

Appendix B

Statement of Committee Member William Dupor*Federal Reserve Bank of St. Louis*

July 31, 2013

Preface: The bulk of my involvement on this committee and my work on this dissent occurred while I was an associate professor of economics at the Ohio State University. The analysis and conclusions set forth are mine and do not represent the views of the Federal Reserve Bank of St. Louis, the Federal Reserve System, or the Board of Governors. I would like to thank Alex Bruner and Peter McCrory for helpful research assistance and Judy Ahlers for valuable editorial assistance.

INTRODUCTION

This appendix presents and discusses information, specifically recent data and the relevant economic research, important in answering the questions that our committee was asked to address. I put forth a considerable amount of this information to the committee during the months of our deliberations. A good portion of this information does not appear in the committee's report, which is why this appendix is needed. Finally, I draw out the policy implications from these recent data and the relevant economic research.

FACTS

FACT 1

The transportation infrastructure component of the American Recovery and Reinvestment Act of 2009 represented a tremendous dollar commitment, relative to federal transportation aid during typical times.

Highway and bridge construction and improvement funded by the act, for example, was \$28 billion; almost the entire amount was funded through grants-in-aid to state governments. This equals 76 percent of 2008 federal-aid highway dollars (\$36.9 billion) or, stated another way, 44 percent of 2008 total highway capital improvements made by states from all sources (\$62.9 billion). Thus, the Recovery Act's transportation component represented a large increase in dollars relative to the prerecession commitment to transportation. How does this compare with the act's other components? As one example, the tax cut component provided to the typical U.S. household was modest, relatively speaking. In 2008, middle-quintile households earned \$64,000; such households paid \$7,500 in federal taxes.¹

¹ Congressional Budget Office (2012).

The Recovery Act's primary tax benefit to individual households (married filing jointly) was the \$800 Making Work Pay tax credit.² This tax benefit amounts to only 11 percent of the typical household's federal tax bill before the act. *Thus, the Recovery Act provided a 76 percent boost in highway aid relative to one year of typical federal aid but only an 11 percent easing of the taxpayer burden relative to one year of typical federal taxes.*³

FACT 2

Despite the size of the act's transportation component, the relevant statistics for either industry inputs or output show little movement in the years following the Recovery Act's passage.

It is crucial to understand the impact of the act on the public infrastructure construction industry. The highest-quality data to which I have access concern the highway program, so this program is my focus.

What happened to the highway construction industry? According to Federal Highway Administration (FHWA) data, the number of workers on federal-aid highway projects fell by 32,000 workers from before passage (2008) to after passage (2010), a 9.4 percent decline (Figure B-1).⁴

The Bureau of Labor Statistics (BLS) Establishment Survey provides a second data source on employment. According to the BLS, the number of workers engaged in highway, street, and bridge construction from 2008 to 2010 fell by 40,000, a 12.3 percent decline (Figure B-2).⁵

In addition to employment, other measures of economic activity in the transportation sector were nonresponsive. Bridge safety saw a meager improvement following the act's passage. In 2008, 26.9 percent of all bridges in the country were classified as either structurally deficient or functionally obsolete. In 2011, this percentage was nearly unchanged at 25.4 percent (Figure B-3).

In terms of output, the data do show a temporary spike in highway infrastructure physical investment. According to the U.S. Census Bureau, the value of construction put in place for public highways increased by only \$2.9 billion from 2008 to 2010; however, this increase was short-lived. In 2011, this value returned to roughly its 2008 level (Figure B-4).

Transportation infrastructure was a major component of the Recovery Act. However, at least for highways, the postenactment changes in the relevant economic activity were negative, small, and/or short-lived.

Figure B-5 shows one reason why there was no clear highway construction boom. The figure plots national spending on highway, street, and road construction between 2007 and 2011 under several scenarios. These series include expenditures from all funding sources: the federal

² Note that a middle-quintile household, depending on its particular circumstances, may have had access to more specialized Recovery Act tax benefits, such as the First-Time Homebuyer Credit.

³ Both the tax credit and the highway spending were spread out over several years; therefore, it is inappropriate to interpret either percentage cited above as an annual rate.

⁴ The source for this information is the FHWA Office of Civil Rights. The information was acquired through my Freedom of Information Act request made while I was on the faculty of the Ohio State University. Data reported are the number of workers in July of the corresponding years. Three states are excluded because of data nonavailability.

⁵ The source for this information is the BLS Establishment Survey. The employment decline in the BLS series is likely greater than the decline in the FHWA series because the FHWA does not include street construction. Note that street construction, for the most part, was not covered by the Recovery Act's transportation component.

