Backgrounder

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Highways and Jobs: The Uneven Record of Federal Spending and Job Creation

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During the recent debate on the costly reauthorization of the federal highway program, many statements in favor of the bill emphasized its job-creation potential. For example, Senate Majority Leader Bill Frist (R–TN) claimed that the legislation would create 2 million jobs.[1]

Such claims, however, are highly questionable given the mixed findings of decades of independent academic studies on the relationship between federal spending programs and job creation. Only one substantive study—commissioned by the U.S. Department of Transportation (DOT)—asserts much of an impact on job creation. In fact, further review of this study reveals that many proponents of highway spending exaggerate its ability to predict the number of jobs created by additional highway spending.

The DOT Study

The DOT study calculates that each billion dollars of highway spending by the federal government will lead to what DOT analysts describe as "employment benefits" totaling 47,576 person-years.[2] The study used the DOT's JOBMOD Employment Estimation Model, an input/output (I/O) model of the highway construction sector of the U.S. economy, to calculate the employment effects of additional highway spending as follows:

- **First-round** effects total 19,585 person-years, comprised of 12,453 jobs in the highway con-

1. Jim Abrams, "White House Warns of Highway Bill Veto," Associated Press, February 3, 2004.

Talking Points

- Claims that federal spending on infrastructure creates jobs are questionable given the mixed findings of the many studies investigating that relationship.
- A review of the DOT jobs study reveals that proponents of highway spending exaggerate the study's ability to predict the number of new jobs created by additional highway spending.
- A GAO study of the effects of a job-creation bill found that federal funds were spent slowly and that relatively few jobs were created when most needed in the economy.
- Likewise, a CBO jobs study concluded that available research does not support the claim that increasing federal infrastructure spending would increase economic growth.
- Creating jobs is not the same thing as creating value. Spending any sum of money on nearly anything will contribute to a job, but whether that job leads to the creation of products and services of broad public value is another question.

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struction sector and 7,132 jobs in industries supplying equipment and materials (e.g., stone, concrete, rebars, and fuel).

- **Second-round** effects total 6,939 person-years of indirect employment caused by additional production demands in industries that supply highway construction materials (e.g., iron and steel, financing, insurance, repair, and chemicals).
- **Third-round** effects of 21,052 person-years result from spending by the workers employed in the first two rounds on consumer goods (e.g., DVDs, Big Macs, baseball caps, hockey tickets, bourbon, socks, magazines, and home repair).

As the billion dollars of federal highway spending works its way through the economy, this input/output (I/O) analysis contends that the money will produce the equivalent of 47,576 jobs for one year.

Notwithstanding the extent to which senators, lobbyists, and the media tout the number of new jobs that the bill "creates" for every extra billion dollars spent, the words "new" and "create" appear only infrequently in the study's lengthy written report about the operation and results of the model. Often, it ambiguously refers to "employment benefits."

Such cautionary statements are appropriate because the analytical approach and mathematical model used to calculate these "employment benefits" has only a limited capability to make firm predictions on new job creation. Indeed, in an introductory section, the report carefully hedges its predictions with such statements as "assuming there is slack labor supply, each construction project creates a number of new jobs directly."

Such qualifications are particularly justified given that the mathematical model used by the DOT—traditional I/O analysis—is little more than a comprehensive technical description of the quantities of materials, supplies, and labor that are needed to make a certain product. This model does *not* accurately describe the complex workings of a market economy in which, each moment, thousands of participants make millions of choices involving hundreds of thousands of services and commodities, all in limited supply. In the real economy, more of one thing means less of another in the short run as individuals and businesses *substitute* one product for another in response to changing prices. The DOT traditional I/O analysis does not consider such offsets and substitutions.

For example, using the job creation numbers provided by JOBMOD, an additional billion dollars in highway spending requires an estimated 26,524 additional workers[3] to build and supply a billion dollars worth of new highways. In the real world, the additional federal borrowing or taxing needed to provide this additional billion dollars means that a billion dollars less is spent or invested elsewhere and that the jobs and products previously employed by that billion dollars thus disappear. Regardless of how the federal government raised the additional billion dollars, it represents a shift of resources from one part of the economy to another, in this case to road building. The only way that a billion dollars of new highway spending can create 47,576 new jobs is if the billion dollars appears out of nowhere as if it were manna from heaven.

