* Changing business tax provisions with respect to intangible holding companies, pass-through entities, and sales of goods shipped from Virginia to other states;
- *Cigarette Tax:* Increasing Virginia's cigarette tax from 2.5 cents per pack to 25 cents per pack with all of the proceeds dedicated to paying for health care, while also giving localities the ability to levy an additional tax, up to a phased-in maximum rate of 50 cents per pack;
- *Car Tax:* Phasing in the completion of the car tax relief program by calendar year 2008, subject to the same revenue growth triggers as currently specified in the Code of Virginia;
- *Estate Tax:* Eliminating the estate tax for closely held businesses and working farms as well as imposing the tax only on estates valued in excess of \$10 million after January 1, 2004;
- *Accelerated Sales Tax Collections:* Ending the accelerated payment of sales taxes in June 2005;
- *Business Incentives:* Conforming to federal tax provisions which allow businesses to deduct as business expenses up to \$100,000 in equipment or similar purchases each tax year (compared to the current limit of \$25,000);
- *Age Deduction:* Restructuring the age deduction provided to seniors in the future while grandfathering the tax benefit to current senior citizens;
- Providing tax relief to military, reservists, and National Guard families by conforming to recent federal tax provisions; and,

- Adopting the Streamlined Sales Tax statute (without the sourcing rules) effective July 1, 2006.

The provisions of the Governor's tax reform plan have since been incorporated into his proposed budget recommendations for the 2004-2006 biennium. Subsequently, questions have been raised about the economic impact of various features of the plan. The purpose of this study is to assess the overall economic impact of both the tax reform and budget proposals on the Virginia economy.

### **Methodology for Study**

Governor Warner's tax reform and budgetary proposals involve a combination of changes to the tax code as well as changes to the level and mix of state expenditures. Making a reliable numerical estimate of the net impact of this package of policy initiatives requires a great deal of information about difficult-to-measure aspects of consumer and business behavior. For example, the proposed changes in the sales tax could alter the types of goods purchased. The reduction in the estate tax could boost business formation and survival in Virginia and increase capital expenditures both inside and outside of the state's borders. Changes in the cigarette tax could affect the number of children who choose to take up smoking and ultimately public health costs. There are many complex factors to be accounted for.

Moreover, even if one could identify all of the important responses by the various affected parties and make credible estimates of the likely magnitudes of those responses, the results would have to be knitted together into a mathematical model that accurately reflects the relationships between all the various players in the economy. This model would have to be stable enough to remain relatively accurate in its assessment of the economy in good times and bad. Because current six-year financial plan required in the Code of Virginia projects continuing budget shortfalls at least through the end of the 2008-2010 biennium, the model should also be able to accurately assess the economic impact of various options for addressing the shortfalls, including budget reductions. The model must also be carefully calibrated, or fit, to the actual

circumstances and relationships in the Virginia economy in a way consistent with sound economic theory, requiring enormous attention to detail.

To assess the economic impact of Governor Warner's tax and budget reform proposal, the four staff economists in the Economic and Regulatory Analysis Division of the Department of Planning and Budget conducted an intensive review and analysis of 155 different economic studies conducted in recent years. For each change to the tax code and each budgetary proposal, staff economists identified as many of the relevant studies as could be found in order to evaluate the quality and relevance of the study to each of the Governor's proposals, and to use this body of work to draw inferences and conclusions about what is known and about what, with any confidence, can be said and cannot be said.

At the outset, it is acknowledged that for any fair reading of the literature, there is a wide range of estimates for the measures of responsiveness and impact to tax policy changes, as well as changes in governmental spending. Generally, it is not possible to conclude that one study is better or worse than another, only that different measurement experiments have enough differences in data collection or design to produce significant variation in results. However, based on the entire scope of this collection of findings and results, staff have drawn reasonable conclusions about the weight of the overall evidence presented herein. These are outlined below.

## **General Conclusions**

Governments generally use tax policy to influence private behavior (e.g., private investment) or to raise sufficient revenues to pay for spending on public goods. It is within the context of these behavioral changes or monetary flows that fiscal policy affects economic activity.

Some of the activities of government are simply transfers of income from one set of citizens to another. These transfer payments, whatever their motivation, can be expected to have little net impact on overall economic activity in the short run. Over longer periods of time, the existence of the transfer payments can have a larger impact due to the responses of individuals in the economy to their new set of economic incentives.

Other activities of government are intended to address circumstances where a collective judgment has been made that markets operating on their own may not be able to provide an optimal level of certain important goods or services. Education, transportation, and indigent medical care are three such areas. The governments of all developed economies invest substantial resources in each of these areas.

As with private economic activity, it is almost certainly true that (1) not all expenditure plans are equally productive, and (2) government expenditures in the otherwise productive areas eventually become subject to diminishing marginal returns as the expenditures increase relative to the size of the economy. Given these assumptions, it follows that, to judge the economic effectiveness of any governmental plan for raising and spending funds, it must be determined whether the planned expenditures are well targeted and whether the level of expenditures is likely to be past the point of rapidly diminishing returns.

Similarly, the various sources of revenue do not have the same impact. Different sources of government revenue have different effects on economic activity in the short run and on into the future. As one of fifty states embedded in a highly integrated national and international economy, Virginia must consider the relative mobility of capital, people, and resources when considering methods for raising revenue. To the extent that revenue actions induce unproductive tax avoidance behavior or the movement of resources out of the state, taxes can impose an additional burden on Virginians. A well-crafted revenue plan, however, can keep the additional resource costs of taxation to a minimum.

### **Specific Conclusions**

1. The changes proposed in the Governor's plan to the individual income tax reduce the tax payments made by lower and middle-income earners, while raising the rate on approximately four per cent of the top income earners. Given the modest size of the increase and given that Virginia's top effective rate for that bracket remains lower than in Maryland, North Carolina, and West Virginia, it is anticipated that the increase in the top

bracket will not cause a significant reduction in economic activity. This is especially true since the reduction in tax payments in lower income brackets will provide some short-run stimulus to the state's economy.

2. Evidence suggests that the reduction in the estate tax may have a significant positive effect on capital formation and investment in Virginia. This will be balanced, to some extent, by reduced charitable contributions by those previously subject to the estate tax.

3. The increased deductions for business equipment provide a stimulus for investment while the implementation of the throwback rule works in the opposite direction. Initial analysis suggests that the throwback rule will have a relatively small impact on most firms while the effect of increased deductions will be more widespread. This suggests that the changes to corporate taxes may, on net, have a positive impact on economic activity.

4. Because the reduction in the personal property tax is paid for one-for-one with other tax revenues or spending reductions, its main effect will be on increasing the relative attractiveness of spending on cars relative to other consumption goods. This will not have a significant net effect on Virginia's economy.

5. The increase in the sales tax rate on non-food commodities along with the reduction in the rate on food results in a net increase in state revenues. Since the revenues from the increase are proposed to be spent principally on education, transportation and Medicaid, the change would only produce a net drag on the economy if the economic impact of the rate increase is significantly higher than the impact of the resulting spending programs. However, it should be noted that Virginia's sales tax rate is generally lower than other states in the region, even after the proposed rate increase. In addition, available studies do not support the contention that the negative economic response to a sales tax increase is likely to be greater than the response to increased spending on infrastructure and education. In fact, it seems clear, based on available evidence, that a spending plan

focused on higher rate-of-return programs stands a good chance of providing a significant net economic gain for the state economy.

In addition, while the proposed increase in the sales tax does increase sales tax payments by lower income families, the increase is relatively small, and to some extent is offset by changes to the income tax. This impact is further offset by increased spending on indigent medical care services and support for public education. Lower income families will benefit disproportionately from Medicaid spending and from support for K-12 education in Virginia.

6. The cigarette tax, unlike other taxes, could conceivably produce a net economic benefit in its own right. If, as some studies conclude, smoking generates a net drag on economic activity due to its harmful effect on productivity and on public expenditures on health care, then any reduction in smoking due to the tax increase would actually have a positive net economic impact. Even if the benefits of a reduction in smoking do not fully offset the impact of the tax increase, they do ensure that increases in the cigarette tax from its current low rate will have considerably less impact on the economy than an increase in other sources of revenue.

As already mentioned, a comprehensive and credible economic impact assessment of the Governor's proposals should not analyze the effects of his tax policy changes without also addressing the likely benefits of the spending supported by the increased revenues.

7. There is strong evidence that expenditures focused on the quality of K-12 education, especially expenditures that result in lower class sizes and improved teacher quality, can significantly improve student outcomes. Corporate surveys have consistently shown that the availability of skilled labor is the most important factor in choosing site locations. Through increased productivity and increased business investment, expenditures on education produce significant growth in employment and per capita income. Investments in top-ranked academic research with respect to science and technology is also known to be associated with increased private investment in those areas.

8. Traffic congestion can add significantly to the cost of doing business in Virginia. By hurting productivity, congestion eventually reduces the level of capital investment in the Commonwealth. A safe modern transportation infrastructure is an essential state contribution to business productivity and competitiveness; and is vital to maintaining Virginia's reputation as a great place to live and work.

9. The Medicaid program does more than provide immediate medical assistance to indigent families. Through the 50% federal match on every dollar of state spending, Medicaid pumps hundreds of millions of dollars in federal spending into Virginia's economy. In addition, there are big hidden costs to not providing basic health care to indigent families. Uninsured low-income families receive less preventive care, are diagnosed at more advanced disease stages, and once diagnosed, tend to receive less therapeutic care and have higher mortality rates. These costs are paid for by all Virginians and often with no federal matching dollars. Providing basic health care to poor families materially contributes to the health of the Virginia economy.

10. The balance of the available economic evidence suggests that, up to a point, targeted spending on transportation, education, and Medicaid can improve both short and long run economic growth and employment. This set of proposed expenditures supported by the increased revenue in the Governor's proposal represent modest increments to the state's long-standing commitment in all three areas. As such, the additional expenditures in these areas have a good chance of providing a significant positive impact on economic growth through contributions to competitiveness, employment, and per capita income.

After reviewing the results of various published research efforts on the economic impact of fiscal policy changes, the evidence supports the conclusion that the various tax reductions and the additional expenditures targeted to improving Virginia's business climate – through improvements in education, Medicaid spending, and transportation – will outweigh any plausible negative effects from the proposed change in the sales tax and the increase in the top bracket of the income tax.



# Table of Contents

I.	Executive Summary .....	i
II.	Impact of Tax Code Changes .....	1
	a. Individual Income Tax .....	1
	b. Corporate Income Tax .....	5
	c. Estate Tax .....	9
	d. Personal Property Tax .....	11
	e. Sales Tax .....	12
	f. End Accelerated Sales Tax Collections .....	21
	g. Cigarette Tax .....	22
III.	Impact of New Revenue.....	30
	a. Public Education .....	30
	b. Spending on Higher Education.....	32
	c. Transportation Infrastructure.....	36
	d. Medicaid Funding .....	43
IV.	Study Authors.....	46
V.	References .....	47
VI.	Appendix A: Fiscal Impact of Each Action .....	58

# Impact of Tax Code Changes

## *Individual Income Tax*

### Exemptions and Deductions

#### Governor Warner's Proposal:

- Increase personal and dependent exemption from \$800 to \$1,000
- Increase the standard deduction for single filers from \$3,000 to \$4,000
- Increase the standard deduction married couples filing jointly from \$5,000 to \$8,000
- Increase the standard deduction for married couples filing separately from \$2,500 to \$4,000

Effects: These higher exemptions and deductions will reduce income taxes for all households that currently pay income taxes. Households will spend some percentage of the dollars that they no longer have to pay in income tax, and will save the rest. Lower income households tend to spend a higher percentage of their income and save a lower percentage than do higher income households. Thus, a reduction in the relative tax burden on lower income families will tend to provide a short-run stimulus to economic activity in the state more than an equivalent reduction of taxes on higher income families. Additionally, the proposed tax structure will eliminate the current marriage penalty associated with deductions. Under current tax law, single filers receive a \$3,000 standard deduction, while married filers receive a \$2,500 per person deduction. Under the Governor's proposal, both single and married filers will receive a \$4,000 per person standard deduction.

### Rates and Brackets

#### Governor Warner's proposal:

- \$0 to \$5,000: no change
- \$5,001 to \$7,000: reduce from 5% to 3%
- \$7,001 to \$17,000: no change
- \$17,001 to \$20,000: reduce from 5.75% to 5%

- \$20,001 to \$100,000: no change
- \$100,001 and over: increase from 5.75% to 6.25%

Effects: The reduced rates for taxable income from \$5,001 to \$7,000 and from \$17,001 to \$20,000 clearly reduce individual income taxes for those that earn taxable income of \$100,000 or less per annum. It also reduces individual income taxes for those with taxable incomes up to \$112,500, since for these individuals the higher taxes they pay for their taxable incomes between \$100,000 and \$112,500 is less than the lower taxes they pay on their incomes in the \$5,001 to \$7,000 and \$17,001 to \$20,000 ranges. Those individuals who earn taxable incomes in excess of \$112,500 will pay more based on the bracket rate changes.

About four percent of Virginia tax filers have taxable income in excess of \$100,000 once exemptions and deductions are accounted for, and these filers will pay more income tax under Governor Warner's proposal. All remaining filers who pay some income tax under the current system would pay less in income tax.

Even with the proposed rate increase for the over \$100,000 bracket, Virginia's top effective income tax<sup>1</sup> rate for that bracket remains lower than in Maryland, North Carolina, and West Virginia. Hence, though Virginia's advantage for attracting wealthier individuals to reside in the Commonwealth is diminished somewhat relative to the current situation, there is little in the economic literature to help quantify the magnitude of this effect. Given the small magnitude of the change and the remaining relative advantage of Virginia over its neighbors, it is expected that little net migration of people (into or out of Virginia) will result from this change.

## **Filing Threshold**

### Governor Warner's Proposal:

- Increase the filing threshold for singles filers from \$5,000 to \$7,000
- Increase the filing threshold for married couples filing jointly from \$8,000 to \$14,000

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<sup>1</sup> Inclusive of income taxes levied at both the state and local level.

