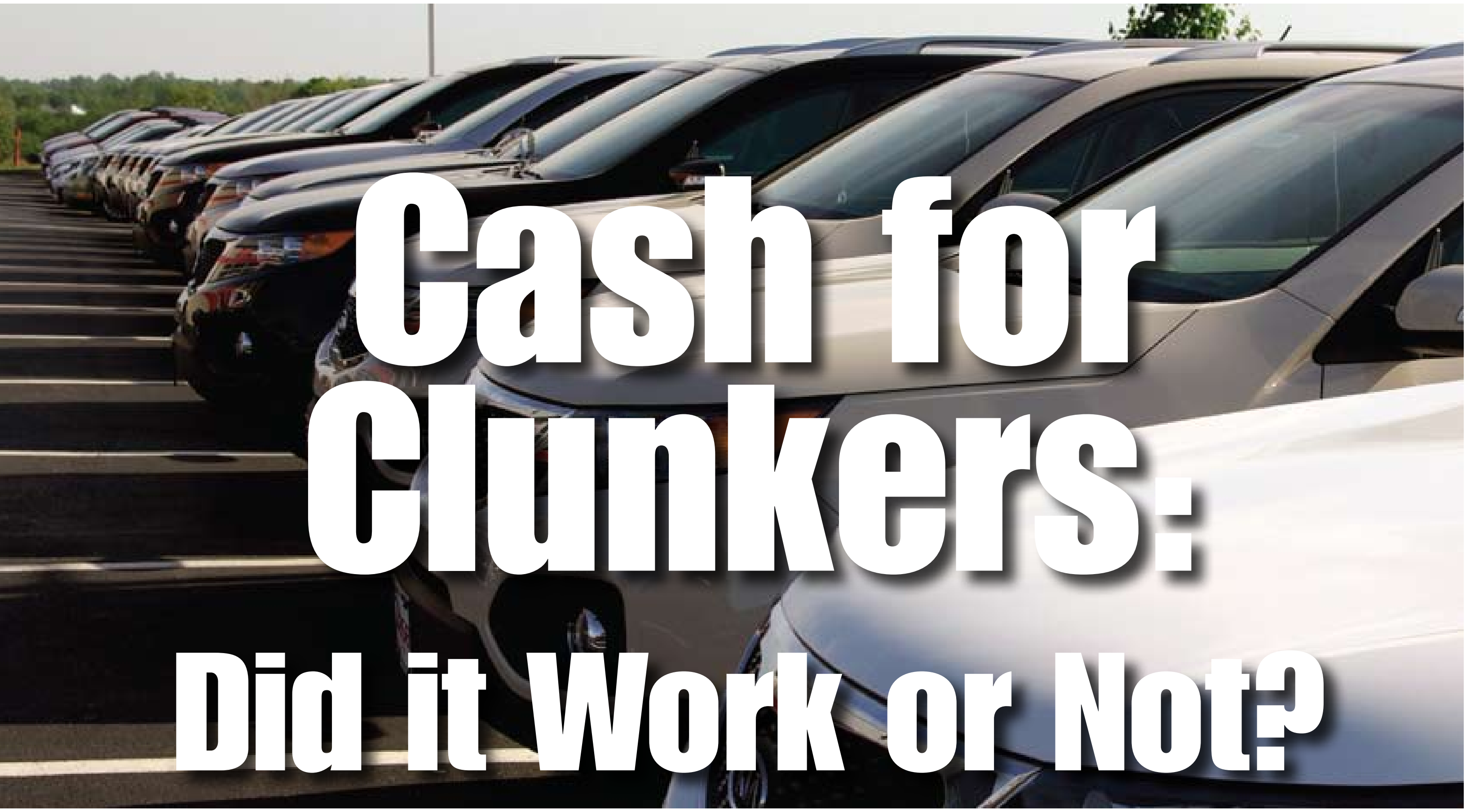

Cash for Clunkers: Did it Work or Not?

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The voluntary vehicle trade-in program that passed into law under the Consumer Assistance to Recycle and Save Act of 2009—also known as the Car Allowance Rebate System or CARS—has been among the more widely discussed and debated government spending programs in recent years. Referred to in the popular media as Cash for Clunkers, the program offered consumers a rebate for trading in used vehicles for qualifying new vehicles. The program had two purposes: first, to increase spending and employment during a time of recession by stimulating the automobile industry; and second, to address environmental concerns by increasing the average fuel efficiency of the U.S. auto fleet (NHTSA 2009).

This case study focuses on the first point. Analyzing survey data collected from 22 new-car dealers in St. Charles County, Missouri, our research team estimates the initial direct impact of Cash for Clunkers on sales of new motor vehicles in the county. We then use output multipliers from the regional economic model IMPLAN (Minnesota IMPLAN Group, Inc.) to estimate the total economic impact of Cash for Clunkers on the county's output after taking multiplier effects (explained below) into account. Utilizing data from the Council of Economic Advisers (CEA), along with estimates of direct government spending in the county on CARS vouchers, we also estimate the total change in employment in the county attributable to the Cash for Clunkers program.

Even though most of the economic impact of Cash for Clunkers occurred through new-car sales, we also briefly discuss how Cash for Clunkers affected used-car sales. Additionally, we consider whether Cash for Clunkers created a true stimulative effect or if, as some analysts have argued, the program merely caused consumers to move their car purchases forward into the CARS rebate period (see, for example, Edmunds.com 2009). This research represents the first assessment of the impact of Cash for Clunkers on a regional economy. It is also the only study, to our knowledge, that surveyed automobile dealers regarding their experience with and attitudes toward the program.