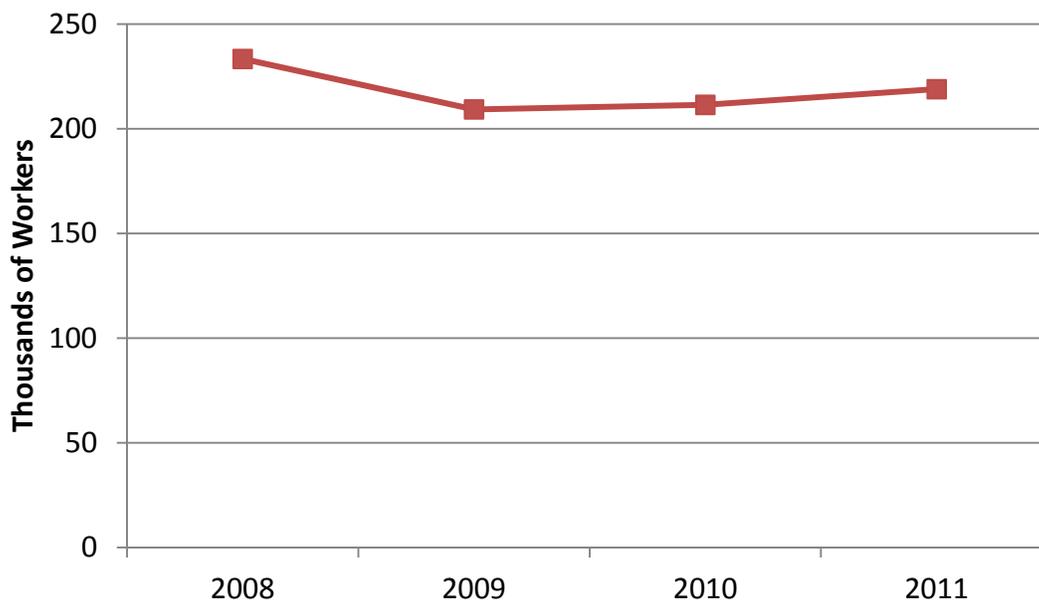


FIGURE B-1 Number of workers on federal-aid highway projects before and after passage of the 2009 Recovery Act. The above data cover 47 states. Three states (along with U.S. territories) are not included because the data were not available.
(SOURCE: FHWA Civil Rights records.)

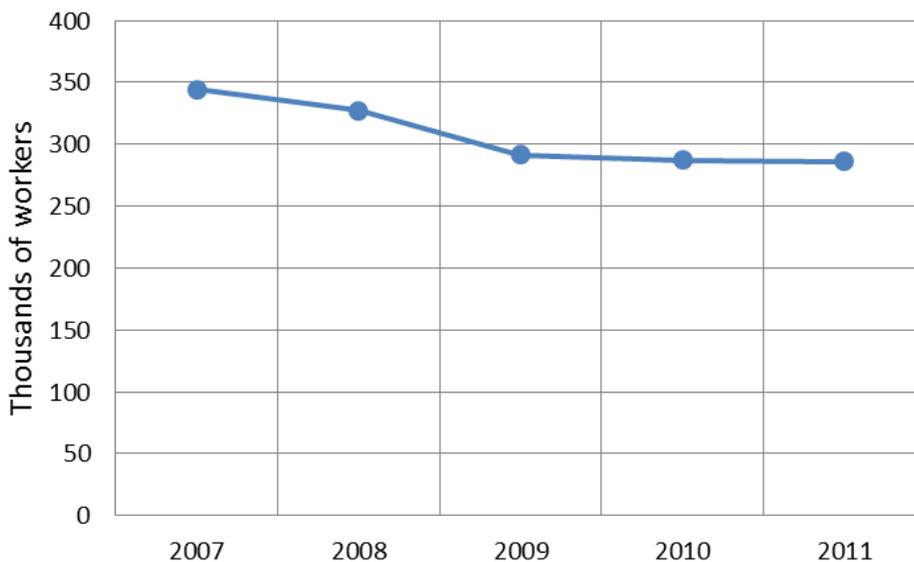


FIGURE B-2 Number of workers in highway, bridge, and street construction before and after passage of the 2009 Recovery Act.
(SOURCE: BLS Establishment Survey.)

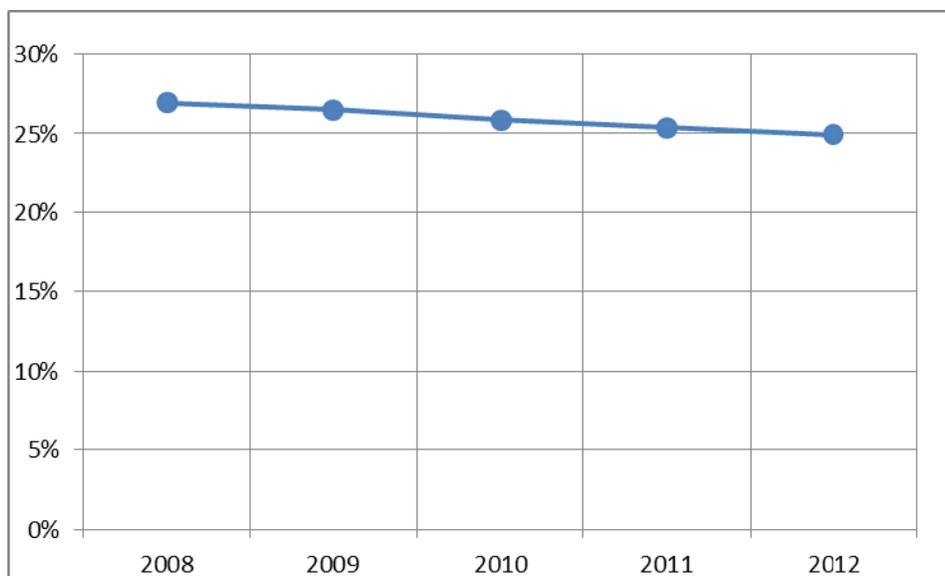


FIGURE B-3 Fraction of structurally deficient and functionally obsolete bridges in the United States before and after passage of the 2009 Recovery Act.
(SOURCE: FHWA.)