The DOT's input/output model could be used to approximate such substitution effects, but the department did not incorporate these considerations into the study; hence, the professors prefaced their report with the condition "assuming there is slack labor supply"—economists' equivalent of manna. At the height of I/O analysis, as used during the 1970s

2. The DOT study that was used to provide the employment estimates is in fact a series of studies completed between June and December 2000 by two professors at the Boston University Center for Transportation Studies under subcontract to Battelle Memorial Institute. In turn, some of the results of these studies were incorporated into an employment estimation model called JOBMOD (ver.#1.1) and made available for use in 2002. Several studies were provided to the Federal Highway Administration (FHWA). The most relevant is Center for Transportation Studies, Boston University, *Evaluating Federal-Aid Highway Construction Program Employment Impacts and Productivity Gains, Final Report B (Revised): Comprehensive Employment Estimation Model*, produced under subcontract to Battelle Memorial Institute, June 2000, revised December 2000. The summary findings of JOBMOD (version 1.1) are incorporated into an undated FHWA document titled *Introduction to JOBMOD, A Federal-Aid Construction Spending Income and Employment Estimation Model*.
3. This number includes only first-order and second-order effects. The third-order effects are excluded because they are irrelevant in this brief analysis.

in the centrally planned socialist countries of Eastern Europe and the Soviet Union, the operation of these models explicitly considered such substitution effects. Without markets and prices to allocate these countries' scarce resources, government central planners had to consider the full implications of taking from one sector in order to give to another.

For example, building a new hydroelectric dam would require tens of thousands of cubic yards of concrete, thousand of tons of rebars, dozens of bulldozers, thousands of workers, and so forth. Without free markets to allocate and produce these products by signaling supply and demand through price changes, government central planners would use I/O models to calculate from which sectors to take the needed labor and supplies. Then the government planners could determine the implications of such withdrawals: how many fewer new apartments, roads, warehouses, missile silos, farm tractors, and other outputs would be sacrificed in order to build the hydro project.

With the collapse of most centrally planned economies, use of I/O analysis is now largely confined to economic consultants hired to justify costly and underutilized building projects such as a convention center or football stadium because they will "create" jobs. In fact, such projects never create anything approaching the benefits projected through the misuse of these models, but there always seem to be local boosters, businessmen, and politicians willing to exaggerate the potential benefits.

Because of these inherent limitations, I/O models such as the one used by the DOT should be used with caution, and their limitations and artificial assumptions clearly acknowledged. When these conditions are considered, the job-creation potential of any spending scheme will be found to be a small fraction of what such models initially report.

Although the DOT report made only passing and oblique references to such limitations and drawbacks, a number of other federal studies investigating the same or similar types of spending were quite explicit about such deficiencies. These studies—including the three other studies discussed in this paper—concluded that the job-creation potential of government infrastructure spending is substantially less than that reported by the DOT.

The Congressional Research Service Study

Using a different I/O model, an earlier Congressional Research Service (CRS) study reported a much more cautious and qualified estimate of the potential of highway spending to create jobs.[4] Although the CRS found similar first-order and second-order effects—24,300 jobs versus the DOT's estimated 26,524—the CRS study clearly states in its summary and conclusion that these employment gains would likely be offset by losses elsewhere in the economy:

> To the extent that financing new highways by reducing expenditures on other programs or by deficit finance and its impact on private consumption and investment, the net impact on the economy of highway construction in terms of both output and employment could be nullified or even negative.

