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School Funding, Taxes, and Economic Growth

An Analysis of the 50 States

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Great Public Schools for Every Child

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Richard G. Sims
Independent Consultant

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Appendix B contains descriptions of an econometric model developed by Regional Economic Models, Inc. (REMI), and draws on language and graphics from the REMI Web site (www.remi.com/). These materials are adapted with the permission of REMI, 306 Lincoln Avenue, Amherst, MA 01002.

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Executive Summary

Recent court decisions and state studies indicate that none of the states measure up on even rough measures of adequacy and equity in school funding. Because of tax and spending limits, some states have school funding systems that are equitable, but hardly adequate. One way to address this problem is for states to get on a path toward achieving adequacy and equity by increasing education spending by a small percentage each year. However, given the compelling need to balance state budgets, governors and legislators frequently confront the difficult choice of cutting spending or raising taxes. A major aspect of this knotty fiscal dilemma is the effect such a fiscal policy decision will have on employment levels in the state.

This study employs a set of state-specific dynamic computable general equilibrium (CGE) models to evaluate the employment effects of a fiscal policy decision relating to education-related taxing and spending. Specifically, the study looks at the consequences of an increase in education spending by 2 percent and an equal increase in state residents' consumer taxes. The analysis considers the development impacts of education as an economic "industry," employing resources and producing an output. It also considers effects that are unique to educational spending, such as its role in regional amenity enhancement (i.e., the value that the increased quality of life from better-supported schools has in attracting a productive and efficient workforce).

The study finds that the number of jobs created by increasing education spending is larger than the number of jobs lost from increasing taxes to support that spending. The study reveals that such a strategy has significant net positive near- and long-term employment effects for each of the 50 states.

School Funding, Taxes, and Economic Growth: An Analysis of the 50 States

What makes America great are the values we all believe in—democracy, equal opportunity, and fairness—the values that public education helps us preserve. As parents, we want excellent schools for our own children so that they can succeed in life. As members of a community, we want a high-quality school system so that we can attract and develop new businesses. As citizens, we want our nation to have a world-class educational system that enables our children to compete with the best that other nations have to offer.

School funding typically tops the list of concerns of state policymakers and of the electorate. Support for education is widespread and transcends political, social, and economic lines. (Brunori 2000, for example, noted that of five major tax bills recently introduced to support education funding, Republicans introduced four.) Yet, however popular it may be, education funding is typically neither adequate nor equitable. In almost all of the recent school finance cases, courts have ruled in favor of plaintiffs, declaring state funding systems unconstitutional. An analysis of more than a dozen states conducted by the National Education Association shows that none of the states measure up to even a rough measure of adequacy and equity.

In-depth studies using methods such as the professional judgment method and the successful schools method also show a significant gap between current levels of funding and those necessary to achieve adequacy and equity (see Ladd et al. 1999).

Adequacy and equity in school funding are necessary to implement the programs and practices that work. But it would be difficult to achieve adequacy and equity overnight. Therefore, we assume in this study that each state would take an incremental approach to the problem, increasing education spending by an additional 2 percent per year of current expenditures over 10 years. (See Appendix A for by-state totals derived from NCES 2000.) We believe that such an approach not only would move states closer to achieving adequacy and equity but also would have a positive impact on state economies.

Weighing against our desire to achieve adequate and equitable funding is the reality that increased spending comes at a cost—in particular, a cost in the form of taxes. Higher taxes reduce the amount of money consumers have to spend on other items, thereby reducing retail sales, cutting business profits, lowering the demand for intermediate goods and services, and lowering the level of employment.

Both spending for education and taxing to fund that spending have significant effects on states' economies. The positive economic effects of education spending start with direct spending for the education budget. Examples include compensation for teachers, administrators, and other education related personnel; payments for transportation, school safety, environment and facility maintenance; and purchases of school supplies, materials, equipment, and business services. These direct spending effects in turn produce indirect effects. For example, the wages of school employees support consumer spending in the community; expansions of school buildings employ local construction and maintenance services; and school purchases ring up as sales for local businesses.

The negative economic impact of taxes start by taking money out of the hands of individuals, reducing household

purchasing power, and lowering the demand for local businesses' goods and services. Faced with reduced sales and falling profits, those local businesses reduce their own purchases and payrolls, and that in turn leads to further reductions in spending in the community at large. The net economic consequences that arise from these opposing tensions between additional education spending and additional taxes (when both occur in balanced budgetary environment) are the subject of this study.

Many studies have looked at the issue of taxes, spending, and state economic growth. Typically, these studies begin with broad aggregate levels of public finance—such as total state and local revenues as a percentage of state personal income, or state and local education spending per student—and compare them with broad measures of state economic growth, such as increase in per capita personal income. These studies frequently address issues such as a state's tax competitiveness and the effects of improved workforce quality and productivity on regional growth (see Bartik 1992; Garcia-Mila and McGuire 1992; Helms 1985; and Wasylenko 1997).

This study borrows heavily from the economic literature but differs from most previous works in that it uses a set of state economic simulation models incorporating detailed data on each individual state to explore a specific fiscal policy measure and applies that measure to each of the 50 states to observe the outcomes. The specific policy change addressed herein is an increase in public school funding by 2 percent each year, fully funded by a broad-based sales tax. A relatively small change is politically more realistic, and changes at the margin largely avoid issues of structural shifts that might be brought about by large initial changes. Use of a simulation model allows an observer to isolate the effects of the various aspects of a policy measure, separating out the effects of taxes on their own and of the spending on its own.

The present study estimates the combined direct and indirect effects on a state's employment and the general economy of the new education spending and the related taxing by using a set of econometric models designed to depict each state's individual economy. Each state model contains extensive data on the state economy that include the linkages between taxes and the economy, between industries, between regions, between changing demographics and the economy, and between the state and the national economy. In particular, the models look at current and historical linkages between education spending and the economy based largely on U.S. Census, Bureau of Labor Statistics, and other official primary data. The long-term impacts take into consideration expected trends in the U.S. economy, including changes in the composition of industries, in supply and demand for the various inputs, in capital and labor productivity, and in regional demographics. To avoid distracting from the main points of this study, the study presents the details and technical features of the model separately (see Appendix B).

The study starts by focusing on the employment aspects of school funding and school-related taxation. Concentrating on one economic variable, such as jobs, should allow presentation of the steps in analyzing the education funding process in a relatively clear and uncluttered manner. After explaining and analyzing the various steps in the economic sequence for their employment impacts, the study then expands the findings to include the broader economic measure of personal income (see Appendix C).

Spending on Education: Schools, Teachers, and the Ripple Effect

Direct budgetary spending for K-12 education involves the employment of teachers, school administrators, and classroom aids and of clerical, maintenance, security, and other personnel whose jobs and income come directly from the education system. This analysis starts with the consideration of the job effects of increasing public K–12 education spending by 2 percent of the current amount and maintaining that increase in real, constant-dollar, terms in future years. We assume that this added educational spending is allocated on items and in proportions similar to those of current spending. Current expenditures are from NCES (2000).

Money that starts as spending for educational activities soon becomes the income for households and for businesses in the community. Additional wages paid to school personnel become part of their household income and are used to purchase houses, automobiles, groceries, and theater tickets and for other forms of consumer spending, thereby stimulating the local economy. In addition, the budgetary activities of operating a school system have a direct bearing on the revenues and employment of the firms and non-school-employed individuals who supply the education system with goods and services. Regional building contractors, food vendors, office suppliers, and other school service providers derive part of their earnings from the direct spending by educational institutions. These secondary effects are sometimes referred to as the ripple effects of the initial spending.

This simulation begins by entering a 2 percent increase into each state's simulation model. Again, the additional

spending is allocated in the model in proportion to existing spending patterns. Table 1 shows that the direct and indirect effects of a 2 percent incremental increase in education spending on employment are positive for all 50 states. We expect this, of course, because we have not yet accounted for the cost of the spending.