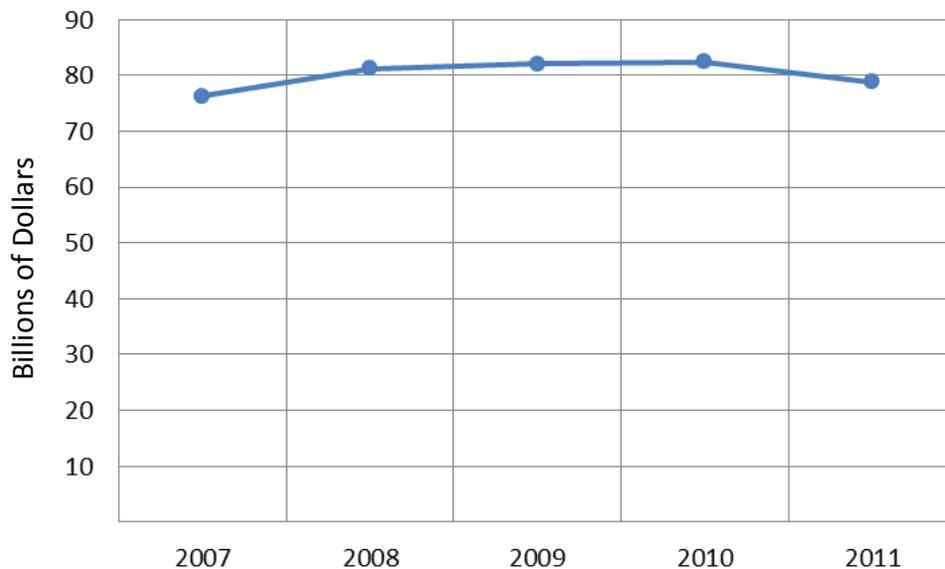


FIGURE B-4 Value of construction put in place for public highways before and after passage of the 2009 Recovery Act.
(SOURCE: Bureau of the Census.)

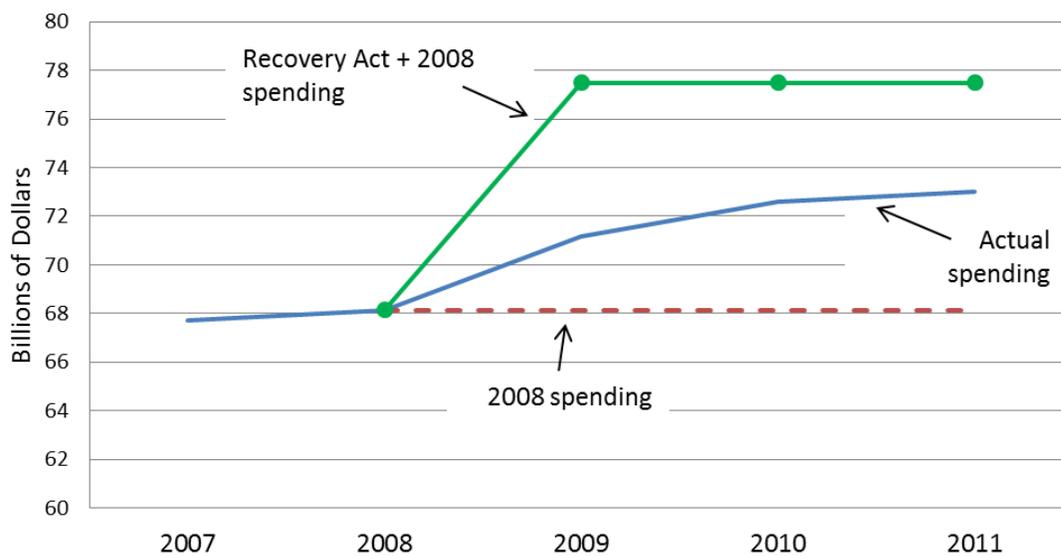


FIGURE B-5 State spending on capital improvements on state-administered highways, roads, and streets (all revenue sources), as well as alternative spending scenarios.
(SOURCE: FHWA and author's calculations.)

Highway Trust Fund, Recovery Act grants, state fuel tax revenue, as well as other state and federal sources. The solid line plots actual spending. It shows a mild uptick. In 2009, \$3 billion more was spent on this type of construction than in 2008, which is roughly \$9.70 per capita. In 2010, spending was \$4.4 billion higher than in 2008. The dashed line in Figure B-5 projects the 2008 spending level into 2009, 2010, and 2011. This provides a useful baseline. Had states been required to maintain their efforts at their pre-Recovery Act levels, spending would have been at least this much.

For states, much of their highway revenue sources were not inherently endangered by the recession for several reasons. First, many states have fuel taxes dedicated to their highway programs. Second, the demand for fuel is price and income inelastic, so the tax base was unlikely shrunk by the recession. Third, I found no evidence that states cut their fuel tax rates between 2008 and 2011. Finally, states continued to have access to the Highway Trust Fund throughout the period. Therefore, the availability of non-Recovery Act funding sources did not automatically “dry up” during this time.