An Overview of the CARS Program

Although Cash for Clunkers was a novel concept to many Americans, voluntary vehicle trade-in programs—more commonly referred to in the academic literature as vehicle scrappage programs—are certainly not new. The Swedish government implemented the first such program in 1976, and other EU nations have done so since (Allan, et al. 2009). The first vehicle scrappage program that appeared in the U.S., dating back to 1990, was actually a private sector initiative. Instituted in the Los Angeles area by UNOCAL,[1] the Southern California Retired Automobile Program (SCRAP) offered owners of pre-1971 cars $700 to voluntarily relinquish their vehicles for scrapping. SCRAP was deemed a success because, during a four-month period, UNOCAL removed 8,736 "dirty" vehicles from the streets of Los Angeles (Shaheen, et al. 1994). Following SCRAP's success, similar programs were implemented in other states, including Delaware (1992), Illinois (1993), and Colorado (1993-1994) (Allan, et al. 2009). Early vehicle scrappage programs in the U.S. and elsewhere generally focused on reducing criteria pollutant emissions, while recent programs (those starting in 2009) have been primarily aimed at stimulating the automobile industry (Allan, et al. 2009).

Cash for Clunkers, launched on July 27, 2009, was one of a number of stimulus programs whose purpose was to "shift expenditures by households, businesses, and governments from the future to the present" (CEA 2009). Congress initially appropriated $1 billion for the program. Because consumers responded in much greater numbers than expected, that entire sum was exhausted within three days. This prompted Congress to allocate additional funds to the program. By the time the CARS rebate period ended on August 24, 2009, a total of 690,114 vehicles had been traded in under the program, with a final count of 677,842 paid vouchers. The average rebate was $4,209 per traded-in vehicle, and the total dollar amount of rebates issued through the program nationwide was $2.85 billion (NHTSA, Report, 2009). According to the National Highway Traffic Safety Administration (NHTSA), the agency that administered the program, participation in Cash for Clunkers on a per-capita basis was highest in the Midwestern states and several Northeastern and Atlantic seaboard states and much lower in most Southern and some Western states (NHTSA, Report, 2009).

Cash for Clunkers offered consumers a rebate of $3,500 or $4,500 per traded-in vehicle, depending on the vehicle category and the fuel-efficiency rating of the new vehicle compared to the trade-in vehicle. Table 1 outlines the basic credit allowances under the program.

The program had other key requirements. The new vehicle had to carry a base manufacturer's suggested retail price of $45,000 or less, traded-in vehicles had to be registered and insured for the year prior to the trade-in date, and the engines of all the traded-in vehicles had to be disabled by a prescribed method. Dealers were required to store the traded-in vehicles until they were disabled at the dealership or a property under the control of the dealership; dealers were required to use salvage facilities or salvage auctions approved by the NHTSA; and the salvagers that received the traded-in vehicles were instructed to shred them within six months (NHTSA, Rule, 2009). Dealers were required to disclose to buyers the best estimate of the scrappage value of the traded-in vehicles, less a $50 administrative fee. Additionally, dealers were not allowed to use the CARS credit to offset any other rebates or discounts (NHTSA, Rule, 2009). Dealers were asked to submit all the necessary paperwork to the NHTSA through a dedicated website (www.CARS.gov) that also served as an information center for auto dealers and consumers.

Prior Analyses of the Program

Analyses of the Cash for Clunkers program appear to be ongoing, but to date there has not been a comprehensive independent analysis of the total economic impact of

The Survey Questionnaire

The survey questionnaire for new-car dealers asked a series of questions related to sales before, during, and after the CARS rebate period. Among other questions, new-car dealers were asked how many $3,500 and $4,500 vouchers they turned in; the average price of cars sold through the CARS program; the average Manufacturer's Suggested Retail Price (MSRP) of the vehicles sold through CARS; the number of vehicles they had sold during the same time period in 2008; the number of vehicles that came in under CARS that were not eligible, but that the dealer accepted for trade anyway; and what number of vehicles the dealership believed that it sold due to Cash for Clunkers that would not have sold without the program. In addition to these questions, dealers were asked a series of questions related to the operational aspects of the program: the average length of time in days the dealer had to wait to receive payment on traded-in clunkers; whether the dealer's business operations were impacted by delays in receiving payment from the government; whether sales during the CARS rebate period were hampered by issues with depleted inventory; and the average net amount received by the dealership for the disabled clunkers. The survey also solicited qualitative data, asking respondents what recommendations they would make regarding changes to the program's structure if another program like Cash for Clunkers were ever considered again in the future.

the program. Much of the analysis by independent (i.e., non-government) economists has been in the form of commentary and estimates of the type often referred to as "back-of-the-envelope." The most comprehensive analyses to date are both government agency reports: one by President Barack Obama's CEA in September 2009 and the other by the NHTSA in December 2009. Non-government analyses of the program that are more sophisticated than back-of-the-envelope estimates include a study by economic consulting and modeling firm REMI (2009), a study by the automotive website Edmunds.com (2009), and various estimates of the program's impact on industry sales and/or national GDP by J.D. Power and Associates (2009), IHS Global Insight (2009), and Macroeconomic Advisers (2009). Most of these analyses—government and non-government—are not truly comprehensive because most overlook the potential impacts of Cash for Clunkers on the used-vehicle market and the market for auto salvage. Only one, the study by NHTSA, directly addresses, albeit minimally, the program's impact on these after-markets.

With respect to estimating the stimulative impact of Cash for Clunkers, the CEA's report aptly frames the essential research questions.

The first step in our analysis is to estimate the effect of the CARS program on motor vehicle sales, because sales are the ultimate driver of production and employment. But in calculating the effect of the program, we must know not just how many sales occurred, but how many sales would have occurred anyway (even without the program); the CARS program can be credited with an effect on sales only for those sales that would not have taken place in its absence. We also need to make assumptions about the extent to which the CARS-induced sales were borrowed from sales that would have occurred in the near future (CEA 2009).

The phenomenon described by the CEA, sales "borrowed" from the near future, is called the "pull-forward" or "payback" effect (see "The Payback Effect," p. 22), and it is a critical issue in estimating the true stimulative effect of a vehicle scrappage program such as Cash for Clunkers. Common sense dictates that some portion of new-car sales during the rebate period must have been borrowed or pulled forward from a near-future period. However, anecdotal evidence suggests that some sales transactions also took place that would not have occurred until a much later time period in the program's absence.

