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Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output in 2014

In February 2009, in response to significant weakness in the economy, lawmakers enacted the American Recovery and Reinvestment Act (ARRA). The legislation's numerous spending and revenue provisions can be grouped into several categories according to their focus:

- Providing funds to states and localities—for example, by raising federal matching rates under Medicaid, providing aid for education, and increasing financial support for some transportation projects;
- Supporting people in need—such as by extending and expanding unemployment benefits and increasing benefits under the Supplemental Nutrition Assistance Program (formerly the Food Stamp program);
- Purchasing goods and services—for instance, by funding construction and other investment activities that could take several years to complete; and
- Providing temporary tax relief for individuals and businesses—such as by raising exemption amounts for the alternative minimum tax, adding a new Making Work Pay tax credit, and creating enhanced deductions for depreciation of business equipment.

When ARRA was being considered, the Congressional Budget Office and the staff of the Joint Committee on Taxation estimated that it would increase budget deficits by $787 billion between fiscal years 2009 and 2019. CBO now estimates that the total impact over the 2009–2019 period will amount to nearly $840 billion (Table 1). By CBO's estimate, close to half of that impact occurred in fiscal year 2010, and more than 95 percent of ARRA's budgetary impact was realized by the end of December 2014.

Various recipients of ARRA funds (most recipients of grants and loans, contractors, and subcontractors) were required to report the number of jobs funded through ARRA after the end of each calendar quarter through December 2013.[1] The law also requires CBO to comment on those reported numbers.[2]

During calendar year 2013 recipients reported that ARRA funded an average of about 76,000 full-time-equivalent (FTE) jobs.[3] Those reports, however, do not provide a comprehensive estimate of the law's impact on

1. The last quarterly reports were submitted in January 2014. See the Recovery Accountability and Transparency Board, "Recipient Reporting" (accessed February 17, 2015), http://go.usa.gov/3qSYC.

2. Sections 1512(c) and 1512(e) of the American Recovery and Reinvestment Act of 2009, Public Law 111-5, 123 Stat. 115, 287–288. This report is the 16th in CBO's series of reports. Public Law 112-204, enacted on December 4, 2012, reduced the required frequency of CBO's reporting from quarterly to annually over the 2013–2015 period and eliminated the reporting requirement altogether after 2015. For the previous report, see Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output in 2013* (February 2014), www.cbo.gov/publication/45122.

3. Data compiled from recipients' reports (on jobs funded and other information) are shown at www.recovery.gov/arra/. Recipients were asked to calculate FTEs by taking the total number of hours worked in a quarter that were funded by ARRA and dividing the total by the number of hours that a full-time employee would have worked in that quarter. The last required quarterly reports covered the fourth quarter of 2013. See www.recovery.gov/arra/FAQ/Pages/RecipientReporting.aspx.

Table 1.

Estimated Budgetary Effects of the American Recovery and Reinvestment Act of 2009

Billions of Dollars, by Fiscal Year

	2009	2010	2011	2012	2013	2014	2015	2016 - 2019	2009 - 2019
Outlays									
Department of Health and Human Services Services									
Medicaid	32	40	12	4	3	2	2	4	99
Other	2	12	11	7	8	7	2	3	53
Refundable Tax Credits	3	45	38	6	5	0	0	0	97
Unemployment Compensation[a]	28	33	3	0	0	0	0	0	64
SNAP	5	11	12	8	6	6	0	0	48
Department of Education									
State Stabilization Fund	12	23	12	2	1	1	1	0	54
Other (Including Pell grants)	9	19	11	3	1	1	0	0	44
Department of Transportation	4	17	11	5	3	1	2	3	46
Department of Energy	1	8	11	8	3	1	1	1	34
Build America Bonds	0	1	4	4	4	4	4	16	36
Social Security Administration	13	0	0	0	0	0	0	0	14
Other	7	25	21	12	6	2	1	0	74
Total Outlays	**114**	**235**	**147**	**59**	**41**	**26**	**14**	**28**	**663**
Revenues	-65	-167	2	13	4	7	9	24	-173
Total Effect on the Deficit[b]	**-179**	**-401**	**-145**	**-47**	**-37**	**-19**	**-5**	**-4**	**-836**

Sources: Congressional Budget Office and the Department of the Treasury.

