

April 2010

AUTO INDUSTRY

Lessons Learned from Cash for Clunkers Program



GAO

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Highlights of [GAO-10-486](#), a report to congressional committees

Why GAO Did This Study

In July and August 2009, the federal government implemented the Consumer Assistance to Recycle and Save (CARS) program, or “Cash for Clunkers,” a temporary vehicle retirement program that offered consumers a monetary credit (\$3,500 or \$4,500) to trade in an older vehicle for a new, more fuel-efficient one. The National Highway Traffic Safety Administration (NHTSA) was responsible for administering the program, and GAO was required to review the program’s administration. This report examines (1) what is known to date about the extent to which the CARS program achieved its objectives; (2) what stakeholders’ experiences were with the CARS program; and (3) how the CARS program compares to other selected domestic and international vehicle retirement programs.

To address these issues, GAO reviewed the CARS legislation and implementing regulations, a required NHTSA report to Congress on the program’s efficacy, and CARS program transaction data. GAO also contacted officials from NHTSA and the Environmental Protection Agency (EPA); representatives of industry organizations and academics; as well as CARS program stakeholders, including representatives from consumer groups, scrap and salvage industries, automobile manufacturers, vehicle dealerships, and charities. GAO also interviewed officials from other domestic and international vehicle retirement programs and reviewed information about these programs.

View [GAO-10-486](#) or [key components](#). For more information, contact A. Nicole Clowers at (202) 512-2834 or clowersa@gao.gov.

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What GAO Found

Members of Congress and administration officials articulated two broad objectives for the CARS program: (1) help stimulate the economy and (2) put more fuel-efficient vehicles on the road. The program achieved these broad objectives; however, the extent to which it did so is uncertain. For example, nearly 680,000 consumers purchased or leased vehicles using the program’s credit, yet some of these sales would have happened anyway. Among others, NHTSA estimated how many sales were directly attributable to the program. In its report to Congress, the agency estimated that 88 percent of the 677,842 CARS transactions approved at the time of its report were directly attributable to the program. Additionally, NHTSA found that the average combined fuel economy of new vehicles purchased or leased under the program was 24.9 miles per gallon, compared with 15.7 miles per gallon for vehicles traded in. According to the agency, however, the entire difference in combined fuel economy may not have been a direct result of the program. NHTSA also estimated that the program reduced fuel consumption for the typical CARS participant. NHTSA based these estimates on a consumer survey that it designed and implemented. However, largely because it had limited time to establish and administer the program, NHTSA did not follow some generally accepted survey design and implementation practices, thereby posing a potential risk to the reliability of estimates based on the survey data.

Stakeholders in the CARS program reported varied experiences. Specifically, the program benefited eligible consumers, providing them with a monetary credit to help purchase or lease a new vehicle. GAO found that participation in the program was distributed across the country and reflected the U.S. population distribution. Many consumers contacted the Department of Transportation (DOT) about the program, but DOT officials reported that no systemic problems with the program were identified through these contacts. Representatives of scrap and salvage industries reported that the impact of the CARS program was mixed. Automobile manufacturers and eligible dealerships generally benefited from the increased sales the program generated, even though they identified some administrative challenges. Representatives GAO spoke with about the impact on used vehicle dealerships and charities reported mixed experiences during the program and said it would be difficult to isolate the impact of the CARS program.

The CARS program and most other vehicle retirement programs GAO reviewed shared some similarities, but differed in their objectives, eligibility criteria, and incentives. Most of the programs required that the trade-in vehicle be operational and registered. However, only the CARS program used fuel economy as a criterion for the trade-in vehicle, while other programs used different criteria, such as the vehicle’s age or emissions. Moreover, while the CARS program established a price ceiling for the new vehicle, only one other program included such a criterion. All of the programs used monetary incentives to encourage participation, but the average CARS monetary credit—about \$4,200—was larger than other programs’ incentives, which ranged from about \$300 to \$3,500.

DOT and EPA commented on this report and provided technical comments, which GAO incorporated, as appropriate. DOT discussed the successes of the program and noted the limited time NHTSA had to design and implement the program’s consumer survey.

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Abbreviations

CARS	Consumer Assistance to Recycle and Save
CEA	Council of Economic Advisers
DOT	Department of Transportation
EPA	Environmental Protection Agency
NHTSA	National Highway Traffic Safety Administration
NMVTIS	National Motor Vehicle Title Information System
OMB	Office of Management and Budget
TARP	Troubled Asset Relief Program

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United States Government Accountability Office
Washington, DC 20548

April 29, 2010

The Honorable Henry A. Waxman
Chairman
The Honorable Joe Barton
Ranking Member
Committee on Energy and Commerce
House of Representatives

The Honorable Jay Rockefeller
Chairman
The Honorable Kay Bailey Hutchison
Ranking Member
Committee on Commerce, Science,
and Transportation
United States Senate

The recent financial crisis has affected many sectors of the economy, including the auto industry. Domestic automobile manufacturers and foreign manufacturers with production facilities in the United States have seen vehicle sales decrease and some factories idle. These decreasing sales have, in turn, contributed to layoffs of auto workers and declining revenues for dealerships and automotive parts suppliers. The federal government has taken steps to assist the ailing domestic auto industry in an effort to improve the economy. For example, the Department of the Treasury has provided more than \$80 billion in financial assistance to the domestic auto industry since December 2008.¹ Over fourth-fifths (or approximately \$67 billion) of that financial assistance was provided to two of the nation's three largest automobile manufacturers—Chrysler Group LLC and General Motors Company—and the federal government now has an unprecedented ownership stake in both of those manufacturers.

¹In December 2008, the Automotive Industry Financing Program was established under the Troubled Asset Relief Program (TARP). Through the Automotive Industry Financing Program, the Department of Treasury provided about \$67 billion to help Chrysler and GM continue operating as the companies restructured. In exchange for the funding it provided, the Department of Treasury received 9.85 percent equity in the new Chrysler, 60.8 percent equity and \$2.1 billion in preferred stock in the new GM, and about \$13.8 billion in debt obligations between the two companies. For more information on the Automotive Industry Financing Program, see GAO, *Troubled Asset Relief Program: Continued Stewardship Needed as Treasury Develops Strategies for Monitoring and Divesting Financial Interests in Chrysler and GM*, [GAO-10-151](#) (Washington, D.C.: Nov. 2, 2009).

The federal government has also sought to help manufacturers manage the capital costs associated with producing advanced technology vehicles. In 2007, Congress established the Advanced Technology Vehicle Manufacturing loan program, which offers low-cost loans to automobile manufacturers and component parts suppliers to retool aging plants or build new plants that will lead to the production of advanced vehicles that are at least 25 percent more fuel-efficient than current vehicles for sale or advanced technology components for these new vehicles.²

To further aid the auto industry and boost the economy, President Obama signed into law the Consumer Assistance to Recycle and Save (CARS) Act on June 24, 2009.³ The act directed the Secretary of Transportation to establish and administer a vehicle retirement program through which owners of vehicles meeting statutorily specified criteria could receive a monetary credit for trading in their vehicle and purchasing or leasing a new, more fuel-efficient vehicle. The act originally appropriated \$1 billion for the CARS program (commonly known as “Cash for Clunkers”) and established a period of eligibility between July 1, 2009, and November 1, 2009. The National Highway Traffic Safety Administration (NHTSA) had responsibility for developing the implementing regulations for and administering the program. The act required NHTSA to publish the program’s final implementing regulations within 30 days of enactment. NHTSA carries out highway safety and consumer programs and sets fuel economy standards for passenger cars and light trucks sold in the United States, but had no previous experience overseeing a vehicle retirement program.⁴ NHTSA established the program’s implementing regulations within the time required by the CARS Act on July 23, 2009, and eligible vehicle dealerships began submitting applications for the program’s credit on behalf of participating consumers beginning July 27, 2009. High consumer interest during the first days of the program led Congress to

²42 U.S.C §17013.

³Consumer Assistance to Recycle and Save Act of 2009, Pub. L. No. 111-32, tit. XIII, 123 Stat. 1859, 1909-1915 (June 24, 2009).

⁴NHTSA’s primary mission is to save lives, prevent injuries, and reduce economic costs due to road traffic crashes through education, research, safety standards, and enforcement activity.

appropriate an additional \$2 billion for the program on August 7, 2009.⁵ To ensure the program’s appropriated funding would be sufficient for all completed transactions, NHTSA closed the program to new transactions on August 24, 2009, and required all transactions to be submitted for approval by August 25, 2009.

According to the Congressional Research Service, vehicle retirement programs have been used both internationally and domestically—at the state level—to provide an economic incentive for the owners of older or highly polluting vehicles to retire their vehicles permanently from use.⁶ Vehicle retirement programs are currently or have recently been carried out in other countries, including Canada, France, Germany, Italy, Japan, Spain, and the United Kingdom. In addition, since the early 1990s, domestic vehicle retirement programs or related pilot projects have been carried out in a handful of states including California, Colorado, Delaware, Illinois, Texas, and Virginia. The CARS program was the first federal vehicle retirement program in the United States.

