

RESPONDING to the GLOBAL FINANCIAL CRISIS What We Did and Why We Did It

The Fiscal Response to the Great Recession: Steps Taken, Paths Rejected, and Lessons for Next Time

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Note: The views expressed in this draft are strictly those of the author(s).

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Introduction

The fiscal response to the Great Recession started when President Bush signed the Economic Stimulus Act of 2008 on February 13, 2008 and finished when the payroll tax cut enacted under President Obama expired at the end of 2012. Congress enacted at least 18 different laws that explicitly included discretionary fiscal stimulus totaling over \$1.5 trillion during those five years, with about half of that coming from the American Recovery and Reinvestment Act signed into law by Obama on February 17th 2009.² The stimulus was 54 percent tax cuts, 19 percent individual transfers, 11 percent state and local fiscal relief and 16 percent public investment—with nearly all of that public investment coming in the Recovery Act. The discretionary fiscal stimulus averaged 2.0 percent of GDP over those five years, boosting the level of GDP from what it otherwise would have been by a maximum of 3.4 percent in the third quarter of 2010 with a smaller effect thereafter. In addition, automatic stabilizers brought the total magnitude of the countercyclical fiscal response to an average of 3.4 percent of GDP, the largest fiscal response to a recession in U.S. history.

The first section of this paper describes the origins of these stimulus measures and the second section summarizes their magnitude and composition. The third section addresses some of the evidence evaluating the efficacy of the stimulus. The fourth section describes some of the approaches that were considered by the Obama transition team and Administration but not implemented. Finally, the last section discusses some lessons for the future.

This paper is focused on the *macroeconomic* analysis of the fiscal response to the financial crisis, and the extent to which it prevented a deeper recession, and helped speed the economic recovery. It only briefly discusses other goals, like protecting the most vulnerable as well as improving infrastructure, healthcare, broadband and energy efficiency. These are all very important topics but largely outside the scope of this work.³

I. The Three Phases of Stimulus

The fiscal stimulus went through three phases: (i) an initial set of responses in 2008 that aimed to be “timely, targeted, and temporary”, (ii) a large response in the Recovery Act in early 2009 that aimed to be “substantial, speedy, and sustained”, and (iii) a number of laws passed in subsequent years that in retrospect could be described as “opportunistic, extended, and under the radar.”

The 2008 Stimulus: “Timely, Targeted, and Temporary”

In 2007 the U.S. economy was deteriorating rapidly. Most notable was a rise in the unemployment rate from 4.4 percent in March 2007 to 5.0 percent in December 2007—a

² This does not include the Alternative Minimum Tax (AMT), Troubled Asset Relief Program (TARP), or support for the Government-Sponsored Entities.

³ For an excellent account of the Recovery Act and its longer-term structural legacy see Grunwald (2012).

magnitude of increase that, based on historical precedent, signaled the coming of a recession that would cost many more jobs. Between September and December of 2007 the Federal Reserve reduced its target federal funds rate from 5.25 percent to 4.25 percent, but because of lags in the effectiveness of monetary policy this was not expected to substantially bolster the economy until late 2008. In addition, the Fed took a number of other actions, like expanding the discount window and establishing the Term Auction Facility (TAF), that had unknown efficacy and timing. As a result, there was significant concern that the economy would get worse before monetary stimulus set in.

On December 5, 2007, Martin Feldstein (2007) became perhaps the first prominent economist to raise the possibility of fiscal stimulus. “The American economy is now very weak and could get substantially weaker,” he wrote. “Current economic conditions call for lowering interest rates and for enacting a tax cut now that is conditioned on economic developments in 2008.” Lawrence Summers (2007) went on to explicitly call for fiscal stimulus on December 19, 2007, saying it should aim to be timely, targeted, and temporary.

By this time President Bush had already asked Treasury Secretary Henry Paulson and his White House economics team to evaluate the need for a fiscal stimulus program. In January, Paulson and the White House team reported back to Bush that a stimulus plan was needed urgently and could be devised in a manner that would receive broad bipartisan support and be quickly enacted. Bush wanted a package with the guiding motivation being to put money into consumers’ hands quickly to provide a fast boost to the economy. On January 18, 2008, Paulson unveiled the broad parameters of a stimulus package, saying, “Our economy is growing slower than expected, and that means we need to act quickly to put together a package that is temporary, simple enough to get enacted quickly, effective at boosting growth and job creation this year, and large enough to make a difference.” (Paulson 2008). This was enacted with strong cooperation by Congressional Democrats in a matter of weeks and largely took the form of one-time refundable individual tax rebates. The first electronic payments were made in April 2008 and the first checks mailed out in May (Internal Revenue Service 2008).

While the economic threat at the time appeared to be nothing worse than a typical recession, there were two prime rationales for the stimulus: (i) fiscal action could provide a faster boost to the economy than monetary policy, filling in some of the gap before the interest rate cuts started kicking in; and (ii) given that the effectiveness of monetary stimulus was uncertain, it was best to diversify the response by using multiple instruments (Elmendorf and Furman 2008).

The Recovery Act: “Substantial, Speedy, and Sustained”

Despite the fiscal stimulus and further interest rate cuts, the economic and financial crisis intensified, particularly in the autumn after Lehman Brothers failed, with the unemployment rate rising from 5.0 percent to 7.3 percent over the course of 2008. By early January 2009 the numbers showed that the economy had lost an average of 510,000 jobs a month for the previous three months, a loss that was subsequently revised up to 647,000 jobs a month.

As the economy weakened, the target size of stimulus plans increased. Running for president, Obama originally proposed a fiscal stimulus in January 2008, proposed another one in April, and expanded the size of the proposed stimulus over the course of the year, including in June, August and October. Fiscal stimulus was also motivated by the concern that the Fed, which had effectively cut its target rate to zero in December, 2008, was running out of conventional monetary policy options and that all tools that relied on the financial sector for transmission to the real economy were of uncertain and potentially limited impact due to the crisis and associated breakdown of the financial system.

Building on these plans the transition team, which included Jack Lew, Dan Tarullo, Jason Furman, and Austan Goolsbee, met with President-elect Obama on November 12th and presented him with the following rationale for a recommended \$300 billion stimulus:

Broad expectation that economy will be anemic in 2009 and beyond: job losses are accelerating; consumption deteriorating; Blue Chip/WSJ Survey projecting negative GDP growth in Q1 2009 while other analysts project negative growth for all of 2009; financially led recessions tend to last longer—Goldman Sachs projects unemployment to peak at over 8% and remain high for most of 2009 and 2010.

Running out of other options: not clear where economic jumpstart will come from with tight credit markets, tapped out consumers, trading partners following behind economic cycle and heading into recession and a stronger dollar.

Appropriate tool in current environment: fiscal stimulus only real option since monetary tools are exhausted and there is room for monetary policy response if fiscal policy overshoots—recession risk much greater than fears of inflation and crowding out (though inflation concern will increase once a recovery is underway).

The question of whether or not the stimulus should be paid for was also debated during this meeting. Economically, there was no need to pay for a stimulus, and politically, the desire to move quickly and without complication to passing relief was compelling. On the other side of the argument, some were worried about the impact that rising debt would have on financial markets. Ultimately Obama decided to advance a stimulus plan that could pass on a standalone basis but to make it clear it was part of a longer-run budget that, taken as a whole, would make the debt sustainable.

At the time, even a \$300 billion unpaid-for stimulus would have been considered large, pushing the bounds of what was possible in Congress. Any stimulus was expected to need the votes of the Blue Dog coalition, about 50 House Democrats concerned about the deficit and debt who had explicitly said they would not vote for another unpaid stimulus. House Democratic leaders had been considering a \$150 billion stimulus, with some talking about packages of up to \$300 billion. Leading progressive economists were advocating similar top-line numbers: a November 19th letter organized by the Center for Economic Policy Research and signed by hundreds of economists including George Akerlof, Dean Baker, James Galbraith, Lawrence Mishel, and Joseph Stiglitz called for a \$300 billion to \$400 billion stimulus that would be “spent quickly” (Akerlof et al. 2008).