Notes: Outlay totals shown here include only spending directly resulting from the American Recovery and Reinvestment Act (ARRA); the effect on spending from regular appropriations or other authorizations (which, in any given year, might have been supplanted by funding from ARRA) is not included in this table. CBO estimates that the effect on the deficit in 2009 and 2010 was somewhat less than the amounts shown here because additional spending from ARRA was partly offset by reduced spending from regular appropriations. (The opposite could be true for 2011 to 2019.)

CBO has prepared estimates of ARRA's effects only through 2019, consistent with the original cost estimate that was prepared when the legislation was considered in 2009. However, there will probably be some small net effects from additional spending and revenues after 2019.

SNAP = Supplemental Nutrition Assistance Program.

a. The outlays shown for unemployment compensation include about $3 billion in intragovernmental transfers, most of which occurred in 2009. The Administration recorded those transfers as outlays.

b. Negative numbers indicate an increase in the deficit.

U.S. employment, which could have been higher or lower than the number of FTE jobs reported, for several reasons (in addition to any issues concerning the quality of the reports' data).[4] First, some of the jobs included in the reports might have existed even without the stimulus package, with employees working on the same activities or other activities. Second, the reports covered employers that received ARRA funding directly and those employers' immediate subcontractors (the so-called primary and secondary recipients of ARRA funding) but not lower-level subcontractors. Third, the reports did not attempt to measure the number of jobs that were created or retained indirectly as a result of recipients' increased income, and the increased income of their employees, which could have boosted demand for other products and services as they spent their paychecks. Fourth, the

4. For a discussion of data quality, see Government Accountability Office, *Recovery Act: Opportunities to Improve Management and Strengthen Accountability Over States' and Localities' Uses of Funds*, GAO-10-999 (September 2010), www.gao.gov/new.items/d10999.pdf (4.83 MB).

recipients' reports covered only certain ARRA appropriations, which encompassed about one-fifth of the total either spent by the government or conveyed through tax reductions in ARRA; the reports did not measure the effects of other provisions of the stimulus package, such as tax cuts and transfer payments (including unemployment insurance payments) to individual people.

Estimating the law's overall effects on employment requires a more comprehensive analysis than can be achieved by using the recipients' reports. Therefore, looking at recorded spending to date along with estimates of the other effects of ARRA on spending and revenues, CBO has estimated the law's impact on employment and economic output using evidence about the effects of previous similar policies and drawing on various mathematical models that represent the workings of the economy.[5] On that basis, and as summarized in Table 2, CBO estimates that ARRA's policies had the following effects in calendar year 2014 compared with what would have occurred otherwise:

- They raised real (inflation-adjusted) gross domestic product (GDP) by between a small fraction of a percent and 0.2 percent,
- They lowered the unemployment rate by an amount between a small fraction of a percentage point and 0.2 percentage points,
- They increased the number of people employed by between 0.1 million and 0.3 million, and
- They increased the number of full-time-equivalent jobs by between a slight amount and 0.2 million.

The effects of ARRA on output peaked in the first half of 2010 and have since diminished, CBO estimates. The effects of ARRA on employment are estimated to have lagged slightly behind the effects on output; CBO estimates that the employment effects began to wane at the end of 2010 and continued to do so through 2014.

5. For a more detailed discussion of CBO's approach to analyzing short-term fiscal policy, see Felix Reichling and Charles Whalen, *Assessing the Short-Term Effects on Output of Changes in Federal Fiscal Policies*, Working Paper 2012-08 (Congressional Budget Office, May 2012), www.cbo.gov/publication/43278.