The increase in employment, although remaining positive for all states, diminishes over time and thus is somewhat lower in real terms in 2014 than it was in 2004. This gradual decline is caused in part by wage increases and in part by productivity improvements. That is, an increase in education spending, creating an added demand for educational labor, will drive wages up slightly for that group, because the offer of higher wages will be needed to attract new teachers, for example, into the region. This in turn means that a given amount of spending will support slightly fewer jobs after the wage adjustment. In addition, producers of goods and services typically become more efficient over time, thus requiring progressively fewer workers to meet the added demand brought on by the new spending.

This summary does not present detailed state results for particular occupations affected by a spending increase. The employment results also vary considerably from state to state. In general, however, about one-third of the added jobs are classroom personnel (primarily teachers, librarians, and counselors); one-third other school personnel (administrators, clerical, and support); and one-third non-school-related workers. The added nonschool employment is largely in retail trade but may also include construction, finance, insurance, and real estate.

TABLE 1 Direct Primary and Secondary Employment Effects of a 2 Percent Increase in Education Spending
(Change in Number of Jobs, in Thousands)

State	2004	2014	State	2004	2014
Alabama	3.2	2.5	**Montana**	1.1	0.9
Alaska	1.0	0.9	**Nebraska**	1.6	1.3
Arkansas	1.2	1.5	**Nevada**	1.0	0.6
Arizona	2.9	2.2	**New Hampshire**	0.8	0.6
California	24.2	16.0	**New Jersey**	6.5	4.7
Colorado	3.4	2.3	**New Mexico**	1.5	1.3
Connecticut	2.0	1.5	**New York**	14.2	10.9
Delaware	0.3	0.2	**North Carolina**	4.6	3.8
Washington, DC	0.3	0.3	**North Dakota**	0.6	0.5
Florida	10.2	8.4	**Ohio**	9.8	7.0
Georgia	5.5	4.2	**Oklahoma**	2.7	2.2
Hawaii	0.5	0.4	**Oregon**	3.6	2.6
Idaho	1.1	0.9	**Pennsylvania**	7.6	6.0
Illinois	7.8	5.7	**Rhode Island**	0.6	0.5
Indiana	4.8	3.6	**South Carolina**	3.2	2.5
Iowa	2.7	2.2	**South Dakota**	0.6	0.5
Kansas	3.3	2.7	**Tennessee**	3.1	2.4
Kentucky	3.9	3.1	**Texas**	17.5	12.5
Louisiana	3.0	2.5	**Utah**	2.1	1.6
Maine	0.9	0.8	**Vermont**	0.6	0.6
Maryland	3.4	2.7	**Virginia**	4.8	3.6
Massachusetts	3.5	2.6	**Washington**	5.6	4.3
Michigan	8.8	6.2	**West Virginia**	1.9	1.7
Minnesota	4.8	3.3	**Wisconsin**	4.8	3.7
Mississippi	1.8	1.5	**Wyoming**	0.7	0.5
Missouri	3.8	3.1			

Role of Education Spending in Enhancing Regional Economic Competitiveness

Among all of the budgetary options facing state or governments, education stands out as one to which voters consistently favor devoting more resources and personnel. The local education system also factors into businesses' location decisions (see, e.g., Jacobson 2002). Public and business support for education is generally not based on the number of education jobs the spending creates but on the idea that perceptions of the community are improved because of its expanded educational effort and on expectations that students in the area will have greater future earning power. In economic terms, the increased education spending embodies two compelling features: first, the increased economic competitiveness and general desirability of areas where schools improve; and, second, the increased productivity that added educational support instills in future workers.

The competitiveness aspect of education spending is predicated on the fact that people and businesses prefer to locate in areas with comparatively better schools. Increased education spending makes a community a more desirable place to live and work, and thus more people move there. An increase in the region's attractiveness also means that workers will be more willing to accept employment in the

Box 1 Literature on the Effects of State and Local Education Spending on Economic Growth

Numerous researchers have addressed the concept of the effects of state and local education spending on economic growth. Among them, Helms (1985) found that increases in state and local taxes used to increase public spending in health, highways, schools, or higher education caused growth in state personal income. Bartik (1989) observed that increases in state and local taxes increased the rate of small business creation if additional tax revenues were spent on local school and fire protection. Garcia-Mila and McGuire (1992) considered data over a 14-year period from the 48 contiguous states to estimate elasticity coefficients for publicly provided highways and education. They found that both highways and education are productive inputs to state economic growth and that education has the stronger impact.

Bogart and Cromwell (1997) analyzed three Cleveland neighborhoods, part in one school district and part in another, where one district clearly had a better reputation than the other. After controlling for housing size and quality, the authors found differences attributable to perceived school quality of $5,600 in the first neighborhood, $10,900 in the second, and $12,000 in the third, using 1987 dollars. In 2001-dollar terms, these differences would be $8,680, $16,895, and $18,600, respectively (inflation changes calculated by this author). These positive differences occur even though school taxes were higher in the high-reputation district. Dee (2000) considered whether new school districts' resources were capitalized into the housing values and residential rents within those districts. Dee's estimates, based on district-level census data, indicate that new educational expenditures generated by court mandates substantially increased median housing values and residential rents. His findings imply that court-mandated finance reforms increased the perceived quality of the poorer school districts in reform states.

Brasington (1999) used both traditional hedonic house price estimation and a hedonic corrected for spatial autocorrelation to estimate the school quality/housing value relationship. Proficiency tests, expenditure per student and the student–teacher ratio are consistently capitalized into housing prices. Teacher salary and student attendance rates are also valued, but these results are sensitive to the estimation technique employed. Value-added measures, graduation rate, teacher experience levels, and teacher education levels are not consistently positively related to housing prices.

Finally, Weimer and Wolkoff (2003), in a study of districts in New York State, found "substantively large effects of elementary school output on housing values." The researchers identified school quality indicators including average ELA scores, ratio of students to teachers, Regents' diploma graduation rate, percentage greater that 65% on Regents' English exam, school tax rate, and effective tax rate and found that school spending tends to be capitalized into housing values in a community.

For additional articles discussing the link between schools, economic growth, the labor force, and housing values see Barro (2001); Betts (1995); Black (1999); Brasington (1999); Card and Krueger (1996); Crone (1998); Downes and Zabel (2002); Figlio and Lucas (2000); Fisher (1997); Goldin and Katz (2001); Gradstein and Justman (2002); Haurin and Brasington (1996); Hayes and Taylor (1996); Hanushek and Kimko (2000); Kane, Staiger, and Samms (2003); Kodrzycki (2002); McGuire (2003); Nechyba (2003); and Yitzhaki (2003).

area at relatively lower wages than before or than they might get elsewhere. The expanded labor force in the area makes it easier and less expensive for employers to find qualified workers and holds down regional employment costs for employers. The increase in the potential workforce thus boosts the long-term productivity and competitiveness of the region. The quality-of-life factors in a region's "attractiveness," its *amenity value*, influence a region's competitiveness and growth potential.

The effects of in-migration related to education spending can be seen in housing values and wages. In-migration increases the demand for housing and raises housing values in communities of increasing school spending (Weimer and Wolkoff 2003; Bogart and Cromwell 1997, 2000; Dee 2000). Studies have shown that even people without children prefer to live and own property in areas where schools are considered to be of high quality or at least improving (Hilber and Mayer 2002).

The fact that people are willing to pay more for housing or accept lower wages to live in areas with better schools is consistent with everyday observation. People routinely accept lower wages and pay higher housing prices to be near amenities such as beaches, mountains, and golf courses, as well as communities with wide choices for shopping, recreation, and leisure activities or other factors they view as contributing to their quality of life (see, e.g., Jensen and Leven 1997; Kahn 1995; Kotkin and DeVol 2001; Florida 2002).