The August 7, 2009, legislation that provided supplemental funding for the CARS program also directed us to review the administration of the CARS program within 180 days of the end of its authorization on November 1, 2009. In response, this report addresses (1) what is known to date about the extent to which the CARS program achieved its objectives; (2) what stakeholders’ experiences were with the CARS program; and (3) how the CARS program compares to other selected domestic and international vehicle retirement programs. The Department of Transportation’s (DOT) Inspector General is also issuing its report today; the Inspector General’s report examines the effectiveness of NHTSA’s controls over CARS transactions, implementation challenges, and NHTSA’s progress toward evaluating compliance and accounting for total program costs.⁷

⁵Consumer Assistance to Recycle and Save Program, Supplemental Appropriations, Pub. L. No. 111-47, 123 Stat. 1972 (Aug. 7, 2009). This funding was transferred from the amount made available for the Department of Energy’s Innovative Technology Loan Guarantee Program in the American Recovery and Reinvestment Act of 2009. Pub. L. No. 111-5, 123 Stat. 115 (Feb. 17, 2009).

⁶Congressional Research Service, *Accelerated Vehicle Retirement for Fuel Economy: “Cash for Clunkers,”* R40654 (Aug. 10, 2009); and *A Clean Air Option: Cash for Clunkers*, 96-766 ENR40654 (Sept. 16, 1996).

⁷For information on the DOT Office of Inspector General, see www.oig.dot.gov.

To prepare this report, we reviewed pertinent federal legislation, regulations, and reports, such as the CARS legislation and documents that the legislation directed NHTSA to prepare, including NHTSA's implementing regulations for the CARS program and a report to Congress on the CARS program. We also reviewed NHTSA's regulatory impact analysis of the CARS program, as well as related documents from other federal entities, including the Council of Economic Advisers (CEA), the Congressional Budget Office, the Congressional Research Service, and the Office of Management and Budget (OMB).

In addition, we conducted, summarized, and analyzed in-depth interviews with officials from vehicle retirement programs in California, Texas, Canada, and Germany and reviewed the programs' documentation on areas such as the eligibility criteria and program incentives. We selected vehicle retirement programs for our review that were ongoing or recently completed, were cited by auto industry associations and experts, or were consulted by NHTSA during its development of the CARS program's implementing regulations. We also interviewed officials from Germany's Supreme Auditing Institution which was responsible for evaluating Germany's vehicle retirement program. Finally, we contacted industry experts; academics; consumer groups; and representatives of new and used vehicle dealers, manufacturers, the scrap and salvage industries, and charities that receive vehicle donations. See appendix I for more information about our scope and methodology.

We conducted this performance audit from September 2009 through April 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Under the CARS program, participating consumers received a \$3,500 or \$4,500 credit to purchase or lease an eligible new vehicle. The CARS program required that both the trade-in vehicle and the purchased or leased new vehicle meet certain requirements, including combined fuel

economy thresholds.⁸ In general, for a trade-in vehicle to be eligible as a “clunker,” it had to:

- be in drivable condition;
- have been continuously insured and registered for 1 year or more prior to trade in;
- have been manufactured less than 25 years before the transaction; and
- have a maximum combined fuel economy of 18 miles per gallon.⁹





For a new vehicle to be eligible, it had to be a passenger car, category 1 truck (e.g., sport utility vehicle), category 2 truck (e.g., large van or large pickup truck), or category 3 truck (e.g., very large van or very large pickup truck). The new vehicle also generally had to have a better combined fuel economy than the trade-in vehicle, as determined by the EPA.

The credit amount generally depended on the type and combined fuel economy of both the trade-in and new vehicle. Specifically, in all transactions except those involving category 3 trucks, receiving the higher credit amount required a greater improvement in the combined fuel economy from the trade-in to the new vehicle, although heavier vehicles required a smaller improvement in combined fuel economy than passenger cars to receive the maximum credit (\$4,500). Figure 1 provides additional information on the program’s eligibility criteria and credit amounts.

⁸According to the CARS program’s final implementing regulations, combined fuel economy is an Environmental Protection Agency (EPA) calculation representing the weighted average of a vehicle’s city and highway fuel economy as determined by the method described in EPA implementing regulations at 40 CFR 600.210–08(c).

⁹*Requirements and Procedures for Consumer Assistance to Recycle and Save Program*, 74 Fed. Reg. 37878, 37884 (July 29, 2009).

Figure 1: CARS Program’s Eligibility Criteria and Credit Amounts

Type of new vehicle purchased or leased	The combined fuel economy of the new vehicle must be...	The type of vehicle traded in is...	Amount of credit	
			If the difference in combined fuel economy of the new and trade-in vehicle is...	The credit is...
 Passenger car	At least 22 MPG ^a	Passenger vehicle, category 1 or 2 truck (must have a combined fuel economy rating of 18 MPG or less)	4-9 MPG	\$3,500
			10 MPG or more	\$4,500
 Category 1 truck (e.g., sport utility vehicle)	At least 18 MPG	Passenger vehicle, category 1 or 2 truck (must have a combined fuel economy rating of 18 MPG or less)	2-4 MPG	\$3,500
			5 MPG or more	\$4,500
 Category 2 truck (e.g., large van or large pickup truck)	At least 15 MPG	Category 2 truck (must have a combined fuel economy rating of 18 MPG or less)	1 MPG	\$3,500
			2 MPG or more	\$4,500
		Category 3 truck (EPA does not rate fuel economy of category 3 trucks)	N/A	\$3,500
 Category 3 truck (e.g., very large van or very large pickup truck)	N/A (EPA does not rate fuel economy of category 3 trucks)	Category 3 truck	N/A However, the new vehicle must have an equal or lesser Gross Vehicle Weight Rating	\$3,500

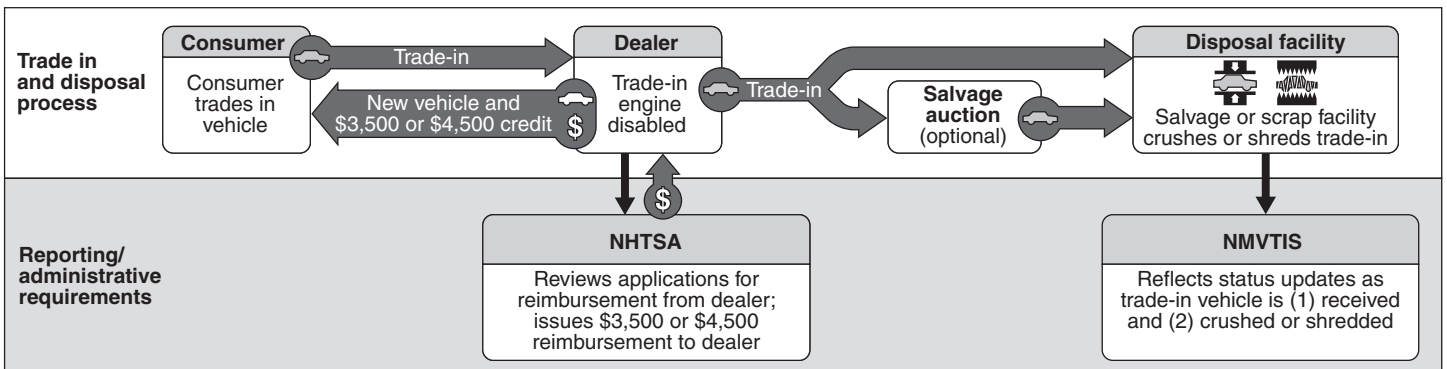
Source: GAO analysis of CARS program regulations.

^aMPG=Miles Per Gallon

Consumers and dealers were required to take several steps to participate in the CARS program (see fig. 2). The consumer had to bring an eligible trade-in vehicle to a dealer and purchase or lease an eligible new vehicle. Then, the dealer had to ensure that both vehicles met the program’s eligibility criteria, provide the consumer with a credit toward the purchase or lease of the new vehicle, disable the engine of the trade-in vehicle, submit a complete application for reimbursement to NHTSA, and arrange for disposal of the trade-in vehicle. To arrange for vehicle disposal, dealers could elect to either transfer the trade-in vehicle directly to a qualified disposal facility or transfer it indirectly via a salvage auction. If the trade-in vehicle was transferred via a salvage auction, only disposal facilities

were eligible to participate in the auction.¹⁰ The qualified disposal facility was required to remove and dispose of all toxic or hazardous vehicle components, crush or shred the vehicle, and report that the vehicle had been received and then crushed or shredded to the National Motor Vehicle Title Information System (NMVTIS) overseen by the Department of Justice.¹¹

Figure 2: CARS Program Process



Source: GAO analysis of CARS program regulations.

The CARS legislation required the Secretary of Transportation, acting through NHTSA, to submit a report to Congress describing the efficacy of the CARS program no later than 60 days after November 1, 2009.¹² NHTSA, a modal administration within DOT,¹³ prepared the report and found that 677,842 vehicles received a credit through the CARS program, with an

¹⁰Disposal facility means a facility listed as eligible to receive a trade-in vehicle for crushing or shredding under the CARS program, except in the case of a U.S. territory. These disposal facilities include (1) salvage facilities—also referred to as automotive recyclers or salvage yards—which recycle automotive parts for reuse and (2) scrap facilities—also referred to as scrap recycling facilities—which shred the vehicles and recycle some of the remaining materials.

¹¹74 Fed. Reg. 38974 (Aug. 5, 2009); 75 Fed. Reg. 5248 (Feb. 2, 2010).

¹²NHTSA, *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* (Dec. 2009) <http://www.cars.gov/files/official-information/CARS-Report-to-Congress.pdf>.