The solid line with circle markers in Figure B-5 plots a hypothetical path for capital outlays. In each of the three years following the act's passage, the line plots the sum of 2008 spending plus one-third of the Recovery Act highway allotment.⁶ The gap between the line with circles and the solid line shows how states responded to the arrival of Recovery Act funds. I explain the reasons for this substantial gap next.

⁶ Thus, in this hypothetical scenario, the Recovery Act highway dollars are outlaid at an equal rate over three years.

FACT 3

The Recovery Act transportation money was spent very slowly.

By the two-year mark of the Recovery Act's passage, only 56 percent of the \$48.1 billion transportation dollars had been spent.⁷ Although this spending rate is remarkably slow, in Facts 4 and 5 below, I explain how this 56 percent figure is itself an *overstatement* of the increase in transportation aid to states during the period.

Economists writing decades ago understood that this slow rate of spending was one reason stimulus spending might be ineffective. Friedman (1960) explained that fiscal policy, as well as monetary policy, suffers from “long and variable lags” in moving from (i) the initial proposals to conduct a stimulus policy to (ii) the time the policy is actually implemented and then to (iii) the time that it affects the economy.

FACT 4

Many states cut their capital budgets upon receipt of Recovery Act dollars. Forty percent of the U.S. population lived in states where state highway construction spending, from all sources, was lower in 2010 (post-passage) than in 2008 (pre-passage). Over the same period, many of these states increased spending on nontransportation items (e.g., education and government administration).

Table B-1 lists 16 states that spent less (or basically the same amount) on highway infrastructure in 2010 than in 2008. For example, Texas decreased its spending on highway infrastructure by \$98 per capita from 2008 (pre-Recovery Act) to 2010 (post-Recovery Act). This reduction includes highway spending from the state's funds, Recovery Act funds, and non-Recovery Act federal aid.

For many of these states with reduced highway spending, the declines were not part of an overall government cutback. Despite the major reduction in highway construction, Texas increased its spending on government administration by \$20 per capita from 2008 to 2010. Texas also increased its spending on combined government administration and education by \$288 per capita.

Some research suggests that, in addition to effectively moving their own funds to other spending categories, state governments used Recovery Act funds, generally speaking, to increase their savings. Cogan and Taylor (2012) show that there was positive accumulation of financial assets by the aggregated state and local governments during the early phase of the Recovery Act. This result is consistent with the work by Edward Gramlich (1978, 1979), who found a similar response of federal aid to subnational governments during previous fiscal stimulus.

Here, I add that some states did *increase* highway infrastructure spending substantially after the act's passage—consistent with the view that their transportation aid was indeed spent on transportation.

⁷ This figure is based on the Recovery Act programs administered by the U.S. Department of Transportation through March 31, 2011.

TABLE B-1 Change in State Government Spending on Various Categories from 2008 to 2010, per Capita, for 16 States

State	Change in Highway Infrastructure Spending	Change in Government Administration Spending	Change in Government Administration Plus Education Spending
Georgia	-109	-9	82
Texas	-98	20	288
Maryland	-73	4	129
Kentucky	-45	0	147
Virginia	-44	9	5
Florida	-35	-16	-24
Indiana	-28	-18	559
Louisiana	-21	18	13
Alabama	-12	3	-20
Mississippi	-10	20	58
Ohio	-10	-38	131
Hawaii	-9	-58	-169
Illinois	-9	9	83
Colorado	-7	-4	236
Arkansas	-6	-13	129
Kansas	1	24	86

NOTE: Years correspond to state fiscal years. Spending in each category reflects state government spending from all sources (i.e., own state and federal).

SOURCE: FHWA National Highway Statistics and U.S. Census Bureau Annual Survey of State and Local Governments.

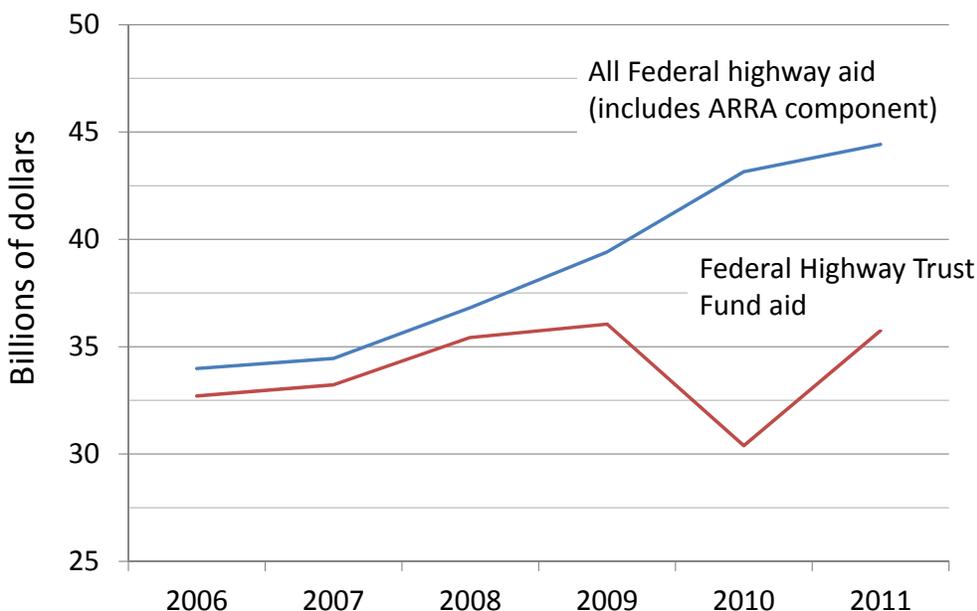
FACT 5

Many states cut their use of non–Recovery Act federal highway dollars coincident with their receipt of Recovery Act highway dollars. Total federal aid for highway construction (i.e., summed across Recovery Act and non–Recovery Act dollars) increased by substantially less than the amount appropriated by the act.