- Increase the filing threshold for married couples filing separately from \$4,000 to \$7,000

Effects: Approximately 141,000 current filers will no longer be required to file returns due to the increase in the filing thresholds. These higher filing thresholds will save the affected households the time and expense associated with calculating and filing tax returns. Again, any net transfer of the tax burden from those with lower incomes to those with higher incomes should be expected to provide a small short-run stimulus for the state's economy.

### **Age Deduction**

Current: The existing age deduction is \$12,000 for each individual 65 or older and \$6,000 for individuals age 62 through 64, regardless of income. This is much higher than in neighboring states other than Tennessee. All things being equal, this makes Virginia a more attractive retirement location.

Tax Reform Proposal: Individuals currently receiving the \$12,000 deduction (i.e., are currently at least 65) are not affected. Filers who turn 65 on or after January 1, 2005 will receive an age deduction based on their income. The age deduction for these individuals will be reduced by \$1 for every \$2 above \$50,000. Married couples who turn 65 on or after January 1, 2005 will see their deduction reduced by \$1 for every \$2 above \$75,000. The current \$6,000 deduction for individuals who are 62-64 may be claimed only by filers who turn 62 on or before January 1, 2005.

Effects: The reductions in the age deduction will make Virginia a marginally less attractive retirement location compared to the current situation. However, Virginia continues to provide significantly larger age deductions for middle and low-income seniors compared to Maryland, North Carolina, and West Virginia, giving it a continuing absolute advantage in this area. As with other net increases in revenue, the economic cost of the increased revenue must be balanced against the gain from the increased state expenditures.

### **Military Family Tax Relief Act**

Current: Virginia does not conform to the provisions of the recently enacted Military Family Tax Relief Act.

Tax Reform Proposal: Conform to federal provisions of the Military Family Tax Relief Act. Virginia will conform for all affected tax years -- allowing federal tax relief to apply to the Virginia income tax. Examples of this tax relief are a deduction that allows people who serve in the National Guard to deduct up to \$1,500 in expenses for overnight travel associated with their duty, and a capital gains exclusion for military personnel who sell a home owned for less than two years.

Effects: Adopting the Military Family Tax Relief Act will not significantly affect Virginia's economy. It will provide a small reduction in the financial burden faced by military personnel who encounter expenses related to serving the nation.

### **Individual Income Tax: General**

- The Governor's plan is more progressive than the current tax structure. The lower the household's income, the larger the percentage reduction in the income tax burden, other things being equal.
- The decrease in income tax for most Virginians will produce an economic stimulus, other things being equal.
- State personal income taxes are deductible in determining federal taxes. Thus, any increase in state taxes will be partially offset in terms of total tax burden (federal and state). This is especially true of higher income individuals (most affected by the proposed Virginia changes) because they tend to itemize deductions for federal income tax purposes more often than lower income tax payers.

# ***Corporate Income Tax***

## **Close Intangible Holding Company Loophole**

Description: Currently firms doing business in Virginia can set up subsidiaries to hold intangible assets. These subsidiaries are called intangible holding companies. These subsidiaries have been used to create tax preferences that lower taxable income in Virginia -- often without serving any other useful business function. North Carolina and eight other states (Alabama, Arkansas, Connecticut, Massachusetts, Mississippi, New Jersey, New York, and Ohio) have passed legislation making clear that such transactions may not be used to shelter income. Currently several corporations in Virginia are claiming that such income is not taxable under Virginia law. The Commonwealth disputes that interpretation.

Tax Reform Proposal: Virginia law will be amended to make clear that a firm's transactions with an intangible holding company that it has set up cannot be used to shelter corporate income.

Effects: The intangible holding company loophole is only applicable for states with *non-unitary* tax systems (i.e. not treating all of the sub-units of a corporate entity as one functional unit). About half of all states, mostly in the eastern part of the country, have non-unitary tax systems. At least nine states with non-unitary tax systems have either explicitly clarified that transactions with intangible holding companies cannot be used to shelter corporate income, or their courts have made this clear. It is possible, though highly unlikely, that, once this change is made to Virginia law, some firms currently operating in Virginia could choose to relocate in one of the non-unitary tax system states that cannot reach intangible holding company income. The recent trend has been for non-unitary states to pass laws to allow them to reach this sheltered income. Thus, there is little to gain by moving corporate activities solely on the basis of this rule. Thus, the proposal to amend Virginia law to make clear that a firm's transactions with an intangible holding company that it has set up cannot be used to shelter corporate income will probably eliminate some unproductive tax avoidance behavior, will increase revenues, and will not induce any significant loss of business investment or employment in Virginia.

## **Sales Throwback Rule**

Description: The sales throwback rule effectively allows a state in which a corporation produces its goods to tax the profit on any sales made by the corporation in other states in which the corporation has insufficient presence to be subject to a tax on its profit from those sales. (The sales are said to be "thrown back" for tax purposes from the state in which the purchaser is located to the state in which the seller is located. If a state does not have a throwback rule in effect, 50 to 100 percent of the profits of its resident corporations frequently will be what tax officials call "nowhere income" -- profit that is earned somewhere in the United States but not subject to tax by any state. Alabama, Alaska, Arkansas, California, Colorado, District of Columbia, Hawaii, Idaho, Illinois, Indiana, Kansas, Maine, Massachusetts, Mississippi, Missouri, Montana, New Hampshire, New Mexico, North Dakota, Oklahoma, Oregon, Texas, Utah, Vermont, Wisconsin have adopted sales throwback rules. Virginia and 20 other states have not.

Tax Reform Proposal: Adopt the sales throwback rule.

Effects: This will likely raise revenue in the short term. Some corporate profits not currently taxed by any state will be taxed by Virginia. In the long term, the proposal may or may not raise net revenue. If fewer firms locate in Virginia, or produce fewer of their products in Virginia, then there will be less taxable corporate income in Virginia. Since adopting the throwback rule effectively raises corporate taxes paid, the proposal will make Virginia somewhat less attractive as a location for firms, particularly compared to states that do not have the throwback rule. On the other hand, Klassen and Shackelford (1998) found that the lower the corporate tax rate for a throwback state, the less that manufacturing shipments are reduced by the presence of the throwback rule. Since the corporate income tax rate in Virginia is below the national average, the Commonwealth's manufacturing presence will not be as affected by adopting the throwback rule as would a higher tax state. Neighboring states that do not have the throwback rule include Maryland, Tennessee, and Kentucky. Maryland and Tennessee both have higher corporate income tax rates than Virginia; the Commonwealth's flat 6.0 percent rate falls within the middle

of Kentucky's various corporate income tax brackets. Approximately 5,000 corporations in Virginia will be affected by the throwback rule.

### **Pass-Through Entities**

Description: Currently, federal law provides that pass-through entities be taxed at the ownership level. However, most are not required to provide information to Virginia that identifies their owners. At present, only S corporations are required to file an annual informational income tax return with Virginia.

Tax Reform Proposal: All other pass-through entities (partnerships and limited liability companies) will be required to file an annual informational income tax return with Virginia.

Effects: This proposal may enable the Commonwealth to better track taxes due. Better tracking may lead to better enforcement and compliance. On the other hand, requiring that a new form be filed will result in a small increase in administrative costs for pass-through entities.

Approximately 70,000 partnerships and LLCs will be affected.

### **Deductions for Equipment Purchases**

Description: Virginia allows businesses to deduct as a business expense up to \$25,000 in equipment or similar purchases.

Tax Reform Proposal: Virginia will conform to new federal law for all affected tax years, allowing businesses to deduct up to \$100,000 in equipment or similar purchases each year.

Effects: This increase in the allowable deduction reduces the tax burden on businesses that spend more than \$25,000 per annum on capital (equipment, etc.). Many empirical studies<sup>2</sup> have confirmed that reducing the tax burden on capital spending spurs firms to increase their investment in capital. In a very recent compelling study, Austan Goolsbee<sup>3</sup> of the University of

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<sup>2</sup> For example, Cummins, Hassett, and Hubbard, "Have tax reforms affected investment?" in *Tax Policy and the Economy*, Volume 9, 1995, NBER

<sup>3</sup> Goolsbee, A., "Taxes and the quality of capital," *Journal of Public Economics*, Vol. 88 (March 2004): 519-543.



Chicago found that in reaction to tax subsidies such as this, firms significantly shift investment toward higher quality (more productive) varieties of capital. Increased quantity and quality of capital investment means more capacity for economic growth in Virginia.

The reduced tax cost to capital investment will make the Commonwealth more attractive for firm location as well. Area Development Magazine's most recently issued corporate survey found that tax exemptions were the sixth most important factor (out of 25) in choosing site locations. The increased deductions result in some lost tax revenue and, hence, reduced expenditures. The impact of state expenditures will be discussed later in this report.

## Estate Tax

Description: An Estate Tax is imposed on the transfer of taxable estates in excess of \$1.5 million. The amount of the exemption in Virginia mirrors federal law, and under federal law is scheduled to increase to \$2.0 million in 2006, and to \$3.5 million in 2009, before the estate tax is repealed for 2010 and then is re-imposed in 2011.

Tax Reform Proposal: Effective for deaths occurring on and after January 1, 2004, the tax would be imposed only on the transfer of taxable estates in excess of \$10 million. No tax would be imposed on estates if the majority of the estate consists of an interest in a closely held business or a working farm.

Effects: The estate tax will apply to approximately 350 fewer estates per year. The proposal to exempt estates where the majority of the estate consists of an interest in a closely held business or a working farm will increase the demand for closely held businesses and working farms. The incentive is substantial. Purchasing such businesses and farms would serve as an effective tax shelter. This may not significantly increase total investment and job growth since the increased investment in closely held businesses and working farms would likely be in lieu of investment elsewhere. If the increased investment in closely held businesses and working farms occurred largely in Virginia, then this would likely increase total investment and job growth in Virginia, since some part of the displaced investments would likely be from areas outside of the Commonwealth (for example, most stocks and mutual funds are investments in firms located outside of Virginia).

In two papers<sup>4</sup> Douglas Holtz-Eakin, David Joulfaian, and Harvey Rosen (1994a and 1994b) demonstrate that receipt of a large inheritance raises the likelihood that a household starts a business and raises the probability of the business surviving and expanding. This suggests that increasing the estate tax exemption from \$1.5 million to \$10 will raise the likelihood that a

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<sup>4</sup> Holtz-Eakin, Douglas, David Joulfaian, and Harvey S. Rosen. "Sticking it Out: Entrepreneurial Survival and Liquidity Constraints." *Journal of Political Economy* 102 No. 1 (February, 1994a): 53-75; and Holtz-Eakin, Douglas, David Joulfaian, and Harvey S. Rosen. "Entrepreneurial Decisions and Liquidity Constraints." *RAND Journal of Economics* 25 No. 2 (Summer, 1994b): 334-47.

household starts a business and raises the probability of the business surviving and expanding. Also, Holtz-Eakin (1999)<sup>5</sup> finds that business owners who face higher estate taxes work less. Thus, the proposed increase in the exemption level should help spur economic growth and job creation. This does not take into account the impact of the lost revenue by increasing the exemption.

On the other hand, the empirical literature generally finds that the existence of the estate tax does contribute to charitable giving.<sup>6</sup> Joulfaian (2000)<sup>7</sup> estimates that eliminating the national estate tax, and with it the deduction for charitable giving, would reduce charitable bequests by about 12 percent. This implies that significantly increasing the amount exempted for estate taxes in Virginia will have somewhat of a negative impact on charitable giving by Commonwealth residents.

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<sup>5</sup> Holtz-Eakin, Douglas. "The Death Tax: Investments, Employment, and Entrepreneurs." *Tax Notes* 84 No. 5 (August 2, 1999): 782-92.

<sup>6</sup> Joulfaian, David. "Charitable Giving in Life and Death." In *Rethinking Estate and Gift Taxation*, edited by William G. Gale, James R. Hines, and Joel B. Slemrod. Washington, D.C.: Brookings, 2000.

<sup>7</sup> *Ibid*

## ***Personal Property Tax***

Current: Personal property tax reimbursements for motor vehicles are currently frozen at 70% of tax liability for vehicles limited to personal use and for assessments up to \$20,000. About 5.5 million vehicles currently qualify to receive state reimbursement.

Tax Reform Proposal: Increase reimbursement percentage to 77.5% for CY 2005, 85% for CY 2006, 92.5% for CY 2007, and 100% for CY2008, subject to the same conditions as are in the *Code of Virginia* now for revenue growth.

Effects: Taken by itself, the reduction and elimination of the car tax paid by households increases their disposable income. Households will spend some percentage of the dollars that they no longer have to pay in personal property tax and will save the rest.

However, the reduction and elimination of the car tax paid by households increases state expenditures on a dollar-for-dollar basis. The Commonwealth reimburses localities for 100 percent of the reductions in car tax paid by households. These increased state expenditures must be matched by some combination of cuts in expenditures elsewhere or by increased tax revenue. Whether or not the boosts to short-term and long-term economic activity provided by the reduction and elimination of the personal property tax creates a net boost depends on the magnitude of the negative impact on economy activity caused by the cuts in expenditures or increase in taxes elsewhere.

Also, the reduction and elimination of the car tax in combination with the increase in the sales tax for non-food items will make automobiles relatively less expensive compared to other goods and services. This may be expected to lead to an increased demand for cars and a reduction in demand for other consumption goods and services, other factors being equal.

## Sales Tax

Current: A state sales and use tax of 3.5 percent is levied on goods purchased for use within the Commonwealth. An additional one percent sales and use tax is levied by localities. The sales tax on food for home consumption is currently levied at 3 percent state, one percent local.

Tax Reform Proposal: The sales tax on most goods is raised from 4.5% currently to 5.5% beginning July 1, 2004. However, the sales tax on food-related products consumed off the premises is lowered from 4% currently to 3% starting July 1, 2004 and to 2.5% starting July 1, 2005.