In an effort to create political space to pass a larger number through Congress the transition team reached out to several signatories to encourage them to raise their public requests, telling one economist speaking to the House Democratic caucus in the late fall to call for \$1 trillion in stimulus instead of the roughly \$500 billion he had been planning to recommend.

The economic news and forecasts continued to deteriorate. Macroeconomic Advisers, a leading economic research and forecasting firm, made the largest negative revision to a forecast in its history on December 8th. These developments plus the filling out of the Obama economic team—Christina Romer and Summers were both advocates of a much larger stimulus—led to a further upward revision of the number, with a memo to Obama stating:

We believe that \$600 billion in stimulus over two years would create 2.5 million jobs relative to what would happen in the absence of stimulus. However, this falls well short of filling the job shortfall and would leave the unemployment rate at 8 percent two years from now. This has convinced the economic team that a considerably larger package is justified... The memo outlines four alternative plan [sic] ranging from \$550 billion to \$890 billion with the difference between them being the state fiscal relief and tax proposals.

The upper end of this range was estimated to be sufficient to close half of the projected 7 percent of GDP output gap. The memo's rationale for not attempting to close the full output gap included: fiscal stimulus was not the only economic tool, concerns about spooking markets and raising interest rates with too large of a fiscal package, and the view that it would always be possible to add to stimulus but might not be possible to subtract from it.

At a meeting with the transition team on December 16th Obama decided to pursue the largest stimulus that his team thought was politically feasible, his view being that political constraints would be binding well before any economic concerns about market confidence would be relevant. This was agreed to be a stimulus in the \$800 billion range and Obama left it to his political and economic team to develop a strategy to hit this target.

The team decided that coming out with an explicit budget number this large would risk a backlash in Congress, slowing passage. In addition, it decided that proposing a full, explicit plan could slow passage given the limited resources of the transition team and the desire of Congress to put its stamp on the measure. Instead, publicly Obama continued to push for the general concept of fiscal stimulus, using a job target instead of a cost target, which was originally 2.5 million jobs on November 22 but revised up to "at least" 3 million by December 20. Based on the economic team's analysis, this job target corresponded to at least \$850 billion in stimulus. In addition, on January 8, 2009 Obama (2009a) listed a specific set of goals for these investments and framed the issue by saying:

It is not just another public works program. It's a plan that recognizes both the paradox and the promise of this moment—the fact that there are millions of Americans trying to find work, even as, all around the country, there is so much work to be done. That's why we'll invest in priorities like

energy and education; health care and a new infrastructure that are necessary to keep us strong and competitive in the 21st century.

Behind the scenes work was ongoing to have a bill well underway before the inauguration—with specific, detailed meetings with members and staff of Congress beginning immediately after the December 16th meeting. Originally the transition team privately asked Congress for a smaller number because it was concerned about a negative reaction to a larger number, especially from the Blue Dogs, and expected that the total would increase in the legislative process. This expectation was initially justified as the House passed an \$820 billion ten-year stimulus on January 28, 2009. The cost of the Senate bill passed on February 10, 2009 had a slightly higher headline number, \$838 billion, although the effective stimulus was smaller than in the House bill because the Senate added an extension of a patch to the alternative minimum tax (AMT), a measure that didn't increase the effective magnitude of stimulus because it simply continued a long-standing practice that would have been included in other legislation anyway. But instead of the larger total package the Administration hoped and expected to get, the conference agreement was smaller than either bill, coming in at an originally estimated headline cost of \$787 billion after three Senate Republicans insisted the cost come down. The effective stimulus was even smaller because of the inclusion of the AMT patch. Obama signed the Recovery Act into law on February 17.

The guiding philosophy for the Recovery Act was not “timely, targeted, and temporary” but instead “substantial, speedy, and sustained.” The transition team evaluated a wide range of potential provisions against several criteria: (i) how quickly would they spend the stimulus money; (ii) what was their expected multiplier for GDP; (iii) how likely were they to be made permanent (which was generally viewed as a minus because of concern about the long-run deficit); and (iv) how “transformative” would they be for various public purposes beyond immediately increasing GDP. The goal was to come up with a portfolio of provisions that would span short-run stimulus to long-run transformation.

Originally the architects of the stimulus planned to have a limited set of areas for “transformative” provisions centered on healthcare, energy, education and infrastructure. All of these areas were chosen to build on campaign proposals that were more long-run and structural in nature but could be plausibly (or in some cases, less plausibly) be separated out from their broader context with a major down payment included in the Recovery Act. In some cases, these more transformative provisions were motivated less by their macroeconomic impact, instead heeding incoming Chief of Staff Rahm Emanuel's advice that you “never want a serious crisis to go to waste.” For example, the campaign's health information technology spending program and energy investment program were put into the Recovery Act—while the fuller plans for health insurance coverage and cap-and-trade were left to be enacted later. Based on additional input from the transition team and Congress, more items were added to the list including subsidies for broadband in underserved areas and funding for high-speed rail.

When Obama (2009b) signed the Recovery Act into law he said:

Today does not mark the end of our economic troubles. Nor does it constitute all of what we must do to turn our economy around. But it does mark the beginning of the end—the beginning of what we need to do to

create jobs for Americans scrambling in the wake of layoffs; to provide relief for families worried they won't be able to pay next month's bills; and to set our economy on a firmer foundation, paving the way to long-term growth and prosperity.

The *New York Times* (Stolberg 2009) headline noted that “Signing Stimulus, Obama Doesn't Rule Out More”—which turned out to be the case in the next phase.

Post-Recovery Act: Opportunistic, Extended and Under the Radar

The unemployment rate continued to rise, hitting 9.4 percent in May 2009 (before the bulk of the Recovery Act had even kicked in), which was well above what forecasters had predicted as recently as early 2009. The economy was even worse, at least in part, because the many external and internal forecasting models the transition team had used insufficiently accounted for the role of the financial sector in exacerbating and, most importantly, perpetuating the downturn. The Administration proposed more stimulus packages, including in December 2009, September 2010, and the \$447 billion American Jobs Act in September 2011. All of these proposed a combination of public investment, relief for individuals and states and public investment along the same lines as the Recovery Act. Congress, however, had lost its appetite for major additional legislation that was described as economic stimulus and did not enact another bill along these lines after February 2009—although the House did pass an infrastructure-oriented stimulus bill in December 2009 but it was not taken up in the Senate.

Nevertheless, many of the different elements proposed by the Administration or desired by Congress were still passed, attached to other legislation like defense appropriations bills or FAA reauthorizations. The largest opportunity came when the 2001 and 2003 tax cuts were expiring at the end of 2010. Obama had long called for the expiration of the provisions in the tax cuts that solely benefited high-income households. Republicans were in a stronger position after large gains in the mid-term elections. It was possible that Obama could still have pushed through the expiration of the tax cuts, but in that case he would have had no leverage to get any additional priorities in the bill. Instead, he chose to ask Vice President Joe Biden to negotiate a deal with as much fiscal stimulus as possible—specifically, trading a two-year extension of the high-income tax provisions for a continuation of tax credits for low-income families with children and replacing the Making Work Pay (\$58 billion annually) tax credit with a larger but less well-targeted payroll tax cut (\$112 billion annually), and establishing 100 percent expensing for business investment.

This phase of stimulus was necessarily opportunistic. The Administration generally wanted as much fiscal support as possible, including increased public investment and tax cuts. Congress generally wanted less stimulus, but was more supportive of additional tax cuts than funding for infrastructure or other investments and more supportive of extending existing provisions like expiring unemployment insurance benefits than of devising new measures.

The net effect was a substantial additional stimulus: \$657 billion above and beyond the Recovery Act by the end of 2012, which resulted in an increase in total fiscal stimulus

as a share of GDP in 2010, maintained almost that level in 2011, and prevented a sharp falloff in 2012. But this was still well below the size Obama requested and did not have the composition the Administration desired (public investment was almost entirely absent). The piecemeal nature of these additional provisions spread over at least 13 different pieces of legislation, most of which were not explicitly marketed as stimulus, also sacrificed the potential benefit from clearly setting expectations and increasing confidence that a more visible stimulus package might have generated.

