

CASH FOR CLUNKERS ...NOT SO CLEVER

BY TED GAYER AND EMILY PARKER

R

Remember the Car Allowance Rebate System? Of course you don't: the formal name and the acronym, CARS, didn't stick outside the Beltway. But you probably can recall the program by its moniker, "Cash for Clunkers," a stimulus program in 2009 that was crafted to appeal to everybody from automakers to environmentalists to owners of aging gas-guzzlers – not to mention policymakers eager to inject purchasing power into the economy in a timely fashion.

CASH FOR CLUNKERS

CARS was extremely popular. Who could resist a program designed to counter the post-bubble economic contraction even as it created bargains for car shoppers, increased fuel efficiency and helped to clean up the exhausts of America's 250 million-plus fleet of cars and light trucks? That said, it's still important to know how much bang the program got for a taxpayer buck in terms of jobs, economic activity and emissions reductions. We offer estimates implying that the hype exceeded the benefits.

But this, by definition, is hindsight. Although no one is proposing CARS II, the more elusive issue here is whether broader lessons can be drawn from the disappointing outcome to an emergency program offered in the midst of a global crisis.

JUST THE FACTS

The idea of giving owners a limited-time-only financial incentive to trade old cars in for new ones received widespread attention in the United States when Alan Blinder, the Princeton economist and former vice chairman of the Fed, proposed it in a *New York Times* article in July 2008. At the time, the U.S. economy was struggling, to say the least, as the Great Recession took hold. In the third quarter of 2008, GDP growth declined 2 percent, followed by another 8.3 percent drop in the final quarter of the year. The unemployment rate, 5.8 percent in July, was rising rapidly and would break into double digits 15 months later. Hence Blinder was pushing on a door

already opened by policymakers eager to offset falling demand without awakening conservative opposition.

Cash for Clunkers was introduced as a bill in the Senate in January 2009 and in the House two months later. President Obama added his imprimatur in June after it was tacked onto a supplemental appropriations bill, which largely financed the ongoing Afghan and Iraq wars. The initial financing was set at \$1 billion, and the money was to be available between July 1 and November 1. But by July 30, the kitty was almost empty because consumers rushed to take advantage of the offer in unexpected numbers.

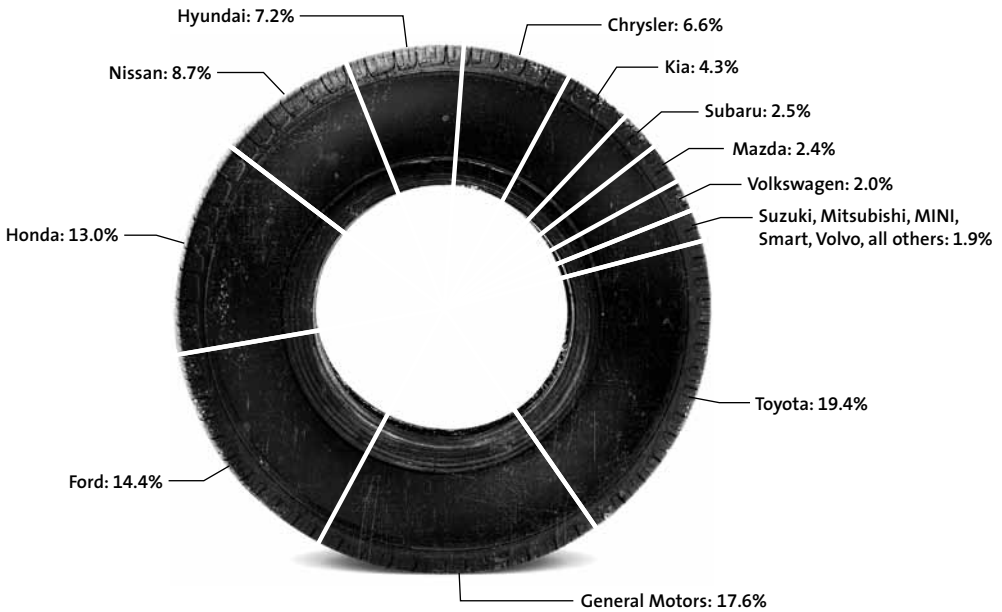
Program administrators at the National Highway Traffic Safety Administration estimated dealer requests for payment would average approximately 3,000 per day. However, in the first 10 days, NHTSA received some 224,000 applications for rebates. And in the following week, Congress added \$2 billion to the appropriation.

Yet even with the additional funds, the program exhausted its money two months before the Nov. 1 deadline. Indeed, NHTSA was overwhelmed. It had to move over 7,000 employees from other federal agencies and government contractors to process the requests. On Aug. 25, when the program ended, NHTSA had nearly 650,000 dealer payment requests pending.