What the payback or pull-forward effect really boils down to is consumer motivation or, more precisely, how Cash for Clunkers may have altered the behavior of American consumers. One can imagine there being five basic types of consumers that would purchase a motor vehicle during the CARS rebate period due to the existence of the program. Table 2 defines the five consumer types in relation to CARS and specifies whether the vehicle purchases of each would contribute to an economic stimulus during a time of recession.

The Edmunds.com study contends that the large majority of consumers who purchased new vehicles during the CARS rebate period belonged to either the Type 1 or Type 2 categories listed in Table 2. Note that to the extent Type 4 consumers participated in the program, Cash for Clunkers effected used-car sales in a negative fashion (discussed in greater detail below); however, such consumers definitely contributed to the economic stimulus intended by the government. To the extent Type 5 consumers were affected by the program, the government enjoyed a bonus effect from tax dollars spent on the rebates.

The CEA uses a different approach to estimate the size of the payback effect and concludes that roughly 440,000 new vehicles were sold due to Cash for Clunkers with a payback ranging from 20,000 to 90,000 vehicles in September 2009. In its three scenarios—pessimistic, baseline, and optimistic—the CEA assumes that all car

Is 22 Dealers Enough?

Even though the survey yielded a 59 percent response rate, the survey population is relatively small, just 22 dealers. A high response rate from a small population still yields a small sample size, and there are well-known caveats associated with making inferences from data based on small sample sizes. It is possible that the dealers who responded to the survey are unrepresentative of the dealers who elected not to respond? For example, perhaps dealers that sold substantially more than the average number of vehicles through Cash for Clunkers were still too busy processing paperwork and playing "catch up" to take time to complete the survey. Or, perhaps, dealers that sold substantially fewer than the average number of vehicles through the program ignored the survey out of some feeling of chagrin.

Although either of the above situations is possible—as well as other potential reasons that respondents are unrepresentative of non-respondents—we believe the concern over small sample size in this study is mitigated by several facts. First, our estimates are in the form of ranges that take into account an appropriate margin of error given the sample size. Because of the small sample size, our estimated ranges are relatively large by necessity. Second, we used state-level NHTSA data as a check against our estimated ranges. Third, although only thirteen (59 percent) of 22 new-car dealers in the county responded to the survey, those dealers who responded represent the vast majority of sales in the county. In fact, we estimate that the respondents to the survey account for at least 75 percent of new-vehicle sales that occurred in St. Charles County through the Cash for Clunkers program.

TABLE 1
NHTSA Final Rule: Determining Eligibility of Trade-in Vehicles and New Vehicles

Vehicle Categories	Description	Trade-in Eligibility (1)	New Vehicle (2) Eligibility	Credit Amounts
Passenger automobiles	Vehicles manufactured primarily for transporting persons.	A combined fuel economy value of 18 mpg or less	A minimum combined fuel economy level of 22 mpg	If new vehicle has a combined fuel economy that is 4-9 mpg higher than the trade-in: $3,500. If new vehicle has a combined fuel economy that is at least 10 mpg than the trade-in: $4,500
Category 1 trucks	Vehicles not manufactured primarily for transporting persons, including all SUVs, minivans, small and medium pickup trucks, and certain vehicles that permit expanded use for cargo-carrying purposes, including vehicles designed to transport more than ten persons.	A combined fuel economy value of 18 mpg or less	A minimum combined fuel economy level of at least 18 mpg	If new vehicle is a category 1 truck, and trade-in is a passenger vehicle, category 1 truck or category 2 truck, a gain of 2-4 mpg=$3,500 and a gain of at least 5 mpg=$4,500.
Category 2 trucks	A large van or a large pickup truck	A combined fuel economy value of 18 mpg or less	A minimum combined fuel economy level of at least 15 mpg	For a category 2 truck traded-in for a new category 2 truck, a gain of 1 mpg=$3,500 and a gain of at least 2 mpg=$4,500.
Category 3 trucks	Very large pickup trucks and very large cargo vans rated between 8,500 and 10,000 pounds gross vehicle weight.	No minimum fuel economy requirement	No minimum fuel economy requirement	A category 3 truck traded-in for a new category 2 truck=$3,500 without fuel gain restrictions. A category 3 truck traded for a new category 3 truck of smaller of similar size=$3,500 (3)

(1) The first three criteria are the same for all categories—be in a drivable condition, have been continuously insured.
(2) Purchased or leased (not less than 5 years). For all categories, vehicle must have a manufacturer's suggested retail price (base price) of $45,000 or less.
(3) Credits for category 3 trucks limited to 7.5 percent of the total funds appropriated for the program.

owners purchasing a vehicle through Cash for Clunkers would have replaced their clunkers anyway within three, five, and seven years, respectively. Altogether, CEA estimates that Cash for Clunkers caused new-car sales in 2009 to increase by about 210,000 vehicles in the pessimistic scenario, 330,000 vehicles in the baseline scenario, and 560,000 vehicles in the optimistic scenario. This translates to GDP growth in the third quarter of 2009 of about 0.1 percentage points under the pessimistic scenario, 0.2 percentage points under the baseline scenario, and nearly 0.4 percentage points under the optimistic scenario. The CEA notes, however, that "[t]he boost to the level of GDP is temporary, and is followed by a drop that slightly more than reverses the increase, reflecting the slightly lower level of sales in the 'payback' period" (CEA 2009). Regarding job growth, the CEA estimates that Cash for Clunkers created around 20,000 job-years in the second half of 2009 under the pessimistic scenario, 35,000 job-years under the baseline scenario, and 60,000 job-years under the optimistic scenario (CEA 2009).

What About Used Cars?