II. The Size and Composition of the Fiscal Stimulus

Overall the cumulative discretionary fiscal stimulus totaled \$1.537 trillion through the end of calendar year 2012.⁴ Nearly half of the fiscal stimulus came in the Recovery Act, which provided a net new \$712 billion for the economy through the end of CY 2012.⁵ The remainder came in at least 17 other laws that included the original 2008 rebate checks, the cash for clunkers program to encourage auto purchases, a tax credit for hiring the long-term unemployed, a tax credit for homebuyers, the payroll tax cut, and several additional provisions.

Table 1

Fiscal Support for the Economy During and After the 2007–2009 Recession		
Legislation	Date of Enactment	Stimulus through 2012 (Billions)
Pre-Recovery Act		
Economic Stimulus Act of 2008 (HR 5140)	February 13, 2008	138
Supplemental Appropriations Act, 2008 (HR 2642)	June 30, 2008	13
Housing and Economic Recovery Act of 2008 (HR 3221)	July 30, 2008	11
Unemployment Compensation Extension Act of 2008 (HR 6867)	November 21, 2008	6
Recovery Act		
American Recovery and Reinvestment Act of 2009	February 17, 2009	712
Post-Recovery Act		
Supplemental Appropriations Act of 2009 (HR 2346)	June 24, 2009	3
Worker, Homeownership, and Business Assistance Act (HR 3548)	November 6, 2009	35
Defense Appropriations Act of 2010 (HR 3326)	December 19, 2009	18
Temporary Extension Act of 2010 (HR 4691)	March 2, 2010	9
Hiring Incentives to Restore Employment Act (HR 2847)	March 18, 2010	13
Continuing Extension Act of 2010 (HR 4851)	April 15, 2010	16
Unemployment Compensation Extension Act of 2010 (HR 4213)	July 22, 2010	33
FAA Air Transportation Modernization and Safety Improvement Act (HR 1586)	August 10, 2010	26
Small Business Jobs Act of 2010 (HR 5297)	September 27, 2010	68
Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (HR 4853)	December 17, 2010	309
VOW to Hire Heroes Act of 2011 (HR 674)	November 21, 2011	0
Temporary Payroll Tax Cut Continuation Act of 2011 (HR 3765)	December 23, 2011	28
Middle Class Tax Relief and Job Creation Act of 2012 (HR 3630)	February 22, 2012	98
Total		1, 537

Note: Calendar year basis. May not sum due to rounding.
Source: Council of Economic Advisers (2014); Congressional Budget Office; author's calculations.

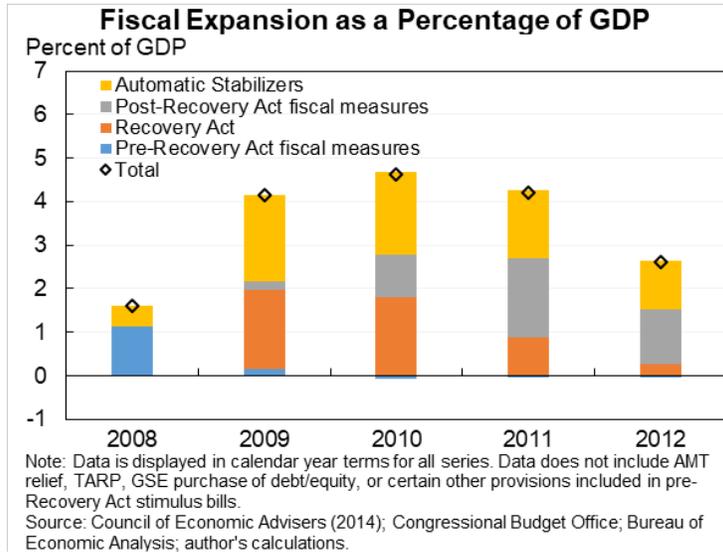
As shown in Figure 1, the overall discretionary fiscal stimulus averaged 2.0 percent of GDP over the five years from 2008 through 2012, peaking at 2.7 percent of GDP in 2010. This was enhanced by automatic stabilizers which expanded unemployment

⁴ The total was \$1.456 trillion counting the budgetary impact through 2019 because some provisions, like bonus depreciation and expensing, raised money in the out years.

⁵ This differs from the headline \$787 billion in that it reflects subsequent CBO re-estimates and also subtracts items like the AMT.

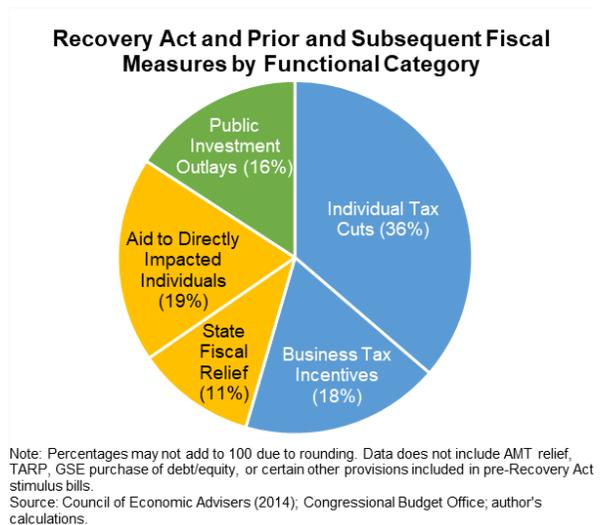
insurance, means-tested programs and reduced taxes—averaging another 1.4 percent of GDP in stimulus and bringing the total stimulus to as much as 4.6 percent of GDP in 2010 and an average of 3.4 percent over the entire period.

Figure 1



The largest category of stimulus was tax cuts for individuals, with total tax cuts making up 54 percent of the fiscal stimulus as shown in Figure 2—although some of the items formally classified as tax reductions are analogous in impact to increased expenditures. Another 30 percent of the stimulus went for relief, either directly to individuals or as fiscal relief for states. The remaining 16 percent of the stimulus was devoted to outlays on public investment. Some of the larger or more notable items in each of these categories along with their cost from 2008-12 are listed in the Appendix.

Figure 2



III. Evidence on the Impact of the Fiscal Stimulus

The principal basis for evaluating the fiscal stimulus should match its primary purpose: raising GDP above what it otherwise would have been, thus preventing a deeper recession and speeding economic growth. In addition, it would be desirable to analyze the relative effectiveness of elements of the stimulus, but evaluating individual provisions proved nearly impossible and those that have are not necessarily comparable. Nevertheless, some general observations are possible.

Ex Ante Projections of the Macroeconomic Impact

The fiscal stimulus was part of a broader response to the crisis that included monetary policy and policies affecting the financial, housing, and auto sectors. Evaluating the causal impact of the entire response, let alone any individual element, is not straightforward and may even be impossible because we cannot observe the baseline that reflects what would have happened absent the policy response. For example, observing that high unemployment rates follow a stimulus may establish nothing more than that the stimulus was warranted in the first place. Conversely, observing the economy recovering may just be the natural self-equilibration of the economy and not the result of macroeconomic policy.

Time series econometric methods have attempted to figure out the impact of fiscal expansions by separating out “endogenous” fiscal policy that is a response to where the economy is from “exogenous” fiscal policy that is done for reasons unrelated to the state of the economy. This method is impossible for the Recovery Act or other fiscal responses because these are basically like a single data point and the fiscal response was clearly an endogenous response to the fact that the economy was widely expected to weaken substantially in the future.

As a result, most of the estimates of the macroeconomic impact of the Recovery Act and other fiscal measures have been estimated *ex ante*. Specifically, they draw on research that was done before the Great Recession to predict the impact that a given fiscal policy would be expected to have on the economy. Generally, this is done by assigning a set of multipliers (spread out over time) to different types of fiscal measures. The multipliers used by the Council of Economic Advisers (CEA) ranged from 1.5 for public investment outlays and for income and support payments, which were expected to generate more economic activity as the initial round of stimulus was spent and re-spent in the economy, to 0.1 for business tax incentives, reflecting the expectation that they would mostly be saved by businesses in the form of larger retained earnings. CEA’s multipliers are shown in Table 2, they generally fall in about the middle of the range for the Congressional Budget Office’s (CBO) low and high multiplier estimates.