Under CARS, the incentive was tied to the difference in fuel economy between the trade-in vehicle and the new one. If the difference between the two was between 4 and 9 miles per gallon, and the new one had a fuel economy rating of at least 22 miles per gallon, the buyer received a voucher for \$3,500. If the difference was at least 10 miles per gallon – and, again, the new passenger car had a fuel economy rating of at least 22 miles per gallon – the buyer received \$4,500. The minimum

TED GAYER directs the economic-studies program at the Brookings Institution. EMILY PARKER is a research assistant at Brookings. Their more-detailed analysis of Cash for Clunkers can be downloaded from the Brookings Web site. Note, too, that the *Review* published a prescient article on this subject soon after the program was completed (Abrams and Parsons, *Milken Institute Review*, 1st Quarter 2010).

DIVIDING THE CARS SALES



SOURCE: NHTSA (2009)

mileage differential for trucks weighing less than 14,000 pounds was far less onerous.

When buyers brought clunkers into dealerships to trade in, they received vouchers to be applied toward the purchase (or long-term lease) of new vehicles. The dealer then destroyed the clunker's engine by running a sodium silicate solution through it and sent it to either a salvage auction or a disposal plant. The dealer got the cost of the voucher back after the government verified the vehicle's demise.

All owners were eligible regardless of income, provided their clunkers were less than 25 years old, in drivable condition and had been registered in the owner's name for at least a year. Some effort was made to prevent a windfall for the wealthy, however: only new cars with sticker prices below \$45,000 were eligible.

The statute set a 30-day deadline for the National Highway Traffic Safety Administration to establish the program and to begin administering it, which led to some sloppiness.

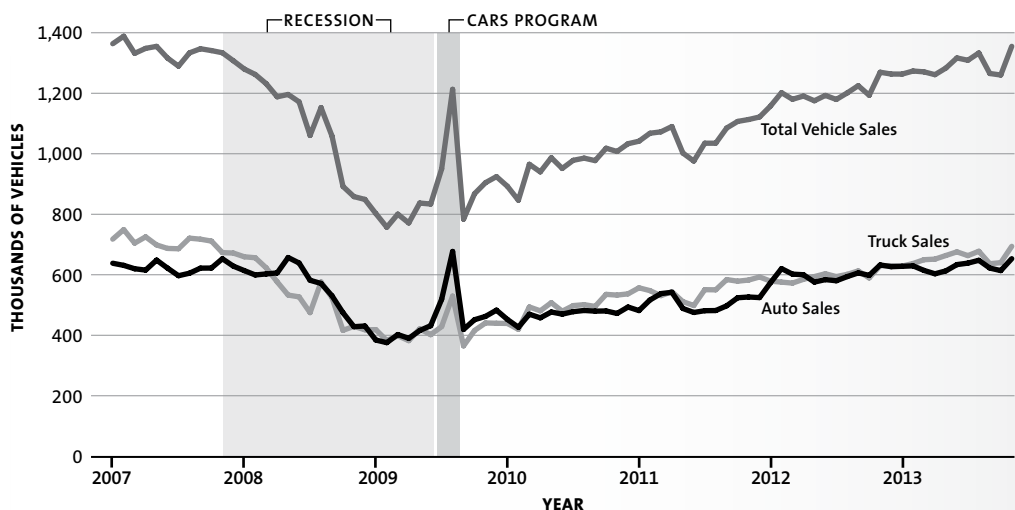
For example, even though dealers were required to ask whether the voucher recipients would have purchased a new vehicle in the absence of the CARS program, compliance with the survey was just 21 percent.

WHAT HAPPENED

A total of 677,842 vehicles were junked under CARS, resulting in \$2.85 billion in rebates, or about \$4,200 per vehicle. (The full \$3 billion appropriation was not spent because the program's end date was set at what proved to be a conservative estimate of when funds would be exhausted.) The new vehicles purchased under the program averaged 24.9 miles per gallon (by official EPA ratings), compared to the 15.8 miles per gallon averaged by the trade-in vehicles. Eighty-four percent of the clunkers were SUVs, small trucks and minivans. By contrast, 59 percent of the vehicles purchased were passenger cars.

The figure above shows how individual

AUTOMOTIVE RETAIL SALES



SOURCE: Bureau of Economic Analysis; Haver Analytics

manufacturers fared. Toyota, General Motors, Ford, Honda, Nissan and Hyundai accounted for more than 80 percent of the new vehicles purchased under the program – no surprise since those five garnered a 70 percent market share in 2013 as well.