Although CBO has examined data on output and employment during the period since ARRA's enactment, those data are not as helpful in determining ARRA's economic effects as might be supposed because isolating the effects would require knowing what path the economy would have taken in the absence of the law. Because that path cannot be observed, the new data add only limited information about ARRA's impact.

Measuring ARRA's Impact Using Recipients' Reports

ARRA required primary and secondary recipients of more than $25,000 from appropriations made under the law to report a variety of information each calendar quarter through the fourth quarter of 2013. That group included most grant and loan recipients, contractors, and subcontractors, but it excluded individual people. The information submitted included the amount of funding received and spent; the name, description, and completion status of the project or activity funded; the number of jobs funded; and, for investments in infrastructure, the purpose and cost of the investment. Recipients who filed reports reported the number of jobs on the basis of the number of employee hours paid for with ARRA funds.[6]

According to those reports, about 76,000 full-time-equivalent jobs were funded by ARRA on average in 2013.[7] However, the reported number of jobs funded is not a comprehensive measure of ARRA's effect on overall employment or even of those provisions of ARRA for which recipients' reports were required. The actual impact could, in principle, have been significantly larger or smaller than the number of jobs reported.

6. Specifically, recipients were instructed to calculate the number of FTE jobs funded through ARRA by counting the total number of hours worked that were funded by ARRA during the fourth quarter, and dividing by the number of hours in a full-time schedule for a quarter. For details and examples, see Office of Management and Budget, "Recovery FAQs for Federal Contractors on Reporting" (accessed February 19, 2014), http://go.usa.gov/BwZY.

7. For the number of jobs by agency, see the Recovery Accountability and Transparency Board, "Top Agencies, as Reported by Recipients (Jan 1–Mar 31, 2013)," http://go.usa.gov/BwZQ; "Top Agencies, as Reported by Recipients (Apr 1–June 30, 2013)," http://go.usa.gov/BwZw; "Top Agencies, as Reported by Recipients (Jul 1–Sep 30, 2013)," http://go.usa.gov/BwBj; and "Top Agencies, as Reported by Recipients (Oct 1–Dec 31, 2013)," http://go.usa.gov/BwBV (all accessed February 19, 2014).

Table 2.

Estimated Macroeconomic Impact of the American Recovery and Reinvestment Act, 2009 to 2014