Similarly, the idea that people will accept higher taxes to support the amenity of better-quality education is consistent with a straightforward line of reasoning. (This is often called *willingness to pay*.) Because education tax decisions are generally made democratically (i.e., voters choose to increase their own taxes either by direct vote or through the vote of a representative), it is reasonable to assume that individuals believe the added educational improvements are worth *at least* what they are paying for them in added taxation. Individuals might consider the educational improvements as worth more than what they pay (i.e., they got a "bargain," or, in economists' terms, they received a *consumer surplus*). It is unlikely, however, that, as a group, taxpayers would consider those improvements as worth *less* than what they willingly pay for them. The idea that a location's appeal is influenced by the combination of school spending and taxes is reinforced by empirical observations that households do migrate (i.e., "vote with their feet") following school funding increases (Margulis 2001).

Box 1 provides a brief review of the literature on the economic effects of state and local education spending.

Incorporating the impacts of the amenity value of new education spending along with the standard industrial input-output impacts produces the results shown in Table 2. This table shows the effects on state employment when the quality-of-life, or amenity, aspects of the increased educational effort are included. Adding amenities to the equation has relatively small near-term effects on the overall job impact of the spending-and-taxing process. Over time, however, as businesses and individuals make location decisions and other adjustments in response to the higher quality of education, job growth continues to increase. The indirect effects—the jobs resulting from the amenity and competitiveness aspects—grow so that by the last year of the analysis they are generally equal to, and for some states greater than, the directs effects from education spending (as can be seen by comparing the 2014 column in Table 2 with that in Table 1).

Taxes: Paying the Piper

Because state and local governments must balance their budgets, their additional spending requires an increase in revenues, generally from an increase in taxes.[1] As we observed above, increased spending for education adds to income and business activity within a region. Imposition of new taxes has the reverse effect. That is, it reduces private sector after-tax income, lowers demand for local goods and services, and generally raises business costs.

The choice of a particular funding source for new spending—such as individual or corporate income taxes, sales or excise taxes, or property taxes—has a different effect on the state economy for a given amount of new taxes. The major tax alternatives have somewhat different effects because they place the burden on different components of the economy and because federal law treats different taxes differently.

For example, increases in *individual income taxes* reduce households' disposable income, lower the returns from working, and therefore reduce the supply of labor. Increases in *sales taxes* increase the cost of goods and services, thereby reducing what consumers can buy. *Property taxes* reduce disposable income, lower the returns to asset ownership, and reduce future investment in taxable property.

In addition, the burden of various state taxes falls differently on different taxpayers, according to their income levels. Because the percentage of income paid in income taxes

[1] Spending for one state program could come from a transfer of funding from other budget-supported activities, but, overall, new spending requires new revenues.

TABLE 2 Indirect Employment Effects from a 2 Percent Increase in Education Spending: Amenity and Competitiveness Aspects Added to Direct Effects
(Change in Number of Jobs, in Thousands)

State	2004	2014	State	2004	2014
Alabama	3.3	4.0	Montana	1.1	1.3
Alaska	1.1	1.4	Nebraska	1.7	2.1
Arkansas	1.3	2.5	Nevada	1.1	1.3
Arizona	3.2	4.2	New Hampshire	0.9	1.1
California	24.0	24.3	New Jersey	7.1	8.2
Colorado	3.7	3.8	New Mexico	2.0	2.4
Connecticut	2.3	2.8	New York	14.0	16.7
Delaware	0.3	0.4	North Carolina	4.8	6.4
Washington, DC	0.4	0.5	North Dakota	0.6	0.7
Florida	9.8	13.8	Ohio	10.1	11.3
Georgia	5.9	7.2	Oklahoma	2.7	3.4
Hawaii	0.6	0.8	Oregon	3.8	4.2
Idaho	1.0	1.1	Pennsylvania	8.2	10.4
Illinois	8.4	9.8	Rhode Island	0.7	1.0
Indiana	5.2	6.0	South Carolina	3.3	4.0
Iowa	2.9	3.3	South Dakota	0.6	0.8
Kansas	4.4	4.8	Tennessee	3.2	4.0
Kentucky	4.8	5.0	Texas	18.3	20.7
Louisiana	3.1	4.1	Utah	2.4	2.7
Maine	1.1	1.4	Vermont	0.9	1.0
Maryland	3.9	4.8	Virginia	5.1	5.8
Massachusetts	3.9	4.3	Washington	5.8	6.5
Michigan	9.5	10.1	West Virginia	1.9	2.4
Minnesota	4.9	5.4	Wisconsin	5.0	6.2
Mississippi	1.9	2.6	Wyoming	0.8	0.8
Missouri	4.0	5.2			

generally rises as income rises, *income taxes are typically progressive*. In contrast, *sales taxes are regressive* because their rate is constant regardless of income, and poorer taxpayers must therefore pay a larger proportion of their incomes to buy necessities. Similarly, because housing and other taxable assets represent a larger portion of the wealth of low-income households, *property taxes are regressive.*

Tax fairness argues for avoiding taxes that fall most heavily on lower-income taxpayers. In this regard, sales and excise taxes are far worse than income taxes.

Federal law figures into the effects of new taxation because it allows deductions for income taxes and property taxes from individual federal taxes, but it does not allow such deductions for sales and excise-type taxes. As a result of their deductibility from federal taxes, income and property taxes ultimately take less money out of the hands of state residents for a given amount of revenue raised than would the same amount of revenue raised from sales taxes. For example, when a taxpayer pays $100 to the state in *sales taxes*, that taxpayer bears 100 percent of the burden of the tax. In contrast, when a taxpayer pays that same $100 to the state in *income taxes*, the taxpayer's federal taxable income is reduced by that $100. At the middle federal tax rate of 28 percent, the taxpayer would save $28 in federal taxes for each $100 paid in state income taxes. This $28 thus stays in the hands of the taxpayer and is available for spending within the state.[2]

[2] Although not all taxpayers itemize on their federal returns and take advantage of this deduction, those who do itemize account for the vast majority of income earned in a given state.

Box 2 Kentucky: Economic Losses Associated with Raising Revenue from Various Tax Sources (Total New Revenue = $68.8 Million)

Revenue instrument / Affected variable	**2004**	**2024**
General sales tax		
Employment ('000)	–2.3	–2.3
GSP (Mil nom $)	–78.5	–177.4
Personal income (Mil nom $)	–59.6	–136.6
New top income tax bracket		
Employment ('000)	–1.5	–1.6
GSP (Mil nom $)	–53.8	–109.0
Personal income (Mil nom $)	–40.7	–95.9
Corporate income tax		
Employment ('000)	–1.7	–1.8
GSP (Mil nom $)	–56.7	–130.8
Personal income (Mil nom $)	–39.2	–95.9
Property tax		
Employment ('000)	–1.0	–1.2
GSP (Mil nom $)	–47.9	–138.0
Personal income (Mil nom $)	–30.5	–72.7

Note: GSP = gross state product. Mil nom $ = millions of nominal dollars (i.e., nonadjusted, current dollars).

Consequently, the impact on the state's economy of selecting a deductible versus a nondeductible tax is significant.

Box 2 illustrates the economic consequences of various taxes—the economic losses associated with a consumption tax, an individual income tax, and a property tax in an amount sufficient to fund a 2 percent expansion in education spending. The Commonwealth of Kentucky is used for the projection. The amount of new educational funding required there is $68.8 million.

In the first year of the projection for Kentucky, a *general sales tax* is shown to cause a loss of 2,300 jobs, with losses in GSP and personal income of $78.5 million and $59.6 million, respectively. Raising the same $68.8 million from a *new top individual income tax* bracket would cost the state about a third fewer jobs, 1,500, and substantially less in lost GSP and personal income, $53.8 million and $40.7 million, respectively. An increase in *corporate income taxes* of $68.8 million would cause a loss of in-state jobs of 1,700, a $56.7 million loss of GSP, and a drop of $39.2 million. Finally, using a *property tax* increase to fund the education spending would mean only about half the lost jobs, GSP and personal income as an equal revenue consumption tax, with a loss of 1,000 jobs, $47.9 million in GSP, and $30.5 million in personal income.