Figure B-6 plots the total federal aid to states for highways. This aid amount was \$2.6 billion greater in 2009 (the first year of the Recovery Act) than in 2008. The amount was \$6.3 billion greater in 2010 than in 2008. Summed across the first two years, federal aid was \$8.9 billion greater than before passage of the act. This amounts to less than one-third of the act's highway spending component. The muted increase in federal spending was due to the decline in use of the federal Highway Trust fund in 2010, which fell by more than \$5 billion relative to the previous year.

Based on my research thus far, the most likely explanation for this decline is that some state departments of transportation (DOTs) ran into bottlenecks for how many new projects they could start after the large influx of Recovery Act dollars.⁸ These Recovery Act dollars needed to be directed to specific projects and then spent in a shorter time frame, because of provisions in the act, than regular Highway Trust Fund money. To meet those deadlines, these state transportation officials likely prioritized spending of the Recovery Act dollars to meet those deadlines.

⁸ Whether other factors could have played a role in this decline is the subject of ongoing research.



**FIGURE B-6 Federal highway aid to states:
Highway Trust Fund component and entire value.**

NOTE: Expressed in current-value dollars. ARRA = American Recovery and Reinvestment Act.
(SOURCE: Fiscal Year 2013, Historical Tables, Budget of the United States.)

POLICY IMPLICATIONS

POLICY IMPLICATION 1

Suppose policy makers pursue a stimulus spending program with a transportation component in the future. They should consider setting hard-and-fast spending floor requirements for states rather than a Recovery Act–style “maintenance-of-effort” requirement.

A careful discussion of the act’s maintenance-of-effort requirement is not possible here due to space constraints. The requirement was intended to provide some limits on states from cutting their own contributions to highway projects. For many states, it did not work.

Moreover, as explained in Fact 4 above, many states that cut their own highway construction spending did so at the same time they were raising spending in other categories. Thus, their own highway contribution cuts were not part of a general decline in state spending. In effect, some states used highway construction dollars from the act to indirectly fund education and government administration. This reallocation of funds is not intended as a criticism of education programs or government bureaucracy, on my part, but rather as recognition of the prevalence of fiscal substitution.

The problem of fiscal substitution by some states is well understood in economics (e.g., Bradford and Oates 1971a, 1971b). The problem was also recognized by at least one member of

Congress during drafting of the act. Representative Bill Shuster from Pennsylvania addressed this issue in a congressional committee hearing during the creation of the act:

In the legislation that I cannot find—and we have looked through—are there any teeth in there that say, for instance, a State spent \$1 billion in maintenance last year, and now we are going to give them \$1 billion more, what is to stop the Governor and the legislature who are having budget trouble from going in and saying, Okay, We are going to cut our transportation spending by \$500 million and replace it with that from the Federal Government? Are there any teeth in there so we can stop that from happening? Because I think the idea is not to just have a shell game here. [sic]⁹

Then-Representative James L. Oberstar from Minnesota was the chair of the committee. At this point in the proceeding, Representative Oberstar explained how the maintenance-of-effort requirement would work, which is the same manner that appears in the eventually ratified act. And then Representative Shuster replies:

I have seen my Governor. He can dance pretty well, and I have seen him tap dance around issues. It would not surprise me to have the Governor of Pennsylvania slash the budget [...]

A few components of the act placed strict requirements on states. Recovery Act grants administered by the U.S. Department of Education were given to a state on the condition that the governor ensured that his or her state would maintain K-12 and higher education support at least at their FY 2006 levels for the first three years following the act's passage. To my knowledge, every governor met this commitment.

Applying transparent and hard rules, such as the one designed for the Department of Education grants, to the DOT grants would help ensure that all states, in actuality, spent transportation dollars on transportation.

POLICY IMPLICATION 2

Suppose policy makers pursue a stimulus spending program with a transportation component in the future. Each state DOT should be allowed some flexibility to reallocate its funds as its state's transportation requirements change.

I heard several times during testimony before the committee—as well as in my own conversations with state DOT officials—that the Recovery Act did not offer state officials enough flexibility. For example, most types of highway funds were required to be obligated by September 30, 2010; this means that those dollars had to be set aside for specific projects. Those funds had to be expended (or equivalently outlaid) by September 30, 2015. As explained previously, even though funds were almost entirely obligated on time, the outlay of money was much slower. Nineteen months after the act's passage (at the deadline for obligation), only 50 percent of the Recovery Act highway grants had been spent. *This means there could have been up to a full five-year period during which a state DOT is/was not permitted to adjust its plans based on new information and program needs.*

⁹ From the hearing “Infrastructure Investment: Ensuring an Effective Economic Recovery Program,” January 22, 2009. <http://www.gpo.gov/fdsys/pkg/CHRG-111hhr46857/html/CHRG-111hhr46857.htm>.