	Change Attributable to ARRA							
	Real Gross Domestic Product (Percent)		Unemployment Rate (Percentage points)		Employment Years (Millions, annualized)		Full-Time-Equivalent Employment Years (Millions, annualized)[a]	
	Low Estimate	High Estimate	Low Estimate	High Estimate	Low Estimate	High Estimate	Low Estimate	High Estimate
	Calendar Year Quarters							
2009								
Q1	*	0.1	**	**	*	*	*	0.1
Q2	0.4	1.3	-0.1	-0.3	0.1	0.5	0.2	0.7
Q3	0.6	2.4	-0.2	-0.6	0.3	1.1	0.4	1.7
Q4	0.7	3.3	-0.2	-1.0	0.5	1.9	0.7	2.7
2010								
Q1	0.9	4.3	-0.3	-1.5	0.6	2.7	0.9	3.9
Q2	0.8	4.6	-0.4	-1.8	0.7	3.4	1.0	4.8
Q3	0.7	4.1	-0.4	-2.0	0.7	3.6	1.0	5.1
Q4	0.6	3.5	-0.3	-1.9	0.6	3.5	0.9	4.9
2011								
Q1	0.6	3.2	-0.3	-1.8	0.6	3.3	0.8	4.6
Q2	0.4	2.5	-0.3	-1.6	0.5	2.9	0.7	4.0
Q3	0.3	2.0	-0.2	-1.3	0.4	2.4	0.5	3.3
Q4	0.2	1.5	-0.2	-1.1	0.3	2.0	0.4	2.6
2012								
Q1	0.1	1.0	-0.1	-0.8	0.2	1.5	0.3	1.9
Q2	0.1	0.8	-0.1	-0.6	0.2	1.2	0.2	1.4
Q3	0.1	0.7	-0.1	-0.5	0.2	0.9	0.2	1.0
Q4	0.1	0.6	-0.1	-0.4	0.1	0.8	0.1	0.8
2013								
Q1	0.1	0.5	-0.1	-0.3	0.1	0.6	0.1	0.6
Q2	0.1	0.4	**	-0.3	0.1	0.5	0.1	0.5
Q3	0.1	0.4	**	-0.3	0.1	0.5	0.1	0.4
Q4	*	0.3	**	-0.2	0.1	0.4	*	0.3
2014								
Q1	*	0.3	**	-0.2	0.1	0.4	*	0.3
Q2	*	0.2	**	-0.2	0.1	0.3	*	0.2
Q3	*	0.2	**	-0.1	*	0.3	*	0.1
Q4	*	0.2	**	-0.1	*	0.2	*	0.1
	Calendar Year Average							
2009	0.4	1.8	-0.1	-0.5	0.2	0.9	0.3	1.3
2010	0.7	4.1	-0.4	-1.8	0.7	3.3	0.9	4.7
2011	0.4	2.3	-0.2	-1.4	0.5	2.6	0.6	3.6
2012	0.1	0.8	-0.1	-0.6	0.2	1.1	0.2	1.3
2013	0.1	0.4	**	-0.3	0.1	0.5	0.1	0.5
2014	*	0.2	**	-0.2	0.1	0.3	*	0.2

Source: Congressional Budget Office.

Note: * = between zero and 0.05; ** = between -0.05 and zero.

a. A year of full-time-equivalent employment years is 40 hours of employment per week for one year.

If, for example, recipients' reports included employment that would have occurred without ARRA, the impact on employment suggested by the reports could be too great. Some people whose employment was attributed to ARRA might have worked on other activities in the absence of the law—for example, a business might have bid on other projects if its resources had not been committed to projects funded by ARRA. In the case of government employees, state or local taxes might have been raised in the absence of ARRA funding (or transfer payments might have been reduced) to pay for some of the jobs that were counted as funded by ARRA.

Conversely, the reported figure could be too low because the reporting requirement was limited to primary and secondary recipients of funds and thus excluded lower-level recipients, such as subcontractors hired by a main subcontractor. Thus, if expenditures under ARRA led to increases in employment among lower-level subcontractors and vendors, those effects were missed by the reports.

Recipients' reports also did not include indirect effects that could have increased or decreased the impact on employment. Among those effects are potential declines in employment in other businesses or economic sectors as demand shifts toward the recipients of ARRA funding—a phenomenon often called the "crowding out" effect of government policies. Conversely, spending under ARRA could have led to higher employment at companies that are not directly connected to that spending—for example, because of additional purchases made by people who would have been unemployed were it not for ARRA funds. CBO estimates that, under the economic conditions since 2009, the indirect effects, on net, would have tended to reinforce the direct effects for most of the range of their estimated magnitude.

Finally, the recipients' reports reflected only about one-fifth of the total amount of spending increases or tax reductions that are attributable to ARRA's provisions. The reports covered direct government purchases of goods and services, grants and loans to private entities, and some grants to states and localities, but they did not cover tax cuts or increases in transfer payments to individuals. The tax reductions and spending that were not covered by the recipients' reports probably had substantial effects on purchases of goods and services and, therefore, on employment.