Clearly, the choice of tax used to fund public services matters. With regard to the state's employment outlook, for example, the consumption tax would inflict far more harm than the income tax. Funding the same level of services from either income taxes or consumption taxes would cause more job losses than funding the services from the property tax.

It should be noted that these tax-and-jobs relationships also apply in reverse. In other words, reducing these various taxes by the revenue amounts indicated would affect approximately the same number of jobs, only in the positive rather negative direction. That is, focusing on first-year job impacts, a cut of $68.8 million in sales taxes would result in a first year increase of about 2,300 jobs; a similar individual income tax cut, 1,500 new jobs; the corporate income tax, 1,700 jobs; and the property tax, about 1,000 new jobs. Of course, these are the gross job impacts of the tax cuts; that is, they do not take into account any employment losses that would be associated with required off-setting spending cuts. (Calculating the net impact of balancing taxes and spending is the subject of the next section.)

TABLE 3 Employment Effects of an Increase in Consumption Tax Equivalent to 2 Percent of Education Spending (Change in Number of Jobs, in Thousands)

State	2004	2014	State	2004	2014
Alabama	–1.6	–1.8	Montana	–0.5	–0.6
Alaska	–0.4	–0.6	Nebraska	–0.8	–1.0
Arkansas	–0.1	–1.0	Nevada	–0.4	–0.7
Arizona	–2.0	–2.4	New Hampshire	–0.5	–0.6
California	–13.8	–13.3	New Jersey	–3.4	–4.3
Colorado	–2.0	–2.0	New Mexico	–1.0	–1.1
Connecticut	–1.1	–1.6	New York	–7.1	–8.6
Delaware	–0.1	–0.3	North Carolina	–2.8	–3.1
Washington, DC	–0.2	–0.3	North Dakota	–0.3	–0.3
Florida	–5.8	–7.0	Ohio	–5.6	–6.0
Georgia	–3.3	–3.8	Oklahoma	–1.4	–1.7
Hawaii	–0.3	–0.4	Oregon	–1.7	–1.9
Idaho	–0.3	–0.4	Pennsylvania	–5.3	–5.
Illinois	–4.5	–5.3	Rhode Island	–0.4	–0.5
Indiana	–2.7	–3.0	South Carolina	–1.5	–1.8
Iowa	–1.3	–1.4	South Dakota	–0.3	–0.3
Kansas	–2.2	–2.3	Tennessee	–1.8	–2.0
Kentucky	–2.3	–2.3	Texas	–9.9	–10.4
Louisiana	–1.7	–1.9	Utah	–1.1	–1.3
Maine	–0.6	–0.7	Vermont	–0.4	–0.5
Maryland	–2.3	–2.5	Virginia	–2.7	–2.9
Massachusetts	–2.1	–2.3	Washington	–2.8	–2.9
Michigan	–4.3	–5.1	West Virginia	–0.7	–0.8
Minnesota	–2.7	–3.0	Wisconsin	–2.7	–3.2
Mississippi	–0.8	–1.1	Wyoming	–0.3	–0.3
Missouri	–2.5	–2.9			

Although state policymakers have the choice, at least in principle, of using taxes such as income or property taxes that would pass along a substantial part of the costs of state spending to the federal government, most proposals to increase state funding for education involve raising the sales tax. Brunori (2001, pp. 597–98) found that of the five education tax measures being considered, three involved the sales tax, two the property tax, and none the income tax. Poll results generally suggest as well that voters prefer sales taxes to income or property taxes as ways of funding any required new spending. For example, a recent poll in New Jersey (Eagleton Poll 2003) found that 77 percent of respondents thought that their state sales tax was "about right," and 61 percent answered that way about their income tax, but only 25 percent said "about right" regarding their property tax. Fully 50 percent said their property tax was "much too high" compared with only 17 percent answering that way for the income tax and 8 percent for the sales tax.

Based in part on the current political reality that sales taxes are the most likely source for new revenues, and in part to illustrate the tax-and-spend effects using a "worst-case" funding source, the present analysis uses a broad-based general sales tax on all consumer goods as the source of funding for the added educational expenditures. Using any of the other major taxes as a funding source should have a lesser negative impact on state employment than does the consumption tax.

The results of increasing consumption taxes on each state's level of employment appear in Table 3. At this stage of the analysis, tax revenues are simply being taken out of the economy and not being respent. As would be expected,

an increase in taxes affects jobs negatively in all states and in all years. This negative effect on jobs increases over time, as businesses and individuals continue to make location decisions favoring areas offering greater opportunities.

Taxing and Spending: The Delicate Balance

The combined effects of an increase in education spending and a general consumption tax (in a balanced-budget environment) appear in Table 4. When all aspects of the added K–12 education spending and the required consumer taxes supporting that spending are considered, this analysis finds that positive job growth occurs in all states and over all future years. In every state, the job effects increase over time, and in some states the effects in the last year of the analysis, 2020, are substantially larger than in the initial year. The difference in the state-to-state job growth rate is a function of each state's unique array of initial taxes, occupational wage rates, industrial mix, self-supply of inputs, and individual sensitivity to demand changes. The overall impact is significantly positive for personal income in all states in all years (see Appendix C).

What makes these job effects positive within a balanced-budget fiscal policy? In the near-term, the positive effects derive primarily from the fact that education spending is (a) *comparatively labor-intensive* and (b) *comparatively local-supply intensive*. On the first point, labor intensiveness, consider that general consumer spending (i.e., other than education), involves heavily capital-intensive items such as

TABLE 4 Net Effects of 2 Percent Education Funding and Matching Tax Increase with Educational Competitiveness Factors Considered
(Change in Number of Jobs, in Thousands)

State	2004	2014	State	2004	2014
Alabama	1.7	2.2	Montana	0.6	0.7
Alaska	0.7	0.9	Nebraska	0.8	1.1
Arkansas	1.2	1.5	Nevada	0.7	0.6
Arizona	1.3	1.8	New Hampshire	0.4	0.6
California	10.2	11.0	New Jersey	3.7	3.9
Colorado	1.7	1.8	New Mexico	1.0	1.3
Connecticut	1.2	1.3	New York	6.9	8.1
Delaware	0.2	0.2	North Carolina	2.0	3.3
Washington, DC	0.2	0.2	North Dakota	0.3	0.4
Florida	4.0	6.7	Ohio	4.5	5.3
Georgia	2.7	3.4	Oklahoma	1.3	1.7
Hawaii	0.3	0.4	Oregon	2.1	2.3
Idaho	0.7	0.8	Pennsylvania	2.9	4.6
Illinois	3.9	4.5	Rhode Island	0.4	0.5
Indiana	2.5	3.0	South Carolina	1.8	2.3
Iowa	1.6	1.8	South Dakota	0.4	0.5
Kansas	2.2	2.5	Tennessee	1.4	2.0
Kentucky	2.5	2.7	Texas	8.4	10.3
Louisiana	1.3	2.2	Utah	1.3	1.4
Maine	0.5	0.7	Vermont	0.4	0.5
Maryland	1.6	2.3	Virginia	2.4	2.9
Massachusetts	1.8	2.0	Washington	3.0	3.5
Michigan	5.2	5.0	West Virginia	1.2	1.5
Minnesota	2.2	2.4	Wisconsin	2.3	3.0
Mississippi	1.1	1.5	Wyoming	0.5	0.5
Missouri	1.5	2.3			

automobiles, computers, appliances, and even food. Typically, about 80 percent or more of school budgets are for personnel costs. A given amount of spending on education thus typically involves more labor and more personal income than does an identical amount of general consumer spending. On the second point, the greater local-supply intensiveness of education spending, consider that purchases such as automobiles, televisions, electronic goods, and food as well as trips and vacations imply substantial spending on out-of-state-produced goods and services. State-funded public education spending on the other hand, is heavily weighted toward in-state purchases, not only for the main expenditure item of personnel but also for goods and services.[3]

Over the longer term, the favorable impacts from increased educational funding are largely attributable to the effects educational support has on regional competitiveness. Education spending is perceived in the marketplace as enhancing the quality of life in the affected area, leading more people to move into the community. This in-migration increases the labor supply in the area, making the labor market more competitive, and it increases the demand for locally produced goods and services.