¹³DOT's modal administrations are the departmental units responsible for the different modes of transportation.

average credit amount of \$4,209 (for a total value of \$2,853,416,000).¹⁴ NHTSA's report to Congress also stated that the number of vehicles traded in under the CARS program accounted for less than 1 percent of the total on-road vehicle fleet in the United States. As shown in table 1, the majority of the trade-in vehicles (approximately 85 percent) were category 1 or category 2 trucks, while the majority of new vehicles were passenger cars (approximately 59 percent). Figure 3 illustrates the most common makes of vehicles traded in by participants. According to NHTSA, approximately 49 percent of the new vehicles sold under the program were manufactured by domestic and foreign automobile manufacturers in the United States and the most popular new vehicle makes were Toyota, Ford, Honda, Chevrolet, Nissan, and Hyundai (see fig. 4).

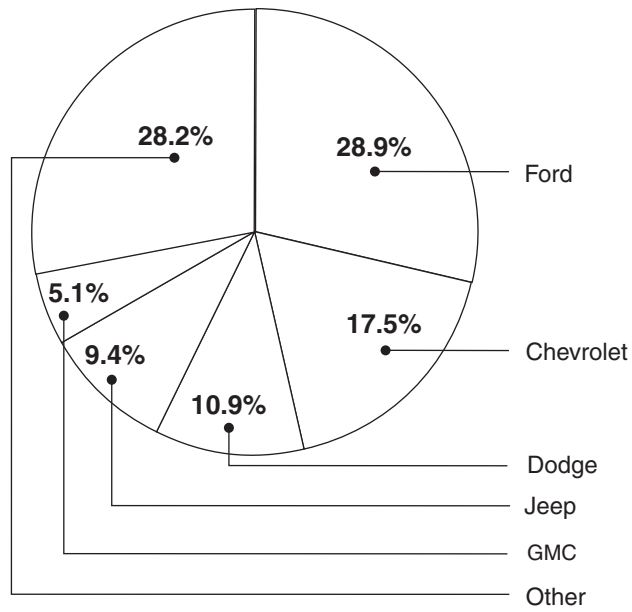
Table 1: Vehicle Categories of Trade-in and New Vehicles

Vehicle category	Trade-in	New
Passenger car		
Total vehicles	94,834	401,274
Percentage of transactions	13.99	59.20
Category 1 truck		
Total vehicles	446,323	225,985
Percentage of transactions	65.84	33.34
Category 2 truck		
Total vehicles	129,732	48,617
Percentage of transactions	19.14	7.17
Category 3 truck		
Total vehicles	6,953	1,966
Percentage of transactions	1.03	0.29
Total	677,842	677,842

Source: NHTSA.

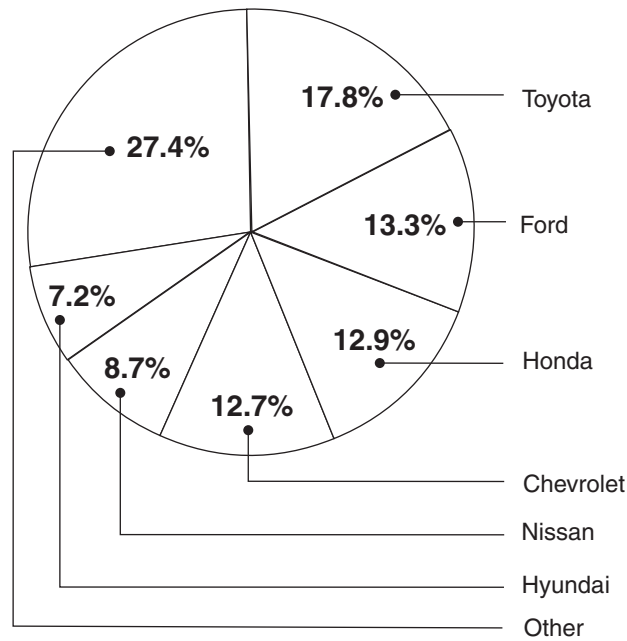
¹⁴In addition to the 677,842 transactions NHTSA found in its report to Congress, NHTSA officials said an additional 401 transactions were paid as of March 15, 2010, and decisions on another 22 transactions were pending.

Figure 3: CARS Program's Top Trade-in Vehicles by Make



Source: NHTSA.

Figure 4: CARS Program's Top Purchased or Leased New Vehicles by Make



Source: NHTSA.

To collect information for its report to Congress on the efficacy of the CARS program, NHTSA designed and implemented a voluntary consumer survey to help determine what CARS program participants would have done in the absence of the CARS program. Dealers were required to provide participants with a copy of this survey, which included three questions:

1. If you were not offered the CARS program trade-in incentive, would you still have traded in your current vehicle to purchase a new or used vehicle this month?
2. If you were not offered the CARS program trade-in incentive, when you disposed of this vehicle, would you have purchased another vehicle?
3. What is your best estimate of the number of miles you drove the traded-in vehicle during the past 12 months?

The CARS Program Achieved Its Broad Objectives, but the Extent to Which It Stimulated the Economy and Reduced Fuel Consumption is Uncertain

The CARS Program's Two Broad Objectives Were To Help Stimulate the Economy and To Put More Fuel-Efficient Vehicles On the Road

Members of Congress and administration officials articulated two broad objectives for the CARS program in statements, press releases, or program documents, including the program's implementing regulations.¹⁵ These broad objectives were to (1) help stimulate the economy and (2) put more fuel-efficient vehicles on the road. For example:

- DOT, in the CARS program's implementing regulations, stated that the program's principal goal was to encourage replacement of older, less fuel-efficient vehicles with new, more fuel-efficient cars and trucks.¹⁶
- President Obama, during his remarks on the economy on July 31, 2009, stated that the CARS program was an effort to boost the economy and sell more fuel-efficient vehicles.
- In comments made on August 6, 2009, the Secretary of Transportation stated that the program removed fuel-inefficient vehicles and replaced them with fuel-efficient ones, making the program a "win-win for our economy and our environment."

¹⁵We reviewed the program's authorizing legislation and the supplemental appropriations act; however, we did not identify anything in these laws that stated the explicit purposes or objectives of the CARS Program. Therefore, we examined statements, press releases, and program documents, including the program's implementing regulations, to identify the program's broad objectives. More specific objectives could lead to a better cost-benefit analysis of a program.

¹⁶74 Fed. Reg. 37894.

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- A press release from a member of Congress on July 24, 2009, stated that the program was designed to energize the economy by boosting auto sales, and will put safer, more fuel-efficient vehicles on road.

The CARS Program Achieved Its Broad Objective of Helping to Stimulate the Economy, but the Extent of This Effect Is Uncertain

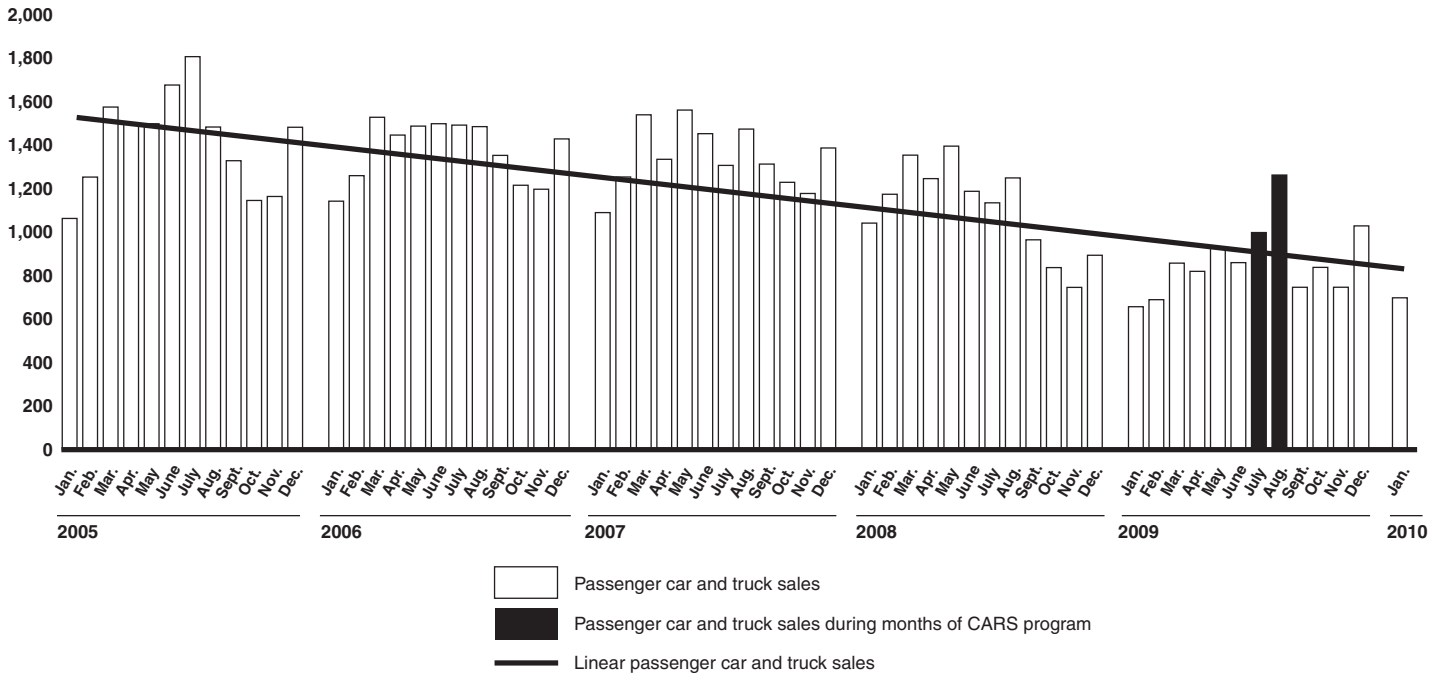
The CARS program helped to stimulate the economy, thereby achieving one of its broad objectives. Several indicators can be used to assess the program's stimulative effect on the economy, including vehicle sales, Gross Domestic Product, and employment. The studies we reviewed showed that the program helped to stimulate economic activity as measured by these three indicators. However, our review of the studies also found that the extent of the program's stimulative effect on the economy is uncertain.