Measuring ARRA's Impact Using Economic Models and Historical Data

CBO used various economic models and historical data to guide its estimate of the way in which output and employment were affected by increases in outlays and reductions in revenues under ARRA. CBO's assessment is that different elements of ARRA (such as particular types of tax cuts, transfer payments, and government purchases) have had different effects on economic output per dollar of higher spending or lower tax receipts. Multiplying estimates of those per-dollar effects by the dollar amounts of each element of ARRA yields an estimate of the law's total impact on output. To produce estimates of ARRA's total impact on employment, CBO combined that estimate with estimates of how changes in output affect the unemployment rate and participation in the labor force.

CBO's Modeling Approach

CBO used evidence from models and historical relationships to determine estimated "multipliers" for each of several categories of spending and tax provisions in ARRA, as shown in Table 3. Each multiplier represents the estimated direct and indirect effects on the nation's output of a dollar's worth of a given policy. Therefore, a provision's multiplier can be applied to the budgetary cost of that provision to estimate its overall impact on output.

Direct effects consist of immediate (or first-round) effects on economic activity. Government purchases of goods and services directly add to the nation's output, dollar for dollar. For reductions in taxes, increases in transfer payments, and increases in aid to state and local governments, the size of the direct effect depends on the policy's impact on the behavior of recipients. If someone receives a dollar in transfer payments and spends 80 cents (saving the other 20 cents), production increases over time to meet the additional demand generated by that spending, and the direct impact on output is 80 cents. Similarly, if a dollar in aid to a state government leads that government to spend 50 cents more on employees' salaries (but causes no other changes in state spending or revenues, with the other 50 cents used to reduce borrowing or build up rainy-day funds), the direct impact on output is 50 cents.

Table 3.

Estimated Output Multipliers for Major Provisions of the American Recovery and Reinvestment Act of 2009

Type of Activity	Estimated Output Multipliers[a] Low Estimate	High Estimate	Major Provisions of ARRA
Purchases of Goods and Services by the Federal Government	0.5	2.5	Division A, Title II: Other; Title IV: Energy Efficiency and Renewable Energy; Title IV: Innovative Technology Loan Guarantee Program; Title IV: Other Energy Programs; Title V: Federal Buildings Fund; Title VIII: National Institutes of Health; Title VIII: Other Department of Health and Human Services
Transfer Payments to State and Local Governments for Infrastructure	0.4	2.2	Division A, Title VII: Clean Water and Drinking Water State Revolving Funds; Title XI: Other Housing Assistance; Title XII: Highway Construction; Title XII: Other Transportation
Transfer Payments to State and Local Governments for Other Purposes	0.4	1.8	Division A, Title VIII: Education for the Disadvantaged; Title VIII: Special Education; Title IX: State Fiscal Stabilization Division B, Title V: State Fiscal Relief Fund
Transfer Payments to Individuals	0.4	2.1	Division A, Title I: Supplemental Nutrition Assistance Program; Title VIII: Student Financial Assistance; Division B, Title I: Refundable Tax Credits; Title II: Unemployment Compensation: Title III: Health Insurance Assistance[b]
Onetime Payments to Retirees	0.2	1.0	Division B, Title II: Economic Recovery Payments
Two-Year Tax Cuts for Lower- and Middle-Income People	0.3	1.5	Division B, Title I: Making Work Pay Credit; American Opportunity Tax Credit
One-Year Tax Cut for Higher-Income People	0.1	0.6	Increase in Individual AMT Exemption Amount
Extension of First-Time Homebuyer Credit	0.2	0.8	Extension of First-Time Homebuyer Credit

Continued

CBO reviewed evidence on the responses of households, businesses, and governments to various types of tax cuts and transfer payments to estimate the size of those policies' direct effects on output.[8] For example:

- A one-time cash payment is likely to have less impact on a household's purchases than is a longer-lasting change to disposable income because the one-time payment has a smaller effect on total lifetime disposable income.

- Increases in disposable income are likely to boost purchases more for lower-income than for higher-income households. That difference arises, at least in part, because a larger share of people in lower-income households cannot borrow as much money as they would wish in order to spend more than they do currently.