Conclusions

This study finds that for state supported K–12 education funding, the employment and economic effects of an incremental increase in spending outweigh the losses associated with the increased taxation in the near- and long-terms. The positive net employment and economic effects grow over time, as the enhanced educational spending effort improves the perceived quality of life in the various regions and as education-related productivity of the regional workforce enables workers to command higher earnings and makes businesses more profitable.

State-level decisions on public spending and taxation clearly have significant implications for the regional economy and job creation, and both spending and taxation must be carefully considered in making objective, accurate evaluations. For the relatively small changes considered in this analysis, education spending constitutes a significant source of in-state jobs and economic growth, even considering the off-setting increases of a tax on local consumption. The overall economic gains from education spending increases arise from both the budgetary effects of educational spending in the near term and from the improvements in regional competitiveness in the long term.

For the purposes of this analysis, a tax on consumer spending is used as the funding source for the new education spending. We noted earlier that consumption taxes are highly regressive, because they impose a higher percentage of their burden on low-income households, and that relying on alternative funding sources, such as income or property taxes, would be more progressive and would have less harmful economic effects. Unlike increased consumption taxes (which among other things are not deductible from federal taxes), federally deductible taxes would decrease the local economic losses associated with raising new tax revenues substantially.

Although these results are presented from the perspective of increases in spending and taxation, the results can also be used as an approximation of the reverse case of cutting education and taxes. For example, under the assumptions of across-the-board education spending cuts and a consumer spending tax cut, the resulting figures would be approximately the same but in negative values. In summary, when states confront the inevitable, difficult decisions regarding public spending versus taxation, policymakers should bear in mind that both components of the balanced-budget equation have implications for jobs and income in the state. Policymakers should therefore devote careful consideration to the likely results of those specific decisions.

[3] The present study is based on tax and spending changes made during periods of relative fiscal stability. Orszag and Stiglitz (2001) argued specifically that during economic downturns, budget cuts have a more harmful effect on a state's economy than do tax increases.

Appendix A: Education Expenditures of State and Local Governments, by State

TABLE A1 Direct General Expenditures of State and Local Governments for Elementary and Secondary Education, by State ($ Millions)

State	Actual	2% increase	State	Actual	2% increase
Alabama	3,570	71.4	Montana	981	19.6
Alaska	1,179	23.6	Nebraska	1,930	38.6
Arizona	4,085	81.7	Nevada	1,510	30.2
Arkansas	1,999	40.0	New Hampshire	1,213	24.3
California	29,890	597.8	New Jersey	11,370	227.4
Colorado	3,897	77.9	New Mexico	1,504	30.1
Connecticut	4,206	84.1	New York	26,188	523.8
Delaware	803	16.1	North Carolina	6,382	127.6
District of Columbia	597	11.9	North Dakota	602	12.0
Florida	13,647	272.9	Ohio	11,896	237.9
Georgia	7,858	157.2	Oklahoma	3,103	62.1
Hawaii	947	18.9	Oregon	3,596	71.9
Idaho	1,178	23.6	Pennsylvania	12,549	251.0
Illinois	11,942	238.8	Rhode Island	1,072	21.4
Indiana	5,967	119.3	South Carolina	3,459	69.2
Iowa	2,841	56.8	South Dakota	673	13.5
Kansas	2,827	56.5	Tennessee	4,254	85.1
Kentucky	3,441	68.8	Texas	20,130	402.6
Louisiana	3,773	75.5	Utah	2,096	41.9
Maine	1,303	26.1	Vermont	661	13.2
Maryland	5,336	106.7	Virginia	6,684	133.7
Massachusetts	6,066	121.3	Washington	6,409	128.2
Michigan	11,454	229.1	West Virginia	1,813	36.3
Minnesota	6,032	120.6	Wisconsin	6,303	126.1
Mississippi	2,305	46.1	Wyoming	653	13.1
Missouri	5,180	103.6			

Source: U.S. Department of Commerce, Bureau of the Census (NCES 2000); Author's calculations.

Appendix B: The Economic Model

To determine the impacts of various fiscal policies and economic proposals, the author used a set of economic models of each state's economy. The modeling system, developed by Regional Economic Models, Inc. (REMI), is a computable general equilibrium model designed to simulate state and regional economic and policy changes.[4] Founded in 1980, REMI has developed and upgraded the model over time and currently has users including state legislatures, state agencies, universities, regional planning agencies, national consulting firms, utility companies, the U.S. Environmental Protection Agency, and the National Institute of Standards and Technology.

The model contains the economic linkages within the state's economy and allows the depiction of the consequences of a wide range of policies and events for the economy. It incorporates state-specific data along with national economic trends and relationships to produce a mathematical reproduction of the state economy.

To simulate the effects of a real-world change or development, the model first states the change in the language of economics, describing events in terms of their economic functions and implications. This language is precise and sometimes subtle. For example, the model's term *increase in output* means that more of a good is produced, and, because the local requirements for the good are unchanged, the output is shipped outside the region. A related term, *increase in demand*, means that local consumers want more of the good but that local producers will fulfill only a portion of that demand, and the remainder will come from outside the region. An increase in demand may cause the price of the good to rise if the model determines that the product is produced and used primarily within the region.

Expressing events in terms of economic variables allows careful and objective consideration of the event's impacts and implications.

The model is sensitive to a very wide range of policy and project alternatives and to interactions between regional, state, and national economies. It comprises explicit cause-and-effect relationships, such as the following:

- Businesses use labor, capital, fuel, and intermediate goods to produce output.
- Businesses change output in response to changes in prices and costs.
- Supply and demand for labor depend on wage rates.
- The workforce expands when real after-tax wages rise or the likelihood of being employed increases in a region.

The cause-and-effect structure of the model allows explanation of the results in terms of conventional economic theory and relationships.

Simulations using the model begin by projecting a baseline forecast for each state using historic trends and relations and the expected outlook for the state and the

[4] *Note:* some descriptions of the REMI model are taken or adapted directly with permission from material supplied by REMI (see, e.g., REMI Web site, http://www.remi.com/overview/structure.html).

nation. Policy changes that will affect this baseline forecast can then be introduced using one or several of the more than 8,000 variables in the model. The change can be in the form of policy changes (e.g., increases or cuts in various taxes, expansions or reductions in public programs, or changes in regulations or standards) or market developments (e.g., an increase in demand for lumber, a rise in the price of imported energy, a new aircraft engine assembly plant, or an increase in the occupational training of the local workforce). Any number of changes can be simulated at once. The initial changes introduced into the model produce impacts on the region's economic output; population and labor supply; wages, prices, and profits; demand for labor and capital; and local industry market shares. Through the feedback responses in the model, each of these induced impacts, in turn, produces further impacts of its own, producing additional impacts, and so on, until the economy returns to an equilibrium condition. Although the model does not strictly require a return to equilibrium for any given period, it continually exerts tendencies that push the results toward equilibrium. The final results are presented as detailed changes in employment, income, population, and the demand for public services in the area.

The data contained in the model are from original sources, primarily the Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau, and U.S. Department of Energy. For most series, the data history extends back to 1969. The final results of the modeling technique are a representation of the region's economy that predicts demand and supply conditions across 172 industry sectors, 94 occupations, 25 final-demand sectors, and 202 age and sex categories.

A demographic component built into the model provides the ability to identify the changes in the workforce and in the local population resulting from a simulation. Changes in local employment opportunities, real wages, living costs, and taxes lead to changes in the amount of labor supplied in the region. Changes in the local labor supply, in turn, lead to changes in the local population. An initial increase in labor requirements would be met in part by workers commuting into the region to pursue employment opportunities. Over time, a portion of these commuters and their families will move into the area, increasing the local population and placing added demand on public services. The model can produce detailed forecasts of the state's population by age, race, and sex.