To our knowledge, the analysis by NHTSA is the only study to date that even mentions the impact of Cash for Clunkers on the used-car and salvage markets. NHTSA only briefly addresses the used-car market in its report to Congress; the entirety of its analysis of that market is contained in the following paragraph:

> Used vehicle prices increased for the six-month period prior to the start of the program. This trend in price increase has been sustained since. While the CARS program further restricted the supply of secondary market vehicles, the majority of vehicles traded in were older and had higher mileage than the average vehicle in the secondary market. In the case that the trade-in vehicle was not high mileage, they were likely to have been in poor condition or in need of repairs exceeding their value, indicating that their net worth was less (sic) likely less than the maximum $4,500 credit allowed under the CARS program. Overall, used vehicle prices have increased over the past 9 months while used vehicle pricing in the lower price tiers ($5,000 and below) has remained steady in September 2009 (NHTSA, Report, 2009).

We intended, as part of this study, to more formally analyze the impact of Cash for Clunkers on used-car sales in the study area. Unfortunately, due to low response from used-car dealers, and due to inconsistencies in the data set, the evidence regarding the impact of the program on the used-car market is inconclusive. Our a priori assumption, based on economic theory, was that used-car sales in the study area would be adversely affected by the program's implementation. This comports with the notion that, at least to some extent, new and used motor vehicles serve as substitutes for one another. An incentive that encourages new-car purchases should thus cause a reduction in spending on used vehicles.

Some used-car dealers who responded to the survey reported decreased sales during the CARS rebate period, as was expected. However, contrary to our assumption, nearly an equal number of respondents reported that sales of used cars at their lots actually increased during the rebate period. The only plausible explanation for this result is that demand for all vehicles increased as the announcements and advertisements associated with the Cash for Clunkers program created a kind of "car-buying mindset" among consumers (as is consistent with Type 5 consumers in Table 2).

There is another manner in which used-car dealers may have been affected by the Cash for Clunkers program, and which NHTSA alludes to in its statement above. Under ordinary circumstances, vehicles traded in at a new dealership are generally sold into the after-market and eventually make their way to used-car lots. Vehicles traded in through Cash for Clunkers were disabled, thereby reducing the number of used cars sold into the after-market. More than one used-car dealer reported that its operations were adversely affected by the reduction in after-market vehicles. Several used-car dealers reported that sales decreased immediately after the CARS rebate period, although it is not clear whether their sales declined due to the cessation of the car-buying mentality among consumers or due to a lack of available inventory.

Because responses we received from used-car dealers were so widely divergent, the overall impact of Cash for Clunkers on the used-car market cannot be reliably estimated from our data set. However, the survey responses do point out some obvious areas for future inquiry. In assessing the overall economic impact of a vehicle scrappage program such as Cash for Clunkers, the used-car market cannot simply be ignored (as almost all prior studies have done). Analyzing the impact on the used-car market is especially important in evaluating the redistributional effects of the program. If, as economic theory would suggest, vehicle scrappage programs cause clunker prices to increase, then drivers of clunkers (who may be assumed to be lower-income consumers) are harmed by such programs. Any such impacts have to be carefully weighed against perceived benefits from the program, such as economic stimulus or reductions in emissions.

TABLE 2
Consumer Types in Relation to CARS

Consumer Type	Motivation	Contributed to Stimulus?
1	Was already planning to purchase a qualifying new vehicle during the CARS rebate period	No
2	Would have purchased a qualifying new vehicle in the near future (i.e., during recession) but was enticed into moving up purchase to CARS rebate period	No
3	Would have purchased a qualifying new vehicle in the distant future (i.e., post recession) but was enticed into moving up purchase to CARS rebate period	Yes
4	Would have purchased a used vehicle (in any period) but was enticed into trading up to a qualifying new vehicle	Yes
5	Enticed by "car-buying mindset" into purchasing a used vehicle or non-qualifying new vehicle during CARS period	Yes

Other industry experts weighed in on the size and timing of the payback effect. Ford's President of the Americas, Mark Fields, "estimated about thirty percent to forty percent of its [Ford's] clunker sales were 'truly incremental,' meaning that they came from consumers who had no plans previously to buy a car. The rest, he said, came from people who were going to buy a car later on" (Strumpf and Fowler 2009). GM's Executive Director of Global Market and Industry Analysis, Michael DiGiovanni, estimated that only "about 200,000 of the 700,000 sold under the clunkers program were pulled ahead from future months" (Welch and Kiley 2009). Moody's Investors Service estimated that "About sixty percent of the vehicles sold with clunker rebates were purchased by consumers who were not otherwise intending to buy" (Bennett 2009). Economic consulting firm IHS Global Insight estimated that Cash for Clunkers increased motor vehicle sales by about 600,000 units for 2009 (IHS Global Insight 2009). J.D. Power and Associates estimated a net increase of 300,000 new vehicles sold in 2009 due to Cash for Clunkers, but the industry forecaster also lowered its projection slightly for new-car sales in 2010 due to the program (J.D. Power and Associates 2009). Leading economic consulting firm Macroeconomic Advisers, advancing a viewpoint similar to that of Edmunds.com, argued that "almost all the sales under this program just moved forward transactions that would otherwise have taken place over the next several months" (Macroeconomic Advisers 2009).

The most comprehensive analysis of Cash for Clunkers to date is the study by NHTSA published in December 2009 as a report to Congress. Because NHTSA administered the program, the agency had access to data not (yet) readily available to other analysts. The NHTSA study concluded that Cash for Clunkers added $6.8 billion to GDP, contributing significantly to GDP growth in the third quarter of 2009 and leading to more than 60,000 jobs created or saved (NHTSA, Report, 2009).