At this point, states were “locked into” the projects they had specified. It is my opinion that this lock-in was not in the interest of the U.S. transportation system. Instead, I believe that any future stimulus spending program should give state DOTs some flexibility. For example, continuing with the Recovery Act example—the act could have been written such that, beginning two years after the passage of the act (i.e., February 2011), states should have had the option to reobligate up to one-third of their Recovery Act grants if their needs dictated such reallocation.

Even if policy makers decide to use the transportation program as a channel for Keynesian fiscal policy, they should strike a balance between (i) the crucial role of transportation in ensuring the efficient and safe movement of goods and people across the country and (ii) the goal of stimulating short-run output. It is my opinion that the committee’s recommendations did not reflect this balance.

Summing up this policy implication, a number of state DOT officials asked for more flexibility. It is my opinion that lawmakers should give it to them if future stimulus laws are enacted.

POLICY IMPLICATION 3

The committee recommends that state DOTs create and maintain a queue of “shovel-ready” project plans that would be prepared in case stimulus transportation spending were undertaken again. Policy makers should recognize that the cost of implementing this recommendation may well outweigh the benefit.

The committee’s recommendation is intended as a fix to the problem that Recovery Act dollars were slow to be spent. If creating and maintaining such a queue were cost free, of course it would be desirable. However, it is not free. A bridge plan, for example, is costly to develop and requires securing environmental and other permits, only to be set aside in case of recession. My understanding from speaking with state DOT officials is that a plan “expires” after a few years; thus, after a few years without a Keynesian spending program, the plan would have to be reapproved to maintain its shovel-readiness.

This brings me to the issue of whether, as the committee suggests, we should ask states to engage in stimulus planning. State DOTs face tremendous budget pressures at a time when the transportation infrastructure of many states is in ill repair. *It is my opinion that, when the economy is not in a recession, a state DOT should allocate dollars with a singular focus on maintaining and improving its infrastructure rather than having a second duty of contingency planning so that it can be an effective agent of Keynesian policy in the event of a large recession.*¹⁰

POLICY IMPLICATION 4

Suppose policy makers pursue a future countercyclical spending program and are considering which components to include. With respect to the goal of increasing short-term employment and output, a transportation infrastructure component may be relatively inferior to other spending categories. More appropriate categories are likely to (i) be labor intensive, (ii) employ relatively less-educated workers, and (iii) involve projects that require short planning and permitting delays.

¹⁰ Bear in mind that these plans would likely be implemented on the rare occasion of a large recession, perhaps once every 30 to 40 years.

How can the government stimulate short-term output and employment more effectively than through transportation infrastructure spending?

First, the Recovery Act experiences teaches us that the government is very efficient at adding and retaining a tremendous number of persons on its own payroll. In Dupor (2012), I show that at its one-year mark, more than three-fourths of the 682,000 jobs directly created and saved by the Recovery Act were government jobs.¹¹ Government workers and their tasks tend to satisfy categories (i) and (iii) above but not category (ii).

On the other hand, some policy makers may be interested in stimulating the private sector instead of the government sector. In this regard, the act had a few success stories, relatively speaking. For example, the Recovery Act's Weatherization Assistance Program authorized \$5 billion in funding to make homes of low-income households more energy efficient. At the end of 2009, 32,252 homes had been weatherized using Recovery Act funds. This component of the act quickly employed private contractors, who may have been in excess supply given the housing market downturn, as well as program administrators, many of whom worked at nonprofit/nongovernmental community action agencies.

A household could demonstrate quickly that it met income requirements. As far as I know, the work did not require obtaining building permits. There was a ready supply of workers in the closely related home construction industry to work on the projects. Also, for the weatherization program, I have not seen evidence of problems described in Facts 4 and 5.

Within the U.S. Department of Transportation, one component proved to be relatively timely in its expenditures. The Federal Transit Administration (FTA) received formula-based grants in the amount of \$7.5 billion to provide aid to state and local governments in improving public transportation.¹² By the end of 2010, the FTA had outlaid (i.e., reimbursed state and local governments for) \$4.9 billion of this program's dollars; moreover, I have not seen evidence of problems faced by the highway component described in Facts 4 and 5. By my account, the FTA also affected employment in jobs that satisfied categories (i), (ii), and (iii) above.

Thus, I conclude that the transportation component (with the FTA subcomponent as an exception) was relatively inferior to some of the other spending components of the act in terms of increasing short-term private-sector employment. *The rub is that the number of relatively effective programs may be small. The weatherization program plus the FTA grants amount to only \$13.4 billion of the \$820 billion Recovery Act.*

POLICY IMPLICATION 5

Policy makers should recognize that the jury is still out on whether countercyclical government spending (on transportation or other categories) has large or small effects on the real economy. This statement applies regardless of whether the stimulus is undertaken when the economy is slack or monetary policy is holding interest rates low.

The committee's position on the general question of the effects of stimulus spending is concisely stated in the introduction of its report:

[T]he preponderance of studies supports the conclusion that federal stimulus spending, during a recession or period of high unemployment, and when monetary policy is

¹¹ In contrast, roughly 32,500 of the 682,000 jobs were in transportation. These transportation jobs were almost entirely in the private sector.