The model incorporates forecasts of factor productivity and allows the option to modify the forecasts to accommodate policies that would change any of those productivities. Similarly, the model contains estimates of each region's relative amenity, or quality-of-life, values. These amenity values, derived from heuristic analysis, are used to explain why individuals and firms chose to locate in one region as opposed to another when the directly measurable economic factors were equal.

Model Structure

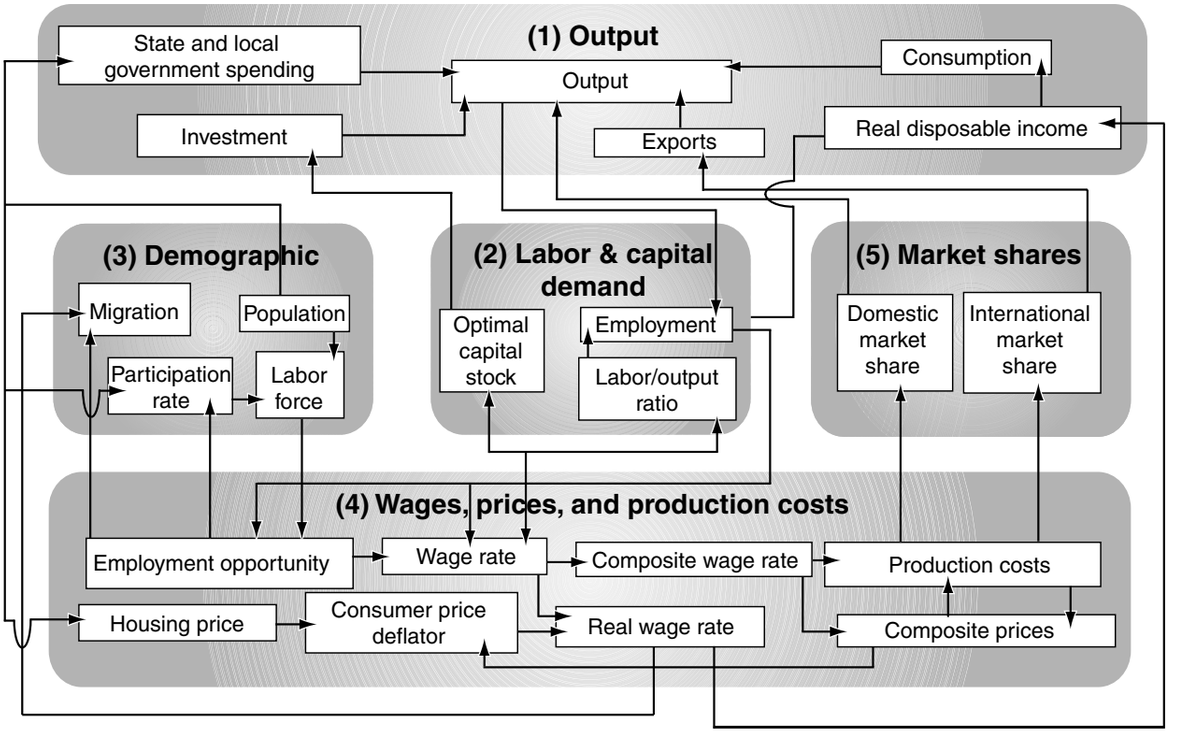
The structure of the model incorporates interindustry transactions and endogenous final demand feedbacks. In addition, the model includes substitution among factors of production in response to changes in relative factor costs, migration in response to changes in expected income, wage responses to changes in labor market conditions, and changes in the share of local and export markets in response to changes in regional profitability and production costs.

The power of the REMI model lies in its use of theoretical structural restrictions instead of individual econometric estimates based on single time-series observations for each region. The explicit structure of the model facilitates the use of policy variables that represent a wide range of policy options and the tracking of the policy effects on all the variables in the model.

The inclusion of price-responsive product and factor demands and supplies give the REMI model much in common with computable general equilibrium (CGE) models. CGE models have been widely used in economic development; public finance and international trade; and, more recently, regional settings. Static CGE models usually invoke market clearing in all product and factor markets. Dynamic CGE models typically assume perfect foresight intertemporal clearing of markets, or temporary market clearing if expectations are imperfect. The REMI model differs, however, because product and factor markets do not clear continuously. The time paths of responses between variables are determined by combining a priori model structure with econometrically estimated parameters.

Although the REMI model contains a large number of equations, the five shaded blocks in Figure B1 describe its underlying structure. Each block contains several components, shown in rectangular boxes. The lines and arrows represent the interaction of key components both within and between blocks. Most interactions flow both ways,

FIGURE B1 Underlying Structure of the REMI Model



Source: Regional Economic Models, Inc., 306 Lincoln Ave. Amherst, MA 01002.

indicating a highly simultaneous structure. Block 1, labeled output, forms the core of the model. An input-output structure represents the inter-industry and final demand linkages by industry. The interaction between block 1 and the rest of the model is extensive. Predicted outputs from block 1 drive labor demand in block 2. Labor demand interacts with labor supply from block 3 to determine wages. Combined with other factor costs, wages determine relative production costs and relative profitability in block 4, affecting the market shares in block 5. The market shares are the proportions of local demand in the region in block 1 and exogenous export demand that local production fulfills.

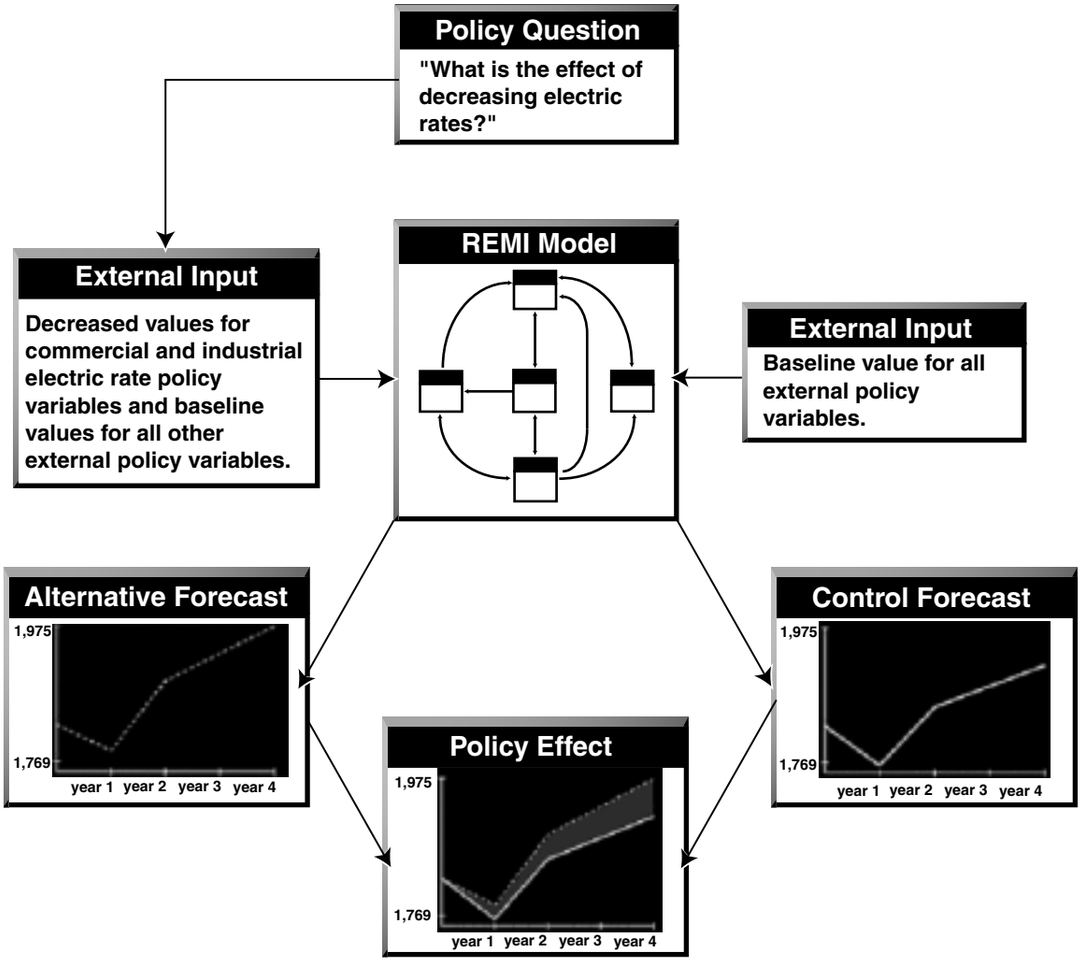
The endogenous final demands include consumption, investment, and state and local government demand. Real disposable income drives consumption demands. An accounting identity defines nominal disposable income as wage income from blocks 2 and 4, plus property income related to population and the cohort distribution of population calculated in block 3, plus transfer income related to population less employment and retirement population, minus taxes. Nominal disposable income deflated by the regional consumer price deflator from block 4 gives real disposable income. Optimal capital stock calculated in block 2 drives stock adjustment investment equations. Population in block 3 drives state and local government final demand. The endogenous final demands, combined with exports, drive the output block.