In calculating the size of the payback effect, NHTSA relied on survey data gathered from consumers who actually participated in Cash for Clunkers. In principle, data collected directly from consumers participating in the program should provide the best insight into the size and timing of the payback effect. However, one of the results of the NHTSA's consumer survey casts significant doubt on the survey's validity. The surprising result is that 35 percent of the respondents, all of whom traded in clunkers, indicated that they would not have replaced their vehicles in the absence of the CARS incentive. We can assume only that participants who responded this way meant that they would not have traded in their vehicles in the absence of the government incentive but rather sold them with the

The Payback Effect

The size and timing of the payback effect associated with Cash for Clunkers became a major point of contention between the White House and analysts at Edmunds.com in the fall of 2009. Edmunds.com argued that of the roughly 690,000 vehicles sold nationally through Cash for Clunkers, only 125,000 represented true incremental sales; that is, sales above and beyond what would have ultimately occurred without the incentive program (Edmunds.com 2009). Edmunds.com examined the historical relationship between the sales trend for luxury (and other non-qualifying vehicles) as a percentage of the sales growth rate for motor vehicles overall. Examining sales of non-qualifying vehicles during the CARS rebate period, the Edmunds.com analysts derived estimates of what sales for CARS-qualifying vehicles would have been if Cash for Clunkers had not been instituted. The Edmunds.com team concluded that, although sales of new cars in July and August were substantially higher than would have been the case without Cash for Clunkers, sales in the last four months of 2009 were actually lower than they would have been if CARS had not existed. More succinctly, the Edmunds.com study concluded that consumers shifted a sizable portion of their spending on new cars forward from the latter part of the year into the CARS rebate period.

Through its blog site, the White House disputed the results of the Edmunds.com study, pointing out that "[t]he Edmunds' analysis rests on the assumption that the market for cars that didn't qualify for Cash for Clunkers was completely unaffected by this program. . . . This analysis ignores not only the price impacts that a program like Cash for Clunkers has on the rest of the vehicle market, but the reports from across the country that people were drawn into dealerships by the Cash for Clunkers program and ended up buying cars even though their old car was not eligible for the program" (Weisenthal 2009).

expectation that the sale price of the vehicles would be greater than the trade-in values or continued to drive them. Such respondents may still have purchased a new vehicle in the near future, and so this group of responses to the NHTSA survey provides little useful information regarding the size or the timing of the payback effect.

Initial Impact on New Vehicle Sales

We estimate that between 307 and 701 new motor vehicles were sold in St. Charles County during the CARS rebate period that would not have been sold in the program's absence. The range is necessarily large because of the small sample size; however, our best estimate is that new-car dealers in the county sold a total of about 504 vehicles during the CARS rebate period due to the program. The average price of a new vehicle sold as a result of Cash for Clunkers in St. Charles County was $22,549. Based on these figures, new-car sales in the county were between $6.9 million and $5.8 million higher during the CARS rebate period than they would have been without the program. Our best estimate is that new vehicle sales in the county were $11.4 million higher than what they would have been in the program's absence. Additionally, new-car dealers in the county netted, on average, about $73 per disabled clunker (disposal costs subtracted from salvage revenues). This translates into estimated additional revenues for new-car dealers ranging from $39,135 to $89,360 for selling the disabled clunkers.

These estimates represent the initial direct impact of the Cash for Clunkers program on new-car sales in the county. Due to the multiplier effect associated with an increase in spending, the ultimate impact on the county's economy is larger than the stated amounts. We estimate that the county's output increased between $11 million and $25.2 million—after taking the multiplier effects into account—due to the initial round of incremental spending associated with Cash for Clunkers. Additionally, due to the program's implementation, between 25 and 56 jobs were added in the county, although, as NHTSA points out, "[w] hile hiring of both dealer sales personnel and manufacturer production staff would be likely responses to the sales spike that resulted from CARS, it is not clear whether added jobs created by this activity will be temporary or permanent" (NHTSA, Report, 2009). In our view, any job creation attributable to CARS was likely only temporary in nature, diminished by the payback effect. In fact, to the extent auto dealers and firms in related industries anticipated a payback effect, the predicted job creation may not have occurred at all, and may instead have taken the form of overtime for current employees.

Table 3 summarizes the estimated economic impacts on St. Charles County of the Cash for Clunkers program.

It is important to bear in mind that the estimates in Table 3 only represent the one-time spike in new-car sales that occurred over the CARS rebate period (and are attributable to the program's existence); the estimates do not take into consideration the payback effect discussed above. Although some used-car dealers in the survey reported an increase in sales immediately following the rebate period, none of the new-car dealers reported an increase. On average, new-car dealers indicated a drop in normal sales levels of 23 to 30 percent in the months following the Cash for Clunkers rebate period. The surveys were distributed approximately three months after the end of the rebate period, which means that new-car dealers experienced lower-than-normal sales for at least that number of months. Based on the average decline in sales reported by new-car dealers in the survey, we estimate that between 51 percent and 67 percent of the new vehicles sold in St. Charles County due to Cash for Clunkers were pulled forward—or paid back—from the three-month period immediately following the rebate period. In other words, at least half, and as much as two-thirds, of the vehicle sales that occurred through the program would have taken place anyway before the end of 2009.

The Relevance of St. Charles County

St. Charles County, selected as the study area primarily due to its proximity to the research team, has an unemployment rate (8.5 percent) that is marginally less than the state's rate of 9.2 percent (December 2009 reported figures, not seasonally adjusted), although the unemployment rate in the St. Louis Metro Area has hovered near the national rate through the better part of the recession (U.S. Bureau of Labor Statistics 2010a and 2010b). In other words, the recession that began in December 2007 has resulted in an unemployment profile for St. Charles County similar to that of the rest of the state and not drastically different from the national average. In the months leading up to the implementation of Cash for Clunkers, the St. Louis region suffered a number of plant closings and mass layoffs similar to those that have occurred in other parts of the country. These negative economic factors have affected residents of the study area, particularly the layoffs and temporary closing of the General Motors assembly plant located in the county, which occurred in the summer of 2009.

There is no reason to believe St. Charles County residents' preferences with respect to new versus used automobiles differed greatly from those of similarly situated consumers in other suburban areas of the country. Yet it is important to note that the county does differ from the average suburban county in two important ways. First, according to Census Bureau projections, St. Charles County has been one of the nation's fastest growing counties in recent years, with an estimated population growth rate of 23 percent from 2000 to 2008 (U.S. Census Bureau 2010a). Second, St. Charles County is the wealthiest county in the state, with a median household income in 2007 of approximately $68,000 compared to a median household income for the state of $45,000 and the nation of approximately $51,000 (U.S. Census Bureau 2010a and 2010b).