Table 2

Estimated Output Multipliers for Different Types of Fiscal Support			
	CEA	CBO Low	CBO High
Public Investment Outlays	1.5	0.5	2.5
State and Local Fiscal Relief	1.1	0.4	1.8
Income and Support Payments	1.5	0.4	2.1
One-time Payments to Retirees	0.4	0.2	1.0
Tax Cuts to Individuals	0.8	0.3	1.5
Business Tax Incentives	0.1	0.0	0.4

Source: Council of Economic Advisers (2014).

Estimates for the macroeconomic impact of the Recovery Act alone are provided in Table 3 generally based on these types of multipliers, showing it adding between 0.7 percent and 4.1 percent to the level of GDP in 2010, when almost all forecasts predicted it would have its peak impact. Blinder and Zandi (2015) used similar methods to estimate the impact of the broader set of fiscal expansions.

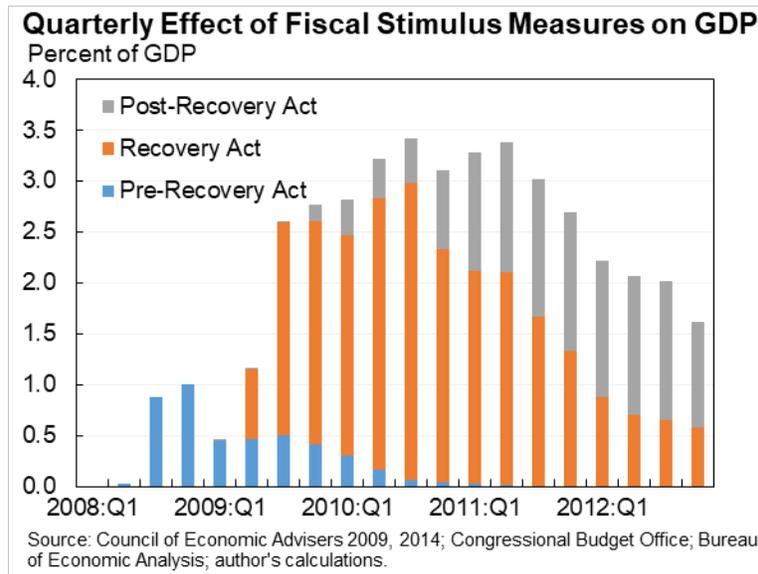
Table 3

Estimates of the Effects of the Recovery Act on the Level of GDP					
	Percent				
	2009	2010	2011	2012	2013
CEA: Model Approach	+1.1	+2.4	+1.8	+0.8	+0.3
CBO: Low	+0.4	+0.7	+0.4	+0.1	+0.1
CBO: High	+1.7	+4.1	+2.3	+0.8	+0.3
Goldman Sachs	+0.9	+2.3	+1.3	–	–
HIS Global Insight	+0.8	+2.2	+1.6	+0.6	–
James Glassman, JP Morgan Chase	+1.4	+3.4	+1.7	0.0	–
Macroeconomic Advisers	+0.7	+2.0	+2.1	+1.1	–
Mark Zandi, Moody's Economy.com	+1.1	+2.6	+1.7	+0.4	–

Source: Council of Economic Advisers (2014).

These same methods can be used to estimate the macroeconomic impact of the full set of fiscal stimulus legislation on GDP starting in 2008, which is shown in Figure 3.⁶ The total raised the level of output by a maximum of 3.4 percent of GDP in the third quarter of 2010 with the effect remaining around 3 percent of GDP through the nearly the end of 2011 and falling off to about 2.2 percent in the beginning of 2012. In terms of growth rates, this means that Q4/Q4 growth rates were raised substantially in 2008 and 2009 but were roughly unchanged in 2010 and 2011 and reduced in 2012 as the addition to the level wore off. This is equivalent to adding about 3 million jobs at the maximum point of the stimulus or a cumulative total of about 10 million job-years over the five-year period the stimulus was in effect.

⁶ The analysis combines the multipliers in Table 2 with the lag structure in CEA (2009). The lags are why the effect of the fiscal stimulus on output is maintained at a higher level even after the fiscal stimulus itself started to be withdrawn.

Figure 3

Ex Post Cross Sectional Effects

In general, it is difficult to evaluate any individual provision of the stimulus on GDP because numerous provisions were going into effect simultaneously. Nevertheless, research has exploited different types of variation to estimate the impacts of some of the individual provisions. These impacts, however, cannot easily be compared to each other because of different estimation strategies, noise, and because many of them did not estimate national multipliers.

A number of papers have effectively used random cross-state variation in different components of the fiscal stimulus to estimate the state-level macroeconomic impact of these particular measures. Chodorow-Reich et al. (2012), for example, study the impact of higher Medicaid matches on state economies by looking at the portion of Medicaid matching that was based on pre-recession Medicaid spending and thus was not simply the result of the recession. They find a state-level multiplier of about 2. Conley and Dupor (2013) used a similar method for highway spending and found a much smaller multiplier. Dupor and McCrory (2017), Dupor and Mehkari (2016), and Wilson (2012) examined broader Recovery Act spending based on formula grants and found multipliers in between these two. The different estimated multipliers are probably an artifact of different modelling strategies, however, and thus not comparable. Chodorow-Reich (forthcoming) provides more harmonized estimates studying these three sets of stimulus and finds multipliers of 1.53 to 2.29, with imprecise measurement meaning that none of them are statistically significantly different from each other at a 5 percent level. These estimates suggest clearly that increased federal transfers to states through a higher Federal Medical Assistance Percentage for Medicaid and other investments funded through state budgets were macroeconomically effective.

Feyrer and Sacerdote (2011) use state- and country-level spending on a variety of types of stimulus grants (again, excluding tax cuts and some individual-level transfer

payments) and find a smaller multiplier of 0.5 to 1.0, although this reflects heterogeneous estimates including a multiplier of -0.7 to -3.3 for education and police spending but much higher multipliers like 2 to 2.3 for low-income support and 1.8 for infrastructure and other grants. Dube, Kaplan, and Zipperer (2015) also use county-level stimulus spending, finding slightly larger effects than Feyrer and Sacerdote (2011).

Translating state-level multipliers into national multipliers is not straightforward because of many factors, most notably the spillovers from one state to another and other general equilibrium effects (Nakamura and Steinsson 2014 and Farhi and Werning 2016). Chodorow-Reich (forthcoming), however, argues that in many cases the policy-relevant multiplier should assume no interest rate response and deficit financing, in which case he shows that state-level cross-sectional multipliers are a rough lower bound on what the relevant Keynesian national multiplier would be. He summarizes his analysis as finding that his own results and other cross-sectional results “implies a no-monetary-policy-response deficit-financed national multiplier of about 1.7 or above. This magnitude falls at the very upper end of the range found in a recent review article based mostly on time series evidence (Ramey 2011). Thus, cross-sectional multiplier studies suggest the national multiplier can be larger than often assumed.”

A few other provisions of the stimulus have also been studied, although most of these estimates do not meaningfully change the *ex-ante* parameters originally assumed when the stimulus passed.⁷ The one case where the evidence suggests a substantially larger effect than originally assumed is for bonus depreciation. The CEA estimates assumed a multiplier of 0.1 for business tax provisions, similar to CBO’s low estimates. Zwick and Mahon (2017), however, studied the actual data and found large effects of temporarily expanded equipment depreciation on investment, particularly for small and financially constrained firms. This finding is consistent with some of the thinking that went into designing these provisions in the first place, which were intended in part as an interest free loan whose benefit would be related to the cash flow in the initial years but whose cost was the much lower present value to the government. The original bonus depreciation, for example, provided \$50 billion of tax reductions in the first two fiscal years as firms shifted depreciation allowances earlier but then most of this money was recouped in future years, leaving the 10-year cost at only \$7 billion. If only 10 percent of the \$50 billion was spent as additional investment that would lead to a multiplier of nearly 1 evaluated against the entire fiscal cost of the measure.⁸

⁷ The 2008 rebate and Making Work Pay were studied by Parker et al. (2013) who looked at the impact on consumption and Sahm, Shapiro, and Slemrod (2012) who relied on self-reported surveys, with the former finding larger impacts than the later. The impact of the cash for clunkers program is debated with Mian and Sufi (2012) and Hoekstra, Puller and West (2017) finding small to negative effects while Green, Melzer, Parker and Rojas (2018) finding a larger effect—although the resolution of this debate has little effect on the *ex-ante* results reported earlier because cash-for-clunkers was only \$3 billion of the overall \$1.5 trillion stimulus. Other evaluations of specific programs include Berger, Turner, and Zwick (2018) finding large effects of the First-time Homebuyers Tax Credit and Chodorow-Reich, Coglianesse, and Karabarbounis (forthcoming) finding smaller labor market effects of the unemployment insurance extensions.