Model Application

The use of the REMI model for analysis of policy effects is a two-step process, as shown in Figure B2. First, the model generates a baseline forecast that uses a national forecast as one of the inputs. Second, the direct effects of a policy change are input into the REMI model to generate a forecast for the local economy with the policy change (alternative forecast). The difference between the baseline and alternative forecasts thus gives the total effects of a policy change.

Direct effects of a policy change are input to the REMI model through a large set of policy variables. They include industry-specific variables, cohort-specific variables for 808 age-gender-race cohorts, and final demand-specific vari-

FIGURE B2 Use of the REMI Model for Analysis of Policy Effects: A Two-Step Process



Source: Regional Economic Models, Inc., 306 Lincoln Ave. Amherst, MA 01002.

ables for 25 final demand sectors. The policy variables cover a wide range of possible types of inputs that make it possible to analyze any policy that may affect a subnational area. Figure B3 shows how different types of policy variables enter the REMI model through each of its five basic blocks.

Articles on Regional Econometric Models and the REMI Model

For readers who would like to pursue the details of econometric modeling and the REMI model, a list follows of further reading. The articles cited here are in four groups, describing regional econometric models in general, describing the REMI model in particular, evaluating the REMI and similar regional policy models, and finally, describing uses of the REMI model. Also included is an overview of the REMI model structure and application.

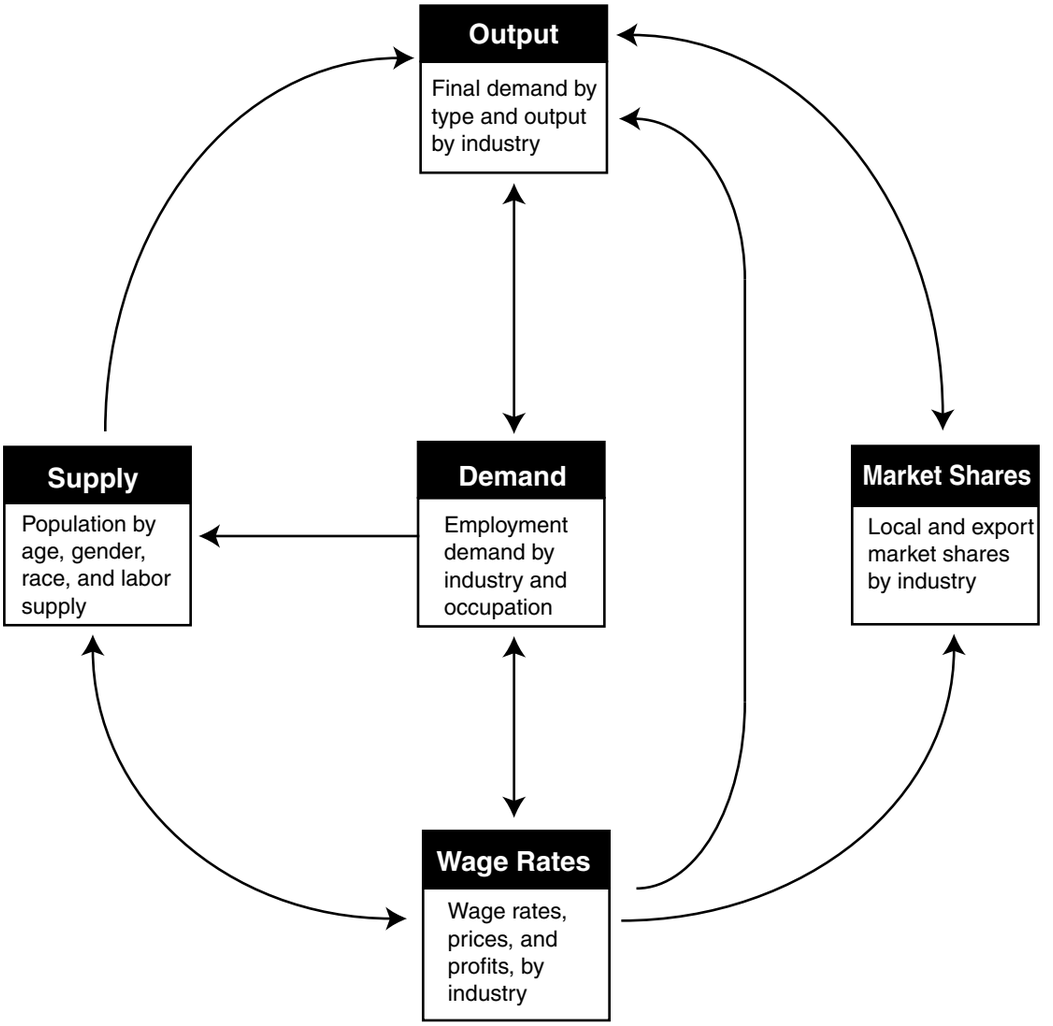
Articles Describing Regional Econometric Models Generally

Almon, Clopper. 2001. *The Craft of Economic Modeling*. 5th ed. College Park: University of Maryland.

National Research Council. 1991. *Improving Information for Social Policy Decisions: The Uses of Microsimulation Modeling*. Vol. 1, *Review and Recommendations,* and Vol. 2, *Technical Papers.* Washington, DC: National Academy Press.

Schaffer, William A. 1999. Regional Impact Models. Regional Research Institute, West Virginia University.

FIGURE B3 Introduction of Policy Variables into the REMI Model



Source: Regional Economic Models, Inc., 306 Lincoln Ave. Amherst, MA 01002.

Sims, Richard G. 2003. "Economic Modeling as an Aid to Public Decision-Making." In Jack Rabin, ed., *Encyclopedia of Public Administration and Public Policy.* New York: Marcel Dekker.

Descriptions of the REMI Model

Treyz, G.I. 1993. *Regional Economic Modeling: A Systematic Approach to Economic Forecasting and Policy Analysis.* Norwell: Kluwer Academic Publishers.

Treyz, G.I., D.S. Rickman, and G. Shao. 1992. "The REMI Economic-Demographic Forecasting and Simulation Model." *International Regional Science Review* 14(3): 221–53.

Articles Evaluating REMI and Similar Econometric Models

Brucker, Sharon M., Steven E. Hastings, and William R. Latham III. 1990 "The Variation of Estimated Impacts from Five Regional Input-Output Models." *International Regional Science Review* 13: 119–39.

DRI/McGraw-Hill. 1994. An Assessment of Input-Output Models. Report prepared for the U.S. Department of Transportation, New York.

Lahr, Michael L. 1996. "Comparison of Ready Made Regional Economic Models in the U.S." Paper given at conference on Economic Impacts of Historic

Preservation, Rutgers University, Rutgers, N.J.