In effect, the CRS study acknowledges that the substitution effects of the new highway spending could more than completely offset the first-order and second-order employment benefits from such spending.[5]

Similarly, any tax increase to fund an equal amount of highway spending would certainly substantially offset the impact, and "output and employment could be nullified or even negative." For example, a proposal by House Committee on Transportation and Infrastructure Chairman Don Young (R–AK) to increase the federal fuel tax by 5.45 cents per gallon and then link it to the rate of inflation in the following years would have reduced personal incomes by $125 billion over the next six years. In turn, this reduction in discretionary income would have reduced personal consumption

4. David J. Cantor, "Highway Construction: Its Impact on the Economy," Congressional Research Service *Report for Congress* No. 93–21E, January 6, 1993.
5. The summary mentions only potential substitution effects from spending shifts and deficit finance and is silent on how a tax increase could affect employment because the U.S. economy was in recession at the time and a tax increase was not an issue. Ironically, Congress raised the federal fuel tax by 4.5 cents in 1993 to facilitate deficit reduction, not road construction. In 1997, the proceeds from that tax increase were redirected to the highway trust fund.

expenditures and eliminated the jobs of the workers who made the lost goods and services.

The General Accounting Office Study

In contrast to the DOT and CRS studies that rely on similar models to *predict* likely employment impacts of highway spending, a General Accounting Office (GAO) study examined the historical record to determine the actual impact of several federal spending programs on employment.[6] It also examined the effect of the spending on the unemployed at the time the programs were launched, thereby addressing the DOT's qualification regarding a "slack labor supply." While the study dates from the early 1980s, the types of programs and issues examined are similar to those being debated today.

The GAO study investigated the employment impact of the Emergency Jobs Appropriations Act of 1983, which was enacted when the U.S. unemployment rate was around double-digit levels. The legislation provided $9 billion ($17.3 billion in 2003 dollars) to 77 federal programs to stimulate the economy and provide employment opportunities to the jobless. According to the GAO, its specific objectives were to (1) provide productive employment for jobless Americans, (2) hasten or initiate federal projects and construction of lasting value, and (3) provide humanitarian assistance to the indigent. These programs were particularly targeted at those unemployed for at least 15 weeks.

Although the program was enacted during the worst of the recession, the GAO researchers found that "implementation of the act was not effective and timely in relieving the high unemployment caused by the recession." Specifically, the GAO found that:

> Funds were spent slowly and relatively few jobs were created when most needed in the economy. Also, from its review of projects and available data, GAO found that (1) unemployed persons received a relatively small proportion of the jobs provided, and (2) project officials' efforts to provide employment opportunities to the unemployed ranged from no effort being made to working closely with state employment agencies to locate unemployed persons.[7]

Of relevance to the potential impact of highway spending alone, the study also notes that "funds for public works programs, such as those that build highways or houses, were spent much more slowly than funds for public services." This is understandable given the long lead time between the decision to build and the time construction actually begins. For the typical federally funded road, environmental impact studies, construction plans, land acquisition, competitive bidding, and awarding of contracts can take several years. In some instances, the environmental permitting process can exceed five years.[8] As a result of such delays, any employment effects related to additional highway spending would not occur for several years, thereby providing only a few jobs to those unemployed when the bill was enacted.

As far as the GAO was able to determine, less than 1 percent of the jobs created by the economy during the relevant period could be attributed to the program:

> GAO estimates that as of March 1984, 1 year after the act was passed, about 34,000 jobs in the economy were attributable to the act's funds spent at that time. The employment increase attributable to the act peaked at about 35,000 jobs in June 1984 when about 8 million persons were unemployed. These additional jobs represented less than 1 percent of about 5.8 million jobs created by the economy since the act was passed. After June 1984, the additional employment attributable to the act began to decline and had decreased to an estimated 8,000 jobs by June 1985.[9]

Obviously, these estimated job-creation impacts, all drawn from actual experience, are substantially less than those predicted by the DOT study.

6. U.S. General Accounting Office, *Emergency Jobs Act of 1983: Funds Spent Slowly, Few Jobs Created*, GAO/HRD–87–1, December 1986.
7. *Ibid.*, p. 3.
8. John W. Fischer, "Highway and Transit Program Reauthorization," Congressional Research Service *Report for Congress*, December 11, 2002, p. 23.
9. U.S. General Accounting Office, *Emergency Jobs Act of 1983*, p. 4.