Vehicle Sales

One economic indicator for the CARS program is vehicle sales—that is, whether the program increased the number of vehicles sold. Figure 5 illustrates that, according to Bureau of Economic Analysis data, overall vehicle sales increased during the months of the CARS program (July and August 2009) compared with most months in the preceding year, when the economic recession drove vehicle sales down to pre-2005 levels. The studies we reviewed, including those from NHTSA and CEA, concluded that vehicle sales during July and August 2009 were, to some degree, attributable to the CARS program.

Figure 5: Vehicle Sales from January 2005 through January 2010

Passenger car and truck sales – not seasonally adjusted (in thousands)



Source: GAO analysis of Bureau of Economic Analysis data.

The extent to which the program stimulated vehicle sales, as measured by the number of vehicle sales attributable to the CARS program, is unclear. While some of the increase in vehicle sales in July and August 2009 is attributable to the CARS program, a portion of the sales would have likely occurred even if the program had not been implemented. To estimate the number of vehicle sales attributable to the CARS program, it is important to calculate “incremental vehicle sales”—that is, identify those vehicle sales that occurred because of the program and exclude those sales that would have occurred in the absence of the program. Among the estimates of incremental vehicle sales we identified, we found that a variety of methods were applied to produce the estimates, and that all of the estimates had limitations. For example:

- According to NHTSA’s analysis in its report to Congress, 597,950 vehicle sales or 88 percent of the 677,842 sales that received a credit through the CARS program were incremental vehicle sales. To calculate this estimate of incremental vehicle sales, NHTSA relied on responses to the program’s voluntary consumer survey. Specifically, survey respondents were asked if they were not offered the CARS program credit, would they still have

traded in their current vehicle and purchased a new vehicle during the month in which they participated in the program. NHTSA considered any transaction to be an incremental vehicle sale when respondents indicated that they would have traded in and purchased a new or used vehicle at a later time. However, largely because NHTSA had limited time to establish and administer the program, it did not follow some generally accepted survey design and implementation practices, thereby posing a potential risk to the reliability of estimates based on the survey data. See appendix II for more information on our analysis of NHTSA's consumer survey.

- According to CEA, approximately 440,000 vehicle sales, or 64 percent of the 690,114 applications submitted for the CARS credit, were incremental sales attributable to the CARS program.¹⁷ CEA estimated incremental vehicle sales attributable to the CARS program by subtracting (1) an estimate of the number of people who would have normally traded in vehicles characteristic of those traded in during the CARS program and (2) an estimate of the number of people who held off purchases in June waiting for the program to officially begin. CEA's estimate may be limited by its assumption about the number of vehicles that would have been traded in normally since this number may not be reflective of what actually happened during the CARS program.
- Industry organizations, such as Edmunds.com and Maritz Automotive Research Group, also estimated incremental vehicle sales attributable to the CARS program. For example, Edmunds.com estimated that 125,000 incremental vehicle sales were attributable to the program. To produce this estimate, Edmunds.com first developed a hypothetical scenario to understand how many vehicles would have sold in the absence of the CARS program using market share information and actual sales data of vehicles that were not eligible for purchase or lease under the program, such as luxury cars. Edmunds.com then took the difference between sales in the hypothetical scenario and both actual sales data and estimated expected sales between October 2009 and August 2010, and considered the difference between these to be incremental vehicle sales attributable to the CARS program. This scenario relies on certain assumptions, which may differ from reality, such as its assumption that the share of sales of vehicles not eligible under the program as a percentage of the total sales remains stable before, during, and after the CARS program. Additionally,

¹⁷CEA determined its estimate by using the approximately 690,000 applications submitted for review to NHTSA at the time CEA performed its analysis. CEA estimated vehicle sales based on pessimistic, baseline, and optimistic scenarios. CEA's estimate of approximately 440,000 incremental vehicle sales is based on its baseline scenario.

Maritz Automotive Research Group estimated that 542,000 incremental vehicle sales were attributable to the CARS program based on a survey that the organization provided to consumers who purchased or leased new vehicles during the CARS program. Specifically, Maritz Automotive Research Group asked consumers if the CARS program was the reason they purchased or leased a vehicle when they did and, based on responses to this question, estimated the number of incremental vehicle sales attributable to the program. As with the other estimates we identified, this estimate has limitations. For example, the survey does not ask respondents when they would have purchased or leased the vehicle in the absence of the program. Therefore, according to a Maritz Automotive Research Group official, the survey data did not allow the organization to determine the extent to which the program pulled forward vehicle purchases or leases.¹⁸

In addition, to fully assess the impact of the CARS program on vehicle sales, it is important to account for changes in vehicle sales following the program. Incentive programs like the CARS program can have a “pull forward” effect—that is, they encourage immediate purchases of vehicles that buyers had planned to purchase in future months—thus, there can be a decline in vehicle sales during those future months, according to CEA. Bureau of Economic Analysis data show that in September 2009, vehicle sales dropped approximately 41 percent compared with August 2009; yet, these data also show that vehicle sales were higher in each month of the last quarter in 2009 than in September 2009. The extent to which the program impacted vehicle sales during these months is unclear, in part, because other factors, such as the condition of the economy, could have affected vehicle sales after the program ended. NHTSA analyzed how far the program pulled vehicle sales forward by using the results of its consumer survey. According to the agency, of respondents who indicated in the survey that they would not have traded in their current vehicle and purchased a new vehicle during the month in which they participated in the program, most reported that they would have traded in, sold or disposed of their trade-in vehicle in 2 years or less, with 2 years from the time of their CARS purchase being selected most frequently. However, as discussed previously, we found a potential risk to the reliability of NHTSA’s estimates based on the consumer survey data. CEA also analyzed how vehicle sales changed following two other incentive programs in order to estimate how vehicle sales might be impacted following the CARS

¹⁸Because this study was published close to the issuance of our report, we were unable to fully review its methodology.

program; but, CEA concluded that the results of this analysis could not be used to reliably estimate how vehicle sales might be impacted following the program.¹⁹

Gross Domestic Product

Another indicator of the CARS program's economic impact is the extent to which the program impacted the nation's economic output, as measured by Gross Domestic Product. Both NHTSA and CEA estimated the CARS program's impact on Gross Domestic Product, and both concluded that the program had a direct economic impact. NHTSA estimated that the impact on Gross Domestic Product from the CARS program was approximately \$6.8 billion. CEA estimated the program's impact on Gross Domestic Product in the second half of 2009 would be between \$2.5 billion and \$6 billion.

However, the full extent of the program's impact on Gross Domestic Product is uncertain. Fully assessing the program's impact on Gross Domestic Product requires information on, for example, (1) the number of incremental vehicle sales attributable to the CARS program and (2) information on how automobile manufacturers managed inventory and production in response to those incremental sales. As discussed, there is little consensus on the number of incremental sales attributable to the CARS program. Furthermore, while auto industry representatives that we spoke with said that CARS program sales reduced vehicle inventory, it is not clear how much of the reduction in inventory led to increased automobile manufacturing and, therefore, a positive impact on Gross Domestic Product.²⁰ Given these uncertainties, there are limitations to the estimates produced by NHTSA and CEA of the CARS program's impact on Gross Domestic Product.

Employment

The extent to which the CARS program led to changes in the number of jobs created or retained is another indicator of the program's stimulative

¹⁹Specifically, CEA estimated how vehicle sales changed following two other incentive programs: zero percent financing in 2001 and employee discount pricing in 2005. CEA's analysis found that sales dropped a statistically insignificant amount after the 2001 program, but dropped a statistically significant amount after the 2005 program. CEA also reviewed the experiences from similar programs in other countries, but found no clear patterns in the post-program periods in those countries. These results led CEA to determine the experiences of these programs could not be used to reliably determine how sales would behave in the month following the CARS program.

²⁰The impact of the reduction in inventory on automobile manufacturing is not clear because information is unavailable on the extent to which vehicles sold from existing inventories were replaced with newly manufactured vehicles.

effect on the economy. According to federal government evaluations, the CARS program created or retained jobs. CEA estimated that 40,000 to 120,000 jobs were created or retained in the second half of 2009 as a result of the CARS program, whereas NHTSA estimated that at least 60,000 jobs were created or retained during the same period.²¹ These estimates vary, in part, because information required to account for the full impact of the CARS program is limited. For example, as discussed, there is no consensus on how many vehicle sales were attributable to the CARS program, which limits the ability to estimate additional vehicle production and, thus, manufacturing jobs created by the program. Moreover, manufacturers may have responded to demand for new vehicles generated as a result of the program by increasing the number of hours in their existing workforce, thus affecting jobs retained by the program; however, data to account for this impact is limited.