⁸ The expansion of Net Operating Losses (NOLs) was also based on a similar logic, but Dobridge (2016) finds that most of these additional payments were saved by firms rather than spent—although this does not rule out additional investment in future years.

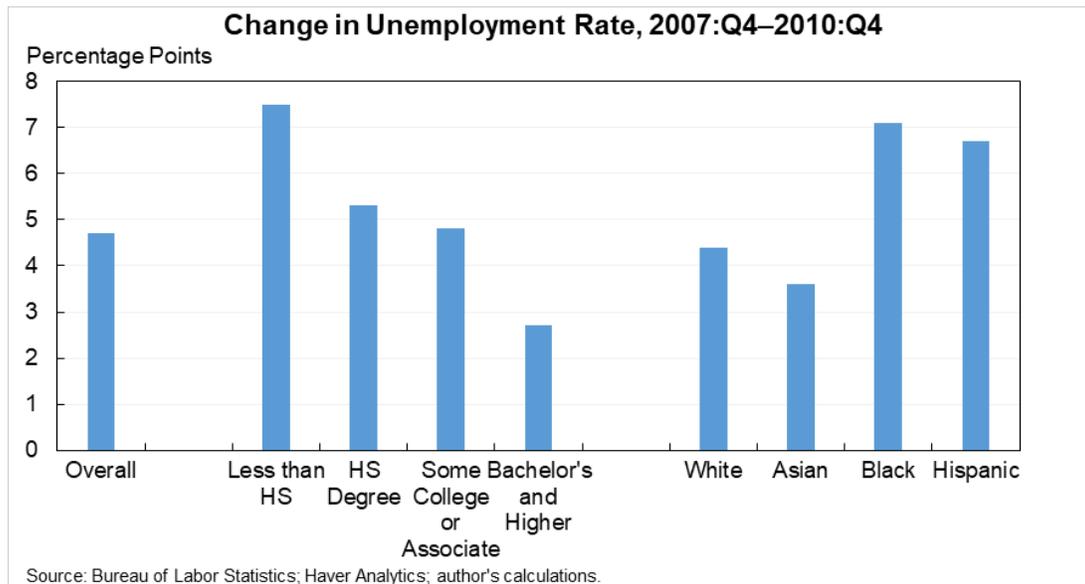
Overall these results are not fully informative about how to design the composition of stimulus. But they do suggest that the multipliers used by CEA, CBO and others may have been too low, especially for some items like business tax incentives and possibly state fiscal relief, and that the actual aggregate impact of the Recovery Act and other stimulus programs may have been larger than previously estimated.

Evaluating Other Goals for Fiscal Stimulus: Protecting the Most Vulnerable

In addition to its overall macroeconomic motivation, the Recovery Act and other fiscal stimulus measures were designed, in the terminology of their creators, to “protect the most vulnerable.” This category included both long-term poor who were viewed as being more vulnerable to a downturn as well as people who temporarily fell on hard times by losing their jobs. In total \$289 billion was spent on direct aid to individuals like the unemployed and those receiving the Supplemental Nutrition Assistance Program (SNAP), but much of the \$836 billion in tax cuts and \$167 billion in state and local fiscal relief also disproportionately benefited the same households.

The labor market did, indeed, disproportionately inflict harm on more vulnerable populations. From the fourth quarter of 2007 through the fourth quarter of 2010 the overall unemployment rate rose 4.7 percentage points but the unemployment rates for those with less education and for African Americans and Hispanics rose much more sharply, as shown in Figure 4.

Figure 4

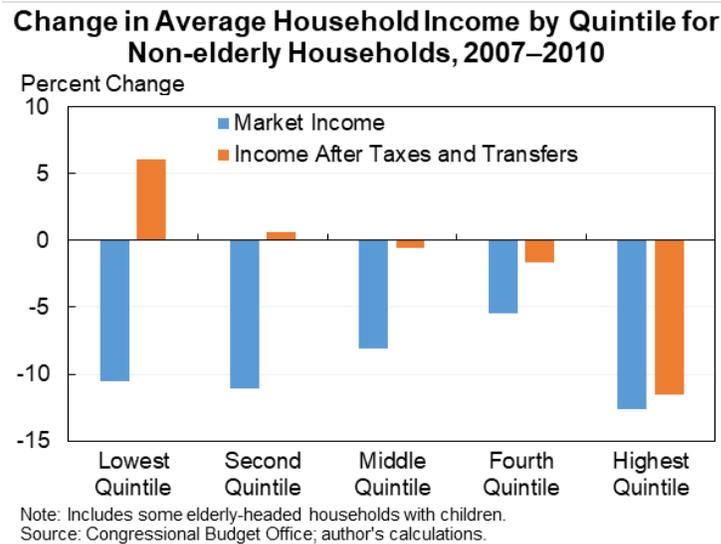


The tax and transfer system, both the automatic measures already in the law and the additions in the Recovery Act and other legislation, did a remarkable job in protecting households from these job losses. Overall the poverty rate would have risen by 4.8 percentage

points from 2007 to 2010 absent these programs, but with them it only rose by at most 0.4 percentage points, and the increase may have been significantly less (Furman 2017).⁹

A more comprehensive picture based of how the Great Recession affected incomes from 2007 to 2010 is shown in Figure 5, which is based on CBO (2018) data for non-elderly households.¹⁰ The largest reductions to market incomes were for the bottom two quintiles (due to the disproportionate job losses) and top quintile (due to the large declines in capital income, although some of this is an artifact of the timing of capital gains). After taking account of taxes and transfers, the bottom quintile for non-elderly households experienced substantial income gains even in the face of a massive recession. The second quintile also enjoyed small gains while taxes and transfers absorbed the bulk of the losses for the third and fourth quintiles. For the highest quintile households, losses were similar both before and after taxes and transfers. In other words, from the perspective of the fiscal system low- and moderate-income households got a bailout, not high-income ones.¹¹

Figure 5



⁹ These estimates were done for Furman (2017) by Wimer et al. at the Columbia Population Research Center. These numbers use the Current Population Survey data on people's self-reporting of what public benefits, like SNAP, that they received. As is widely understood (e.g., Meyer, Mok, and Sullivan 2009), these numbers substantially understate actual take-up of these programs and thus overstate the increase in poverty when these programs are expanded.

¹⁰ Technically this is a combination of CBO's categories "households with children" (which includes a small number of elderly households) and "nonelderly households without children". CBO's overall numbers, including the elderly, tell a very similar story.

¹¹ All of the estimates just show changes in income and do not reflect changes in wealth, for example the loss of homes or stock market wealth. The specific estimate for the top quintile is dependent on the treatment of both the realization of capital gains income and the payment of capital gains taxes but the finding of reductions in both market and after-tax income holds in any case. The other leading source for comprehensive income data—the World Inequality Database based on methods described in Piketty, Saez, and Zucman (2016), has somewhat different findings overall, in part because of their exclusion of the income on capital gains but inclusion of the taxes on these gains.