8. On household spending, for example, see Jonathan A. Parker and others, *Consumer Spending and the Economic Stimulus Payments of 2008*, Working Paper 16684 (National Bureau of Economic Research, January 2011), www.nber.org/papers/w16684; Matthew D. Shapiro and Joel Slemrod, "Did the 2008 Tax Rebates Stimulate Spending?" *American Economic Review*, vol. 9, no. 2 (May 2009), pp. 374–379, www.jstor.org/stable/25592427; Sumit Agarwal, Chunlin Liu, and Nicholas S. Souleles, "The Reaction of Consumer Spending and Debt to Tax Rebates: Evidence From Consumer Credit Data," *Journal of Political Economy*, vol. 115, no. 6 (December 2007), pp. 986–1019, www.jstor.org/stable/10.1086/528721; and David S. Johnson, Jonathan A. Parker, and Nicholas S. Souleles, "Household Expenditure and the Income Tax Rebates of 2001," *American Economic Review*, vol. 96, no. 5 (December 2006), pp. 1589–1610, www.jstor.org/stable/30034986.

Table 3. **Continued**

Estimated Output Multipliers for Major Provisions of the American Recovery and Reinvestment Act of 2009

Type of Activity	Estimated Output Multipliers[a] Low Estimate	High Estimate	Major Provisions of ARRA
Corporate Tax Provisions Primarily Affecting Cash Flow	0	0.4	Deferral and Ratable Inclusion of Income Arising From Business Indebtedness Discharged by the Reacquisition of a Debt Instrument; Clarification of Regulations Related to Limitations on Certain Built-In Losses Following an Ownership Change; Recovery Zone Bonds; Qualified School Construction Bonds

Source: Congressional Budget Office.

Notes: Provisions affecting outlays (including refundable tax provisions) are identified by the same names used in CBO's cost estimate for the conference report on H.R. 1. Provisions affecting revenues—all of which are included in Title I of the American Recovery and Reinvestment Act (ARRA)—are identified by the names used in the Joint Committee on Taxation's (JCT's) estimate (see www.house.gov/jct/x-19-09.pdf).

Some provisions include individual elements that have different multipliers, by CBO's estimate; in those cases, the provisions are listed with the multiplier used for the majority of the 2009–2019 budgetary cost.

The economic impact of three tax provisions with budgetary costs over $5 billion was analyzed using a different methodology, and their effects cannot easily be summarized by a multiplier. Those provisions were titled "Extend by Three Years the Placed-In-Service Date for Each Section 45 Qualified Facility" and "One-Year Extension of Special Allowance for Certain Property Acquired During 2009" in JCT's estimate and "Health Information Technology" in CBO's estimate. Some other provisions, with total budgetary costs of less than $7 billion, were included in the analysis but are not shown in the table.

AMT = alternative minimum tax.

a. The output multiplier is the cumulative impact of spending under the provisions on gross domestic product over several quarters. The ranges shown in the table reflect the fact that the Federal Reserve was holding short-term interest rates about as low as possible and did not tighten monetary policy in response to a fiscal stimulus.

b. This provision is a reduction in taxes, but it is treated as having the same economic impact as transfer payments to individuals.

- Changes to corporate taxes that primarily affect after-tax profits on past investment generally have a smaller impact on output than do policies that alter the return from new investment.

Government policies also can have indirect effects that enhance or offset the direct effects. Direct effects are enhanced when, for example, a government policy creates jobs and those who are hired use their income to boost consumption. Direct effects also are enhanced when greater demand for goods and services prompts companies to increase investment to bolster their future production.