While CEA and NHTSA used similar methodologies, the differences in their estimates highlight the challenge of determining the CARS program's impact on employment. For example, though CEA and NHTSA determined their estimates using similar methodologies, their estimates varied because of differing assumptions. Specifically, both CEA and NHTSA assumed how many vehicles an average auto worker would produce per year and then derived the number of jobs that could be attributable to the CARS program using its estimate of incremental vehicle sales. However, CEA and NHTSA made different assumptions about how many vehicles an average auto worker could produce per year; CEA based its estimates on data for 2006, when vehicle sales and production were near their peak and NHTSA based its estimates on data for 2006 and 2008. Moreover, since the CARS program was temporary, the permanency of any employment impact is more difficult to gauge, and neither CEA nor NHTSA estimated how many jobs would last beyond the second half of 2009. CEA acknowledged that its employment impact estimates were more uncertain than its Gross Domestic Product estimates.

²¹CEA estimated employment impact based on pessimistic, baseline, and optimistic scenarios of how many incremental sales the CARS program would generate. CEA based its estimates on job-years created or saved by the program. For example, CEA's baseline scenario estimated that 35,000 job-years were created by the program in 2009, that is, hours of employment will be created that correspond to the hours associated with about 35,000 full-time year-round jobs. Since all of these jobs are concentrated in the second half of the year; the actual number of jobs would be about 70,000 in the second half of 2009. While NHTSA acknowledged that the longevity of job creation from the program is uncertain, the agency did not define a "job" for the purpose of its analysis.

The CARS Program Achieved Its Broad Objective of Putting More Fuel-Efficient Vehicles on the Road; the Extent to Which the Program Reduced Fuel Consumption Is Uncertain

The CARS program put more fuel-efficient vehicles on the road, thereby achieving one of the program's broad objectives. According to NHTSA's report to Congress, the average combined fuel economy of trade-in vehicles was 15.7 miles per gallon and that of new vehicles was 24.9 miles per gallon, a 58.6 percent increase in fuel economy. Moreover, the report stated that since the CARS program required that participating consumers purchase or lease vehicles that are more fuel-efficient than their trade-in vehicles, the improved vehicle fuel economy will help reduce fuel consumption.

Although the CARS program put more fuel-efficient vehicles on the road, the extent to which the program reduced overall fuel consumption is uncertain. According to NHTSA, the entire difference in combined fuel economy between trade-in and new vehicles may not have been a direct result of the CARS program since some consumers may have purchased or leased more fuel-efficient vehicles even in the absence of the program. Moreover, in addition to a vehicle's combined fuel economy, other factors may impact overall fuel consumption. For example, fuel economy improvements reduce the fuel cost per mile of travel and, thus, may lead to increases in the miles driven which offsets some of the reduction in fuel consumption—a phenomenon commonly referred to as the “rebound effect.” To determine the type and combined fuel economy of the vehicles consumers would have purchased or leased in the absence of the CARS program and estimate the impact of the program on fuel consumption, NHTSA relied on the results of the program's consumer survey. Specifically, for each consumer who indicated they would have replaced their vehicle on the consumer survey, NHTSA calculated the difference between the actual combined fuel economy of the new vehicle purchased or leased under the CARS program and the estimated combined fuel economy of the replacement vehicle selected on the survey. Based on these differences, NHTSA estimated that the program reduced fuel consumption for the typical CARS participant by approximately 10 percent. However, as noted, largely because of the limited time NHTSA had to establish and administer the program, it did not follow some generally accepted survey design and implementation practices, thereby posing a potential risk to the reliability of the agency's survey-based estimate of reduced fuel consumption. See appendix II for more information on our analysis of NHTSA's consumer survey.

In addition, NHTSA's analysis of the CARS program's impact does not account for the energy consumed and greenhouse gas and criteria pollutant emissions produced in prematurely disposing of the trade-in vehicle and in manufacturing the new vehicle.²² NHTSA officials stated that these impacts would be marginal and difficult to measure, because they are dependent on many unknown or highly variable factors. However, according to studies we reviewed, if factored into the analysis, energy consumed to prematurely dispose of the trade-in vehicle and manufacture the new vehicle may offset some of the program's effect on emission reductions. For example, retiring an older vehicle before the end of its useful life will reduce the greenhouse gas and criteria pollutant emissions produced during the vehicle's "use" phase.²³ However, energy is consumed and emissions are produced during all phases of a vehicle's life, including those considered "nonuse" phases, such as raw material extraction, materials production, parts manufacture, vehicle assembly, recovery/recycling, and disposal. According to one study, even if consumers would have disposed of their vehicles and purchased or leased new vehicles at some later date, the extent to which the CARS program accelerated these processes will cause additional emissions to be produced. Consequently, energy consumed and emissions produced to prematurely dispose of the trade-in vehicle and manufacture the new replacement vehicle may offset some of the program's positive impact on emissions. According to an author of the study, although preliminary analysis indicates that the program will have a significant net reduction in energy consumption and greenhouse gas emissions, the magnitude of the net reduction is very sensitive to the expected remaining life of the trade-in vehicle in the absence of the CARS program.

²²The primary greenhouse gases associated with a vehicle are carbon dioxide, methane, and nitrous oxide. Vehicles also emit a number of harmful pollutants including criteria pollutants such as carbon monoxide, nitrogen oxides, sulfur dioxide, particulate matter, and ozone.

²³According to one study we reviewed, the "use phase" encompasses all activities from the delivery of the new vehicle to the dealership to the last mile traveled by the vehicle, including: dealership sales, vehicle operation and storage, routine service and maintenance, and unscheduled service.

Stakeholders’ Experiences with the CARS Program Varied

The CARS program affected a range of stakeholders, and their experiences with the program varied. Through our literature review, we identified a number of stakeholders who were involved with or impacted by the CARS program including consumers, the scrap and salvage industries, manufacturers, eligible dealerships, used vehicle dealerships, and charities. The following summarizes these stakeholders’ experiences with the program.

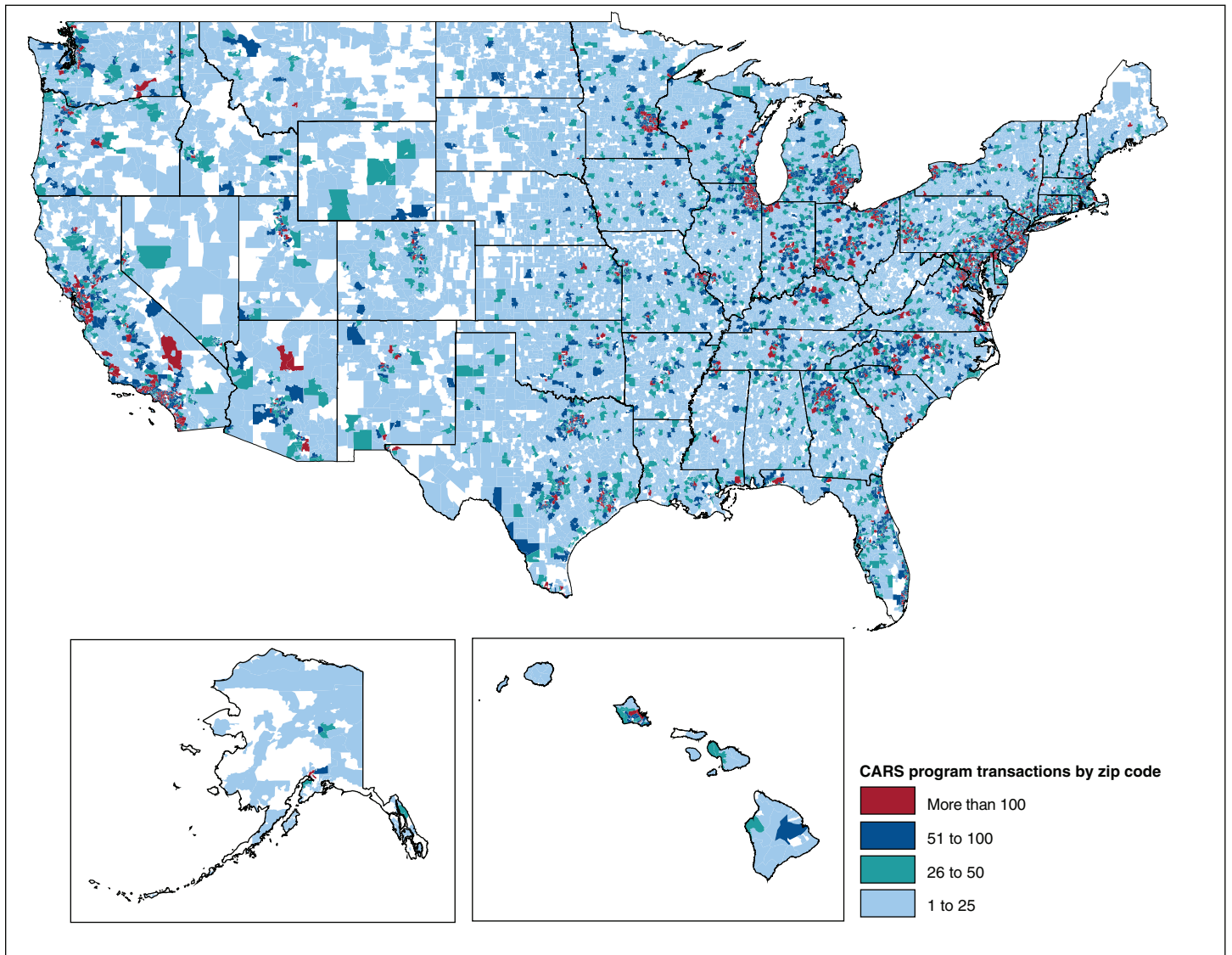
Consumers

There was early and widespread participation by consumers eligible for the CARS program credit. The CARS program benefited participating consumers by providing a \$3,500 or \$4,500 credit toward the purchase or lease of a new vehicle in exchange for their trade-in vehicle.²⁴ While requirements for participation meant that not all consumers were eligible to participate, a large number of consumers were eligible and quickly took advantage of the program, outpacing initial expectations about how many consumers would participate in the program. For example, while the program was authorized to last for 4 months, it lasted less than 2 months before officials closed it, because funding was running out.²⁵ Our analysis of CARS transaction data also shows that consumer participation in the program was distributed across the country and reflected the U.S. population distribution (see fig. 6).