At its peak job production, the 35,000 new jobs created came at a taxpayer cost of $257,142 per job ($485,714 per job in 2003 dollars). Under the circumstances, hiring the unemployed to dig holes in the morning and fill them up in the afternoon would have been far more cost-effective.

The Congressional Budget Office Study

The Congressional Budget Office (CBO) also looked into the relationship between federal spending and job creation and other economic benefits and, based on the evidence adduced during its review, concluded that the connection is relatively weak.[10] In contrast to the DOT, CRS, and GAO studies, the CBO study was a comprehensive review of a large number of academic studies on the subject conducted by individuals and institutions during the preceding 10 years. Although these studies approached the economic impact of infrastructure spending from slightly different perspectives, using a variety of estimation techniques, the overall opinion was that the evidence on the effect of federal infrastructure spending on job creation was inconclusive.

For example, in one 1997 review of 15 separate studies on the state and local impact of highways, eight studies found a statistically significant, positive impact, and seven found negative or insignificant results.[11] The CBO review also cited a 1996 study commissioned by the Federal Highway Administration, which found that the federal highway program produced extremely high benefits in its early days but that the value of these benefits declined as the interstate system neared completion, at which point further federal investment in highways was estimated to be less productive than private investment in general. Other studies found that federal money sometimes merely displaced state and local money that would have been spent on the project anyway. The CBO concluded that:

> The available information suggests three conclusions: some investments in public infrastructure can be justified by their benefits to the economy, but their supply is limited; some (perhaps substantial) portion of federal spending on infrastructure displaces state and local spending; and on balance, available studies do not support the claim that increases in federal infrastructure spending would increase economic growth.[12]

Creating Jobs Versus Creating Value

The CRS, GAO, and CBO studies conclude that the impact on jobs would be much less than the 47,000 new jobs per billion dollars in new highway spending claimed by the DOT study. However, none of these studies questioned the extent to which job creation should even be a high priority of any federal program. Most federal programs were created to meet a particular need that Congress believed government should address in the interest of the general welfare. Food stamps feed the poor, Medicare helps the elderly with medical costs, and the Department of Defense protects America from external threats. To the extent that elusive efforts to create jobs compromise these goals, scarce taxpayers dollars are wasted.

In a 1992 study about federal spending and job creation, CRS analysts pointedly—and sarcastically—asked:

> Have you noticed that most proposals to change some element of Federal economic policy—ranging from a minor tax provision to building public infrastructure to changes in trade restrictions—are debated at least in part in terms of how many jobs they will create? Will these proposals really create jobs? If so, why not just keep adding new programs until full employment is achieved?[13]

Lost in the job-creation debate is the fact that the highway reauthorization process is supposed to be about transportation, mobility, congestion mitigation, and safety. To the extent that these goals are sacrificed to some illusive job-creation process, the

10. Congressional Budget Office, *The Economic Effects of Federal Spending on Infrastructure and Other Investments*, June 1998.

11. *Ibid.*, p. 15.

12. *Ibid.*, p. 18.

13. Jane G. Gravelle, Donald W. Kiefer, and Dennis Zimmerman, "Is Job Creation a Meaningful Policy Justification?" Congressional Research Service *Report for Congress* No. 92–697E, September 8, 1992.

program becomes less effective, if not irrelevant, and ought to be scrapped rather than be allowed to continue to waste the taxes paid by motorists.

Furthermore, arguments for a costly highway bill on the basis of potential job creation fail to recognize that creating jobs is not the same thing as creating value. The expenditure of any sum of money on nearly anything will contribute to a job, but whether that job leads to the creation of products and services of broad public value is another question. Hurricanes, tornadoes, and forest fires create large numbers of jobs, but they also destroy value in the process, an outcome not materially different from much of today's federal spending on costly and underutilized light rail systems.[14]

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14. For one obvious example (massive federal spending on public transit), see John Semmens, "Public Transit: A Bad Product at a Bad Price," Laissez Faire Institute *Issue Analysis*, January 2003, pp. 11–12.