Since a primary goal of CARS was to offset the recession-related decline in demand, a key issue is how the program changed the number of cars sold and the timing of the sales. Throughout the recession, which lasted from November 2007 to June 2009, sales of passenger vehicles dropped 38 percent. During the brief window of CARS rebates, vehicle sales spiked to near pre-recession levels. The jolt was more pronounced for passenger cars than for trucks. But sales reverted to pre-program levels immediately after its expiration. In the following months, car and truck sales gradually trended up as the economy (slowly) recovered. Only recently have sales reached the range seen prior to the recession.

The impact of CARS was also evident in other indicators. There was a 15 percent increase in new auto loans during the third

quarter of 2009, followed by a 6 percent decline in the fourth quarter. Personal expenditures on motor vehicles and parts rose by 11 percent the third quarter of 2009, followed by a 10 percent decline in the fourth quarter.

Both the number of vehicles built and the number of employees in the auto industry increased during CARS. Happily, they did not decline after the program's expiration.

Financial markets react to expectations. From the introduction of the legislation in the Senate in mid-January through the expiration of the program in late August 2009, Ford stock jumped 253 percent, Honda stock rose 44 percent, and Toyota stock rose 30 percent.

While the patterns of all these indicators suggest that CARS affected the market, they cannot clearly indicate the effect's magnitude or duration. Doing so requires a credible sense of the "counterfactual" – of what would have happened absent the program.

THE CARS UPTICK

A key justification for CARS was the need for temporary economic stimulus to an industry –

and economy – reeling from recession. There were nearly 700,000 participants in the 55 days of the program, which represented 31.4 percent of total vehicle sales during that period. However, the relevant question is how many of those sales would have occurred without the incentive. The other dimension here is timing: how many CARS sales were borrowed from sales that would have occurred anyway in the months following the program expiration?

Early research on the effect of CARS relied on aggregate sales data and consumer surveys to estimate the pattern of sales that would have occurred absent the program. Using these methods, the President's Council of Economic Advisers estimated that the program induced

tire Your Ride program, clunker trade-in incentives were not widespread at the time. Their estimate of the net gain (in the United States), some 390,000 vehicles, is close to that of Mian and Sufi.

CARS was designed to provide a short-term stimulus, but the question arises of just how short the term was. The program surely induced additional vehicle sales during its existence, but some of those sales were simply pulled forward – that is, they would have occurred in the future in the absence of the program. This pull-forward effect can be seen in aggregate sales data, which show that vehicle sales dropped by approximately 38 percent in September (the month after the expiration of

CARS was designed to provide a short-term stimulus, but the question arises of just how short the term was.

440,000 additional vehicle sales; for its part, the Department of Transportation put the figure at just under 600,000. However, the volatility of sales in the months preceding the program makes the use of national aggregate data problematic. Later studies also had the advantage of data for the period following the program.

Writing in the *Quarterly Journal of Economics*, the economists Atif Mian at Princeton and Amir Sufi at the University of Chicago instead relied on variation among cities in exposure to CARS, as measured by the number of clunkers in each city as of summer 2008. They estimated that the program induced the purchase of an additional 370,000 vehicles during the treatment period (55 percent of total vehicle sales).

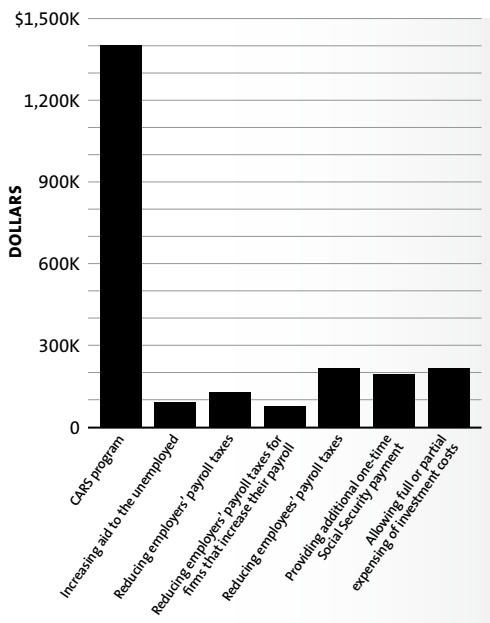
Three other economists, Shanjun Li and Joshua Linn at Resources for the Future and Elisheba Spiller at Duke, used Canadian sales patterns as the counterfactual. Canada's market is similar to that of the United States. And while Canada did institute a more modest Re-

the program) compared to August.