²⁴Consumers may also benefit from additional safety improvements in the new vehicle purchased or leased under the program. According to NHTSA’s report to Congress, any safety improvements added to the fleet since the model year of the trade-in vehicle are benefits attributable to the program. Specifically, the report states that sales of new vehicles under the CARS program will accelerate the presence of, among other things, braking improvements and advanced air bags, some of which can significantly reduce the likelihood of fatal crashes or injuries in crashes. However, the report noted that the CARS program resulted in the replacement of many larger vehicles with smaller passenger cars. It stated that although modern vehicles of all sizes are much safer than older vehicles, occupants of smaller vehicles tend to be more vulnerable in certain crash situations, which could offset some of the increase in the safety of the on-road fleet.

²⁵This includes the supplemental \$2 billion appropriation the CARS program received from Congress in August 2009. Pub. L. No. 111-47.

Figure 6: Participation in the CARS Program



Sources: GAO analysis of CARS data; Map Art (map).

Despite the popularity of the CARS program, consumers raised a number of questions and concerns about their experiences. For example, according to NHTSA’s report to Congress, the agency’s CARS hotline received nearly 900,000 calls during the first few weeks of the program that included questions and concerns. NHTSA officials told us that few of the calls they received about the program required additional follow-up

and that no systemic problems with the program were identified based on information received during the calls. In addition, the DOT Inspector General's hotline complaint center was contacted approximately 4,200 times about the CARS program; however, few of these contacts involved cases of potential fraud. Specifically, according to an Inspector General official, 23 of the contacts to the hotline involved potential fraud cases, and these cases were forwarded to NHTSA for follow up. The official from the Inspector General added that most of these 23 cases alleged that trade-in vehicles were being resold or that vehicles which were not in drivable condition were being accepted for trade in—neither of which is permitted under the CARS program's legislation and implementing regulations. Moreover, according to the official, the allegations of fraud to the Inspector General's hotline did not involve systemic fraud in the CARS program, but rather individual cases of potential fraud.

Representatives of consumer groups told us that they were contacted by consumers with concerns about the program. According to these representatives, the nature of the contacts varied and included concerns about such issues as how long it took to get a response from NHTSA's CARS hotline, ineligibility due to lapses in vehicle registration, and agreements that dealers were requiring CARS program participants to sign under which a participant would have to reimburse the dealer if the federal government rejected an application. One of the consumer group representatives also expressed concern that NHTSA was not publicly providing information about the program's transactions in a timely fashion for real-time analysis and submitted a Freedom of Information Act request for this information. NHTSA subsequently provided transaction information on its CARS Web site.

Scrap and Salvage Industries

Representatives of scrap and salvage industries reported that the impact of the CARS program was mixed. Officials we interviewed representing the scrap industry, which shreds and recycles materials from the trade-in vehicles, told us that their industry had sufficient capacity to handle the volume of trade-in vehicles due to the CARS program. Specifically, according to one of the officials we spoke with, the domestic scrap industry processes approximately 12 million to 16 million vehicles a year and, therefore, the existing processing capacity was sufficient to handle the volume of vehicles received from the CARS program. This official added that any impact from the CARS program on scrap metal prices would likely be minimal. The scrap industry officials we spoke with also stated that the industry identified some challenges associated with the program's requirements. For example, one official stated that scrap and

salvage facilities report vehicle status to NMVTIS through firms that charge a fee for each report, and that the CARS program required two separate reports to NMVTIS when the vehicle was (1) received and (2) crushed or shredded.

According to officials we interviewed representing the salvage industry, which recycles automotive parts for reuse, the CARS program's impact was mixed. These officials stated that the program increased the volume and quality of vehicles they received. However, the CARS program's implementing regulations posed certain challenges. For example, the program's implementing regulations prohibited the resale of engines and assembled drive trains from vehicles traded in under the program, potentially reducing the program's value for the industry. The officials we spoke with representing the industry stated that the engine and drive train generally constitute 60 to 65 percent of a salvaged vehicle's value. Another issue these salvage industry officials cited was the program's requirement to crush or shred vehicles traded in as part of the CARS program within 180 days. According to these officials, the number of CARS vehicles to be crushed or shredded created a potential problem in meeting this 180-day requirement. In February 2010, NHTSA issued a rule extending the deadline for crushing or shredding a vehicle from 180 days to 270 days. These issues aside, officials also said that the number of vehicles received by salvage facilities during the program was two to three times greater than normal, and that the quality of the vehicles received was better as well. The officials added that the better quality of vehicles received under the program contributed to more business at salvage facilities.

Manufacturers

Representatives of automobile manufacturers we contacted reported that although the CARS program increased sales of new vehicles, the program's administrative requirements presented some challenges. When asked to describe the impact of the CARS program on sales, employment, production and/or inventory, representatives of automobile manufacturers we contacted reported generally positive results. Specifically, six of eight manufacturers reported that the CARS program lowered vehicle inventories and five of eight reported increased production. Further, two manufacturers reported that the program sustained or preserved existing employment levels. Nevertheless, manufacturers cited challenges in administering the program. Several manufacturers reported that the program's implementing regulations were either not finalized in a timely manner or changed, resulting in, for example, questions for the manufacturers from dealerships about the program's intent. As another example, several manufacturers reported that their dealerships

experienced difficulties registering or obtaining authorization information necessary to participate in the program. According to NHTSA officials, the agency published the implementing regulations within the time frame established by the CARS Act and offered multiple Webinars to answer stakeholders' questions about the program.

Eligible Dealerships

Representatives we interviewed from a dealership association and from dealerships that were eligible to participate in the CARS program reported that, despite some administrative challenges, they benefited from the CARS program. Some of the representatives told us that they faced some challenges handling the high volume of consumer participation or certain requirements of the program, such as determining consumer eligibility. Further, representatives from the association and one of the dealerships reported that NHTSA's online system for processing CARS program transactions was another administrative challenge they faced. According to NHTSA's report to Congress, the high volume of transactions received during the first few days in which the system was operational contributed to disruptions in the reimbursement system, and the subsequent appropriation of another \$2 billion for the program created further disruptions. These representatives stated that another administrative challenge they faced was the length of time it took to receive reimbursements for the CARS program. While the CARS Act directed NHTSA to develop procedures for a maximum 10-day turnaround for dealer reimbursement, NHTSA's report to Congress determined that the mean processing time for completed submissions was 16.9 days because of the high volume of participation and the need for many dealers to resubmit applications that were not properly completed.

Even though the turnaround time for reimbursements was longer than specified, dealership representatives told us that they benefited from the program. Specifically, all of the representatives we spoke with said that vehicle sales increased during the program. Representatives of one of the dealerships said that the program reduced existing vehicle inventories, which allowed them to order one million new vehicles. Moreover, according to these representatives, as well as representatives from the dealership association, the CARS program also contributed to vehicle sales involving consumers who did not participate in the program, though they did not have data to support this assertion.

Used Vehicle Dealerships

Representatives we spoke with from a used vehicle dealer association and from dealerships that sell used vehicles in multiple states reported a mixed impact during the CARS program. Representatives from the association

told us that demand remained neutral, while representatives of both dealerships told us that sales of used vehicles increased during the CARS program. In addition, according to the association representatives, as well as an industry analyst who tracks the wholesale market for used vehicles, new vehicle sales from the CARS program reduced the supply of certain new vehicle models, which then boosted sales and prices, particularly for comparable late-model used vehicles. According to representatives from one of the dealerships, incentive programs like the CARS program increase sales of used vehicles because some consumers who want to participate in programs like these are unable to do so and, thus, purchase a used vehicle instead. Officials from the association added that prices for used vehicles ten years or older rose during the CARS program. One of the representatives cautioned, however, that it would be difficult to isolate the impact of the CARS program on used vehicle prices, because the economic recession was already contributing to a lower supply of and higher prices for used vehicles. Another industry organization we spoke with told us that the used vehicle market is complex because it involves sales transactions by franchise retailers, independent retailers, and private individuals and, thus, analyzing the impact of the CARS program on it is difficult.

Charities

Similar to other stakeholders, representatives from charities with whom we spoke reported that the impact of the CARS program on charities was mixed. Although six of the seven charities we contacted reported that fewer vehicles were donated during and immediately following the CARS program than during the same period in 2008, they could not directly attribute the change to the CARS program. When asked to report the number of vehicles donated during July, August, and September 2009, the charities reported a range of experiences from a relatively small decrease from the same period in the previous year to a decrease of about half. In addition, several charities we contacted noted that other factors—such as the economic downturn, changes in tax law, and reductions in advertising expenditures—may have contributed to lower vehicle donations during the CARS program. NHTSA did not contact charities as part of its public outreach and consultation period during the design of the CARS program, but its report to Congress suggests that the CARS program may have temporarily and inadvertently reduced vehicle donations to charities.