*Personal Consumption Expenditures.* The higher sales tax on non-food items will increase the cost per dollar of personal consumption expenditures. The increase is mitigated to some extent by the lower sales tax on food commodities. In order to evaluate the net economic impact of these two changes on each dollar of consumption, it is necessary to know what fraction of total consumer expenditures is on food commodities. Based on the Bureau of Labor Statistics' annual expenditure survey of U.S. households for 2002, low-income households spent a significantly larger portion of their expenditures on food commodities than did higher-income households. For example, individuals with income of less than \$5,000 spent approximately 11.2% of their total expenditures on food commodities whereas individuals with income greater than \$70,000 spent approximately 7.5% of their total expenditures on food commodities. Low-income households also spend a significantly smaller portion of their expenditures on non-food commodities than do higher-income households. Individuals with incomes less than \$5,000 spent approximately 39% of their total expenditures on non-food commodities whereas individuals with income greater than \$70,000 spent over 44% of their total expenditures on non-food commodities<sup>8</sup>.

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<sup>8</sup> The calculation makes a conservative assumption that 50% of household expenditure is on services such as housing and healthcare, which are not subject to the sales tax. National Income and Product Account personal consumption expenditures reported for the period 1993-2002 indicate that, on average, 58% of personal consumption expenditure was on services.

Assuming that consumer expenditure patterns in Virginia are not significantly different from those for the United States as a whole, the proposed change in sales tax, while increasing the tax burden on consumers, will increase it by a smaller amount for low-income households than for high-income households. Because a larger proportion of consumption expenditure by low-income households is on food, lowering the sales tax on food items to 2.5% from the current 4% will make the sales tax structure more progressive. An estimate of the difference in sales tax paid by the highest income bracket compared to the lowest income bracket is 0.02 cents per dollar of expenditure under the current sales tax structure and 0.11 cents per dollar under the proposed tax structure.

Thus, by lowering the sales tax on food items, the proposed change mitigates some of the regressive impact of an increase in general sales tax. This impact is likely to be mitigated even further by the types of expenditures financed by the tax reform plan. Increased spending on education, especially K-12, and increased funding for Medicaid is likely to have a larger impact on low-income households than on high-income households. Additional Medicaid expenditures supported by the increase in the cigarette tax and tax reform package, are expected to be roughly \$516 million in FY 2005 and \$844 million in FY 2006, of which about \$245 million in FY 2005 and almost \$408 million in FY 2006 is in the form of federal matching grants. Even high estimates for the increase in tax burden on households at or below the poverty line<sup>9</sup> due to the change in sales tax are outweighed by the increase in Medicaid spending financed by the cigarette tax increase. For example, assuming conservatively that only one-third of the Medicaid spending financed by the cigarette tax increase goes to households at or below the poverty line<sup>10</sup>, the benefits from the proposed increase in spending will considerably outweigh the increase in sales tax burden on these households.<sup>11</sup> Thus, while it is not possible to estimate the precise net burden of the tax on low-income households, it is likely that the impact will be more than offset by the increase in Medicaid spending, possibly even proving to be a net economic benefit to low-income households.

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<sup>9</sup> 2003 federal poverty guidelines define the poverty line for a three-unit household at \$15,260

<sup>10</sup> Based on the 1990 census, a little over 21% of all households had an income of less than \$15,000

<sup>11</sup> While some individuals may end up worse off, on average, lower income families will receive substantially more in benefits than they pay in increased sales taxes.

Standard theoretical literature as well as many empirical studies done on sales taxation suggest that the entire impact of this increase in sales tax on non-food items and the decrease in sales tax on food items is likely passed on to consumers. However, most of the standard theoretical models of the retail industry assume a competitive market where after-tax prices increase by the exact amount of the tax increase. Depending on the cost structure of the industry, some theoretical models of competitive markets indicate that after-tax prices could increase by less than the amount of the sales tax increase. Other studies in the industrial organization literature question the assumption of competitive markets in the retail industry. Dropping the assumption of a competitive market could result in an over-shifting of the tax burden such that after-tax prices increase by more than the increase in sales tax.

Empirical studies on the incidence of sales tax (i.e., who bears the burden of the sales tax) also provide conflicting results. According to a study by Poterba (1996), retail prices rise by approximately the amount of the sales tax with mild, if any, over-shifting of the tax burden. However, a study by Besley and Rosen (1999) indicates that shifting patterns vary widely depending on the type of commodity being studied. Their results indicate that, while the standard theoretical model results hold for some commodities, there exists over-shifting of taxes for other commodities.

It is possible, then, that some of the additional costs associated with the change in sales tax structure will be borne by retailers rather than by consumers. However, it is not possible at this time to precisely determine the extent of the tax burden likely to be borne by consumers and the extent, if any, likely to be borne by retailers. In order to make that determination, it would be necessary to know the market and cost structure of the retail industry in Virginia and the elasticity or sensitivity of demand and supply of each consumer good to changes in price.

*Business Expenditures.* In addition to the effect of the change in sales tax structure on consumer expenditures, the proposed change is also likely to affect some types of business purchases. General sales tax is a tax on final consumption and its base includes substantial sales to businesses. According to a study by Ring (1999), of the \$1,585.5 million in sales tax levied in Virginia in 1989, \$1,115.6 million (or 70%) was on personal consumption expenditures. The

rest of the 30% was on business purchases, government purchases, and purchases by non-profit organizations, with business purchases accounting for a lion's share.<sup>12</sup>

Thus, the proposed change in the sales tax is likely to affect not just personal consumption expenditures, but also certain types of business expenditures. The net impact of the increase in the sales tax on non-food items and decrease in sales tax on food items will depend on the proportion of affected business expenditures that are on food items compared to the proportion on non-food items. Therefore, the precise impact on business expenditures from the proposed sales tax change is not known. In order to estimate the impact, it would be necessary to know the categories of business expenditure that are subject to sales tax and the proportion of these business expenditures spent on food and non-food commodities.

Some of the increase in tax burden per dollar of business expenditure resulting from the proposed change is likely to be passed on to consumers of the final product because of tax pyramiding or cascading. For example, in instances when equipment used in production is subject to a sales tax, the selling price of the final commodity produced using the equipment could reflect some or all of the cost imposed by the sales tax. Thus, it is possible that some of the additional costs associated with the increase in sales tax on businesses expenditures will be borne by consumers of the final product. However, it is not possible at this time to determine the extent of the tax burden likely to be borne by producers and the extent, if any, likely to be borne by consumers. In order to make that determination, it would be necessary to know the market and cost structure of these industries in Virginia and the elasticity or sensitivity of demand and supply of each of these final products to changes in price.

Benefits: The proposed change in sales tax structure is also likely to produce significant economic benefits through higher revenues. The additional revenues are to be spent on investment in education, transportation infrastructure, and Medicaid.

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<sup>12</sup> According to Ring (1999), for the United States as a whole, personal consumption expenditures accounted for approximately 59% of state general sales tax revenues.



*Demand and Border Effects.* The combination of an increase in sales tax on non-food commodities and a decrease in sales tax on food commodities is likely to increase state revenues per dollar of personal consumption expenditure. In addition, the change in sales tax is also likely to increase state revenues per dollar of business consumption expenditure subject to the sales tax. However, the actual increase in revenues is likely to be lower than that projected using current expenditure levels because of:

- Sensitivity of demand to price changes: Based on the above discussion on the effect of the sales tax change on personal and business consumption expenditures, the proposed change in sales tax structure is likely to result in higher price levels, both for consumer goods and some types of producer goods. As a result, demand is likely to fall somewhat, lowering consumption and hence the sales tax revenue collected on final consumption.
- Cross-border effects: As a result of changing the sales tax structure in Virginia, cross-border effects (such as shifting of consumption between Virginia and its neighboring state) are likely to have some effect (albeit modest) on the total amount of revenue collected.

Studies done to-date on interstate and inter-regional sensitivity of employment/employment growth, investment, gross state product, and the birth and location of firms find that these variables do not have great economic sensitivity to differences in tax structure across states or regions. Of 34 studies examining business tax elasticity, Wasylenko (1997) reports that 24 studies reported statistically significant elasticity, although the elasticity values estimated were often quite small. The median value of these elasticities clustered between  $-0.26$  and  $0.00$ , indicating not much responsiveness of economic activity among regions to differences in business taxes.

The following table provides a brief description of sales tax on food and non-food commodities in neighboring states.

<b>State</b>	<b>State and Local Sales and Use Tax</b>	<b>Sales and Use Tax on Food</b>
North Carolina	7% in most counties, 7.5% in one county	Subject only to local sales and use taxes (2.5% in most counties, 3% in one county)
Maryland	5%	Exempt
Tennessee	8% to 9.75%	6% state tax plus applicable local taxes
West Virginia	Approximately 6%	Approximately 6%
Kentucky	6% with some allowable deductible	Exempt
Pennsylvania	6% in most localities, 7% in two localities	Exempt
Washington, D.C.	5.75%	Exempt

Even with the proposed increase in sales tax for non-food commodities from 4.5% to 5.5%, Virginia still has a lower sales tax rate compared to all the neighboring states, with the exception of Maryland. Thus, the largest cross-border effects of the increase in general sales tax are likely to occur with respect to Maryland. Lowering the sales tax on food is likely to produce the largest cross-border effects with respect to North Carolina. Virginia will continue to charge a higher rate of sales tax on food compared to Maryland, Kentucky, and Pennsylvania, albeit the difference in tax rate between Virginia and these states will be smaller. Virginia’s sales tax rate on food will continue to be lower than that of Tennessee and West Virginia.

Another important cross-border effect is the impact on tourism of increasing the general sales tax rate. Virginia is currently ranked number ten among states that get the most tourism spending. California, New York, Florida, and Illinois are some of the states ranked higher than Virginia.

The following table provides state and local sales and use tax rates for these states:

State	State and Local Sales and Use Tax	Sales and Use Tax on Food
California	7.25% to 8.5%	Exempt
New York	7.25% to 8.75%	Exempt
Florida	6% to 7.5%	Exempt
Illinois	6.25% to 9.25%	1%

The general sales tax rate in each of the four states that rank higher than Virginia in terms of tourism is more than the 4.5% currently charged in Virginia. Even with the increase in sales tax to 5.5%, Virginia's general sales tax will continue to be below sales tax levels in each of these states. Thus, raising the general sales tax in Virginia is not likely to have a significant impact on tourism.

The precise impact on revenues from both of the above effects (the price effect and the cross-border effect) is not known. In order to make that estimate, it would be essential to know the elasticity or sensitivity of demand to changes in price and the elasticity or sensitivity of demand to differences in sales tax between states. However, based on existing studies indicating low responsiveness of economic activity among states and regions to differences in business taxes, the proposed change is likely to increase the amount of revenue collected from non-residents. This fact is likely to have a significant impact on the amount of revenues collected from the sales tax increase as 20%-25% of Virginia's sales tax revenues are collected from non-residents.

Net Economic Impact: The net economic impact of the sales tax change will depend on whether the additional costs imposed by the proposed change are outweighed by the additional benefits accruing from it. The net increase in the sales tax will increase costs for consumers and producers per dollar of expenditure. The increase in tax burden per dollar of expenditure is likely to lower growth in the demand for goods subject to the sales tax and will tend to induce a marginal reduction in the growth of business activity in the state. In addition, the increase in tax

burden effectively reduces the disposable income of households and, by lowering the effective after-tax wage rate, is likely to have some negative impact on labor supply in Virginia. The economic effect of the net increase in sales tax is through household consumption levels, business profits, and labor supply. However, the proposed change is also likely to result in additional revenues for the state which, under the Governor's proposal, are primarily spent on investment in education, transportation infrastructure, and Medicaid. This, in turn, is likely to produce economic benefits by encouraging business activity by providing better transportation infrastructure and a more productive workforce. The decline in household real disposable income due to the increase in sales tax is likely to be offset by the lower cost of medical services and by the improvements in education. Finally, any potential decline in labor supply is likely to be counter-balanced by an increase in worker productivity arising from better education and health services being provided by the state. The net economic impact will depend on the rate of return earned by each additional dollar of government revenue compared to the rate of return it would have earned otherwise.

While there have been numerous studies done on the impact of taxes on employment and economic development, their conclusions have been varied. Many studies have found the expected negative impact of taxes on business activity and employment, while other studies such as Erickson and Waslylenko (1980) and Bradbury (1982) have found essentially no impact of taxes on business activity or employment. Some studies such as Palumbo et al. (1990) and Eberts (1991) have even found that tax increases stimulate employment or production. Most of the studies were sensitive to changes in specification (especially with regard to fully accounting for the expected positive impact from services provided by tax revenue), time-period, or measurement. Moreover, most of these studies look at the impact of corporate income and property taxes on business activity and employment, rather than sales taxes. The conclusions of these studies may be considered indeterminate with respect to the effect of the sales tax changes being proposed in Virginia.

Two studies that appear to be most on-point are a study by Harden and Hoyt (2003) and Mark, McGuire, and Papke (2000). Both look specifically at the impact of sales taxation on employment.

Harden and Hoyt find that, while there is an apparent negative impact on employment growth from an increase in sales tax, the results are not statistically significant. Their analysis is based on data aggregated to the state level for all 48 contiguous states from 1977 to 1994.

Mark, McGuire, and Papke (2000) found that, in the Washington, D.C. metropolitan area, higher sales taxes reduced employment growth by a significant amount. However, they also note that higher levels of non-welfare public services expenditures are estimated to increase employment growth. Their analysis is based on data for Washington, D.C. metropolitan area over the period 1969-1994.

Both these studies indicate that an increase in sales tax would not necessarily have a significant negative affect on employment growth once the beneficial effects of the additional state revenues generated from the tax are taken into account.

Apart from empirical and theoretical analyses to be found in economic literature, there also exist a number of econometric models that attempt to evaluate the impact of various tax changes on the economy. However, the results provided by some of these models could be misleading as they all do not explicitly model how the government might productively spend the additional revenues. By ignoring the potential benefits of an increase in various types of government expenditure, these models are likely to be over-estimating the negative impact of tax changes on employment and capital spending.

The current state of economic literature on the subject and existing econometric models do not provide a clear picture of the impact of sales tax increases on employment and investment in Virginia. If the additional revenue is spent in a well-targeted and productive manner, there is reason to expect that the beneficial effect on the economy of such targeted spending will more than compensate for any negative economic impact of the proposed sales tax increase.

