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BENEFITS OF RECENT IMPROVEMENTS IN VEHICLE FUEL ECONOMY

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16. Abstract For the past several years, we have calculated (on a monthly basis) the average, sales-weighted fuel economy of all light-duty vehicles (cars, pickup trucks, vans, and SUVs) sold in the U.S. The results indicate that, from October 2007 to September 2014, the average fuel economy has improved from 20.1 mpg to 25.3 mpg. This brief note quantifies the consequences of this improvement on overall fuel consumption and vehicle emissions.			
Because of their improved fuel economy, the vehicles sold since October 2007 saved a <i>cumulative</i> total of about 15.1 billion gallons of fuel—equivalent to the current total consumption of <i>all vehicles</i> in the U.S. for about 33 days. This reduction in the amount of fuel translates to a reduction of about 297 billion pounds of carbon-dioxide emissions.			
In terms of the <i>current</i> savings, for the most recent month—September 2014—the savings amount to 614 million gallons of fuel, or about 12 billion pounds of carbon dioxide. These savings are equivalent to about 6% of both the average monthly fuel consumption and carbon-dioxide emissions from <i>all light-duty vehicles</i> on the road.			
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Background

Two years ago, we published an analysis of the benefits of the recent improvements in vehicle fuel economy on overall fuel consumption and emissions (Sivak and Schoettle, 2012a). In this brief note, we provide an update through September 2014. However, before we get into the details of the new analysis, we will first take a brief historical view concerning where we have been. This detour will place the magnitude of the recent changes in the context of the progress achieved since the 1920s.

In 1923, the actual, on-road fuel economy of the entire U.S. fleet (including cars, trucks, buses, and motorcycles) was 14.0 mpg. Fuel economy then *declined* to 11.9 mpg in 1973, before it started to climb relatively rapidly, reaching 16.9 mpg in 1991. The changes thereafter have been small, with overall fuel economy in 2007 at 17.2 mpg (Sivak and Schoettle, 2012b).

The data for only cars show the same trends as the data for all vehicles: a decline in fuel economy until 1973, a relatively sharp improvement from 1973 through 1991, and only a minor improvement between 1991 and 2007 (Sivak and Schoettle, 2012b).

Analysis

The present analysis examines recent additions to the U.S. fleet. For the past several years, we have calculated (on a monthly basis) the average, sales-weighted fuel economy of all purchased light-duty vehicles (cars, pickup trucks, vans, and SUVs). Our data (Sivak and Schoettle, 2012b) start with October 2007 (the conventional beginning month of model year 2008 vehicle sales), and currently the latest entry is for September 2014. (These data are based on the EPA “window sticker” ratings; they are not the actual, on-road values.)

Our data indicate that the average, sales-weighted fuel economy of all new light-duty vehicles has improved from 20.1 mpg in October 2007 to 25.3 mpg in September

2014, for a gain of 26%.¹ While this improvement is rather modest in absolute terms, it is substantial in comparison with the above-discussed changes for the entire fleet between 1923 and 2007.

During the seven years covered by our monitoring, we have collected data on 93 million new light-duty vehicles. Using the vehicle-survival rates in David, Diegel, and Boundy (2014), we estimate that 89 million of these 93 million vehicles were still in use in September 2014, representing about 38% of the 234 million light-duty vehicles on the road (FHWA, 2014²). That led us to pose the following question: How much fuel have we saved by driving these new vehicles with improved fuel economy, as opposed to driving vehicles that would have experienced no improvements in fuel economy, retaining the lower fuel economy of the vehicles sold in the first month of our monitoring (October 2007)?

We will answer this question from two related perspectives. The first perspective involves the *cumulative* amount of fuel saved. Assuming that each of these vehicles was driven 11,398 miles every year (a recent estimate of the average annual distance driven in the U.S.; Sivak, 2014), we find that the new vehicles saved about 15.1 billion gallons of fuel. That is equivalent to the current consumption of fuel by *all vehicles* in the U.S. for about 33 days (FHWA, 2014²).

Figure 1 shows the cumulative fuel consumption for new vehicles since October 2007 with and without the recent fuel-economy gains. The difference between the two curves represents the fuel-economy savings.

¹ These values are sales-weighted arithmetic means of window-sticker values. The following analyses of fuel consumption are based on sales-weighted harmonic means.