The CARS Program and Most Other Vehicle Retirement Programs Share Some Similarities, but Also Differences in Program Objectives, Eligibility Criteria, and Program Incentives

Although the CARS program and most other domestic and international vehicle retirement programs shared similarities, such as requiring that the trade-in vehicle be operational, differences existed in program objectives, eligibility criteria, and program incentives. For example, programs had varying eligibility criteria regarding the condition of the trade-in vehicle, the price of the new vehicle, and the income level of eligible program participants. Moreover, those programs used various incentives to encourage participation. See table 2 for more information.

Table 2: Domestic and International Vehicle Retirement Programs We Reviewed

Program location (state or country)	Program name	Level of government	Incentives	Vehicle eligibility criteria	Vehicle replacement required?	Budget	Program duration
United States	Consumer Assistance to Recycle and Save	Federal	\$3,500 - \$4,500	Generally meet specified combined fuel economy thresholds	Yes; \$45,000 cap on manufacturer's suggested retail price	\$3 billion (total)	July 2009 - August 2009
Other domestic programs							
California	Consumer Assistance Program	State	\$1,000	Must fail biennial smog check	No	\$34 million (annual)	November 1998 - ongoing
	Vehicle Buy Back Program	Bay Area Air Quality Management District	\$1,000	Model year 1989 or older	No	\$6.5 million (annual) ^a	June 1996 - ongoing
	Rule 1610	South Coast Air Quality Management District	Amount negotiated by vehicle disposal facility and consumer	Officials project at least 3 years of remaining vehicle life	No	Varies depending on incentive paid by vehicle disposal facility	January 1993 - ongoing

Program location (state or country)	Program name	Level of government	Incentives	Vehicle eligibility criteria	Vehicle replacement required?	Budget	Program duration
	High Emitter Repair or Scrap I	South Coast Air Quality Management District	\$1,000 to scrap; an additional \$1,000 for eligible low-income persons to purchase an eligible replacement vehicle	Program identifies vehicle as a gross polluter via remote sensing	No, but low-income eligible persons may receive a credit to purchase a replacement vehicle	\$4 million (total) ^b	June 2007 - April 2009
Texas	Drive a Clean Machine	16 participating counties	\$3,000 - \$3,500 and only for eligible low-income persons	10 years or older; or failed emissions test	Yes; \$25,000 ceiling on sale price	\$45 million (annual)	December 2007 - ongoing

International programs

Canada	Retire Your Ride	Federal	All participants may receive: \$300 CAD and up to \$3,000 CAD instant rebates from select manufacturers; ^c Other incentives vary by province, such as vouchers for public transportation or bicycle purchase	Model year 1995 or older	No, but may include vehicle manufacturer credit to purchase a replacement vehicle	\$92 million CAD ^d	January 2009; set to end March 2011
Germany	Vehicle Scrappage Program (Abwrackprämie)	Federal	2,500 euros ^e	Model year 9 years or older	Yes	5 billion euros ^f	January 2009 - September 2009

Source: GAO.

^aThis represents the budget for calendar year 2009; budget for calendar year 2010 was not known at the time of this report.

^bThe entire allocated budget was not spent due to a reassessment of the program and low consumer participation.

^cAs of April 8, 2010, these amounts convert to approximately \$300 and \$2,996 in U.S. dollars, respectively.

^dAs of April 8, 2010, this amount converts to approximately \$91.87 million in U.S. dollars.

^eAs of April 8, 2010, this amount converts to approximately \$3,341 in U.S. dollars.

^fAs of April 8, 2010, this amount converts to approximately \$6.68 billion in U.S. dollars.

Program Objectives

The international and domestic programs we reviewed had varying program objectives. Only Germany's vehicle retirement program shared the CARS program's objective of providing a stimulus to the economy. The CARS program and Germany's program also shared relatively short time frames of approximately two months and eight months respectively, compared to the other programs we reviewed, several of which have operated for more than 10 years. In addition, while one of the broad objectives of the CARS program was to put more fuel-efficient vehicles on the road, some other programs we reviewed may include different environmental objectives. For example, the county or district level programs we reviewed may also assist local areas in complying with state and federal air quality rules and regulations or reaching air quality attainment goals.

Eligibility Criteria

Most of the vehicle retirement programs we reviewed required that the trade-in vehicle be operational and registered, but only the CARS program included combined fuel economy as a criterion for eligibility. Under the CARS program, both the trade-in and the new vehicle were generally required to meet specified combined fuel economy thresholds; however, no other domestic or international programs we reviewed incorporated such a requirement. Instead, other domestic and international programs used criteria such as the age of the trade-in vehicle or the trade-in vehicle's emissions, as measured by whether the vehicle had failed an emissions or smog check. Although the CARS program required that the trade-in vehicle have a maximum age of 25 years, when vehicle age was used as an eligibility criterion in the other programs we reviewed, those programs required that the trade-in vehicle be at least 9 years old. Regulations or officials for most of these programs stated that this requirement reflects the fact that older vehicles emit higher levels of criteria pollutants into the air than newer vehicles.

The CARS program and one other vehicle retirement program we reviewed placed a limit on the price for a new vehicle. Specifically, for new vehicles eligible for purchase or lease under the CARS program, the manufacturer's suggested retail price could not exceed \$45,000. In addition, Texas' Drive a Clean Machine program caps the sale price of a new vehicle at \$25,000. The only other program that required the purchase of a replacement vehicle, Germany's Vehicle Scrappage Program, did not place a price cap on the new vehicle eligible for purchase.

Finally, although the CARS program did not include any income eligibility requirements, other domestic programs we reviewed limited participation

or made certain incentives available only to low-income persons. Specifically, only residents who meet statutorily defined household income limits are eligible to participate in the Texas program. For example, for a household of four people, the maximum net income ceiling was \$66,150 in 2009. In California, a vehicle retirement program administered by the South Coast Air Quality Management District provided an additional \$1,000 to consumers who met California's low-income guidelines when those consumers retired their vehicle and replaced it with an eligible used vehicle.

Program Incentives

The vehicle retirement programs we reviewed used a variety of monetary incentives to encourage participation. The CARS program offered the highest monetary incentive, paying consumers an average credit of \$4,209, according to NHTSA's report to Congress. The other programs we reviewed paid incentives that ranged between approximately \$300 and \$3,500. Moreover, governments may partner with the private sector to offer additional monetary incentives to encourage consumer participation in their vehicle retirement programs. For example, in Canada, the government offers a monetary incentive as part of its vehicle retirement program and select automobile manufacturers provide instant rebates of up to \$3,000. Canada's program also offers participants vouchers for public transportation or the purchase of a bicycle as an incentive for retiring their vehicles. The CARS program did not offer similar incentives.

Concluding Observations

The implementation and results of the CARS program offer potential lessons learned for future vehicle retirement or similar incentive programs. First, the program produced economic and environmental benefits, achieving its broad objectives. However, the extent of the program's effects is uncertain. Second, before a program is underway, steps must be taken to determine what impacts are going to be measured and what data will be required to measure them. Moreover, steps must be taken to ensure that the data are reliable. NHTSA relied heavily on the consumer survey for data on the economic and environmental benefits of the CARS program. However, there is a potential risk to the reliability of estimates based on this survey data, because NHTSA did not follow some generally accepted survey design and implementation practices, largely because it had limited time to establish and administer the program. Finally, given the number of stakeholders that are financially affected by the auto industry, it would be important to collect and consider information on how a future program would affect these stakeholders and take mitigating actions, as appropriate.

Agency Comments and Our Evaluation

We provided a copy of a draft of this report to DOT for review and comment. On April 1, 2010, we met with DOT officials to obtain their oral comments on the draft report. DOT officials stressed the economic and environmental successes of the CARS program, which the agency explained in detail in its December 2009 report to Congress. Specifically, officials stated that the program boosted vehicle sales and noted that there was almost a 60 percent improvement in the fuel-efficiency of vehicles purchased or leased under the program. With regard to our findings on NHTSA's consumer survey and related conclusions, DOT officials noted that the agency had very limited time to design and implement the survey and, therefore, OMB approved an abbreviated approach to survey design and implementation practices, such as pretesting and follow-up efforts with CARS participants. Nonetheless, the officials stated that, based on subsequent analysis, they believe that the survey results provide reliable information on the impacts of the program. We agree that NHTSA faced enormous challenges in meeting the program's statutory requirements, including the CARS Act's requirement that NHTSA publish the program's final implementing regulations within 30 days of enactment. Although the draft report recognized the limited time frames that NHTSA was working under, we included additional language in the final report about these time frames. However, we did not change our findings on NHTSA's consumer survey as we continue to believe that following generally accepted survey design and implementation practices is important to ensuring the reliability of estimates based on survey results. DOT officials also provided additional technical comments, including comments on NHTSA's "pull forward" analysis and on the energy consumed and emissions produced to manufacture new vehicles and prematurely dispose of trade-in vehicles as a result of the program, which we incorporated, as appropriate.

We also provided a copy of a draft of this report to EPA for review and comment. EPA provided two technical clarifications via email, which we incorporated, as appropriate.

We are sending copies of this report to other interested congressional committees and members, the Secretary of Transportation, and the EPA Administrator. The report also is available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact A. Nicole Clowers at (202) 512-2834 or clowersa@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.



A. Nicole Clowers, Acting Director
Physical Infrastructure Issues

Appendix I: Scope and Methodology

Our work focused on the impact of the Consumer Assistance to Recycle and Save (CARS) program. In particular, we focused on: (1) what is known to date about the extent to which the CARS program achieved its objectives; (2) what stakeholders' experiences were with the CARS program; and (3) how the CARS program compares to other selected domestic and international vehicle retirement programs. Our scope was limited by the extent to which CARS program data were available at the time of our review.