Rickman, D.S., and R.K. Schwer. 1995. "A Comparison of the Multipliers of IMPLAN, REMI, and RIMS II: Benchmarking Ready-Made Models for Comparison." *Annals of Regional Science* 29: 363–74.

Rickman, D.S., and R.K. Schwer. 1993. "A Systematic Comparison of the REMI and IMPLAN Models: The Case of Southern Nevada." *Review of Regional Studies* 23(2, Fall): 143–61.

Articles Describing Uses of REMI

Braddock, David. 1995. "The Use of Regional Economic Models in Conducting Net Present Value Analysis of Development Programs." *International Journal of Public Administration* 18(1): 223–38.

Cassing, S., and F. Giarratani. 1992. "An Evaluation of the South Coast Air Quality Management District's REMI Model." *Environment and Planning* 24: 1549–64.

Lynch, T.M., P.J. Marsosudiro, M.G. Smith, and E.S. Kimbrough. 1995. "The Use of Regional Economic Models in Air Quality Planning." *International Journal of Public Administration* 18(1): 138–52.

Regan, Michael W., and Mark Prisloe. 2003. "Estimating the Impact of Public Policy and Investment Decisions." *Economic Digest* 8(5, May): 1–6.

Appendix C: Detailed Results of 50-State Analyses

TABLE C1 Detailed Results of 50-State Analyses

State and economic measure	2004	2005	2010	2020
Alabama				
Employment	1,671	1,808	1,830	2,266
Personal income (Mil nom $)	38	69	98	152
Alaska				
Employment	687	717	719	856
Personal income (Mil nom $)	15	29	45	65
Arkansas				
Employment	1,149	1,140	1,150	1,486
Personal income (Mil nom $)	21	38	57	92
Arizona				
Employment	1,256	1,305	1,453	1,750
Personal income (Mil nom $)	24	57	83	142
California				
Employment	10,610	11,390	10,050	11,150
Personal income (Mil nom $)	370	619	743	1,142
Colorado				
Employment	1,663	1,505	1,612	1,798
Personal income (Mil nom $)	33	66	79	114
Connecticut				
Employment	1,168	1,077	1,226	1,298
GRP (Mil fixed 92$)	8	4	(5)	10
Personal income (Mil nom $)	34	65	73	107
District of Columbia				
Employment	155	126	138	148
Personal income (Mil nom $)	2	5	5	6
Delaware				
Employment	207	194	170	179
Personal income (Mil nom $)	4	10	12	17

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TABLE C1 Detailed Results of 50-State Analyses (continued)

State and economic measure	2004	2005	2010	2020
Florida				
Employment	4,047	4,972	6,624	7,295
Personal income (Mil nom $)	133	248	411	776
Georgia				
Employment	2,674	2,711	3,139	3,466
Personal income (Mil nom $)	80	147	187	281
Hawaii				
Employment	266	358	372	324
Personal income (Mil nom $)	7	14	19	29
Idaho				
Employment	680	822	826	858
Personal income (Mil nom $)	17	30	43	61
Illinois				
Employment	3,882	3,959	4,192	4,638
Personal income (Mil nom $)	125	218	257	385
Indiana				
Employment	2,505	2,873	2,816	2,942
Personal income (Mil nom $)	54	100	130	190
Iowa				
Employment	1,593	1,614	1,741	1,703
Personal income (Mil nom $)	32	56	75	105
Kansas				
Employment	2,254	2,257	2,421	2,340
Personal income (Mil nom $)	22	42	58	88
Kentucky				
Employment	2,485	2,515	2,721	2,768
Personal income (Mil nom $)	33	62	89	133
Louisiana				
Employment	1,332	1,683	2,128	2,207
Personal income (Mil nom $)	41	74	108	166
Maine				
Employment	425	448	568	657
Personal income (Mil nom $)	10	20	29	45
Maryland				
Employment	1,580	1,670	2,285	2,443
Personal income (Mil nom $)	37	81	118	186
Massachusetts				
Employment	1,818	1,860	1,939	2,107
Personal income (Mil nom $)	54	104	120	170

TABLE C1 Detailed Results of 50-State Analyses (continued)

State and economic measure	2004	2005	2010	2020
Michigan				
Employment	5,154	5,512	5,080	4,517
Personal income (Mil nom $)	116	198	223	346
Minnesota				
Employment	2,168	2,257	2,196	2,193
Personal income (Mil nom $)	53	98	116	172
Mississippi				
Employment	1,108	1,233	1,318	1,534
Personal income (Mil nom $)	23	42	64	104
Missouri				
Employment	1,504	1,998	2,290	2,198
Personal income (Mil nom $)	36	74	106	170
Montana				
Employment	656	680	670	708
Personal income (Mil nom $)	12	21	30	44
Nebraska				
Employment	848	854	840	946
Personal income (Mil nom $)	19	33	45	67
North Carolina				
Employment	2,029	2,268	3,324	3,020
Personal income (Mil nom $)	59	111	159	255
North Dakota				
Employment	337	344	337	346
Personal income (Mil nom $)	5	10	14	19
Nevada				
Employment	655	549	625	676
Personal income (Mil nom $)	14	25	30	48
New Hampshire				
Employment	347	452	552	608
Personal income (Mil nom $)	9	18	25	40
New Jersey				
Employment	3,652	3,703	3,727	3,957
Personal income (Mil nom $)	106	186	227	335
New Mexico				
Employment	972	1,133	1,279	1,219
Personal income (Mil nom $)	13	28	44	70
New York				
Employment	6,864	8,659	8,130	8,993
Personal income (Mil nom $)	310	486	603	869

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TABLE C1 Detailed Results of 50-State Analyses (continued)

State and economic measure	2004	2005	2010	2020
Ohio				
Employment	4,466	4,589	5,260	5,138
Personal income (Mil nom $)	104	197	244	370
Oklahoma				
Employment	1,318	1,427	1,664	1,660
Personal income (Mil nom $)	30	54	76	117
Oregon				
Employment	2,101	2,282	2,313	2,360
Personal income (Mil nom $)	46	80	107	158
Pennsylvania				
Employment	2,880	3,972	4,612	4,810
Personal income (Mil nom $)	83	172	235	383
Rhode Island				
Employment	393	394	451	457
Personal income (Mil nom $)	9	17	24	38
South Carolina				
Employment	1,813	1,977	2,190	2,270
Personal income (Mil nom $)	39	72	103	156
South Dakota				
Employment	364	468	471	508
Personal income (Mil nom $)	7	13	18	27
Tennessee				
Employment	1,440	1,460	1,590	1,956
Personal income (Mil nom $)	45	76	102	164
Texas				
Employment	8,400	9,664	10,281	10,371
Personal income (Mil nom $)	248	420	524	814
Utah				
Employment	1,311	1,351	1,361	1,379
Personal income (Mil nom $)	23	45	57	78
Vermont				
Employment	357	377	493	425
Personal income (Mil nom $)	6	12	18	26
Virginia				
Employment	2,385	2,417	2,765	2,916
Personal income (Mil nom $)	56	107	141	209
Washington				
Employment	3,047	3,150	3,348	3,577
Personal income (Mil nom $)	81	142	187	274

TABLE C1 Detailed Results of 50-State Analyses (continued)

State and economic measure	2004	2005	2010	2020
West Virginia				
Employment	1,245	1,301	1,452	1,478
Personal income (Mil nom $)	24	41	61	93
Wisconsin				
Employment	2,327	2,408	2,998	2,891
Personal income (Mil nom $)	57	107	140	216
Wyoming				
Employment	471	499	498	494
Personal income (Mil nom $)	8	15	22	29

Note: GSP = gross state product. Mil nom $ = millions of nominal dollars (i.e., nonadjusted, current dollars).

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Note: For specialized bibliographic references on regional econometric modeling, see the section Articles on Regional Econometric Models and the REMI Model, in Appendix B above.

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