Evaluating Other Goals for Fiscal Stimulus: Public Investment

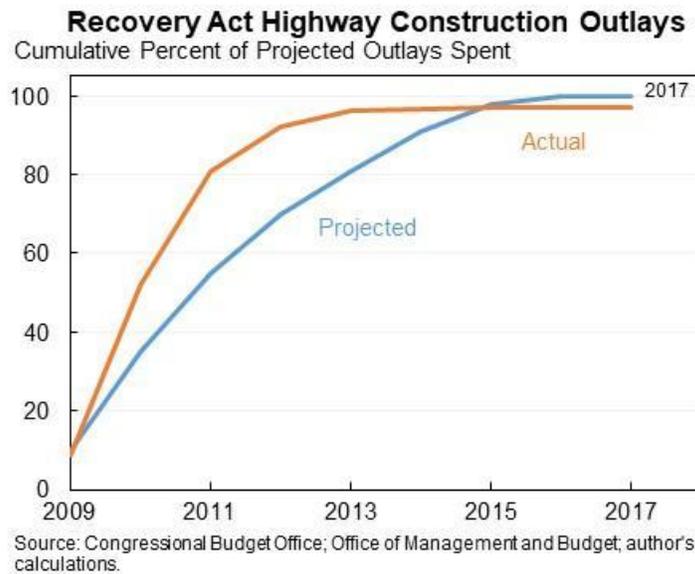
As shown in Table 4, the Recovery Act included about \$300 billion in public investments that were motivated not just by increasing short-run GDP but also by other goals like enhancing long-run growth through more infrastructure or increasing energy efficiency. The prior and subsequent stimulus was almost entirely tax cuts and relief for individuals and states. This paper does not evaluate these goals.

Table 4

Recovery Act Long Term Growth Investment by Category	
	Estimated Cost, 2009–2019 (Billions of Dollars)
Capital	
Construction of Transportation Infrastructure	30.0
Environmental Cleanup and Preservation	28.0
Construction of Buildings	23.9
Public Safety and Defense	8.9
Economic Development	14.6
Memo: Business Tax Incentives	11.7
Labor	
Pell Grants	17.3
Special Education	12.2
Help for Disadvantaged Children	13.0
Other Human Capital	10.3
Technology	
Scientific Research	18.3
Clean Energy	78.5
Health and Health IT	32.0
Broadband	6.9
Other	6.7
Total Public Investment	300.6

Source: Council of Economic Advisers 2014.

One goal of the Recovery Act was to spend investment funding as quickly as possible through so-called shovel ready projects. It was well understood that some measures, like high-speed rail and electronic medical records, would take some time to deliver their benefits but the highway program was designed to spend out relatively quickly. In fact, the actual spendout for the highway program was even faster than initially predicted—with 80 percent of the funding actually spent by 2011, well above the projection of 55 percent by that year (Figure 6).

Figure 6

IV. Alternatives That Were Not Taken

In putting together the Recovery Act and subsequent responses a number of different alternatives were contemplated. Some were rejected by policymakers in the Administration or failed to pass Congress. The following describes three of those alternatives, the thinking that went into them, and potential considerations for future fiscal stimulus.

New Jobs Tax Credit

During the campaign, Obama proposed a \$3,000 tax credit for employers for each net new additional job added in 2009 and 2010 (Obama-Biden campaign 2008). The transition team further refined the idea and Obama signed off on proposing it as part of the Recovery Act. Congress rejected the idea because lawmakers were skeptical of the efficacy of a measure designed to *add* jobs at a time when firms were rapidly *shedding* jobs.

Obama proposed a retooled version in January 2010 that would have provided a tax credit of \$5,000 per net new job and a bonus for firms that raised total wages, with both capped at \$500,000 in credits per firm (White House 2010). The credits would have been paid out quarterly and applied against payroll taxes so that even firms with tax losses would have been eligible. This proposal evolved into the Hiring Incentives to Restore Employment (HIRE) Act passed by Congress in March 2010, but it was ultimately very different because it was a tax credit for hiring the long-term unemployed rather than an incremental tax credit for adding net new jobs.

The theory behind the new jobs tax credit was that it would have the same Keynesian boost as any tax cut while providing additional bang-for-the-buck in terms of higher employment, effectively raising the number of jobs per unit of GDP. This theoretical intuition was bolstered by academic evaluations of the 1977-78 New Jobs Tax Credit, which found that it was effective at promoting hiring (Perloff and Wachter 1979, Bishop 1981). Later in 2009 CEA and Treasury did extensive modelling and found that a new jobs tax credit would cost about \$20,000 per net new job added. About 90 percent of the subsidy would go to jobs that would have been created anyway but the other 10 percent would have provided a net increase in new jobs. Even with this unbalanced ratio, the cost per job created would have been considerably less than CEA's (2014) implied employment estimates of around \$125,000 per job-year for the Recovery Act as a whole.

State Sales Tax Holiday

The transition team considered a state sales tax holiday as a way to shift consumption forward by encouraging households to take advantage of temporarily lower prices. Specifically, the transition team contemplated proposing something like a \$250 billion fund that would be available to states carrying out certain sales tax reductions. States without sales taxes would have been allowed to use the money for income tax cuts. The idea was ultimately not proposed to Congress.

The principal argument for the proposal was to take advantage of intertemporal substitution, effectively setting a very negative real interest rate for consumer purchases that would make it more attractive to make purchases in the short run before sales taxes went up again. This would have acted as an additional stimulus on top of the normal Keynesian response to the additional demand associated with tax cuts. The federal role would have been simply to approve state plans and disburse money according to a specified formula. States' prior experience with sales tax holidays had demonstrated that such a plan would have been relatively straightforward to administer. Concerns with the proposal included worries that it could inhibit spending in the run-up to the tax or hurt future demand by pulling spending forward. In retrospect, given how protracted the downturn was, it was probably economically wise that this proposal was left on the cutting room floor. Nonetheless, it has a number of benefits that merit consideration by policymakers in future short, sharp downturns.

Expiring Debit Cards

A final idea that received substantial consideration during the transition but was never proposed was to deliver rebates on a debit card. The debit card could have been set with a use-it-or-lose-it feature so that, for example, anyone who did not spend all of the money by the end of 2009 would have lost the remaining balance. The goal of the proposal was to make the refund more salient than just getting a check or having fewer taxes withheld, while also helping to ensure that people spent the money more quickly, raising the short-term multiplier relative to traditional tax credits. Extensive work was done with Treasury staff who believed that it would have been administratively possible to provide such cards for all Americans at essentially no transaction cost to the federal government because card issuers would bid for a contract that would earn them interchange fees and float interest. Ultimately, however, it was considered too

administratively risky to design and launch a massive consumer-facing program in a short period of time. Further effort and contingency planning on this idea may be warranted because of its potential upside relative to conventional tax cuts.

V. Lessons for the Future

The experience with the 2008-12 fiscal stimulus and economic research that has been conducted in the years since then provides six lessons for future fiscal stimulus.

LESSON 1: DISCRETIONARY FISCAL STIMULUS CAN BE PARTICULARLY EFFECTIVE, ESPECIALLY AT THE ZERO LOWER BOUND. Prior to 2008 economists were generally skeptical of discretionary fiscal stimulus, concerned about potentially large lags in recognizing the problem, passing a legislative response, implementing the legislation, and having it take effect. In general, monetary policy was considered superior on all of these counts and regarded as the first and potentially only line of defense in downturns.

The 2008-12 experience suggests that these fears were overblown. Policymakers proposed a fiscal response in January 2008, essentially just as the recession began according to subsequent analysis by the National Bureau of Economic Research (NBER) business cycle dating committee. Initial legislation was passed a month later and as the situation became more severe at the end of 2008 the Recovery Act was passed within a month of Obama's inauguration. Many of the provisions were implemented quickly, with electronic refunds first sent out in April 2008, two months after the first stimulus was passed. Similarly, the reductions in withholding included in the Recovery Act were implemented within months. Moreover, the evidence suggests that fiscal measures act on the economy more quickly than with monetary policy.

Looking ahead, fiscal policy may become an even more important tool for aggregate demand management. Research following the Great Recession has helped to build a “new view” of fiscal policy—which in many ways is actually a rediscovery of the old Keynesian liquidity trap views (see Furman 2016 for a summary). In particular, the new view holds that if the equilibrium interest rate has fallen, then monetary policymakers will more often hit the effective lower bound for interest rates—limiting conventional monetary policy and increasing the importance of fiscal policy.