² The FHWA data are for 2012—the latest year available.

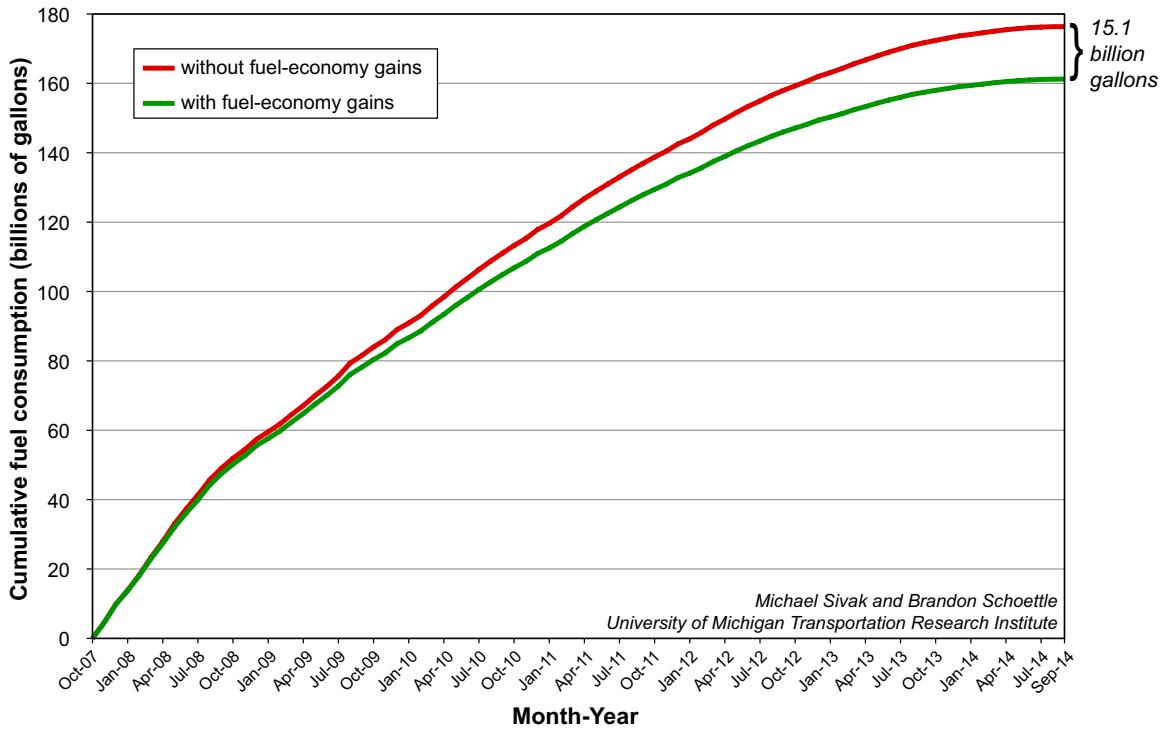


Figure 1. Cumulative fuel consumption for new vehicles since October 2007 with and without the recent fuel-economy gains. The difference between the two curves represents the fuel-economy savings.

Another way to assess the benefits of the improved fuel economy is to examine the *current* savings in the use of fuel. For the most recent month—September 2014—the savings amount to 614 million gallons of fuel.

The reductions in the amount of fuel consumed are important in themselves. However, they also represent reductions in emissions. For example, combustion of one gallon of gasoline creates about 19.64 pounds of carbon-dioxide emissions (22.38 pounds for diesel) (EIA, 2014). Consequently, the cumulative 15.1 billion gallons of fuel saved since late 2007 represent a cumulative reduction of about 297 billion pounds of carbon dioxide (using the gasoline conversion). Analogously, the 614 million gallons of fuel saved during the month of September 2014 represent a reduction of about 12 billion

pounds of carbon dioxide—or about 6% of both the average monthly fuel consumption and carbon-dioxide emissions from *all light-duty vehicles* in the fleet (FHWA, 2014³).

The improvements in vehicle fuel economy over the past seven years are noteworthy, especially in relation to the improvements during the preceding eight decades. As a consequence, we have seen sizeable savings in fuel consumed and emissions produced. The most recent fuel economy (CAFE) standards, issued in 2012 (NHTSA, 2012), will continue to accelerate this progress.

³ The FHWA data are for 2012—the latest year available.

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