## ***End Accelerated Sales Tax Collections***

Description: Sales tax dealers with annual sales of \$1.3 million or more must make a prepayment in June of 90% of their June sales tax liability. Normally, the payment of sales taxes would not be due until the 20<sup>th</sup> day following the close of the month in which such receipts are collected. There are approximately 8,700 firms with annual sales of \$1.3 million or more in Virginia.

Tax Reform Proposal: This requirement is repealed, effective July 1, 2004. Affected dealers will not have to make an accelerated payment in June of each year, starting with June 2005.

Effects: This proposed change will cause some sales taxes from large firms to be paid one month later than currently required (July instead of June). This is a net transfer of one month's interest on those funds from the Commonwealth to those firms. There will be no significant impact on employment and economic growth.

## Cigarette Tax

Current: The Commonwealth currently levies a tax of 2.5 cents per pack on the sale of cigarettes in Virginia.

Tax Reform Proposal: The tax on cigarettes is proposed to be raised from 2.5 cents per pack to 25 cents per pack beginning July 1, 2004.

Effects: The proposed increase in the cigarette tax will be the first such increase in Virginia since 1960. The current cigarette tax of 2.5 cents per pack is the lowest of any state in the United States. By raising the tax to 25 cents per pack, Virginia will continue to be well below the median cigarette tax of 60 cents per pack (the national average is currently 72 cents per pack), with just nine states charging tax rates lower than 25 cents per pack.

By raising the tax and hence the price of cigarettes, the proposed change is likely to reduce the sale of cigarettes in Virginia. A reduction in consumption of cigarettes as individuals choose to reduce the amount they smoke or quit altogether comes in response to the change in price. There exist numerous studies on the aggregate impact of price changes on cigarette consumption. A survey of such studies conducted by the U.S. Surgeon General found that an inverse relationship existed between the price and the consumption of tobacco products. Of the 24 studies reviewed by the report, most of the price elasticity estimates for adult smokers fell in to a range of a 3% to 5% decrease in cigarette consumption resulting from a 10% increase in price. A study conducted by Sung, Hu, and Keeler (1994) on the impact of the 1989 cigarette tax increase in California did control for variables such as anti-smoking regulations and bootlegging that could have reduced taxable cigarette consumption independent of the increase in the tax. That study estimated that the demand elasticity for California cigarette consumption was  $-0.53$  in the short-run (a 5.3% decline in demand for a 10% increase in price) and  $-0.63$  in the long-run (a 6.3% decline in demand for a 10% increase in price). The 25-cent cigarette tax increase (from 10 cents per pack to 35 cents per pack) implemented by California in 1989 resulted in an 11.2% decline in consumption in the short-run and a 13.4% decline in consumption in the long-run.

A reduction in demand due to negative cross-border effects – of Virginia residents shifting their consumption to lower-tax states and out-of-state residents who previously purchased cigarettes in Virginia choosing to shift their consumption elsewhere – could also be expected to occur.

Economic literature and empirical studies have noted the importance of cross-border effects on the consumption of cigarettes. Coats (1995) notes that the cross-border problem with cigarettes can be particularly severe when there are low transportation costs involved and a wide variation in cigarette tax rates. The following table lists the cigarette tax charged in each of the neighboring states.

<b>State</b>	<b>State Cigarette Tax</b>
North Carolina	5 cents per pack
Maryland	1 dollar per pack
Tennessee	Approximately 20 cents per pack
West Virginia	55 cents per pack
Kentucky	Approximately 3 cents per pack
Pennsylvania	1 dollar per pack
Washington, D.C.	1 dollar per pack

Even after the proposed tax increase, Virginia will continue to charge lower taxes than all but nine other states nationwide. As evident from the above table, Virginia will also continue to have lower cigarette taxes than all neighboring states except North Carolina, Kentucky, and Tennessee. Thus, the cross-border effect is likely to be the largest with respect to these three states. While the proposed change will reduce Virginia’s competitive advantage compared to the remaining neighboring states, a cigarette tax of 25 cents per pack is well below the tax levied in these states, indicating smaller cross-border effects.



- a. The cross-border effect of Virginia residents shifting their cigarette consumption to states with lower taxes and prices will have a negative impact on cigarette sales in Virginia. The Sung, Hu, and Keeler (1994) study mentioned above estimated the cross-border effect of the 25-cent California cigarette tax increase in 1989. They found that net cross-border imports of cigarettes in 1988 were 0.03 packs per capita. Following the tax increase, they estimate that Californians would have imported an additional 0.04 packs per capita.
- b. The cross-border effect of out-of-state residents, who currently choose to buy cigarettes in Virginia due to its current low tax rate, shifting their consumption to another state with lower taxes, after the proposed rate increase. This will likely to have a negative impact on cigarette sales in Virginia.

In summary, the proposed increase in cigarette tax is likely to lead to a decline in cigarette sales and consumption in Virginia, both through the sensitivity of cigarette demand to changes in cigarette prices and through negative cross-border effects.

*Consumers:* The proposed increase in the cigarette tax is likely to impose additional costs on smokers who continue smoking after July 1, 2004. According to the Virginia Department of Health, Virginia's adult smoking rate was similar to the national adult smoking rate, reported to be 22.8% in 2001. The youth smoking rate in Virginia in 1996 (the latest date for which data is available) was approximately 27.5%<sup>13</sup>.

It has been argued that increasing the tax on cigarettes is regressive in that it imposes a disproportionate financial burden on certain segments of society, notably the poor and minorities, and hits "hardest those least able to afford them"<sup>14</sup>. However, if these same groups were to be more responsive to taxes than the average population, the regressive effects of the tax would be mitigated by an above-average decrease in smoking. Socio-demographic studies done to-date such as Townsend, Roderick, and Cooper (1994) and Farrelly et al. (2001) indicate that lower

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<sup>13</sup> The Centers for Disease Control reports that the youth smoking fell to 28.4% in 2002

<sup>14</sup> Tobacco Institute (1998)

socioeconomic groups are more price-responsive than higher socioeconomic groups. These studies find that lower income smokers are more likely to quit and decrease consumption in response to cigarette price increases. Thus, although lower income smokers have to pay a larger share of their income in the form of excise taxes, relatively more lower income smokers quit because of their greater sensitivity to prices. This result shifts some of the total tax burden to higher income groups. The Farrelly et al. (2001) study also finds that African-Americans and Hispanics are much more likely than whites to decrease smoking in response to increases in cigarette prices.

The bottom line is that the demand for cigarettes will decline following enactment of the cigarette tax increase as some smokers may choose to quit altogether, others may choose to reduce consumption, and still others may choose to shift their consumption to another state. Smokers who continue to purchase cigarettes in Virginia after July 1, 2004 will be required to pay an additional 22.5 cents per pack. No reliable estimates of the magnitude of the decline in the number of smokers and the decline in the number of packs of cigarettes purchased per smoker are available at this time.

*Producers:* The reduction in demand for cigarettes is likely to have some negative impact on cigarette manufacturers and other tobacco-related industries in Virginia. However, tobacco farmers and cigarette manufacturers in Virginia will feel very little impact from any decline in cigarette consumption in Virginia, because the state accounts for only a small fraction of total cigarette sales in the United States. According to existing data, Virginia producers accounted for approximately 3.3% of all cigarette sales in the United States in 2002. In addition, exports account for a large portion of tobacco and cigarettes produced in Virginia. According to the U.S. Department of Agriculture (USDA), cash receipts from *unmanufactured* tobacco amounted to \$161 million in Virginia in 2002, of which exports accounted for \$71 million (or 43.8%). Moreover, out of the total U.S. cigarette output of 580 billion pieces in 2002, 127.2 billion pieces (or 22% of total cigarette output) were exported overseas. The Centers for Disease Control estimates that through the 1990s, nearly 30% of all cigarettes produced in the United States were exported.

Further, only a fraction of the tobacco and cigarettes produced in Virginia are likely to be consumed in Virginia. Virginia's population accounts for roughly 2.5% of U.S. population. Virginia's cigarette sales per capita in 2000 was 96.7, compared to a national average of 83.5 packs sold per capita. Accounting for the higher per capita consumption of cigarettes, cigarette demand in Virginia would amount to roughly 3% of total demand for cigarettes produced in Virginia.

It is also possible that any loss in revenue due to a decline in cigarette sales in Virginia will be counter-balanced somewhat by an increase in the consumption of other tobacco-related products. Moreover, it is possible that cigarette manufacturers may choose to raise cigarette prices by more than the amount of the tax increase in order to make up for lost revenues. Studies such as Showalter (1999), Sung et.al.(1994), and Harris (1987) indicate that tobacco companies often do raise end-market prices by more than the amount of the tax increase. No reliable estimates of the magnitude of the net impact of the increase in cigarette tax on the tobacco industry are available at this time.

However, the impact of any decline in revenues for tobacco farmers and cigarette manufacturers is not likely to have a large impact on employment and economic growth in Virginia. According to the USDA, cash receipts from tobacco sales accounted for a little less than 7.5% of total cash receipts from all livestock- and crop-related commodities in Virginia in 2002<sup>15</sup>. Just taking into account the share of overseas exports, only 4.2% of these cash receipts could possibly be affected by a decline in demand in Virginia. This figure will be much lower (probably by a factor of 20) once exports to other states are taken into account. According to a 2000 report issued by the Virginia Department of Business Assistance, tobacco products manufacturing was ranked 17 out of 19 largest manufacturing industries in Virginia. Based on information provided in the report, tobacco-related manufacturing accounted for approximately 2.1% of total manufacturing employment and just under 3.5% of total manufacturing income.<sup>16</sup>

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<sup>15</sup> According to the Federal Reserve Bank of Richmond, farm jobs accounted for approximately 1.4% of total employment in the state and farm income accounted for approximately 0.2% of total personal income generated in the state in 2001.

<sup>16</sup> According to the Federal Reserve Bank of Richmond, manufacturing employment accounted for approximately 7.7% of total employment in the state and manufacturing income accounted for approximately 6.5% of total personal income generated in the state in 2001.

In summary, the impact of a decline in cigarette demand in Virginia on Virginia cigarette manufacturers is likely to be tempered by the fact that over 20% of cigarettes produced are exported overseas. This figure is likely to be even higher if exports to other states are taken into account. Based on population estimates and estimates of smoking rates and per capita sales on cigarettes, only a fraction of the total demand for Virginia-produced cigarettes is from Virginia residents. Finally, it should be noted that the decline in cigarette consumption in Virginia will affect not only Virginia-based tobacco farmers and cigarette manufacturers, but tobacco farmers and cigarette manufacturers in other states and abroad. The effect is likely to be divided among the various cigarettes brands sold in Virginia, that include both cigarettes produced in Virginia and cigarettes produced outside Virginia (in other states or abroad).

*State Economy:* The benefits to the state are likely to accrue from an increase in revenues and a reduction in health and productivity costs associated with smoking.

The proposed increase in cigarette tax will increase state revenues collected per pack of cigarettes sold. However, the increase in revenue per pack will be offset to some extent by the decline in cigarette sales – both due to a decline in demand for cigarettes as the price increases and due to the negative cross-border effects of the increase in the price of cigarettes in Virginia.

Revenues are likely to increase with an increase in cigarette tax, despite a *fall in demand*. The increase in price is likely to outweigh the effect of any decrease in demand, resulting in an overall increase in revenues. As mentioned above, a majority of studies on adult smoking indicate that a 10% increase in cigarette price is likely to result in a less than 10% reduction in demand, with the consensus being that a 10% increase in price is likely to result in a 4% decline in demand.<sup>17</sup>

An econometric analysis conducted by Farrelly and Nimsch (2003) of the impact of a hypothetical 70-cent tax increase in Virginia found that revenues are likely to increase from \$16.5 million at the 2001 tax rate to \$313.3 million following the tax increase. Based on existing

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<sup>17</sup> Youth smoking rates are not taken into account as adults consume 98% of all cigarettes in the United States (Congressional Budget Office, 1998).

literature and data, it would be fair to say that the impact of the increase in price and the decline in consumption is likely to be a net increase in state revenues.

The proposed increase in the cigarette tax is likely to produce some *negative cross-border effects*. As noted above, the cross-border effects can be particularly severe when transportation costs are low and there exists a wide variation in state cigarette tax rates. Raising the tax to 25 cents per pack will still maintain Virginia's competitive advantage, albeit at a reduced level, with respect to Maryland, Pennsylvania, West Virginia, and Washington, D.C. However, it will lose its competitive advantage with respect to North Carolina, Kentucky, and Tennessee.

The Farrelly and Nimsch (2003) study estimated the impact on revenues of a hypothetical 70-cent increase in cigarette tax under two scenarios – (1) when all southern states raise taxes by the same amount and (2) other when only one state raises taxes. The results for Virginia indicate that the cross-border effect of such an increase would have reduced revenues by \$17.2 million, from \$313.1 million to \$295.9 million (a relatively small impact). The Sung, Hu, and Keeler (1994) study estimates that the 1989 cigarette tax increase is likely to have lowered state revenues by \$0.4 million just from Californians choosing to purchase cigarettes from another state.

For a decline in revenues to occur in Virginia, the 22.5-cent tax increase being proposed would have to lower consumption by 90% (the calculation is based on \$16.5 million collected in revenue at the 2001 2.5 cent tax rate). This is unlikely to occur in the near future.

By reducing consumption, the proposed increase in cigarette tax will produce health-related benefits. According to the Centers for Disease Control, approximately 440,000 people die of smoking-related illnesses each year in the United States.<sup>18</sup> Thus, by reducing cigarette consumption, the benefits of the proposed change will accrue in the form of reduced medical expenditures attributable to smoking-related illnesses and lower smoking-attributable productivity costs.

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<sup>18</sup> The Surgeon General's report on reducing tobacco use states that tobacco use remains the leading cause of preventable illness and death in the United States.

*Smoking-Attributable Medical Expenditures:* The Centers for Disease Control has estimated that smoking-attributable direct medical expenditures in Virginia amounted to over \$1.6 billion or \$240 per capita in 1998.

*Smoking-Attributable Productivity Costs:* The Centers for Disease Control has estimated that smoking-attributable productivity costs in Virginia amounted to over \$2 billion or \$303 per capita in 1998.