One other noteworthy difference between the study area and the average U.S. suburban county is the presence of the aforementioned General Motors assembly plant in the city of Wentzville. To the extent persons affiliated with the GM plant demonstrate a preference for GM

Photo: Missouri State Archives, Commerce and Industrial Development Collection

The Multiplier Effect and Job Creation

The general idea of the multiplier effect is that a dollar spent in the regional economy ultimately translates into more than a dollar's worth of spending. For example, the auto dealership that sells more cars—due to a government incentive program or otherwise—must purchase more supplies such as fuel, stationery, etc. A portion of those purchases will be from other firms in the region. In turn, those firms that supply inputs to the auto dealer must purchase more inputs for themselves, and so on. Also, beyond some threshold, more direct spending will necessitate firms hiring more workers, and those workers will spend part of their incomes in the region, further contributing to the multiplier effect.

We used the output multiplier for the motor vehicle retail sales sector from the regional economic model IMPLAN (Minnesota IMPLAN Group, Inc.) to estimate the total economic impact of the increase in direct sales in new motor vehicles. We also derived estimates for direct government expenditures on CARS vouchers in the county. According to NHTSA, "The CEA estimates that $92,000 of direct government spending creates one job-year" (NHSTA, Report, 2009). Applying this ratio to the estimated direct government expenditures in the county for CARS vouchers, we calculated estimates for the number of jobs created in the county due to the Cash for Clunkers program.

products, the results of the survey may be skewed, but only with respect to the mix (as opposed to the volume) of new vehicles sold under Cash for Clunkers. Then too, the mere presence of auto manufacturing in the county implies that the final impact on output and employment of Cash for Clunkers will be greater than would be the case for a county that has no auto manufacturing presence. However, because of the EPA fuel-efficiency ratings of the particular van models assembled at the Wentzville plant (the Chevrolet Express and the GMC Savana), the impact of Cash for Clunkers on auto production in the county was likely modest.

Methodology

Twenty two new-car dealerships in St. Charles County participated in Cash for Clunkers. The research team hand-delivered surveys (described in greater detail below) to managers at each of these dealerships. We asked dealers participating in the survey not to identify their personal names or their companies. We distributed the surveys approximately three months after the conclusion of the rebate period, allowing respondents time to assess the impacts of the program on their sales in the period immediately following the CARS rebate period.

A few weeks later, the research team paid each dealer a second visit. During these follow-up visits, the research team asked if the manager had completed the survey. If not, we left another copy and again asked for the manager's participation. Twelve dealers responded in the initial round. One additional dealer responded after the follow-up visits. There was no follow-up round of surveys for used-car dealers. Out of 47 new- and used-car dealers in the study area that received surveys, 23 of them responded for an overall response rate of 49 percent. More important, though, is the response rate for new car dealers since the primary economic impact of vehicle scrappage programs such as Cash for Clunkers occurs through sales of new vehicles. Of the population of new-car dealers in the county that participated in Cash for Clunkers, 59 percent completed and returned surveys.

In calculating the total direct impact of Cash for Clunkers on new-car sales in the county, we added new-car sales reported by the survey respondents to estimated new-car sales of non-respondents. To arrive at an estimate of new-car sales for non-responding dealers, we devised a method for attributing sales figures to non-respondents while maintaining the anonymity of respondents. Survey responses representing sales due to Cash for Clunkers were adjusted to account for respondent size (i.e., number of cars on the lot). The adjustment might be viewed as something akin to the per capita GDP calculation. For example, if a dealership that carries 100 vehicles on the lot on average reported that it sold 50 vehicles through the CARS program, its "per capita" sales volume would be 0.5 vehicles. This figure was determined for all new-dealer respondents and an average was calculated. Applying a margin of error that is consistent with a ninety percent confidence interval, we derived a range for the estimated total number of vehicles sold in the county due to the Cash for Clunkers program. Using the weighted-average

TABLE 3
Economic Impacts of CARS on St. Charles County

Variable Impacted	Estimated Range	Best Estimate
New motor vehicles sold due to CARS program	307 to 701	504
Increase in direct sales (new motor vehicles) due to CARS program	$6.9 million to $15.8 million	$11.4 million
Net salvage revenues for disabled clunkers	$39,135 to $89,360	$64,248
Total CARS vouchers submitted	536 to 1,224	880
Total direct government spending on CARS vouchers	$2.3 million to $5.1 million	$3.7 million
Total initial increase in output due to CARS program (i.e., with multiplier effects)	$11 million to $25.2 million	$18.1 million
Total increase in employment (number of jobs added) due to CARS program	25 to 56	40

sales price per new vehicle sold, along with the estimated number of new vehicles sold, we calculated a range for the estimated total sales in the county attributable to Cash for Clunkers.

Conclusion

The results in Table 3 make it appear as though the federal government achieved its primary goal of stimulating economic activity. Direct government spending in the county in the amount of $3.7 million led to an increase in economic output of $18.1 million. However, as noted in the previous section, the output estimate represents a one-time spike in economic activity. If the payback effect continued into 2010, then it might ultimately be the case that the spending on CARS vouchers generated little economic activity above and beyond what would have occurred in the program's absence.

We estimated that approximately 880 CARS vouchers were turned in by new-car dealers in the county, but that possibly 376 new vehicles would have sold during the rebate period anyway. For the 504 vehicles that sold during the CARS period due to the incentive, the federal government paid about $7,300 per traded-in clunker—not the average voucher amount of $4,209 reported by NHTSA. Using the most conservative estimate of the payback effect, based on the survey data, 51 percent of the 504 vehicles—or 257 vehicles—would have sold anyway in the three months following the rebate period. The sales of those 257 vehicles did not contribute to an economic stimulus because they were pulled forward from a time period when the economy was still in recession. For the remaining 247 vehicles, the government paid about $14,980 per traded-in clunker. The true cost per clunker purchased by the government could be even higher if the payback effect continued into the early months of 2010. (Edmunds.com [2009] estimated that the government ultimately paid around $24,000 per clunker, which is close to the $22,290 per clunker figure we calculated using our least conservative estimate of the payback effect.)