Moreover, fiscal policy may be particularly effective when interest rates are at the lower bound. Traditional concerns about crowding out through higher interest rates may be superfluous when interest rates are stuck at the effective lower bound: even with additional demand the desired interest rate will not rise. Fiscal policy could also lead to “crowding in,” either through an accelerator mechanism that increases growth rates and thus investment growth or by raising expected inflation and thus lowering real interest rates (Hall 2009; Christiano, Eichenbaum, and Rebelo 2011; Woodford 2011).

Concerns about fiscal space may be overstated in a highly depressed economy with interest rates at the effective lower bound because fiscal expansions may raise GDP by more than they raise debt—thus reducing the debt-to-GDP ratio. This result has been

found in a variety of settings, including the Fed’s main macroeconomic model FRB-US (Reifschneider and Summers as reported in DeLong, Summers, and Ball 2014), the Organisation of Economic Co-operation and Development’s (2016) NiGEM and FM models, the International Monetary Fund’s modelling (Gaspar, Obstfeld and Sahay 2016), simulations by DeLong and Summers (2012) and regression-based estimates of past fiscal stimulus by Auerbach and Gorodnichenko (2017). On the other hand, there is still some reason for caution: Romer and Romer (2017) found that countries that go into financial crises with higher debt have smaller fiscal responses and worse macroeconomic outcomes. (It is not clear if their result reflects high-debt countries having little economic space for stimulus or making political mistakes about too little stimulus.)

LESSON 2: THE POLITICAL SYSTEM MAY TIRE OF FISCAL STIMULUS PREMATURELY, SO TRIGGERS AND OTHER AUTOMATIC MECHANISMS MAY BE WARRANTED—INCLUDING STRONGER AUTOMATIC STABILIZERS. The transition team thought that if the initial stimulus was too small or the economy worsened further it would not be very difficult to persuade Congress to provide more fiscal stimulus. This view did not seem unreasonable at the time: in the face of a much milder recession in 2001 Congress passed bills it described as fiscal stimulus in 2001, 2002, 2003, and again in 2004, nearly three full years after the end of the recession. In a time of widely appreciated national economic emergency it should have been even easier to get more stimulus, especially given that lawmakers would normally have wanted to be seen doing something closer to the 2010 election.

This view proved less wrong than popularly understood when you look at the more than 13 subsequent bills that included additional stimulus. But this stimulus still fell well short of the Administration’s subsequent requests and, in general, stimulus was removed well before it was economically sensible to do so—creating a fiscal drag starting in 2011 as the total magnitude of stimulus started to phase down.

The difficulty stems from three challenges. The first is that, paradoxically, the worse-than-expected macroeconomic outcomes *reduced* the desire to take more macroeconomic measures. Even though the bulk of the unexpected deterioration of the economy happened by early-to-mid 2009, before the bulk of the Recovery Act went into effect, this was viewed by some as evidence that the law had not worked, making future stimulus counterproductive. The second is concerns over the deficit—which nearly reached 10 percent of GDP in 2009, putting the debt on a course to eventually more than double as a share of GDP. The final reason was partisan politics, and in particular Congressional Republicans not wanting to cooperate with the Administration in passing more fiscal measures.

One way to address the political failures in the future would be to make the initial stimulus package contingent on economic outcomes. For example, the Recovery Act could have included an annual tax credit that would be in effect every year the unemployment rate was above 7 percent. Such a trigger would have delivered more consistent, predictable, and potentially larger fiscal support in subsequent years.¹²

¹² An important caveat depending on the political context: if the Recovery Act had included such contingent measures while keeping within the \$800 billion budgetary limit set by Congress then it would

Even better would be to expand the automatic stabilizers permanently. In general, the United States has smaller automatic stabilizers than most other advanced economies, largely because their magnitude is highly correlated with the size of government—and the United States has a generally smaller government.

Such automatic stabilizers could be measures that automatically expand (like unemployment insurance and SNAP). In fact, the health insurance tax credits and Medicaid expansion in the Affordable Care Act (ACA) will increase automatic stabilizers in future years. Alternatively, automatic stabilizers could be contingent on national or state economic data, perhaps full federal funding for lengthening unemployment insurance benefits or higher Medicaid matching rates in states with high or rising unemployment rates.

LESSON 3: IMPORTANCE OF MAKING SURE THAT STATES AND LOCALITIES DO NOT UNDERCUT THE FEDERAL FISCAL STIMULUS. As the federal government was expanding fiscal support for the economy in the wake of the Great Recession, states and localities were cutting spending and thus undoing a meaningful portion of this stimulus. This was unusual. If State and local spending had followed the average pro-cyclical pattern of six of the previous seven recoveries and everything else was the same, the GDP growth rate would have been 0.6 percentage point per year higher in the five years following the trough.¹³

The reductions in state and local purchases may have been specific to this recession because of the substantial and lagged effects of reduced housing prices on property tax revenue. Nevertheless, the causes of the large departure from previous experience are not fully understood and the 2001 experience was also worse than the historical experience. That raises the concern that, in the future, state and local fiscal policy could once again run against federal efforts or be insufficiently supportive of them. Moreover, even optimal subnational policy will be insufficiently fiscally supportive in a recession because states and localities do not take into account the substantial benefits of their stimulus measures on other states.

This highlights the importance of steps to support state and local spending in future recessions and their aftermath. One approach would be to legislate discretionary fiscal relief, either general fiscal relief or labelled for a specific purpose—with the understanding that it would be fungible. Another and potentially better approach would be to make state fiscal relief an automatic stabilizer that is triggered when the national and/or state unemployment rates rose.

LESSON 4: THE IMPORTANCE OF MAINTAINING THE CONFIDENCE OF TAXPAYERS WHEN UNDERTAKING A LARGE, RELATIVELY RAPID SPENDOUT OF FUNDS. The Recovery Act included unprecedented transparency and accountability measures, including an independent Recovery Accountability and Transparency Board, regular and timely reporting of all contracts and other information,

have actually been *smaller* upfront. The reason is that CBO and JCT score legislation probabilistically and even a chance that such a trigger would still be in effect in, say, 2015 would count towards the cost requiring other provisions to be smaller to fit in the \$800 billion limit.

¹³ Excludes the 1980 recession because of overlap with the 1981–1982 recession.

and an easily accessible website to share all of this public information. As a result, only a miniscule percentage of the contracts were considered fraudulent and even Republican Congressman Darrel Issa, a frequent critic of the Administration, acknowledged that the new recipient reporting standards were “the key to the success of the Recovery Accountability and Transparency Board in catching and preventing fraud, waste, and abuse in stimulus spending.” (House Oversight Committee 2011).

LESSON 5: GROWING EVIDENCE THAT TAX CUTS MAY BE MORE EFFECTIVE THAN PREVIOUSLY APPRECIATED, POTENTIALLY IF TARGETED AT LOWER-INCOME HOUSEHOLD AND ALSO AT ACCELERATED DEPRECIATION. Beyond the specific evidence that emerged from studying the Recovery Act itself, economic research focused on a longer period of time is finding growing evidence that tax cuts, in particular, may have a higher multiplier than previously appreciated. Romer and Romer (2010) use a narrative method to identify exogenous tax shocks and find that the impact of a tax cut worth 1 percent of GDP grows over time to about 3 percent of GDP after 10 quarters, an effect that may reflect expanded demand in a traditional Keynesian manner or increased supply through the incentives to work. Barro and Redlick (2011), Mertens and Ravn (2013) and Mertens and Montiel-Olea (2017) find impulse responses from tax cuts that are similarly large. Zidar (2017) finds large responses as well but also finds substantial heterogeneity, with a much larger multiplier for tax cuts for low-income households than high-income households.

Most of these papers are focused on tax multipliers but they generally find larger effects than the papers focused just on spending multipliers (e.g., Ramey 2011 and Ramey and Zubairy 2018). In some cases, the papers provide estimates for both tax and spending multipliers on a consistent basis (e.g., Carlino and Inman 2016, Andrés, Boscá, and Ferri 2016 and Ramey 2018) and also find larger tax multipliers than spending multipliers—in some cases by substantial magnitudes.