Combining both these costs, the Centers for Disease Control (CDC) estimated that it cost Virginia \$5.57 per pack in direct medical expenditures and lost productivity in 2001. Moreover, in 1998, the CDC estimates that Virginia spent about 14% of all Medicaid expenditures on smoking-related illnesses and diseases. By reducing smoking consumption, the proposed change is likely to reduce health costs associated with smoking.

*Net Economic Impact:* The net economic impact of the proposed increase in cigarette tax will depend on whether the benefits of the tax increase in terms of the increase in state revenue and the decrease in health and productivity costs are greater than or less than the cost imposed on consumers (in terms of the higher price per pack of cigarettes) and producers (in terms of a potential loss in revenues from the increase in cigarette tax.)

The additional cost to smokers will be balanced by the additional increase in state revenues. All of the additional revenues in this case are budgeted to provide additional funding for Medicaid, including Medicaid payments to treat smoking-related illnesses. The net economic impact of the transfer of resources between smokers and the state will depend on the rate of return earned by each additional dollar of government revenue compared to the rate of return it would have earned otherwise. Given the potential benefits to be gained from lower health care and productivity costs, there is good reason to argue that a cigarette tax is likely to have a lower economic cost per dollar raised than many other taxes might have. In fact, although the empirical evidence is not settled on this point, it is theoretically possible that a dollar of tax raised on cigarettes, rather than imposing a cost, could instead result in a net long-term gain to Virginia.

# Impact of New Revenue

## *Public Education*

Tax Reform Proposal: The Governor's tax reform and budget proposals provide over \$774.0 million for public education, including a three percent salary increase for public school employees funded through the Standards of Quality (SOQ). The additional money recommended for K-12 spending is large by historical standards. For example, the increase for the last biennium was closer to \$200 million. This funding will allow the state to meet its statutory obligations with respect to K-12 spending as well as fund teacher retirement contributions on a pooled basis with retirement contributions for state employees. The latter action will also save localities over \$20 million of spending each year. Revenues from tax reform will also be used to improve remedial education and at-risk programs and to recognize the prevailing practice for English as a Second Language programs statewide. Finally, the additional revenues will enable the state to support the final phase of the "cost of competing" adjustment for Northern Virginia, which is designed to make teacher salaries more competitive in that region.

The productivity of dollars spent on K-12 education depends on how the money is spent. However, there is a rapidly developing literature indicating that, if spent effectively, investments in the quality of K-12 education can earn significant returns for a state's economy.

Education and economic performance: Studies indicate that the quality of the labor force is one of the top factors affecting firms' location decisions and whether to expand at current locations. For example, Area Development magazine's two most recently issued corporate surveys (December 2002 and December 2003) found that "availability of skilled labor" was ranked as the most important and third most important factor (out of 25), respectively, in choosing site locations. Also, higher-skilled labor is more productive, and higher productivity is closely associated with higher wages. Thus, employment and economic growth is positively affected by improved labor quality. Higher earnings also help sustain long-term revenue growth.

Targeted spending and improved outcomes: There exist numerous studies in well-respected peer-reviewed journals concerning school attributes affected by K-12 expenditures and their effects on students and teachers. Though there are reputable studies that find otherwise, there is increasingly strong evidence suggesting that carefully targeted expenditures can significantly improve: 1) student academic performance, 2) graduation rates, 3) the proportion of students going on to college, 4) teacher quality, 5) the earning potential of students, and 6) labor force quality.

In “Experimental Estimates of Education Production Functions,” *The Quarterly Journal of Economics*, May 1999, Alan Krueger found that:

- “On average, performance on standardized tests increases by four percentile points the first year students attend small classes.”
- “The test score advantage of students in small classes expands by about one percentile point per year in subsequent years.”
- “Class size has a larger effect for minority students and those on free lunch.”

Other studies find that, other things equal, an increase in average teacher's salary raises student performance on college entrance exams. Sander (1993) found that an increase in average teacher's salary raises students' performances on college entrance exams and increases the percentage of students that go on to college. Sander also found that a reduction in the teacher-student ratio increases the graduation rate.

A growing body of research also points to a consistent conclusion that the imposition of tax and expenditure limits results in long-run reductions in the performance of public school students. Figlio (1997) finds that tax “limitations are associated with lower student performance on mathematics, science, social studies, and reading examinations...” Figlio and Reuben (2001) “find that [state] tax limits systematically reduce the average quality of new public school teachers in states that have passed these limits.”

Card and Krueger (1992) find that men educated in states with higher-quality schools (measured in terms of student-teacher ratios, length of the instructional period and relative teacher pay) have a higher return to additional years of education. Thus, lower student-teacher ratios, longer instructional periods, and higher teacher salaries – all dependent on expenditures – are associated



with greater lifetime earnings potential. Further Kane and Rouse (1995) and Jaeger and Page (1996) measure the significant increase in earnings from post-secondary education.

As demonstrated above, expenditures on K-12 can significantly improve the performance of students, increase graduation rates, and increase the percentage of students that go on to college. These are all indicators of the knowledge and skills of the labor force. Higher-skilled labor is more productive and is an important driver of economic growth. Higher-skilled labor both attracts more firms and improves the productivity and growth of current businesses.

The lesson here is that certain characteristics of schools do make an important difference in student outcomes and that improving these characteristics takes money. Not providing the money needed to keep class sizes small, to provide competitive teacher salaries, and to improve teacher quality will result in lower student outcomes. This, in turn, can have a real impact on the business climate in the Commonwealth.

### ***Spending on Higher Education***

Tax Reform Proposal: The Governor's tax reform budget proposals make possible spending of over \$100 million for higher education in the 2004-06 biennium. This funding will help Virginia's public colleges and universities absorb expected increases in enrollment, and ensure that more students complete degrees each year. Funds will provide base operating support for these institutions, a significant need identified by the legislature's Joint Subcommittee on Higher Education Funding Policies. The proposal also provides increased funding for the Tuition Assistance Grant for students who attend private colleges and universities, as well as funding to waive out-of-state tuition surcharges for spouses and dependents of military personnel stationed in Virginia.

In addition, revenues from tax reform will be used to strengthen research programs at state colleges and universities – a key step toward the goal of reaching \$1 billion in sponsored research by 2010. The proposed revenues also support funding for the Institute for Advanced Learning and Research in Danville, which will provide expanded access to higher education in

Southside Virginia. Likewise, the proposal provides supplemental funding for higher education centers in Southwest Virginia and Roanoke.

#### Expenditures for increased enrollment and base adequacy

Repeatedly, surveys of business indicate that the single most important factor in determining location investment among the states is the quality of the workforce. One of the key economic benefits of public funding of higher education is the value of a more educated workforce in both attracting capital investment from outside of Virginia and in inducing bright, entrepreneurial people to locate in Virginia and pursue their business opportunities here. High quality, reasonably priced higher education provides an opportunity for high school graduates to stay in Virginia for college. Retaining those who wish to receive higher education will tend to improve the quality of the workforce. In addition, opportunities to attend a high quality school in Virginia will draw potentially valuable additions to the workforce to study and then settle in the state.

Virginia is expected to have a significant increase in the number of students graduating from high school over the next several years. Investing in programs and facilities to serve these students will result in more of the students remaining in Virginia. Higher levels of education are associated with higher productivity which is, in turn, associated with higher wages and increased capital investment. The value to the economy of having additional members of the workforce qualified and motivated enough to earn advanced degrees is well-documented:

- On average, a person with an associate degree earns \$8,000 more per year than a person with a high school diploma and \$20,000 more than a person without a high school diploma.
- On average, a person with a bachelor's degree earns \$13,000 more per year than a person with a high school diploma and \$25,000 more than a person without a high school diploma.
- On average, a person with a master's degree earns \$28,000 more per year than a person with a high school diploma and \$40,000 more than a person without a high school diploma.

While the general conclusion that investment in post-secondary education earns returns to the state through higher wages and increased growth, it is not possible to estimate the value returned per dollar invested. To make a reliable estimate would require that we know how many of the additional students will remain in Virginia upon completing their education and how effective those newly trained graduates will be in generating economic value for Virginia. We do know that, at the margin, the increased number of graduates will improve the business climate in the state. The stiff competition among the states for business investment and the response of that investment to workforce quality allow us to conclude that investment in high quality post-secondary education has very significant value to the state's economy.

#### Expenditures on improving the standing of top academic research departments

A significant portion of the increased funding to higher education in Governor Warner's budget proposal is associated with increasing the standing of Virginia's top academic research centers in the areas of science-dependent research and development. Research indicates that expenditures in this area have the potential to make significant contributions to income growth in the state in the medium and long term.

Matching federal and private research funding add directly to economic activity because they generally represent a net inflow of funds into the state. Also, these funds leverage the value of the state's contribution to investments in new knowledge and technology. An additional benefit of drawing matching grants is that such grants, and the research they support, serve as accepted signals of academic quality. This, in turn, has a "feed-back" effect by making it easier to attract future external funding.

Studies suggest that high rates of knowledge creation fuel faster economic growth through several mechanisms. First, there are "knowledge spillovers," that is, when one firm or agency generates new knowledge, there are benefits to other, nearby, firms. These spillovers occur both within industries and between industries. Spillovers within industries help explain why we observe agglomeration (concentration) of firms in an industry in one locality. Spillovers between industries also help explain the faster growth rate of cities over non-urban areas.

A second way that knowledge fuels growth is through the local entrepreneurial activities of faculty and graduates of universities. Empirical evidence suggests that one important explanation of above average growth near universities may be found in the relationships between *star faculty* (and their top graduate students) and surrounding firms. In many cases, faculty and graduates start their own firms to capitalize on theoretical discoveries made on campus.

State funding dedicated to attracting knowledge industries has increased substantially in the last decade. The competition among states for the higher paying jobs and the possibility of being the home of the next "Silicon Valley" has driven up the costs of attracting those industries.

Some factors most commonly cited for siting high-tech research facilities include:

- Association with or proximity to high quality institutions of higher education
- Association with or proximity to star scientists in their fields
- A pleasant environment with good cultural, recreational and retailing facilities
- Association with military research and development
- The availability of specific kinds of labor:
  - Well-educated and skilled labor
  - Inexpensive, low-skilled labor

Many of these factors are associated with high quality research institutions.

The benefits of high-tech facility siting include:

- Higher wage jobs, relatively few low-wage jobs
- New local entrepreneurial opportunities:
  - Service industries to support the high tech industries
  - Other hi-tech support/supplier industries
- “Agglomeration” effects (as more firms locate nearby, other firms are drawn to the area)
- Capital intensive facilities bring capital investment to the area; after investing in facilities firms tend to stay and expand

The conclusion to be drawn from this analysis is that carefully targeted investment in developing top-ranked departments in the sciences and in engineering can be expected to pay long-term dividends in increased growth.

## **Transportation Infrastructure**

Tax Reform Proposal: The Governor's tax reform and budget proposals fund \$272 million in highway construction in the 2004-06 biennium. In addition, \$74.8 million in general fund revenue is provided to pay debt service on Federal Revenue Anticipation Notes (FRANS) issued in the current biennium, freeing up transportation revenue for construction and maintenance. The allocation of these funds will constitute a significant increase in transportation spending.

### Increase funds for transportation infrastructure:

The economic effects of investment in transportation infrastructure are widespread as the system facilitates movement of goods and people from any departure to any destination. New investments provide direct savings to individuals and businesses in transportation costs, which ripple through the economy and produce a number of desirable macroeconomic outcomes. These include gains in productivity, output, welfare, employment, personal income, regional output, and sectoral output. There is a solid consensus on the positive attributes of investment in transportation infrastructure.

### Savings in non-business user costs:

The research indicates that non-business users of infrastructure will realize savings in terms of reduced vehicle-hours of travel and vehicle operation costs such as fuel efficiency and regressed depreciation. Additional societal gains may include reductions in crash rates, stress, medical care and improvements in national security, emergency preparedness, access to parks and forests, comfort, etc.

- The number of hours that users were delayed in metropolitan traffic increased 46% from 21.9 to 31.9 person hours between 1992 and 2000 (FHA 2002). Also, average rush hour grew more than 18 minutes between 1997 and 2000.
- The suggested value of personal travel time is 50% of the wage rate, which vary from \$6.00 to \$10.20 for local travel and from \$10.20 to \$15.30 for intercity travel per person-hour in 1995 dollars (OST 1997). Also, the value of travel time can be stratified at \$2.64 an hour for an income level of \$15,000, \$5.34 an hour for an

income level of \$55,000, and \$8.05 an hour for income level of \$95,000 in 1995 dollars (Hickling 1995).

- Texas Transportation Institute estimated that the congestion bill for 68 cities in 1996 was about \$74 billion, the value of hours of delay, and over 6 billion gallons of excess fuel consumed (TTI 1996).
- The cost of vehicle damage and accelerated depreciation is estimated to cost Virginia \$1.3 billion, or \$256 per motorist annually (ASCE 2003).

#### Savings in business user costs:

There is abundant evidence showing that improved transportation infrastructure reduces costs associated with limited mobility, freight distance, delivery time and uncertainty, inventory level, small markets, and limited access to inputs and suppliers. Following is an overview of the studies in this area.

- Improved highway infrastructure reduces on-the-clock travel time (trips drivers take as part of their work), which reduces business costs. The estimated cost savings in 1995 dollars per person-hour in wages, fringe benefits, vehicle costs, and inventory carrying costs of cargo for a medium auto and 4-axle truck were \$28.29 and \$31.02, respectively (FHA 1997).
- Improved highway infrastructure reduces logistic costs. Firms using heavy and bulky goods locate close to the supplier in order to minimize logistic costs. Improved infrastructure can increase productivity as a result of reducing the costs of current delivery and increasing sales. Also, less congestion reduces inventory costs and delivery uncertainty (supplier speed, frequency, reliability) (Evers 1988; McCann 1993; Ciccone and Hall 1996; Treyz and Bumgardner 1996). It is estimated that a 1% reduction in travel time leads to a 0.055% reduction in logistic costs in retail food industry, 0.234% reduction in automotive parts industry, 0.103% reduction in telecommunication equipment industry, and a 0.548% reduction in medical/surgical instruments industry. This study also shows that consolidating facilities as a logistical response to highway improvements in medical and surgical industry provided a 18.2% reduction in transportation costs, a 22.2% reduction in warehousing

costs, and a 18.2% reduction in inventory carrying costs (Hickling 1995).