In the other direction, substantial government spending can cause a shift in resources (including employees) away from production in other businesses and sectors to government-funded projects. That indirect crowding-out effect could cause growth in employment among recipients of ARRA funding to be offset by declines in employment elsewhere in the economy. Increases in interest rates are one possible mechanism for such crowding out: Higher interest rates discourage spending on investment and on durable goods such as cars because they raise the cost of borrowing. However, because the Federal Reserve has kept short-term interest rates very low, that mechanism does not appear to have been an important factor in 2014. By another mechanism for crowding out, activities funded by ARRA could reduce production elsewhere in the economy if they used scarce materials or workers with specific skills, creating bottlenecks that hindered other activities. That effect, too, has probably been much smaller since ARRA was enacted than it might have been otherwise because of high unemployment and a large amount of unused resources (as well as the diversity of activities funded under ARRA).

In estimating the magnitude of indirect effects, CBO relied heavily on estimates from macroeconometric forecasting models, informed by evidence from other types of models, direct estimation using historical data, and ongoing review of relevant research.[9]

The multipliers are applied to outlays when they occur and to changes in taxes or transfer payments when they affect disposable income. CBO's estimates, therefore, account for the different rates of spending for various types of appropriations and, similarly, for the timing of different tax cuts or transfer payments. In some cases, when different elements of a single provision were estimated to have different multipliers, the total cost of a provision was divided among more than one category. In those cases, the provision is shown in Table 3 in the category to which most of its budgetary cost applied. Provisions that affect outlays (including refundable tax credits) are identified by the same names used in CBO's cost estimate for the conference agreement on ARRA.[10] Provisions that affect revenues are identified by the names used in the revenue estimate prepared by the staff of the Joint Committee on Taxation for the same legislation.[11]

The estimates of ARRA's effects on output were translated into estimates of the effects on the unemployment rate, total employment, and FTE employment in a series of steps. First, the impact on the output gap—the percentage difference between actual and potential output—was calculated.[12] Next, the effect of the change in the output gap on the unemployment rate was estimated using the historical relationship between those two measures.[13]

9. For a detailed discussion of those sources of information, see Felix Reichling and Charles Whalen, *Assessing the Short-Term Effects on Output of Changes in Federal Fiscal Policies*, Working Paper 2012-08 (Congressional Budget Office, May 2012), www.cbo.gov/publication/43278.

10. See Congressional Budget Office, cost estimate for the conference agreement for H.R. 1, the American Recovery and Reinvestment Act of 2009 (February 13, 2009), www.cbo.gov/publication/41762.

11. See Joint Committee on Taxation, *Estimated Budget Effects of the Revenue Provisions Contained in the Conference Agreement for H.R. 1*, JCX-19-09 (February 12, 2009), www.jct.gov/x-19-09.pdf (40 KB).

12. Potential output is the maximum sustainable output of the economy.

13. Changes in the output gap affect unemployment gradually over several quarters. Initially, part of a rise in output shows up as higher productivity and hours per worker rather than as reduced unemployment.

Then, the effect of changes in the unemployment rate on the labor force was taken into account: If unemployment declines and the economic environment improves, discouraged workers and people who have chosen to pursue activities such as education rather than work will tend to return to the labor force. Together, the estimated effect on the unemployment rate and the effect on the labor force were used to estimate the impact on the number of people employed. The change in FTE employment was then estimated using the historical relationship between changes in hours per employed worker and changes in the gap between the unemployment rate and CBO's estimate of the natural rate of unemployment.[14] Because higher spending and lower taxes can affect output and unemployment for some time after they occur, the impact of ARRA on employment in 2014 depended partly on the law's effect on spending and revenues in previous years.

A key advantage of the model-based approach used in this analysis is the ability to provide estimates of the total effects throughout the economy of the government spending, transfer payments, and tax cuts resulting from ARRA. By focusing on the net change in employment, that approach captures both the jobs created and the jobs retained as a result of ARRA.

A key disadvantage of the model-based approach is the considerable uncertainty about many of the economic relationships that are important in the modeling. Because economists differ on which analytical approaches provide the most convincing evidence about such relationships, they can reach different conclusions about those relationships. In addition, each study involves uncertainty about the extent to which the results reflect the true effects of a given policy or the effects of other factors. For those reasons, CBO provides ranges of estimates of ARRA's economic effects that are intended to encompass most economists' views and thereby reflect the uncertainty involved in such estimates.