Mian and Sufi found that in the months after the program expired, there were far fewer new vehicles bought in the “treatment” cities (those that had a large stock of eligible clunkers before the program) than in the “control” cities (those that had a small stock of eligible clunkers before the program). Ten months after the program ended, the cumulative purchases of the high- and low-clunker cities from July 2009 to June 2010 were nearly the same. Other studies corroborate this finding.

The degree to which pulling forward led to a short-term boost in GDP and employment during the existence of the program depended more on the impact on production than on sales. If the industry primarily relied on reducing inventory to meet the higher demand during the short period of the program (which it could subsequently replenish during the low-demand post-program months), there would have been a muted impact on

COST PER JOB CREATED



NOTE: The estimates for alternative policies are an average of the high and low estimates provided by CBO (2010).

SOURCE: CBO (2010)

employment and GDP. Adam Copeland and James Kahn of the New York Fed found that the increase in production during the program was less than half of the induced increase in sales and that this additional production was shifted forward from the subsequent two quarters. The net result was a negligible increase in GDP, shifting roughly \$2 billion into the third quarter of 2009 from the subsequent two quarters.

Similarly, Li, Linn and Spiller found a minimal increase in employment due to CARS. They estimate an additional 3,676 job-years from June through December 2009, split between the assembly and parts industries. (The employment impact on the new car marketing and distribution chain was not measured.) Over the longer term, through May 2010, they found a net increase of only 2,050 job-years.

Using Li, Linn, and Spiller's long-term

jobs estimate, the program spent \$1.4 million per job-year created. This suggests that CARS was far less cost-effective than other fiscal-stimulus programs, such as increasing unemployment aid, reducing payroll taxes, providing an additional Social Security payment or allowing investment costs to be deducted immediately, rather than depreciated.

The average price for vehicles purchased under the CARS program was \$22,592 (minus the value of the voucher), which is a big purchase even if buyers spread the outlay over a long period. And that raises the issue of whether consumers bought less of other goods and services because they bought more vehicles, thereby undermining the stimulus.

Using household consumption data from census surveys, we found that in the third quarter of 2009, the participants in CARS spent almost as much of their before-tax income on non-auto consumption (11.8 percent) as did all non-participants in the program (13 percent), non-participants who purchased a new vehicle (11.1 percent) and non-participants who purchased a new or used vehicle (12.7 percent). This suggests that the substitution issue is a bit of a red herring. The data sample was small, however, so too much shouldn't be read into the conclusion.

WHO BENEFITED?

Using the consumer expenditure survey, we can compare the socio-demographic characteristics of households that were likely participants in the CARS program with those of other households. Based on this refined but limited sample, the households we identify as likely participants in the CARS program had a median income of about \$69,000. Compared to households that purchased a new vehicle in 2009 but likely did not receive the CARS voucher, program participants had lower incomes, were less likely to be homeowners,

more likely to have high school degrees, more likely to be white and more likely to be older. Further complicating the distributional impact, the program destroyed a lot of clunkers that would otherwise have remained on the road. That may have been a good thing in environmental terms (see below). But it did represent the destruction of capital which would have generated value for some (presumably low-income) households.

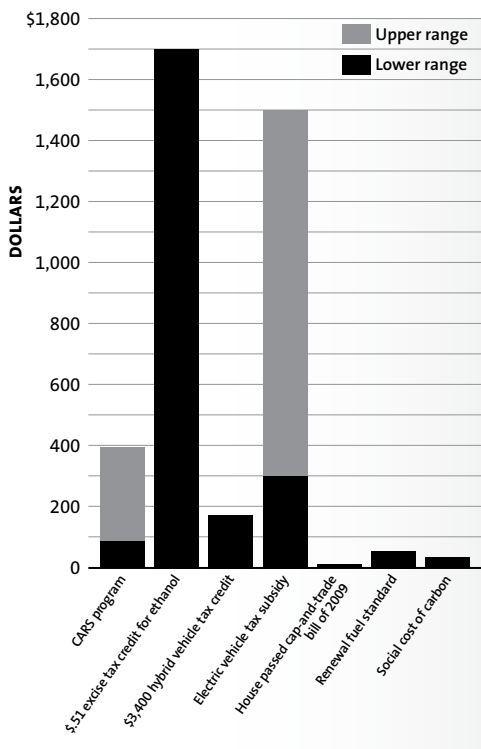
ENVIRONMENTAL EFFECTS

One would not expect a substantial reduction in carbon emissions (or other tailpipe emissions), given that the nearly 700,000 vehicles purchased under the program accounted for less than 1 vehicle in 300 on the road. Moreover, as discussed earlier, only about 55 percent of these purchases were due to the program, and those vehicles would have been purchased anyway within a few more months.