Infrastructure investments lead to reductions in inventory levels (Shirley and Winston 2001). Travel time predictability provides cost savings to businesses. A household appliance shipper was willing to pay \$34.32 to reduce standard deviation of travel time by 1 day (Watson et al. 1974). Willingness to pay to reduce standard deviation of transit time by 1 day in unregulated agriculture was \$404, in regulated agriculture was \$4,110; in stone, clay, and glass products it was \$3,244, and in primary fabricated metals, \$1,279 (Winston 1981). A shipper was willing to suffer an extra 1.3 days of transit time to reduce late shipments by 1% (Wilson et al. 1986). Nigerian firms were willing to pay 1.6 Naira per ton to reduce standard deviation of transit time by one hour (Ogwude 1990 & 1993). Businesses were willing to pay \$323/lb of shipment for each day of improvement in reliability (Abdelwahab and Sargious 1992). Willingness to pay for a 1% reduction in the difference from expected travel time was \$0.37 (Richardson and Cuddon 1994). Increasing on-time deliveries by 5% was valued equivalently to a one-half day decrease in scheduled journey time (Fowkes et al. 1991). Carriers valued late schedule delays \$371.33 per hour, and value transit time at \$144.22-\$192.83 per hour (Small et al. 1997).

- Improved transportation infrastructure reduces just-in-time (JIT) production costs. JIT is a means of raising productivity and lowering costs for manufacturing. It relies on tightly scheduled and frequent deliveries of supplies to reduce inventory needs and costs (McCann 1993). Fifty-seven percent of procurement professionals reported management emphasis on improved delivery performance (Cruz 1996). Reliability and dependability was one of the most important factors in the choice of carrier or mode (Small et al. 1997). JIT was found to produce savings from 2% to 30% of overall operation costs and from 30% to 80% for specific categories of space, labor, and inventory costs (Voss 1987; Couvrette 1991; Stuart 1993). Businesses that provide perishable goods placed more value on and were more sensitive to JIT (Blackburn 1991). However, JIT may also contribute to congestion itself.
- Investment in transportation infrastructure reduces market scale and accessibility costs. There could be a reduction in demand and output due to limited market area, higher unit costs due to reduced-scale inefficiencies in production delivery, and

reduced access to specialized inputs (Ciccone and Hall 1996; Treyz and Bumgardner 1996). Improvements in access to markets increase competition where suppliers previously exercised monopoly power. Agglomeration economies and accessibility factors are valuable to businesses (McConnel and Schwab 1990). With better accessibility, businesses can potentially realize economies of scale in serving broader markets and provide access to greater variety of specialized labor skills or other inputs (Evers et al. 1988; Fujita 1989; Krugman 1995; Ciccone and Hall 1996). On the other hand, agglomeration may contribute to congestion.

- Better infrastructure reduces business costs of worker commuting. Businesses tend to compensate workers for higher commuting expenses (Moses 1962; Muth 1969; Mills 1972; White 1976; Zax 1991). People who change jobs effectively trade off commuting costs against wages. In other words they get paid higher when commuting costs are higher (Madden 1985). A negative relationship is found between wage rates and public transit availability and dependency. The negative relationship is strongest for white-collar jobs, which is believed to reflect not only the incremental value of time spent commuting, but also additional out of pocket expenses, lost leisure time, and added commuting hassle (DeSalvo and Huq 1996; Zax 1991).
- Investment in highway capital reduces costs of congestion avoidance adjustments. Some travelers and businesses try to adjust to congested conditions by adjusting their choice of travel time (off-peak hour of travel time), choice of route, choice of mode, and choice of destination. In the long run they adjust by relocating (Cohen 1994; Gordon and Richardson 1989).
- Other business cost savings may stem from reduced worker stress, worker absenteeism, excess parking, parking cash-out costs, medical care, employee benefits, and employee turnover.

In short, the findings in the literature predict significant cost savings for businesses if Virginia invests in transportation infrastructure. These expected business cost savings are mostly in terms of productivity gains and will ultimately translate into aggregate cost savings and various economic gains at the macroeconomic level. Lower costs could also convince some businesses



to expand in or relocate to Virginia, which would induce demand for inputs, create additional sales, and increase tax revenues.

#### Macroeconomic benefits:

The converging research findings show significant savings in aggregate business costs and increases in total output through productivity gains. Economic growth, in turn, would increase welfare/living standards for all Virginians. A survey of the literature follows.

- Keeler and Ying (1988) found that 1% increase in highway investments reduced costs of trucking industry by 0.07%. Also, they concluded benefits to the trucking industry alone would have repaid between one-third and nearly three-quarters of the total highway investment.
- A seminal study, Nadiri and Mamuneas (1996), found 0.04% reduction in business costs in 35 industries over 1947-1989 for a 1% increase in highway capital. According to this study, marginal benefits to businesses have averaged a 23-cents-return per year on each dollar invested in highway infrastructure. The rate of return was higher for earlier periods. The current rate of return is probably lower as earlier investments focused on building the basic system and later focused more on enhancing the basic system.
- Lynde and Richmond (1992) estimated significant cost reductions for United Kingdom manufacturing sector over 1958-1989 from public capital investment. A follow up study, Lynde and Richmond (1993), estimated that investment in public capital per employee contributed 17% productivity growth in U.K. manufacturing sector over 1966-1990, which is about the same as the contribution of private capital expenditures.
- Other international studies also found significant cost reductions from investment in transportation infrastructure. These include Elhance and Lakshmanan (1988), Seitz (1994 & 1994), and Conrad and Seitz (1994).

### Aggregate Productivity Gains:

The consistent finding is that there is a positive relationship between output and spending on transportation infrastructure. This line of research focuses on output levels. The relationship of (percent output)/(percent capital) is found to be in the range of 0.2-0.4 at the national level, around 0.15 at regional and state levels, and as low as 0.004 at metropolitan levels. The economic benefit appears to be smaller for small areas because network interconnection benefits and broad area benefits are not captured in the regional studies.

- Ratner (1983) found that a 1% increase in non-military public capital increased total business sector output in the United States by 0.05% to 0.06% from 1949-1973.
- Costa et al. (1987) estimated that a 1% increase in state and local public capital in 48 states increased manufacturing output by 0.19%, non-agriculture sector output by 0.20%, and output of all sectors by an average of 0.19%.
- Deno (1988), using data from 36 U.S. metropolitan areas, estimated that a 1% investment in highway and bridge capital increased manufacturing output supply by 0.31% to 0.57%.
- Duffy-Deno and Eberts (1991) found that a 1% investment in public capital increased personal income by 0.08%, based on data from 28 U.S. metropolitan areas over the period 1980-1984.
- Aschauer (1989) estimated a 0.39% and 0.24% increase in output as a result of a 1% increase in non-military public capital and core public capital (highways, airports, utilities, mass transit, and water and transit system.) Similarly, Munnell (1990) estimated 0.31% to 0.39% increase in output as a result of 1% increase in core public capital.
- Hulten and Schwab (1991) concluded no significant contribution of public capital to manufacturing output, but their work has been severely criticized on methodological grounds.
- Forkenbrock and Foster (1990) showed the distributional income effect of infrastructure improvements among localities, gasoline service stations, eating, drinking service industries. Evidence showed a decrease in sales along relief routes, but these sales depend most on traffic (Handy et al. 2000).

- The studies conducted in other countries consistently found significant contribution to output ranging from a 0.30% to 0.80% increase in measure of economic output as a result of a 1% investment in highway infrastructure. These studies include Mera (1973), Johanson (1993), Johanson and Karlsson (1994), Anderson, et al. (1990), and Prud'homme (1993).
- Also, Eno (1997) estimated an average annual return of 26% for highway projects and 15% rate of return for projects in all sectors from World Bank projects in developing countries.

The research shows that expected productivity gains will likely occur and increase total state output and improve welfare/living standards for all Virginians. The magnitude of the productivity gains and of the aggregate effects depends on the size of reduction in business costs. Studies done by Cambridge Systematics, Inc. for highway projects in Wisconsin and Florida first estimated business cost savings and based on that information estimated substantial employment gains in addition to \$3 and \$5.50 in economic benefits for every dollar invested in proposed transportation projects.

In summary, investments into transportation infrastructure have numerous economic benefits affecting households, businesses, and localities.

## Medicaid Funding

Tax Reform Proposal: The Governor's tax reform and budget proposals make possible state spending of over \$707 million for Medicaid utilization and inflation. All of the additional revenue from the proposed cigarette tax increase is earmarked for Medicaid expenditures.

To address hospital and nursing home reimbursement rates that are exceptionally lean in comparison to those of other states, the Governor's budget recommends modest rate increases for these providers. Hospitals will be reimbursed for an additional \$18.2 million of their costs. Nursing homes will be reimbursed for an additional \$19.4 million of their costs. Tax reform will fund reductions in the waiting list for Medicaid waiver services for individuals suffering from developmental disabilities. As part of the Governor's initiative, \$1.6 million will enable 25 additional Virginians to receive appropriate services in community-based programs.

Health Benefits: Direct health-related benefits from increased Medicaid spending are the value of improved health to the individuals receiving the care, the value of avoided medical care costs, and improved productivity of the labor force. While there are few studies quantifying these benefits of Medicaid spending, the literature on differences between insured and uninsured is immense. Kaiser Commission (2002) summarizes dozens of studies conducted on the economic costs of being uninsured. The major findings are as follows:

- Uninsured receive less preventive care, are more likely to be diagnosed at advanced stages of a disease, and upon diagnosis, are found to have higher rates of mortality. Ayanian et al. (1993) found that uninsured were 1.68 times less likely to receive cancer preventative services such as pap smears and mammography and 1.49 times more likely to have died between 4 to 7 years after diagnosis. Uninsured were found to have a lower likelihood of receiving preventive care and relatively higher mortality rates for other diseases including breast cancer, colorectal cancer, cardiovascular disease, and diabetes (Roetzheim et al. 2000; Young and Cohen 1991; Canto et al. 2000; Breen et al. 2001; Sudano and Baker 2001; Hadley 1982, Roetzheim et al. 2000; Hadley 1988; Haas and Goldman 1994).

- Uninsured receive less health care compared to insured and have lower health status (Sorlie et al. 1994; Franks and Clancy 1993; Hadley 1988; Lichtenberg 2001; Kasper et al. 2000; Bradfury et al. 2001).
- Uninsured pregnant women and newborns receive less care and tend to have lower health status (Braveman et al. 1989; Currie and Gruber 1996; Liu 1998; Hadley 1982; Cremieux et al. 1999; Aron et al. 2000; Stafford 1990).
- The category of avoided medical care costs merits further mention. Most Medicaid recipients are children, pregnant women, and mothers of very young children. Enhancing medical care for this population has a substantial payoff in terms of better health outcomes later in life (Kozak et al. 2001; Pappas et al. 1997).
- Good health status also increases education and income potential (Chirikos and Nestel 1985; Frostin and Holtmann 2000; National Academy on Aging Society 2000; Grossman 1975; Perri 1984; Wolfe 1985; Wadsworth 1986).
- In addition, routine medical care for this population avoids many of the otherwise inevitable emergency expenditures that would come at a much higher cost (Baker and Baker 1994; Williams 1996).
- Further, many of the expenditures that would occur later in life would not be subject to the federal match. Hence the full cost of the care would fall on the state economy.

Combined together these better health outcomes will make a significant contribution to the net benefits of Medicaid spending.

Federal Match: Every Medicaid dollar spent brings in another dollar from the federal government. While the state funds must come from somewhere within the state and hence will have significant offsetting economic effects, matching federal funds inject money into the state economy without any offsetting economic effects elsewhere in the state. These federal funds would be spent on hospitals, nursing homes, physicians, and other Medicaid providers. This means a direct increase in total Virginia income (output) and a net improvement in the health status of Virginia citizens.

The federal match money is subject to an economic multiplier as the injected cash is spent on goods and services in Virginia. The size of the multiplier depends on leakages such as the savings rate. The greater the savings rate, less income is spent at each round, and the multiplier becomes smaller. Another factor is the source of the increase in spending. Taking money away from somewhere else creates a leakage from the economy and the multiplier process works in reverse direction. Since federal match represents a minimal leakage from the Virginia economy, the size and the effect of multiplier should be higher for that part of the additional Medicaid spending.

While there are a number of studies of the benefits of Medicaid spending on state economies, these studies must be interpreted with caution. Many studies conclude that Medicaid spending is a “growth engine” for the economy as it brings incremental money flowing from outside the state and boosts the economy. While the infusion of federal money into the state economy can be expected to boost economic activity, it is also true that, at some point, the productivity of additional expenditures on Medicaid, both as an economic stimulus and as a contribution to individual welfare will fall. However, given that Virginia per capita Medicaid expenditures are fortieth nationwide, it seems likely that the additional money brought into the state economy from the federal match will have a net positive impact on both economic activity and on net economic welfare.

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## References

- Abdelwahab, W., and M. Sargious, 1992-January. Modeling the demand for freight transport: A new approach. *Journal of Transport Economics and Policy* 26(1): 49-70.
- American Society of Civil Engineers (ASCE), August 2003. *Virginia State Report*.
- Andersson, A., C. Anderstig, and B. Harsman, 1990. Knowledge and communications infrastructure and regional economic change. *Regional Science and Urban Economics* 20:359-376.
- Aron, D. C., H. S. Gordon, D. L. DiGiuseppe, D.L. Harper, and G. E. Rosenthal, 2000. Variations in risk adjusted cesarean delivery rates according to race and health insurance. *Medical Care* 38(1):35-44.
- Aschauer, D. A., 1989. Is public expenditure productive? *Journal of Monetary Economic* 23:177-200.
- Atkinson, R. D., R. H. Court and J. M. Ward, 1999 – July. The state new economy index: benchmarking economic transformation in the states. *Progressive Policy Institute Technology & New Economy Project*.
- Audretsch, D. B. and M. P. Feldman, 1996. Innovative clusters and the industry life cycle. *Review of Industrial Organization* 253-273.
- Ayanian, J. Z., B. A. Kohler, T. Abe, and A. M. Epstein, 1993 – July. The relationship between health insurance coverage and clinical outcomes among women with breast cancer. *The New England Journal of Medicine* 29:329:326-31.
- Baker, L. C. and L. S. Baker, 1994 – Winter. Excess cost of emergency department visits for nonurgent care. *Health Affairs*, 162-71.
- Bania, N., R. W. Eberts and M. S. Fogarty, 1993. Universities and the startup of new companies: can we generalize from route 128 and Silicon Valley? *Review of Economics and Statistics* 75(4): 761-66.
- Besley, T. J. and H. S. Rosen, 1999 – June. Sales taxes and prices: an empirical analysis.” *National Tax Journal* 52(2): 157-78.
- Blackburn, J. T., 1991. The time factor. In *Time-based competition: the next battleground in manufacturing*, ed. J. T. Blackburn, Business One Irwin, Homewood, Illinois.
- Bradbury, K. L., 1982 November-December. Fiscal distress in large U.S. cities. *New England Economic Review* 33-44.