Changes From CBO's Previous Estimates of the Impact of ARRA

CBO's current estimates of the economic effects of ARRA for the years 2009 to 2013 are identical to those the

14. The natural rate of unemployment is the rate that arises from all sources except cyclical fluctuations in economywide demand for goods and services.

agency published in February 2014.[15] In this report, CBO provides estimates of the economic effects of ARRA in 2014 for the first time.

ARRA's Long-Run Effects

In contrast to its positive near-term macroeconomic effects, ARRA will reduce output slightly in the long run, CBO estimates—by between zero and 0.2 percent after 2016. But CBO expects that the legislation will have no long-term effects on employment because the U.S. economy will have a high rate of use of its labor resources in the long run.[16]

ARRA's long-run impact on the economy will stem primarily from the resulting increase in government debt.[17] To the extent that people hold their wealth in government securities rather than in a form that can be used to finance private investment, increased debt tends to reduce the stock of productive private capital. In the long run, each dollar of additional debt crowds out about a third of a dollar's worth of private domestic capital, CBO estimates. (The remainder of the rise in debt is offset by increases in private saving and inflows of foreign capital.) Because of uncertainty about the degree of crowding out, however, CBO's range of estimates of ARRA's long-run effects reflects the possibility that the extent of crowding out could be more or less than one-third of the added debt.

Over the long term, the output of the economy depends on the stock of productive capital, the supply of labor, and productivity. The less productive capital there is as a result of lower private investment, the smaller will be the nation's output over the long run.

The effect of the crowding out of some private investment under ARRA will be offset somewhat by other factors. Some of ARRA's provisions, including its funding for roads and highways, may add to the economy's potential output in much the same way that private capital investment does. Others, including its funding of education, may raise long-term productivity by enhancing people's skills. Still other provisions create incentives for increased private investment. According to CBO's estimates, the provisions that potentially add to long-term output account for between one-fifth and one-quarter of ARRA's budgetary cost.

ARRA's long-run effect on output also depends on whether it permanently changed people's saving or their ability or willingness to work. For example, to the extent that ARRA reduced long-term unemployment during the 2009–2014 period, it might improve participation in the labor force, employment, and productivity in later years. However, CBO's estimates of the long-term effects of ARRA do not incorporate any effects of that sort.

Section 1512(e) of the American Recovery and Reinvestment Act of 2009 (ARRA) requires the Congressional Budget Office (CBO) to comment on reports filed by recipients of ARRA funding that detail the number of jobs funded through their activities. This CBO report fulfills that requirement. Felix Reichling of CBO's Macroeconomic Analysis Division wrote the report under the supervision of Wendy Edelberg and Benjamin Page. Mark Lasky, Dan Ready, and Joshua Shakin contributed to the analysis. This report, along with previous reports on the topic, is available at the agency's website (www.cbo.gov).

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15. See Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output in 2013* (February 2014), http://www.cbo.gov/publication/45122.

16. The reduction in GDP is therefore estimated to be reflected in lower wages rather than less employment, as workers will be slightly less productive because the capital stock will be slightly smaller. See Congressional Budget Office, letter to the Honorable Judd Gregg concerning the estimated macroeconomic impacts of H.R. 1 as passed by the House and the Senate (February 11, 2009), www.cbo.gov/publication/20474. CBO has not updated those estimates.

17. For a discussion of the long-run effects of other debt-financed policies for boosting output and employment, see testimony of Douglas W. Elmendorf, Director, Congressional Budget Office, before the Senate Committee on the Budget, *Policies for Increasing Economic Growth and Employment in 2012 and 2013* (November 15, 2011), www.cbo.gov/publication/42717.