Accurately quantifying the payback effect is, in our view, the most important issue in assessing the true stimulative impact of vehicle scrappage programs such as Cash for Clunkers. Even though NHTSA collected data from consumers who participated in the program, the questions regarding the payback effect on the national level remain unanswered, at least in our minds, due to apparent problems with the NHTSA survey. Our estimates of the payback effect for St. Charles County are more in line with those of Edmunds.com and Macroeconomic Advisers than with the NHTSA. There is still much disagreement among experts regarding this issue, and so it is clearly a key area for further study.

We did not attempt to assess the environmental impact of Cash for Clunkers on the study area. Moreover, it is clear that the government's environmental goal was secondary to that of stimulating the auto industry. We also did not attempt to analyze the impact on sales tax revenue or fuel tax revenue even though both are important public policy issues.

As mentioned in a previous section, the survey solicited suggestions for improving the Cash for Clunkers program. Several auto dealers, both new and used, expressed concern that the clunker rebates were available for foreign-made vehicles. Several used-car dealers expressed frustration that the program failed to provide help to small independent businessmen. Some new-car dealers indicated that the program was unduly burdensome from an administrative standpoint. One dealer's comments sum up this attitude well: "It would have been better if the paperwork and processing burden wouldn't have been put on the dealership. Maybe a prequalified voucher system would have been better. It was very stressful for us and was a huge burden that caused massive overtime to complete."

Other data from new-car dealers support the claim that the program was replete with administrative problems. The average length of time new dealerships waited to receive voucher payments from the federal government ranged from eighteen days to sixty days, and nearly all of the new-car dealers who responded indicated that their business operations were effected by delays in receiving payment (a few respondents even stated that delayed payments created cash-flow problems). The majority of new-car dealers also indicated that their sales were hampered by issues with depleted inventory, which implies that dealers did not have adequate time to ramp up for the program, and/or the cash-flow problems associated with delayed voucher payments prevented them from replenishing inventories in a timely manner.

In spite of these administrative problems, the NHTSA claims that Cash for Clunkers was a success. Based on our results, it appears that the program increased economic activity in St. Charles County, but there is evidence that the economic activity may not have been sustained. Any job creation in the county due to the program was likely of limited duration. To the extent there were Type 3 and Type 4 consumers (see Table 2) purchasing new vehicles during the rebate period, new-car dealers in the county benefited. To the extent there were Type 5 consumers making purchases, new- and used-car dealers benefited (although the presence of Type 4 consumers in the market harmed used-car dealers). It is assumed that all consumers who participated in the program benefited, otherwise they would not have taken advantage of the rebate. However, as we have already pointed out, the cost of the program on a per-voucher basis, at least for St. Charles County, was much greater than the government-issued statistics reveal. It is these costs that must be considered when weighing the ultimate costs and benefits—and thus the overall success or failure—of the Cash for Clunkers program.

SOURCES

Allan, Alexander, Rachel Carpenter, and Geoff Morrison, 2009. "Abating Greenhouse Gas Emissions through Cash-for-Clunkers Programs." Institute of Transportation Studies, University of California Davis, Research Report UCD-ITS-RR-09-26. http://pubs.its.ucdavis.edu/publication_detail.php?id=1321 (accessed January 2010).

Bennett, Jeff. "Car Makers Upbeat as Sales Rebound," *Wall Street Journal*, September 2, 2009, p. B1.

Council of Economic Advisers, Executive Office of the President. September 10, 2009. "Economic Analysis of the Car Allowance Rebate System ("Cash for Clunkers")." http://www.whitehouse.gov/assets/documents/CEA_Cash_for_Clunkers_Report_FINAL.pdf (accessed January 2010).

Edmunds.com. October 28, 2009. "Cash for Clunkers Results Finally In: Taxpayers Paid $24,000 per Vehicle Sold." http://www.edmunds.com/help/about/press/159446/article.html (accessed January 2010).

IHS Global Insight, August 31, 2009. "Forecast and Analysis: Industry and Production Outlook – Light Vehicles: Outlook for Light Vehicle Production."

J.D. Power and Associates, Press Release by J.D. Power and Associates, August 20, 2009. "Strong Consumer Response to CARS Program Expected to Lift August New-Vehicle Retail Sales to Highest Level in the Past Year."

Klier, Thomas, July 10 2009. "'Clunkers for Cash' Sells Cars, Hikes Fuel Economy." http://midwest.chicagofedblogs.org/archives/2009/07/cash_for_clunke.html (accessed December 2009).

Macroeconomic Advisers. September 3, 2009. "Outlook Commentary."

Minnesota IMPLAN Group, Inc., IMPLAN System (data and software), 1725 Tower Drive West, Suite 140, Stillwater, MN 55082 www.implan.com.

National Highway Traffic Safety Administration, U.S. Department of Transportation. Consumer Assistance to Recycle and Save Act of 2009. "Report to the House Committee on Energy and Commerce, the Senate Committee on Commerce, Science and Transportation and the House and Senate Committees on Appropriations," December 2009. http://www.cars.gov/files/official-information/CARS-Report-to-Congress.pdf (accessed January 2010).

National Highway Traffic Safety Administration, U.S. Department of Transportation. Consumer Assistance to Recycle and Save Act of 2009. Final Rule: "Requirements and Procedures for Consumer Assistance to Recycle and Save Program." http://www.cars.gov/official-information/the Rule.pdf (accessed December 1, 2009).

REMI (Regional Economic Models, Inc.), WebEx recording, Seminar first presented August 11, 2009. https://remi.webex.com/cmp0306l/webcomponents/docshow/docshow.do?siteurl=remi&setupStatus=1 (accessed September 2009).