- Bradbury, R. C., J. H. Golec, and P. M. Steen, 2001 – August. Comparing uninsured and privately insured hospital patients: admission severity, health outcomes and resource use. *Health Services Management Research* 14(3):203-10.
- Braveman, P., G. Oliva, M.G. Miller, R. Reiter, and S. Egerter, 1989 – August. Adverse outcomes and lack of health insurance among newborns in an eight-county area of California, 1982 to 1986. *The New England Journal of Medicine*. 321(8):508-13.
- Breen, N., D. K. Wagener, M. L. Brown, W. W. Davis, and R. Ballard-Barbash, 2001 – November 21. Progress in cancer screening over a decade: results of cancer screening from the 1987, 1992, and 1998 national health interview surveys. *Journal of the National Cancer Institute* 93 (22):1704-13.
- Burton, L, 1989 - Fall. Indicators for state science and technology programs. Technology and American Competitiveness. *Policy Studies Journal* 18, (1):164-175.
- Cambridge Systematics, Inc., 2003. *Macroeconomic impacts of the Florida Department of Transportation work program*. Prepared for the Florida Department of Transportation.
- Cambridge Systematics, Inc., 2003. *Transportation improvements grow Wisconsin's economy: the economic benefits of transportation investments*. Prepared for the Transportation Development Association of Wisconsin.
- Canto, J. G., W. J. Rogers, W. J. French, J. M. Gore, N. C. Chandra, and H. V. Barron, 2000 – March 27. Payer status and the utilization of hospital resources in acute myocardial infarction. *Archives of Internal Medicine* 160:817-23.
- Card, D. and A. Krueger, 1992. Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy* 100(1): 1-40.
- Carlino, G. A., January 1995. Do education and training lead to faster growth in cities? *Business Review*, Federal Reserve Bank of Philadelphia 15-22.
- Carroll, H., Rider, and H. S. Rosen, 2001. Personal income taxes and the growth of small firms. *NBER Tax Policy and the Economy* Vol. 15.
- Chirikos, T. N. and G. Nestel, 1985. Further evidence on the economic effects of poor health. *The Review of Economics and Statistics* 67:61-9.
- Ciccone, A., and R. Hall, 1996. Productivity and density of economic activity. *The American Economic Review*. 86 No. 1: 54-70.
- Coats, R. M., 1995 – December. A note on estimating cross-border effects of state cigarette taxes. *National Tax Journal* 48(4): 573-84.

- Cohen, H., 1994 – September. Literature review on travel impacts of highway capacity improvements. *National Research Council Paper*.
- Congressional Budget Office, Washington, D.C. The proposed tobacco settlement: issues from a federal perspective. *Manuscript*.
- Connolly, L. S., 1997. Does external funding of academic research crowd out institutional support? , *Journal of Public Economics*, 64: 389-406.
- Conrad, K. and H. Seitz, 1994. The economic benefits of public infrastructure. *Applied Economics* 26:303-311.
- Costa, J. S., R. W. Ellison and R. C. Martin, 1987. Public capital, regional output, and development: some empirical evidence. *Journal of Regional Science* 27:419-3.
- Couvrette, C., F. Valenta, and M. Miron, 1991. Variety reduction by design: a key element to successful just-in-time implementation in a custom manufacturing environment. In *Just-in-Time Manufacturing Systems: Operational Planning and Control Issues*. Amsterdam: Elsevier Press.
- Crémieux, P., P. Ouellette, and C. Pilon, 1999. Health care spending as determinants of health outcomes. *Health Economic* 8:627-39.
- Cruz, C., 1996 – May 23. Purchasing execs take shears to corporate costs. *Purchasing*.
- Cummins, Hassett, and Hubbard 1995. Have tax reforms affected investment? *NBER Tax Policy and the Economy* 9.
- Currie, J., J. Gruber, 1996 – May. Health insurance eligibility, utilization of medical care, and child health. *The Quarterly Journal of Economics* 111(2): 431-66.
- Deno, K. T., 1988. The effect of public capital on U.S. manufacturing activity: 1970 to 1978. *Southern Economic Journal* 55: 400-411.
- DeSalvo, J. S. and Huq, M., 1996. Income, residential location and mode choice. *Journal of Urban Economics* 40: 84-99
- Downes, T., and D. Figlio, 1999 – March. Do tax and expenditure limits provide a free lunch? Evidence on the link between limits and public sector service quality. *National Tax Journal* 52:113.
- Duffy-Deno, K. T., and Randall W. Eberts, 1991 – November. Public infrastructure and regional economic development: a simultaneous equations approach, *Journal of Urban Economics* 30(3): 329-343.
- Eberts, R., 1981. An empirical investigation of intraurban wage gradients. *Journal of Urban Economics* 10: 50–60.

Eberts, R., 1991. Some empirical evidence on the linkage between public infrastructure and local economic development. In *Industry Location and Public Policy*, eds. H. Herzog and A. Schlottman. University of Tennessee Press, Knoxville, TN.

Elhance, A. P. and T. R. Lakshmanan, 1988. Infrastructure-production system dynamics in national and regional systems; an econometric study of the Indian economy. *Regional Science and Urban Economics* 18: 513-531.

Eno (Eno Transportation Foundation), 1997. *Intermodal Freight Transport in Europe and the United States*, D.C., Eno Transportation Foundation.

Erickson, R. A., and M. Wasykenko, 1980 – July. Firm relocation and site selection in suburban municipalities. *Journal of Urban Economics* 8(1): 69-85.

Evers, G. H. M., et al., 1988. Regional impacts of new transportation infrastructure: a multi-sectoral potentials approach. *Transportation* 14: 113–126.

Farrelly, M. C., J. W. Bray, T. Pechacek, and T. Woollery, 2001 – July. Response by adults to increases in cigarette prices by sociodemographic characteristics. *Southern Economic Journal* 68: 156-173.

Farrelly, M. C., and C. Nimsch, 2003. Impact of cigarette excise tax increase in low-tax southern states on cigarette sales, cigarette excise tax revenue, tax evasion, and economic activity. *Final report prepared for the Tobacco Technical Assistance Consortium*, Research Triangle Institute.

Federal Highway Administration (FHA), 1997 - March update. *The Highway Economic Requirement System: Technical Report*.

Feller, I., 1992. American state governments as models for national science policy. *Journal of Policy Analysis and Management* 11(2):288-309.

Figlio, D., 1997 – September. Did the “tax revolt” reduce school performance? *Journal of Public Economics* 65(3): 245-269.

Figlio, D., and K. Reuben, 2001 – April. Tax limits and the qualifications of new teachers.” *Journal of Public Economics* 80(1):49-71.

Forkenbrock, D. J. and Norman S. J. Foster, 1990. Economic benefits of a corridor highway investment. *Transportation Research A* 24:303-312.

Fowkes, A. S., C. A. Nash, and G. Tweddle, 1991. Investigating the market for inter-modal freight technologies. *Transportation Research A* 25: 161–172.

- Franks, P. and C. M. Clancy, 1993 - September. Health insurance and subjective health status: data from the 1987 national medical expenditure survey. *American Journal of Public Health* 83(9): 1295-9.
- Fronstin, P., A. G. Holtmann, 2000. Productivity gains from employment-based health insurance. In *The Economic Costs of the Uninsured: Implications for Business and Government*, ed P. Fronstin, Washington D.C.: Employee Benefit Research Institute 25-39.
- Fujita, M., 1989. Urban economic theory: land use and city size. *Cambridge University Press*, Cambridge, Massachusetts.
- Gates, J. M., T. A. Grigalunas, and L. F. Vieira, 1984. Cost effectiveness of publicly funded research: a case study of the United States academic research fleet. *Applied Economics* 16:355-367.
- Georgellis, Y. S. and H. J. Wall, 1999 – June. What makes a region entrepreneurial? Evidence from Britain. *Working Papers*. Federal Reserve Bank of St. Louis, 99-0009A.
- Glaeser, E. L., H. D. Kallal, J. A. Scheinkman and A. Shleifer, 1992. Growth in cities. *Journal of Political Economy* 100, No. 6.
- Goolsbee, A., 2004 – March. Taxes and the quality of capital. *Journal of Public Economics* 88: 519-543.
- Gordon, P., H. W. Richardson, and A. Kumar, 1989. Congestion, changing metropolitan structure and city size.” *International Regional Science Review* 12: 45–56.
- Grossman, M., 1975. The correlation between health and schooling.” In *Household Production and Consumption*, ed. N.E. Terleckyj. Columbia University Press 147- 211.
- Haas, J. S., L. Goldman, 1994 – October. Acutely injured patients with trauma in Massachusetts: differences in care and mortality, by insurance status. *American Journal of Public Health* 84(10): 1605-068.
- Hadley, J. 1988 – Winter. Medicare spending and mortality rates of the elderly. *Inquiry* 25: 485-93.
- Hadley, J., E. Steinberg, and M. Klag 1982. A comparison of insured versus uninsured individuals who died from acute myocardial infarction. Center for Health Policy Studies 1-23.
- Handy, S. L., S. Kubly, J. Jarrett, and S. Srinivasan, 2000. Center for Transportation Research, The University of Texas at Austin.
- Harden, J. W., and W. H. Hoyt, 2003 – March. Do states choose their mix of taxes to minimize employment losses. *National Tax Journal* 56(1): 7-26.

- Hare, P. and G. Wyatt,. Economics of academic research and its implications for higher education. *Oxford Review of Economic Policy* 8(2):48-65.
- Harris, J. E., 1987. The 1983 increase in federal excise tax.” In *Tax Policy and the Economy*, ed. L. H. Summers. MIT Press, Cambridge, Massachusetts 1:87-111.
- Hickling, L. B., et. al., 1995 – August. *Institute of Transportation Studies (ITS)*, University of California, Irvine, Center for Urban Transportation Research, University of South Florida.
- Holtz-Eakin, D., 1999 – August. The death tax: investments, employment, and entrepreneurs. *Tax Notes* 84(5): 782-92.
- Holtz-Eakin, D., D. Joulfaian, and H. Rosen, 1994 – February. Sticking it out: entrepreneurial survival and liquidity constraints. *Journal of Political Economy* 102(1): 53-75.
- Holtz-Eakin,., D. Joulfaian, and H. Rosen, 1994 – Summer. Entrepreneurial decisions and liquidity constraints. *RAND Journal of Economics* 25(2):334-47.
- Hulten, C. R., and R. M. Schwab, 1991. Public capital formation and the growth of regional manufacturing industries. *National Tax Journal* 44(4):121-34.
- Irvine, J., B. R. Martin, and P. Isard, 1990. Expenditure in the United States. *Investing in the future: an international comparison of government funding of academic and related research*. Aldershot, H., England: E. Elgar; Brookfield, Vt.: Gower.
- Jaeger, D., and M. Page, 1996 – November. Degrees matter: new evidence on sheepskin effects in the returns to education. *The Review of Economics and Statistics* 78(4): 733-40.
- Jaffe, A. B., M. Trajtenberg and R. Henderson, 1993 – August. Geographic localization of knowledge spillovers as evidenced by patent citations. *The Quarterly Journal of Economics* 108:587-598.
- James, Jr., T. E., S. C. Ballard, C. W. Smith, and L. L. Murry, 1989 – Fall. Science, technology, and the developing state: a case study of Oklahoma. *Policy Studies Journal* 18( 1).
- Johansson, B., 1993. Infrastructure, accessibility, and economic growth. *International Journal of Transport Economics* 20(2):131-156.
- Johnsson, B., and C. Karlsson, 1994. Transportation infrastructure for the Mälars region." *Regional Studies* 28: 169-185.
- Joulfaian, D., 2000. Charitable Giving in Life and Death. In *Rethinking Estate and Gift Taxation*, ed. G. W. Gale J.R. Hines, and J.B. Slemrod, Brookings.
- Kaiser Commission on Medicaid and the Uninsured, 2002. *Sicker and poorer: the consequences of being uninsured*.

- Kane, T., and C. Rouse, June 1995. Labor-market returns to two-and four-year college. *The American Economic Review* 85(3 ): 600-614.
- Kasper, J. D., T. A. Giovannini, and C. Hoffman, 2000 – September. Gaining and losing health insurance: strengthening the evidence for effects on access to care and health outcomes. *Medical Care Research and Review* 57(3): 298-318.
- Keeler, T. E., and J. S. Ying, 1988. Measuring the benefits of a large public investment; the case of the U.S. federal aid highway system. *Journal of Public Economics* 36: 69-85.
- Klassen, K. J., and D. A. Shackelford, 1998. State and provincial corporate tax planning: income shifting and sales apportionment factor management. *Journal of Accounting and Economics* 25: 385-406.
- Kozak, L. J., M. J. Hall, and M. F. Owings, 2001 – March/April. Trends in avoidable hospitalizations. *Health Affairs* 20(2): 225-32.
- Krueger, A., 1999 – May. Experimental estimates of education production functions. *The Quarterly Journal of Economics* 114(2): 497-532.
- Krugman, P., 1995. *Development, Geography, and Economic Theory*. MIT Press, Cambridge, Massachusetts.
- Laksmanan, T. R., W. P. Anderson, 2002 – January. *Transportation Infrastructure, Freight Services Sector, and Economic Growth*. Prepared for The U.S. Department of Transportation Federal Highway Administration.
- Lambright, H. W. and A. H. Teich, 1989 – Fall. Science, technology, and state economic development. *Policy Studies Journal* 18(1).
- Levine, A. L., 1989 – Fall. Space technology and state competitiveness. *Policy Studies Journal* 18(1).
- Lichtenberg, F. R., 2001. The effects of Medicare on health care utilization and outcomes. In *Frontiers in Health Policy Research*, ed. A. M. Garber 5. NBER: 1- 38.
- Link, A. N. and J. Rees, 1990. Firm size, university based research and the returns to r & d. *Business Economics* 25-31.
- Liu, G. G., 1998 – February. Birth outcomes and the effectiveness of prenatal care. *Health Services Research* 32(6): 805-23.
- Lund, L., 1986. Locating corporate r & d facilities. *Conference Board Report No. 892*, Conference Board, New York.