Zwick and Mahon (2017), discussed above, also finds very large responses to accelerated depreciation, especially compared to the cost to the government. These responses may be specific to a financial crisis, however, because the cash flow improvement was especially potent and the present value cost to the government was especially low given modest federal borrowing rates.

All of this said, the general evidence on generic tax cuts—like any macroeconomic evidence—is not definitive and in some cases is puzzlingly larger than one would expect based on the economic theory of either Keynesian multipliers or possible supply-side responses. Moreover, it is possible that both spending multipliers and tax multipliers have been underestimated in the past.

Overall, however, the evidence suggests some upward revision in tax multipliers relative to what was believed in 2009 and 2010, especially for tax cuts for lower-income households and for businesses.

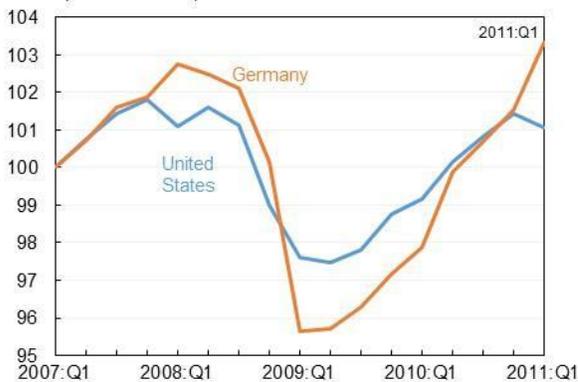
LESSON 6: SUGGESTIVE SUPPORT FOR THE NOTION THAT IT WOULD BE BENEFICIAL TO INCREASE THE NUMBER OF JOBS PER UNIT OF GDP. The Great Recession had a particularly severe impact on the labor market even conditional on the large increase in the unemployment rate, including sustained record high long-

term unemployment rates, a spike in people working involuntarily part time, and a large reduction in the labor force participation rate. Similar labor market dysfunctions followed the much shallower 2001 recession as well.

In many ways the labor market experience was much worse in the United States than in other advanced economies. Germany experienced a similar decline in GDP without the large increase in unemployment that the United States had, as shown in Figures 7a and 7b. Instead, hours worked were reduced in Germany, spreading the employment decline across a much larger number of people.

Figure 7a**Real GDP Growth in Germany and the United States**

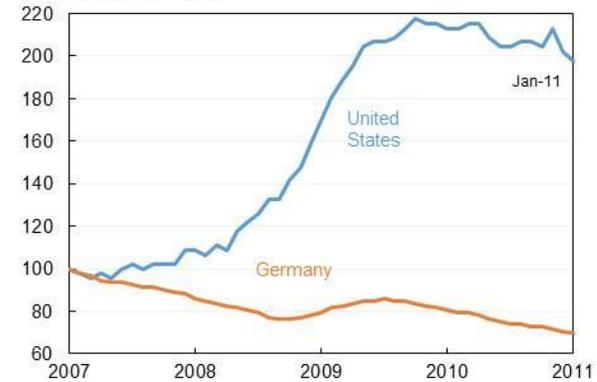
Index (2007:Q1 = 100)



Source: U.S. Bureau of Economic Analysis; Deutsche Bundesbank; author's calculations.

Figure 7b**Unemployment Rate in Germany and the United States**

Index (Jan-2007 = 100)



Source: Organisation for Economic Co-operation and Development; author's calculations.

While Germany followed some different policies and has very different institutional arrangements than the United States, their experience highlights the potential for increasing the number of jobs conditional on a given amount of GDP—not just focusing on maximizing GDP. One way to do this is through a new jobs credit, described above, which CEA estimated would add one job year for each roughly \$20,000 spent—giving it a considerably higher employment impact than generic stimulus. Another possibility would be to encourage more states to adopt the type of short-term compensation found in Germany that provides unemployment insurance not just for people fired from jobs but also for people who have their hours involuntarily reduced.

VI. Conclusion

The stimulus that started in 2008, was greatly expanded in 2009, and somewhat expanded and extended further in the several years thereafter, was an integral part of the overall macroeconomic response to the financial crisis. Absent these measures the recession would have been much deeper and more prolonged—potentially even more so than conventional models indicate because of the possibilities of self-fulfilling vicious cycles and persistent losses in output. This stimulus acted in a synergistic manner with monetary and financial policy, helping the U.S. economy fare better than many historical precedents and outperforming other countries in the wake of the Great Recession (CEA 2017).

Nonetheless, there were significant shortcomings in the fiscal response, largely the result of the political difficulty of convincing Congress to pass sufficiently large stimulus bills starting with the Recovery Act in 2009 and the failure to win support for additional stimulus that was both large enough and weighted more towards public investment.

Much of the stimulus was designed with reasonably good aggregate macroeconomic models, models that have been further corroborated by the experience of the 2008-12 stimulus bills. Knowledge of the different impacts of different types of measures, however, was much less certain than the point estimates published by different macroeconomic forecasters might lead one to believe. We know only a little more today and it is likely that policymakers will still be flying blinder than should be the case when designing the specific composition of the next fiscal stimulus. But, the evidence for the overall importance of fiscal stimulus is stronger than ever.

Appendix

Some of the larger or more notable items in each of these categories along with their cost from 2008-2012 were:

- **Individual Tax Cuts**
 - Making Work Pay (\$112 billion). A tax credit that was generally \$400 for individuals and \$800 for married couples, phased out for higher-income households. It was originally passed as part of the Recovery Act and lasted for 2009 and 2010.
 - Payroll tax cut (\$207 billion). A 2 percentage point reduction in Social Security payroll taxes, with the cost reimbursed to the Social Security Trust Fund. Originally passed for 2011 and extended through the end of 2012.
 - Tax credits for low- and moderate-income households with children (\$41 billion). The Recovery Act expanded the Earned Income Tax Credit for married couples and households with three or more children and also increased the refundable portion of the child tax credit. These provisions were subsequently made permanent.

- **Business Tax Incentives**
 - Bonus depreciation and expensing (\$180 billion). Originally allowed businesses to deduct 50 percent of the cost of their equipment investments up front and was expanded to 100 percent expensing of equipment investment from September 9, 2010 through the end of 2011.
 - Discharge of business indebtedness (\$43 billion). Allows certain business repurchasing specific types of debt to pay taxes on the cancellation of that debt income over five years beginning in 2014.
 - Tax credits related to clean energy and energy efficiency (\$12 billion). The Recovery Act included a number of tax credits for clean energy including extending and expanding the energy tax credit.

- **Aid to Directly Impacted Individuals**
 - Unemployment insurance expansions (\$240 billion). Full federal financing for benefits for up to 99 weeks of unemployment in high unemployment States, initially also included temporarily increased benefit amounts. In addition, the Recovery Act and subsequent legislation included unemployment insurance reforms.
 - Increased Supplemental Nutrition Assistance Program (SNAP) (\$38 billion). A temporary bump up to SNAP benefits that started in the Recovery Act, was partially rescinded in two subsequent pieces of legislation, and was phased out by November 2013.

- Temporary Assistance to Needy Families (TANF) Emergency Fund (\$5 billion). A temporary increase to TANF that could be used by States for purposes including public employment and hiring subsidies.

- **State Fiscal Relief**
 - Increased Federal Medical Assistance Percentage (FMAP) (\$100 billion). Increased Federal matching for State Medicaid programs originally passed as part of the Recovery Act and extended in the summer of 2010.
 - State educational assistance (\$63 billion). Federal subsidies for States and localities to fund efforts to prevent teacher layoffs. Included the “Race to the Top” program, a competitive grant for States undertaking major reforms.

- **Public Investment Outlays**
 - Increased investments in the highway and rail program (\$28 billion). Largely formula funding for the traditional surface transportation programs.
 - Transportation Investment Generating Economic Recovery (TIGER) Grants (\$3 billion). Competitive grants available to States and localities for a variety of transportation purposes.
 - High-speed Rail (\$2 billion). Grants to support State high-speed and inter-city rail projects passed as part of the Recovery Act.
 - Health information technology (\$15 billion). Including, incentive payments to medical providers to adopt and meaningfully use electronic medical records, with penalties for those that took the subsidies without meaningfully using them.

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