Shaheen, Susan, Randall Guensler, and Simon Washington, January 1994. "Vehicle Scrappage Programs: Are Some Sectors of Society Paying More For Clean Air?" Environmental Ethics/Equity, Session 3C. Reference Number: UCD-ITS-RP-94-46. Series: Presentation Series. http://transaq.ce.gatech.edu/guensler/publications/others/NAEP94shaheen.pdf (accessed December 2009).

Strumpf, Dan and Bree Fowler. Associated Press, August 28, 2009. "Ford Exec Sees U.S. Auto Sales Rising in August."

U.S. Bureau of Labor Statistics. Local Area Unemployment Statistics, Unemployment Rates for Large Areas. http://data.bls.gov:8080/PDQ/outside.jsp?survey=la (accessed January 2010).

U.S. Bureau of Labor Statistics (a), Labor Force Statistics for the Current Population Survey. http://data.bls.gov/PDQ/servlet/SurveyOutputServlet?data_tool=latest_numbers&series_id=LNS14000000 (accessed January 2010).

U.S. Census Bureau (b), State and County Quickfacts (a). http://quickfacts.census.gov/qfd/states/29/29183.html (accessed January 2010).

U.S. Census Bureau, State and County Quickfacts (b). http://quickfacts.census.gov/qfd/states/00000.html (accessed January 2010).

Weisenthal, Joe. *Business Insider,* October 29, 2009. "The White House Stupidly Goes To War With Car Web Site Edmunds.com." http://www.businessinsider.com/the-white-house-stupidly-goes-to-war-with-car-website-edmundscom-2009-10, (accessed January 2010).

Welch, David and David Kiley. "After the Clunker Party, an Auto Sales Hangover," Business Week, posted on September 1 2009, 6:00 PM, accessed January 2010 at http://www.businessweek.com/print/bwdaily/dnflash/content/sep2009/db2009091_796652.htm.

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NOTES

[1] UNOCAL was once a major oil exporter and marketer that in 2005 merged with Chevron Corporation.

[2] Unlike Cash for Clunkers, the SCRAP program did not require participants to purchase a replacement vehicle (Shaheen, et al. 1994).

[3] Vehicle scrappage programs initiated in 2009 in France, Italy, Portugal, Spain, Luxembourg, Cyprus, the United Kingdom, and the U.S. had the stated goals of stimulating the auto industry and reducing greenhouse gas emissions (Allan, et al. 2009).

[4] 12,272 transactions that did not meet CARS program criteria were cancelled by the dealers or NHTSA (NHTSA 2009).

[5] The base MSRP is the price on the window sticker before any dealer accessories, optional equipment, taxes, or destination charges are added.

[6] Car buyers in New Hampshire and Wisconsin were exempted from this rule, as those states have no insurance requirement under state law.

[7] Salvagers were permitted to strip and resell all parts of the traded-in clunkers except for the engines.

[8] Consumers who purchased luxury vehicles or other non-qualifying vehicles during the rebate period and were already planning to do so are not considered in this classification scheme. Clearly purchases in this category cannot be attributed to Cash for Clunkers.

[9] In order to estimate the incremental or CARS-induced sales, the CEA calculated a figure for normal monthly clunker-replacement in the absence of Cash for Clunkers. The CEA assumptions about the payback effect were based on information from multiple sources, including Ford Motor Company, General Motors, J.P. Morgan, Moody's Investors Service, Goldman Sachs, IHS Global Insight, and the Federal Reserve Bank of Chicago. The CEA further analyzed the payback effect by examining two prior periods in which new vehicle sales were boosted through financial incentives programs: the zero-percent financing and other incentive programs offered following the September 11, 2001, terrorist attacks in New York and the expiration of employee discount pricing incentives in 2005 (the idea of the latter being that the period just prior to the expiration of employee pricing incentives would see a CARS-type increase in new-car sales) (CEA 2009).

[10] NHTSA acknowledges the improbability of this result and makes an adjustment for it (NHTSA 2009). Still, this surprising and unlikely result casts significant doubt on the validity of the survey instrument and/or the method of collection.

[11] This figure represents a weighted average (weighted by number of vehicles sold as a result of CARS).

[12] This figure represents a weighted averaged, with the number of clunkers accepted for trade serving as the weight.

[13] As a check of our estimates, we compared the total CARS vouchers submitted in the county using our estimation method with the total CARS vouchers submitted using a "top-down" estimation method. For the top-down method we multiplied the ratio of St. Charles County's population to the state's population by the number of CARS vouchers submitted in Missouri from the NHTSA database. The top-down method yields an estimated number of vouchers submitted for the county that is very close to the 880 vouchers we estimate using our "bottom-up" method.

[14] Bureau, but most residents would likely consider it more suburban in nature.

[15] Given that our survey was anonymous, we did not solicit data from auto dealers regarding the specific makes and models of vehicles sold through CARS.

[16] Our estimation technique captures any added production and employment that occurred at the Wentzville GM plant due to CARS-induced sales that took place in the county. But CARS-induced sales of the particular models produced at the Wentzville plant that occurred outside the county are not be captured in the results. This impact is likely to be small; Chevrolet and GMS together accounted for only about fourteen percent of total sales of all the makes of vehicles of sold through Cash for Clunkers. Moreover, Category 2 and Category 3 trucks only accounted for about 7 percent of the vehicle types sold through CARS.

[17] With the exception of one dealership, whose manager was not available at the time of the research team visits.

[18] For the purposes of this study, cars sold as part of Cash for Clunkers includes vehicles for which consumers received the CARS rebate, as well as new vehicles that did not qualify for the rebate but for which the dealer chose to grant the rebate anyway (out of the dealer's own profits).

[19] This figure does not include the NHTSA's administrative costs.

[20] The output multiplier used from IMPLAN is "Retail Stores – Motor Vehicle and Parts," Industry Code 320.

[21] This was achieved by calculating the ratio of submitted vouchers to cars sold due to Cash for Clunkers for the sample and then applying that ratio to the estimated number of cars sold by all new-car dealers due to the rebate. The average voucher amount was around $4,200, according to our survey as well as the NHTSA data.