The savings in fuel economy and reduction in emissions therefore apply to relatively few vehicles. Moreover, the required differential in fuel economy under the program was modest. For example, more than 8,200 owners traded old Ford F-150 pickup trucks for new F-150s, making it the most common swap of the program. A 1990 four-wheel drive F-150 gets 14 miles per gallon and a 2010 one gets 16 miles per gallon. But because the F-150 is considered a category 2 (relatively heavy) truck – and perhaps because Congress had a soft spot for truck users – this trade was nonetheless eligible for a \$4,500 voucher. Overall, the average fuel economy of the vehicles traded under CARS was 15.7 miles per gallon and that of new vehicles purchased under the program was 24.9 miles per gallon.

Li, Linn and Spiller estimated that the program would reduce fuel consumption by between 884 million and 2.9 billion gallons during the lifetime of the vehicles affected, which

COST PER TON OF CARBON DIOXIDE REDUCED



SOURCE: Li, Linn, Spiller (2012); Congressional Budget Office (2012); Holland et al. (2011); Knittel (2012); Interagency Working Group on Social Cost of Carbon (2013)

is equivalent to 2.4-7.9 days' worth of current U.S. gasoline consumption. They also estimated that the program would result in a reduction of carbon dioxide emissions of 8.58 to 28.28 million tons (depending on a variety of assumptions) – at most, 1.5 percent of transportation emissions in 2009.

This implies that the emissions reductions (including the co-benefit reduction in carbon monoxide, volatile organic compounds, nitrogen oxides and exhaust particulates) cost between \$91 and \$301 per ton – a lot more than most estimates of the societal cost of carbon emissions. And while it is less than the sky-high cost of reducing emissions through the electric car subsidy and the ethanol tax subsidy (which expired two years ago), it is

CASH FOR CLUNKERS

more than the cost of the renewable fuel standard. Equally relevant, it is far higher than the \$15 per ton cost envisioned in the cap-and-trade bill passed by the House in 2009.

WORTH THE BOTHER (AND MONEY)?

Judging by these numbers, the CARS program can hardly be rated a success. It generated modest amounts of revenue (and, presumably, operating profits) for the auto industry and did save some jobs. But the cost per job was ferociously high, requiring six times the government outlay of alternative stimulus measures ranging from payroll tax cuts to beefed-up unemployment benefits. And it apparently had a negligible effect on GDP, mostly shifting output from one quarter to another.

Much the same can be said for the impact on fuel efficiency and auto emissions. CARS did raise the average mileage per gallon of the auto fleet a bit and marginally reduced emissions. But again, the cost of the approach in terms of federal outlays was very high per ton of emissions saved – far more than most estimates of the societal benefits and far more than lawmakers contemplated when they almost passed a cap-and-trade climate bill in 2009.

In retrospect, there are some lessons here. First, while providing countercyclical stimulus and addressing environmental externalities are both worthy policy goals, the attempt to achieve both within a single program muddied the waters. Indeed, with CARS, the two goals were somewhat competing. If a consumer was going to trade in a clunker anyway within a short time frame, but the voucher provided an incentive to purchase a more fuel-efficient vehicle than otherwise, then the program achieved environmental improvement – but not stimulus. If a consumer had no intention of trading in a clunker absent the voucher, then the program provided stimulus

but had an indeterminate effect on the environment since the improvement in fuel economy was offset to some degree by the greater energy use from additional production and disposal of the old vehicle. At least in the abstract, then, it would have made more sense to design separate policies to manage countercyclical stimulus and emissions reductions.

Second, CARS's focus on boosting GDP obscured the very real issue of the loss of capital implied by the destruction of useful (if dirty) gas-guzzlers.

That said, some perspective is needed here. With the economy running far below full capacity, the cost of stimulus was less than the government outlay. It fairly arbitrarily shuffled some wealth among car buyers, auto companies and workers and future taxpayers, which presumably had a negative impact on total societal welfare. But because it occurred in an economy operating below its potential, it created some income gains that otherwise would not have occurred.

An important dimension in evaluating CARS, then, is to compare it to the alternatives. In the best of worlds, it makes sense to label policies that don't get the maximum bang for their buck as falling short. And in this case, it is clear that a mix of, say, payroll tax cuts, grants to keep teachers on the job and market-friendly climate change measures would have been far more efficient.

But it is not self-evident that nixing CARS would have led to an equivalent alternative injection of stimulus cash or a more efficient approach to climate containment. CARS drove past the opposition because it brought together a potent coalition of disparate interests. In the end, then, one must have a good sense of what else would have been possible before deciding whether CARS left the proverbial water glass three-quarters empty or one-quarter full. **M**