¹² See http://www.fta.dot.gov/12297_10518.html.

maintaining low interest rates, leads to an increase in GDP and in employment, at least in the short term (within one or two years after the spending).¹³

The sentence is not an accurate description of the state of macroeconomists' understanding of the issue.¹⁴ Several similar sentences are peppered throughout the report; these too are inaccurate.

First, the above quote is inconsistent with the body of the committee's own report in several places.

- The committee uses the words “preponderance of studies” in its introduction and then in Chapter 2 quotes scholars in the field who contradict the preponderance claim. For example, citing Ramey (2011a, 681), the committee writes: “Moreover, ‘if the increase is undertaken during a severe recession, the estimates are likely to be at the upper bound of this range. It should be understood, however, that there is significant uncertainty involved in these estimates. Reasonable people could argue that the multiplier is 0.5 or 2.0 without being contradicted by the data.’”¹⁵ Ramey is saying that, while it is possible the multiplier is greater than 1, it is also possible that the multiplier is less than 1. A multiplier less than 1 implies that government spending crowds out private economic activity.

- The committee's report also describes the Congressional Budget Office's (CBO's) reading of existing research. The CBO issued its first Recovery Act report in late 2009. In it, the CBO gave an interval range of multiplier estimates for “federal transfers to payments to state and local governments for infrastructure.” The multiplier range was between 1 and 2.5. As time passed from 2009 to 2011, the CBO analyzed new empirical research being released on the effect of stimulus spending. *With incoming data and research, the CBO moved its range in a direction toward less-effective stimulus rather than more-effective stimulus or leaving the range unchanged.*¹⁶ Specifically, in a 2010 report and then each of its later reports, the CBO shifted its multiplier downward to between 0.5 and 2.2. Note also that between 2009 and 2010, the CBO was monitoring an economy in which interest rates remained low and unemployment remained high. If the economy remained sluggish, then the preponderance statement used by the committee (if accurate) would imply that the CBO should have pushed its range of multipliers

¹³ It is important to note that, for the most part, macroeconomists would agree that in the short term stimulus spending increases output because government spending is included as part of gross domestic product (GDP) at cost. Thus, \$1 of government spending—even if applied to an inherently useless activity—increases GDP by \$1. The question on which macroeconomists disagree is whether other components of GDP also increase. A multiplier of less than 1 means that stimulus spending reduces private economic activity. This last sentence is the one on which macroeconomists disagree.

¹⁴ One could split hairs and say that the phrase “increase in GDP and in employment” could be read as “at least a negligible increase in GDP and employment.” By not specifying any magnitude here, the statement could be interpreted broadly. In that case, the statement is so broad that it is not inconsistent with the views of most researchers on the topic. I take the phrase “increase in GDP and employment” to mean “a substantial increase.” With this meaning, the statement is definitely inaccurate.

¹⁵ Note that the Ramey quote is from a survey paper of existing research by herself and other scholars. Ramey and two coauthors have published research, which I discuss later in my dissent, that finds a low response of real economic activity in the United States even when the economy is in a recession.

¹⁶ It is important to note that the CBO estimates of the effects of the Recovery Act are not “policy evaluation.” The CBO did not look at outcome variables for the Recovery Act, such as employment. Rather, the CBO estimates are based on its readings of existing economic research (most of which was completed before the act's passage). As such, the CBO estimates are not useful for evaluating the policy effects of the Recovery Act; however, they are useful for summarizing one organization's view of the state of existing economic research on the topic.

upward rather than downward. As with Ramey (2011a), the CBO reads the existing economic research as being consistent with the hypothesis (as well as other hypotheses) that infrastructure spending crowds out private-sector output.

- The report cites papers that specifically used post–Recovery Act data. The committee interprets these papers as being consistent with the committee’s preponderance statement. In Chapter 2, the committee writes “Both Wilson and Feyrer and Sacerdote find relatively large total and private-sector employment effects of the ARRA [American Recovery and Reinvestment Act] spending.” The committee’s statement is inaccurate. Objectively speaking, both papers find mixed results. I explain below.

- In the abstract of his paper, Wilson (2012) states “IV results indicate that ARRA spending in its first year yielded about eight jobs per million dollars spent, or \$125,000 per job.”¹⁷ This is roughly three times the typical compensation (including benefits) for an employee working in the United States in 2008, the year before the stimulus. Moreover, when Wilson excludes government employment and focuses on private employment only, in one specification he finds no statistically significant effect of the Recovery Act.¹⁸ This specification is consistent with the benchmark finding in a paper I wrote with Tim Conley (University of Western Ontario)—that the Recovery Act had no statistically significant effect on private-sector employment but a statistically significant effect on government employment (Conley and Dupor forthcoming).

- The committee’s reading of Feyrer and Sacerdote (2011) is also inaccurate. It is inaccurate in a way that supports the committee’s preponderance claim. As in Wilson (2012), the paper analyzes the cross-state employment effect of the Recovery Act. In their abstract, Feyrer and Sacerdote write:

A cross state analysis suggests that one additional job was created by each \$170,000 in stimulus spending. Time series analysis at the state level suggests a smaller response with a per job cost of about \$400,000. These results imply Keynesian multipliers between 0.5 and 1.0, somewhat lower than those assumed by the administration.