To assess the objectives of the CARS program, we reviewed federal legislation, including the CARS Act and the supplemental appropriations act, CARS program's implementing regulations, the National Highway Traffic Safety Administration's (NHTSA) regulatory analysis of the CARS program, NHTSA's report to Congress on the CARS program, and press releases of members of Congress and statements by administration officials, and other reports issued by federal entities such as the Congressional Research Service, the Congressional Budget Office, and the Council of Economic Advisers. We also conducted a literature review of other evaluations of the CARS program from auto industry experts and academics. In addition, we reviewed data from NHTSA on the CARS program, as well as data from the Bureau of Economic Analysis. We further reviewed guidance on survey design and implementation from the Office of Management and Budget. We interviewed NHTSA officials about the CARS program and officials at the Department of Transportation Office of Inspector General about its review of the CARS program and contacts to its hotline complaint center about the program. We also interviewed officials from the Environmental Protection Agency, representatives of organizations from different sectors of the auto industry, and representatives of an organization focused on fuel-efficiency and environmental issues, and academic experts who prepared environmental evaluations of the CARS program.

To determine stakeholders' experiences with the CARS program, we first conducted a literature review to identify program stakeholders. Through this review, we identified the following groups as stakeholders: consumers, the scrap and salvage industries, manufacturers, eligible vehicle dealerships, and used vehicle dealerships, and charities. We contacted representatives from each of these groups. Specifically, for consumers, we spoke with representatives of consumer groups and Department of Transportation Inspector General officials about contacts from consumers about the CARS program; for scrap and salvage industries, we spoke with representatives from a scrap recycling industry association, an automotive recycling industry association, and a scrap

recycling facility; for manufacturers, we spoke with associations representing automobile manufacturers and contacted representatives of automobile manufacturers that produced the top 8 vehicle makes purchased or leased under the CARS program; for eligible dealerships, we spoke with representatives of a new vehicle dealership association and two dealerships; and for used vehicle dealerships, we spoke with representatives of a used vehicle and independent dealership association, two dealerships, and organizations that provide analysis of the used vehicle market. We also contacted and received information from representatives of 7 charities that operate vehicle donation programs. We selected these charities based on a review of previous GAO reports from 2003 and 2008 on vehicle donations to charities. The 2003 report identified 65 charities that operate vehicle donation programs. From this list we identified the top 10 charities by net proceeds from the vehicle donation program and the top 10 charities by the number of vehicles donated. We then selected the 7 charities that were on both top 10 lists for our review.

To understand how the CARS program compares to other domestic and international vehicle retirement programs, we identified states and countries through a literature review and interviews with government and industry officials. To select which other programs to review as part of our study, we used the following criteria: the program was ongoing or recently completed; it was consulted by NHTSA officials during the development of the CARS program's implementing regulations; or was cited by officials we spoke with as worthy of review. Based on these criteria, we selected seven programs in four locations (California, Texas, Canada, and Germany) to review (see table 3 for additional information). We conducted in-depth interviews with officials from these programs via phone or in-person meetings and reviewed program documentation on areas such as the programs' eligibility criteria and program incentives. In addition, we visited officials at the European Commission in Belgium to obtain an in-depth understanding of their evaluation of vehicle retirement programs in Europe. While in Belgium we interviewed an official representing a European automobile manufacturers' association and, by phone, representatives of a German manufacturers' association and a United Kingdom manufacturers' association, who were knowledgeable about vehicle retirement programs in Germany and the United Kingdom.

Table 3: Domestic and International Vehicle Retirement Programs We Reviewed

Program location (state or country)	Program name
California	Consumer Assistance Program Vehicle Buy Back Program Rule 1610 High Emitter Repair or Scrap I
Texas	Drive a Clean Machine
Canada	Retire Your Ride
Germany	Vehicle Scrappage Program (Abwrackprämie)

Source: GAO.

We conducted this performance audit from September 2009 through April 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: GAO's Analysis of the CARS Program's Consumer Survey

NHTSA designed a consumer survey to collect data on what consumers who participated in the CARS program would have done in the absence of the program. However, largely because NHTSA had limited time to establish and administer the program, the agency did not follow some generally accepted survey design and implementation practices, thereby posing a potential risk to the reliability of estimates based on the survey data. We identified areas of data collection, data processing and data analysis, and survey design that NHTSA omitted.

According to CARS program's implementing regulations, dealers were instructed to distribute the survey to participating consumers for completion and were requested to attach a completed consumer survey to each application for reimbursement submitted to NHTSA. Although consumers were not required to respond to the survey, dealers were instructed to return the survey marked "declined" if the consumer chose not to respond. NHTSA officials reported that the agency expected approximately 75 percent of consumers to respond. However, according to NHTSA's report to Congress, of the 677,842 paid transactions under the CARS program at the time of the report, a total of 185,342 consumer surveys were submitted, for an overall response rate of 27 percent. NHTSA officials reported that the agency subsequently omitted 41,344 surveys, or 22 percent of submitted surveys, because they were incomplete or incorrect (27,623), blank (2,579), duplicate (4,939), invalid (3,859), or did not match the transaction (2,344). After omitting these surveys from the total submitted, the valid response rate was reduced to 21 percent.

NHTSA did not follow recommended data collection procedures when it did not follow up with nonrespondents to increase the survey response rate and identify reasons for nonresponse. The survey response rate is generally considered to be one indication of the quality of survey data. According to Office of Management and Budget (OMB) guidance, agencies should, as part of their data collection methodology, develop procedures to monitor how survey data are collected, including strategies to correct identified problems.¹ For example, OMB guidance suggests that agencies have reporting systems that provide timely information about survey response rates and the reasons for nonresponse. Further, when response rates are low, OMB recommends follow-up with a subset of

¹See *Office of Management and Budget Standards and Guidelines for Statistical Surveys* (September 2006), which documents the professional principles and practices that federal agencies are required to adhere to and the level of quality and effort expected in statistical activities.

nonrespondents, which would allow for some understanding of differences between respondents and nonrespondents. According to NHTSA officials, they became concerned that many dealers were not offering the survey to consumers as required in the CARS program's implementing regulations. Although NHTSA did not conduct any follow-up efforts with consumers to increase the response rate and identify reasons for nonresponse, it did contact a dealership association to assist in encouraging more dealers to distribute the survey. NHTSA stated that the tight schedule for the issuance of its report to Congress mandated in the program's authorizing legislation made conducting follow-up efforts with nonrespondents impractical.

NHTSA also did not follow recommended data analysis procedures when it did not conduct a nonresponse bias analysis on all survey items used in its analysis before publishing its report to Congress. To better understand the potential for bias caused by nonresponse, OMB guidance suggests that nonresponse bias analysis should be planned for or conducted if the expected or actual response rate for a particular survey item is below 70 percent. According to NHTSA's report to Congress, the agency compared survey respondents to nonrespondents on the basis of location, Manufacturer's Suggested Retail Price, odometer reading, trade-in vehicle age, credit amount, and new vehicle combined fuel economy, and found that respondents and nonrespondents were similar for these items. However, when NHTSA reduced the number of surveys from 143,998 (21 percent) to 88,286 (13 percent) for purposes of its analysis of the impact of the CARS program on fuel consumption and emissions, it did not conduct a similar comparison for this reduced sample before publishing its report. NHTSA reduced the number of surveys by eliminating the surveys submitted by consumers who responded that they would not have replaced their vehicle (approximately 35 percent of survey respondents). The report states that these surveys were eliminated because there was no alternate replacement vehicle that would have been purchased in the absence of the CARS program with which to compare their actual purchase under the CARS program. Although the agency did not conduct a nonresponse bias analysis on the reduced sample before the report to Congress was published, in response to GAO questions about whether a nonresponse bias analysis was conducted on the reduced sample, NHTSA subsequently conducted such an analysis on the reduced sample comparing respondents to those who did not respond on the basis of Manufacturer's Suggested Retail Price, trade-in vehicle age, credit amount, new vehicle combined fuel economy and odometer reading, and found that nonrespondents and respondents were similar.

NHTSA did not perform a key recommended survey design practice. Specifically, OMB guidance states that agencies must test surveys before they are distributed—a process known as pretesting—through, for example, the use of cognitive testing, focus groups, or field tests. NHTSA officials told us that due to the condensed time frame to establish the program, they were unable to perform a formal pretest of the survey, but stated they performed an informal pretest of the survey involving three staff members not involved in designing the survey to allow for feedback on the survey's structure and clarity. We have found that pretesting helps ensure that the survey:

- actually communicates what it was intended to communicate;
- is standardized and will be uniformly interpreted by survey respondents; and
- will be free of design flaws that could lead to inaccurate answers.

In addition to helping ensure the clarity of the questions, we found that pretesting can indicate when there is a low likelihood of obtaining accurate factual data from survey responses. NHTSA's consumer survey included factual questions. For example, the survey asked consumers the number of miles they drove the traded-in vehicle during the past 12 months.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

In addition to the individual named above, Raymond Sendejas, Assistant Director; William Colwell; Elizabeth Eisenstadt; Lorraine Ettaro; Timothy Guinane; Terence Lam; James Leonard; Nancy Lueke; Susan Michal-Smith; Amanda Miller; Tina Won Sherman; and Crystal Wesco made key contributions to this report.

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