- Lynde, C., and J. Richmond, 1992. The role of public capital in production. *Review of Economics and Statistics* 74: 37-44.
- Lynde, C., and J. Richmond, 1993. Public capital and long-run costs in UK manufacturing. *Economic Journal* 103: 880-93.
- Madden, J. F., 1985. Urban wage gradients: empirical evidence. *Journal of Urban Economics* 18: 291–301.
- Mansfield, E., 1995. Academic research underlying industrial innovations: sources, characteristics, and financing. *The Review of Economics and Statistics* 77(1):55-65.
- Mark, S. T., T. J. McGuire, and L. E. Papke 2000 - March, The influence of taxes on employment and population growth: evidence from the Washington, D.C. metropolitan area. *National Tax Journal* 53(1): 105-23.
- McCann, P., 1993. The logistics–cost location–production problem. *Journal of Regional Science* 33(4): 503–516.
- McConnell, V. D., and R. M. Schwab, 1990. The impact of environmental regulation on industry location decisions: the motor vehicle industry. *Land Economics* 66(1): 67-81.
- Mera, K., 1973. Regional production functions and social overhead capital: an analysis of the Japanese case. *Regional and Urban Economics* 3: 157-186.
- Mills, E., 1972. *Studies in the Structure of the Urban Economy*, Johns Hopkins Press, Baltimore, Maryland.
- Moses, L. N., 1962. Towards a theory of intra-urban wage differentials and their influence on travel patterns. *Papers and Proceedings of the Regional Science Association*, 9: 53–63.
- Munnell, A. H., 1990 – January/February. Why has productivity growth declined: productivity and public investment. *New England Economic Review* 2-33.
- Muth, R. F., 1969. *Cities and Housing*, University of Chicago Press.
- Nadiri, I. M., and T. P. Mamuneas, 1996. *Constitution of Highway Capital to Industry and National Productivity Groups*. Report prepared for FHWA, Office of Policy Development.
- Nash, B. J., 1998 – Summer. Dr. Robert Gallo: dogged persistence and brilliant scientific institution define this biotech researcher. *Region Focus* 5-7.
- National Academy on an Aging Society, 2000 - October. *How healthy are young retirees and older workers?*

Office of the Secretary of Transportation (OST), 1997 – April. *Guidance for the valuation of travel time in economic analysis, U.S. DOT.*

Ogwude, I. C., 1990. Estimating the modal choice of industrial freight transportation in Nigeria. *International Journal of Transport Economics* 17: 187–205.

Ogwude, I. C., 1993. The value of transit time in industrial freight transportation in Nigeria. *International Journal of Transport Economics* 20: 325–337.

Palumbo, G., and S. Sacks, and M. Wasylenko, 1990 – March. Population decentralization within metropolitan areas: 1970-1980. *Journal of Urban Economics* 27 No. 2: 151-67.

Pappas, G., W. C. Hadden, L. J. Kozak, and G. F. Fisher, 1997 – May. Potentially avoidable hospitalizations: inequalities in rates between US socioeconomic groups. *American Journal of Public Health* 87(5): 811-6.

Perri, T., 1984. Health status and schooling decisions of young men. *Economics of Education Review* 3: 207-13.

Poterba, J. M., 1996. Retail price reactions to changes in state and local taxes. *National Tax Journal* 49(2): 165-76.

Prud'homme, R., 1993 – June. Assessing the role of infrastructure in France by means of regionally estimated production functions. *Paper presented at the Workshop "Infrastructure, Economic Growth and Regional Development: The Case of Highly Industrialized Developed Countries,"* Jönköping, Sweden.

Ratner, J. B., 1983. Government capital and the production function for U.S. private output. *Economics Letters* 13: 213-217.

Richardson, A. J., and A. P. Cuddon, 1994. Melbourne City link project: stated preference survey methodology.

Ring, Jr., R. J., 1999 – March. Consumers' share and producers' share of the general sales tax. *National Tax Journal* 52(1): 79-90.

Rivkin, S., E. Hanushek, and J. Kain, 1998. Teachers, schools, and academic achievement. *National Bureau of Economic Research Working Paper* 6691.

Roetzheim, R. G., N. Pal, E. C. Gonzalez, J. M. Ferrante, D. J. Van Durme, and J. P. Krischer, 200 – November. Effects of health insurance and race on colorectal cancer treatments and outcomes. *American Journal of Public Health* 90(11): 1746-54.

Sander, W., 1993 – October. Expenditures and student achievement in Illinois. *Journal of Public Economics* 52(3): 403-16.



- Seitz, H., 1994. A dual economic analysis of the benefits of the public road network. *Annals of Regional Science* 27: 223-239.
- Seitz, H., 1994. Public capital and the demand for private inputs. *Journal of Public Economics* 54: 287-307.
- Shirley, C., and C. Winston, 2001 – May. An econometric model of the effect of highway infrastructure investment on inventory behavior. *Project Status Report to FHWA*.
- Showalter, M. H., 1999. Firm behavior in a market with addiction: the case of cigarettes. *Journal of Health Economics* 18(4): 409-27.
- Small, K. A., X. Chu, and R. Noland, 1997 – January. Valuation of travel-time savings and predictability in congested conditions for highway user-cost estimation. NCHRP 2-18(2), TRB, National Research Council, Washington, D.C.
- Sorlie, P. D., N. H. Johnson, E. Backlund, D. D. Bradham, 1994 – November. Mortality in the uninsured compared with that in persons with public and private health insurance. *Archives of Internal Medicine* 14: 2409-16.
- Stafford, R. S., 1990 – March. Cesarean section use and source of payment: an analysis of California hospital discharge abstracts. *American Journal of Public Health* 80(3): 313-5.
- Stuart, R. G., 1993. The development and adoption of the just-in-time philosophy in the United States: a literature review and case analysis. *Master's thesis*, Sloan School of Business, Massachusetts Institute of Technology, Cambridge.
- Sudano, J., D. W. Baker, 2001 – June. Antihypertensive medication use in Hispanic adults: a comparison with black adults and white adults. *Medical Care* 39(6): 575-87.
- Sung, H., T. Hu, T. E. Keeler, 1994 – July. Cigarette taxation and demand: an empirical model. *Contemporary Economic Policy* 12(3): 91-100.
- Surgeon General's Report on Reducing Tobacco Use, 2000. *Evidence of the Effect of Price on Tobacco Use*.
- Texas Transportation Institute (TTI), 1998. Traffic jams: not just big-city problem. *Texas Transportation Researcher*, 34(3).
- Townsend, J. P., P. Roderick, and J. Cooper, 1994. Cigarette smoking by socioeconomic group, sex, and age: effects of price, income, and health publicity. *British Medical Journal* 309: 923-7.
- Treyz, F., and J. Bumgardner, 1996. Market shares for non-manufacturing industries: a monopolistic competition model calibration for Michigan. *5th World Congress of the Regional Science Association International*, Tokyo.

U.S. Department of Transportation Federal Highway Administration (FHA), Fiscal Year 2003, 2002 – September. *Performance Plan*.

Varga, A., 1997 – October. Regional economic effects of university research: a survey. *Regional Research Institute*.

Voss, C., 1987. *Just-in-time manufacture*. IFS Publications, Ltd., U.K.

Wadsworth, M., 1986. Serious illness in childhood and its association with later-life achievement. In *Class and Health*, ed. R. Wilkinson. London: Tavistock.

Wasylenko, M., March-April 1997. Taxation and economic development: the state of the economic literature. *New England Economic Review*.

Watson, P. L., J. C. Hartwig, and W. E. Linton, 1974. Factors influencing shipping mode choice for intercity freight: a disaggregate approach. *Transportation Research Forum*, 15: 138–144.

Weisbrod, G., D. Vary, G. Treyz, 2001. *Economic implications of congestion*. Prepared for Transportation Research Board National Research Council, National Cooperative Highway Research Program.

White, M. J., 1976. Firm suburbanization and urban centers. *Journal of Urban Economics* 3: 232–243.

Williams, R. M., 1996 – March. The costs of visits to emergency departments. *The New England Journal of Medicine* 334(10): 207-14.

Wilson, F. R., B. G. Bisson, and K. B. Kobia, 1986. Factors that determine mode choice in the transportation of general freight. In *Transportation Research Record 1061*, TRB, National Research Council, Washington, D.C. 26–31.

Winston, C., 1981. A disaggregate model of the demand for intercity freight transportation. *Econometrica*, 49: 981–1006.

Wolfe, B. L., 1985 – October. The influence of health on school outcomes: a multivariate approach. *Medical Care* 23(10): 1127-38.

Young, G. J., B. B. Cohen, 1991 – Fall. Inequities in hospital care, the Massachusetts experience. *Inquiry* 28: 255-62.

Zax, J. S., 1991. Compensation for commutes in labor and housing markets. *Journal of Urban Economics* 30: 192–207.

Zucker, L. G., M. R. Darby and J. Armstrong, 1998 – January. Geographically localized knowledge: spillovers or markets? *Economic Inquiry* 36(1): 65-86.

## **Appendix A: Governor Warner's Plan for Tax Reform Fiscal Impact of Each Action\*\***

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>
<b>Individual Income Tax</b>					
Raise the personal and dependent exemption from \$800 to \$1,000 (effective January 1, 2005)	--	(29.3)	(56.2)	(55.5)	(54.9)
Raise the standard to \$4,000 single, \$8,000 married, \$4,000 separate (effective January 1, 2005)	--	(54.2)	(104.5)	(104.4)	(103.7)
Increase the filing threshold to \$7,000 single, \$14,000 married, \$7,000 separate (effective January 1, 2005)	--	(2.3)	(4.5)	(4.7)	(4.8)
Expand the 3% bracket to \$7,000 and 5% bracket to \$20,000 (effective January 1, 2005)	--	(89.0)	(171.2)	(170.3)	(169.1)
Add a top bracket of 6.25% on taxable income above \$100,000 (effective January 1, 2005)	--	96.6	195.9	215.5	235.6
Retain the \$12,000 age deduction in its current form for all filers who are at least 65 by January 1, 2005.	--	--	--	--	--
For filers who are 65 on or after January 1, 2005, adjust the \$12,000 age deduction based on income:	--	1.6	6.4	9.7	13.7
For single filers, the age deduction will be reduced by \$1 for every \$2 above \$50,000, and be phased out completely for those with incomes above \$74,000.					
For married couples where both are 65, the age deduction will be reduced by \$1 for every \$2 above \$75,000, and be phased out completely for income above \$123,000.					
Allow \$6,000 age deduction only for those who are 62 by January 1, 2005 (effective January 1, 2005)	--	7.6	28.6	42.9	44.4

Conform to the provisions of the Military Family Relief Act (allowing military families to exclude the gain on the sale of a home owned for less than 2 years, and allowing National Guard and reservists to deduct up to \$1,500 for overnight travel on military duty (effective January 1, 2004)	(2.6)	(2.4)	(2.0)	(2.1)	(2.1)
<b>Sales Tax</b>					
Increase the sales tax on non-food items by 1 percent items (effective July 1, 2004)	--	727.1	832.6	869.5	908.8
Reduce the sales tax on food by one percent (effective July 1, 2004)	--	(101.2)	(113.2)	(116.2)	(119.2)
Reduce the sales tax on food by one half percent (effective July 1, 2005)	--	--	(51.9)	(58.1)	(59.6)
<b>Corporate Income</b>					
Eliminate the corporate income tax loophole for intangible holding companies (effective January 1, 2004)	--	34.0	22.4	23.2	24.1
Eliminate the "nowhere income" loophole for corporate income by ensuring that profits on products shipped from Virginia are taxed in Virginia, unless they are taxed in another state (effective January 1, 2004)	--	10.6	7.3	7.5	7.7
<b>Other Business Taxes</b>					
Conform to federal tax provisions which allow businesses to expense up to \$100,000 for purchases of equipment and similar goods (effective Dec. 31, 2003)	(11.7)	(11.2)	(5.6)	6.0	6.9
Require that "pass through entities" file an annual information return with the Department of Taxation identifying their owners (effective January 1, 2004)	--	2.0	6.0	7.9	7.9
Eliminate the requirement that businesses with more than \$1.3 million in annual sales accelerate their payment of sales taxes each June (effective for the June payment, 2005)	--	(181.0)	--	--	--
<b>Cigarette Tax</b>					
Increase Cigarette Tax by 22.5 cents per pack to 25 cents per pack, dedicated for health care (effective July 1, 2004)	4.0	146.5	145.	143.8	143.8

### Estate Tax

Provide a full exemption against the estate tax for all estates valued at \$10 million or less, all closely held businesses, and all working farms (provided the closely held business or working farm comprises more than half of the estate's value) (effective January 1, 2004)

-- (50.9) (63.3) (53.3) (50.3)

### Personal Property Tax

Increase the reimbursement percentage for personally owned vehicles assessed at \$20,000 or less on the following timetable, subject to the current revenue triggers:

CY 2005 77.5%  
CY 2006 85.0%  
CY 2007 92.5%  
CY 2008 100.0%

-- (25.8) (130.8) (248.9) (378.9)

### Net Impact\*\*

(\$10.3) \$481.6 \$546.2 \$515.8 \$453.1

\*\*Individual actions do not add to the total because income tax actions interact.