Two of the statements in the abstract are inconsistent with the committee’s preponderance claim because (i) private-sector output was either unchanged or crowded out by government purchases and (ii) the time-series estimates imply employment increased, but at a tremendous cost per job.

The report’s “preponderance” sentence (and the associated discussions in the report) is also inconsistent with a number of papers to which I referred the committee. These papers are not mentioned in the committee’s report. I discuss them next.

- Ramey (2011b) conducts what is called a vector autoregression study that finds low output responses to government spending shocks in the United States. She finds no evidence that these responses are any larger when she restricts attention to a sample containing an extended period of low interest rates.

- Bognanni (2013) examines the question of whether the output responses to stimulus spending are larger in recessions than during expansions. He finds the opposite result of

¹⁷ The term “IV” used here denotes instrumental variables, a statistical procedure.

¹⁸ See the column “Non-farm private employment” and row “Announcements” of Wilson’s Table 7. He considers three alternative treatment variables. “Announcements” (i.e., announced Recovery Act dollars) is his preferred treatment variable. For his other two alternatives, he finds a positive private-sector employment effect of the act.

Auerbach and Gorodnichenko (2012), who find larger multipliers in recessions than expansions. From Bognanni's abstract:

[M]y estimates suggest that the value of the government spending multiplier is likely smaller in recessions than in expansions, while tax cuts have a greater effect in recessions than in expansions. I find little evidence that regime change in monetary policy rules and fiscal policy rules have caused time variation in the value of the fiscal multiplier.

The differences in findings are likely to be due to differences in methodology. Bognanni (2013) disciplines the data using a dynamic stochastic equilibrium model, which is standard in business cycle and monetary economics research. Auerbach and Gorodnichenko (2012), on the other hand, use a more atheoretical structural vector autoregression. I view both methodologies as valid and useful. I interpret the differences across findings as evidence that the size of fiscal multipliers during recessions is an issue that remains not at all settled.

- I offered other papers to the committee on time-varying dynamic responses to stimulus spending: those by Pereira and Lopes (2010) and Kirchner et al. (2010).¹⁹ Each study finds relatively small multipliers that do not vary substantially during times of recessions versus expansions. I do not discuss these here because the Transportation Research Board staff requested that I limit the length of this dissent.

The report's preponderance sentence (and the associated discussions) is also inconsistent with more recent papers on the topic.

- Owyang et al. (2013) analyze U.S. and Canadian data using a vector autoregression. They use a longer sample, but seek to answer the same question as Auerbach and Gorodnichenko (2012). The longer samples are 1890 through 2010 (for the United States) and 1921 through 2011 (for Canada). Over the four years following an exogenous increase in government spending and during periods of high unemployment, their estimated multiplier is 0.78 in the United States and 1.16 in Canada. Thus, for the United States, government spending crowds out private gross domestic product. For Canada, the multiplier is greater than 1; however, it is still substantially less than Auerbach and Gorodnichenko's estimate (for the United States), which is based on a shorter sample.

- The committee's report emphasizes that economic research has shown that when monetary policy is not responsive to inflation, fiscal multipliers tend to be larger than they would be with monetary policy used in typical times. The committee accurately discusses the findings of one paper: "Christiano et al. (2011, 93) similarly conclude that government spending multipliers can be greater than 3 under some assumptions." In recent work, however, Carlstrom et al. (2012) show that minor changes in how policy and shocks are introduced can dramatically affect the results obtained by Christiano et al. Slightly different modeling assumptions related to whether policy has a "fixed" or "random" duration can lead to a multiplier much closer to 1.

¹⁹ See also Crafts and Mills (2012).

POLICY IMPLICATION 6: SUMMING UP

- **There is substantial uncertainty about the short-term effect of stimulus spending on economic activity, regardless of whether an economy is in a recession and/or has low interest rates.**
 - **There is certainty that the spending causes deficits and near-certainty that future distortionary taxes are needed to finance the resulting debt.**
 - **The spending policy, in a form similar to that of the Recovery Act, inherently involves resource redistribution across households. Whether this redistribution is viewed as beneficial or harmful depends on the preferences of each individual.**
 - **Weighing these factors together, I suggest that policy makers consider not using stimulus spending at all regardless of category.²⁰ It would be sensible to revisit the issue if and when economic research provides a more conclusive answer to the question of short-term benefits.**
 - **If policy makers are set on enacting stimulus programs with a transportation component, I have provided several practical suggestions to at least partially avoid the deficiencies that arose during the Recovery Act episode.**

CONCLUSION

Research on the macroeconomic effects of the transportation component of the Recovery Act, as well as the act and stimulus spending in general, is far from complete.

It is worth highlighting one theme that reoccurs in my dissent: how economic theory permitted economists to foresee some of the problems with the Recovery Act beginning decades ago. These economists include Gramlich (1978, 1979), recently followed by Cogan and Taylor (2012), on subnational government savings behavior; Friedman (1960) on long policy lags; and Bradford and Oates (1971a, 1971b) on fiscal substitution.

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²⁰ There are sensible reasons besides increasing short-term economic activity to enact a Recovery Act–type program. For example, extending the duration of unemployment insurance may be socially optimal given the lack of private insurance for labor income risk, even though these extensions may discourage job search and thus extend the slump in the labor market (see, for example, Mulligan 2012).

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