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ECONOMIC INDICATORS AS PREDICTORS OF THE NUMBER AND FUEL ECONOMY OF PURCHASED NEW VEHICLES

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16. Abstract <p>This study examined the relationship between two economic indicators—the unemployment rate and the price of gasoline—and purchase decisions of new vehicle buyers. Two regression analyses were performed, one focusing on the number of vehicles purchased and the other one on their fuel economy. Both analyses used monthly data from October 2007 through April 2009. There are three main findings. First, during the 19 months examined, the average fuel economy of purchased light-duty vehicles improved by a substantial amount—1.1 mpg. Second, both the unemployment rate and the price of gasoline contributed significantly to accounting for the fuel economy of purchased vehicles in the expected positive direction. Third, while there was a significant negative relationship between the unemployment rate and the number of vehicles purchased, the price of gasoline did not significantly increase the predictive power of the model.</p>					
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Introduction

In the U.S., the monthly sales (not adjusted for seasonal variations) of new light vehicles (cars, pickup trucks, minivans, and SUVs) fell from 1,232,000 in October 2007 to 820,000 in April 2009 (Automotive News, 2009). This study examined the relationship between two economic indicators—the unemployment rate and the price of gasoline—and purchase decisions of new vehicle buyers. Two regression analyses were performed, one focusing on the number of vehicles purchased and the other one on their rated fuel economy. Both analyses used monthly data from October 2007 (the conventional starting month of the 2008 model year) through April 2009 (the latest month for which the data are available). This study complements two recent studies on the trends through 2006 in actual on-the-road fuel economy of vehicles (Schipper, 2009; Sivak and Tsimhoni, 2009).

Sales volume

The dependent variable was the seasonally adjusted annualized sales rate of light-duty vehicles (Automotive News, 2009), shown in the top panel of Figure 1. The independent variables were the unemployment rate (Bureau of Labor Statistics, 2009) and the average price of unleaded regular gasoline (Energy Information Administration, 2009). The values of both of these economic indicators throughout the period of interest are shown in the bottom panel of Figure 1.

The regression model was highly significant, $F(1, 17) = 139.60$ $p < .001$. The unemployment rate had a significant effect on the sales of vehicles in the expected (negative) direction ($t = -11.82$), and it accounted for 89% of the variance in vehicle sales. The price of gasoline was not a significant factor in the model.

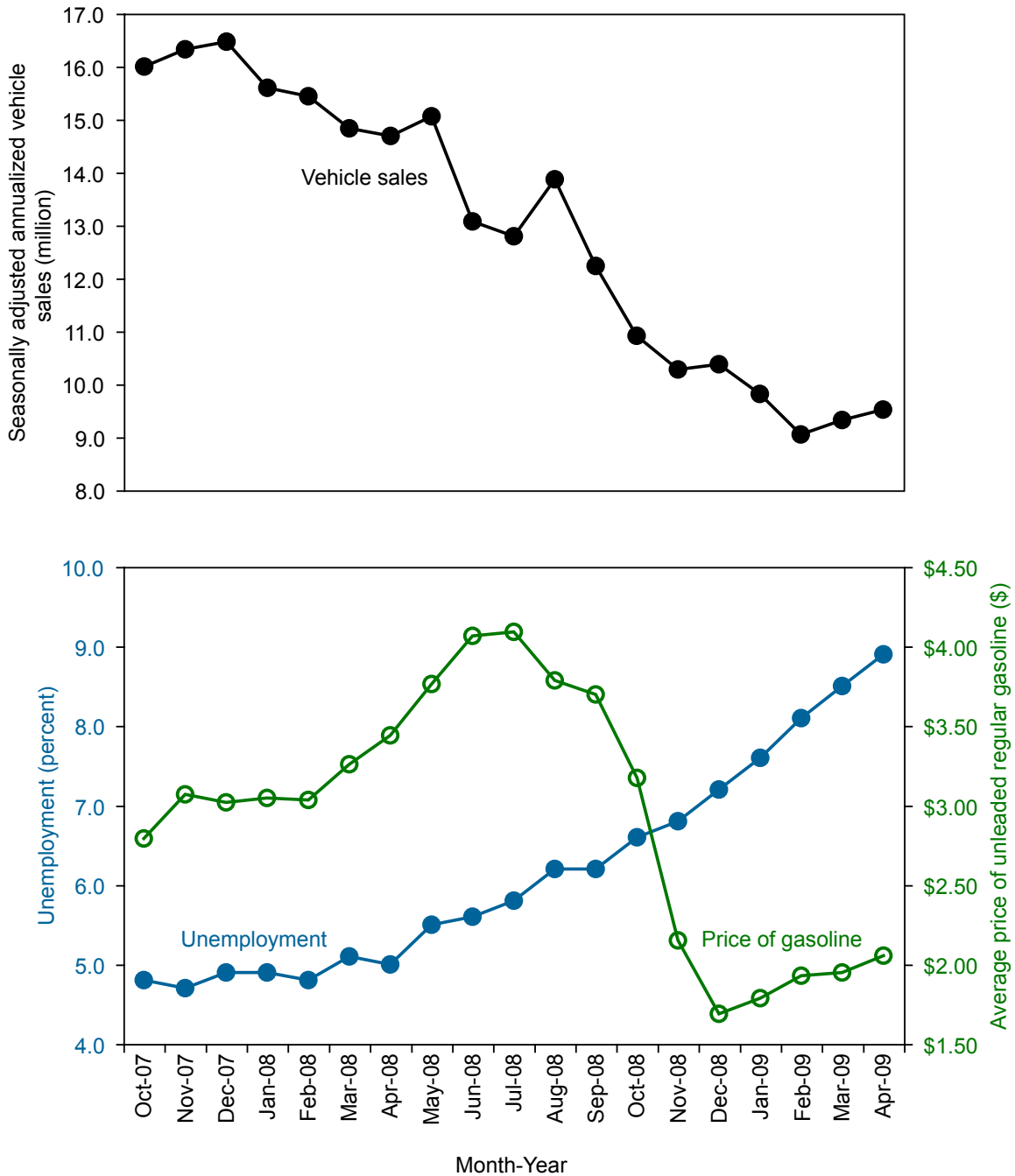


Figure 1. Seasonally adjusted annualized sales of light-duty vehicles (top panel), and the unemployment rate and the price of unleaded regular gasoline (bottom panel).

Fuel economy of purchased new vehicles

In this regression, the dependent variable was the average sales-weighted fuel economy of purchased vehicles. This average was calculated from the monthly sales of individual models (Automotive News, 2009) and the EPA combined fuel-economy ratings for the respective models (Environmental Protection Agency, 2008; 2009). All vehicles purchased in October 2007 through September 2008 were assumed to be model year 2008, while all those purchased in October 2008 through April 2009 were assumed to be model year 2009. (The fuel-economy information was available for 99.8% of vehicles purchased.) As in the preceding analysis, the independent variables were the unemployment rate and the average price of unleaded regular gasoline.

The average fuel economy of purchased vehicles increased from 20.2 mpg in October 2007 to 21.7 mpg in May 2008, as shown in the top panel of Figure 2. In April 2009 (the latest month examined), the average fuel economy was 21.3 mpg. This value, albeit lower than the peak in May 2008, is still 1.1 mpg higher than in October 2007.

The regression model was highly significant, $F(2, 16) = 9.11$, $p = .002$. Both the unemployment rate and the price of gasoline had significant effects on the average fuel economy of purchased vehicles in the expected (positive) direction ($t = 4.13$ and 3.55 , respectively). These two variables accounted for 53% of the variance in the average fuel economy.

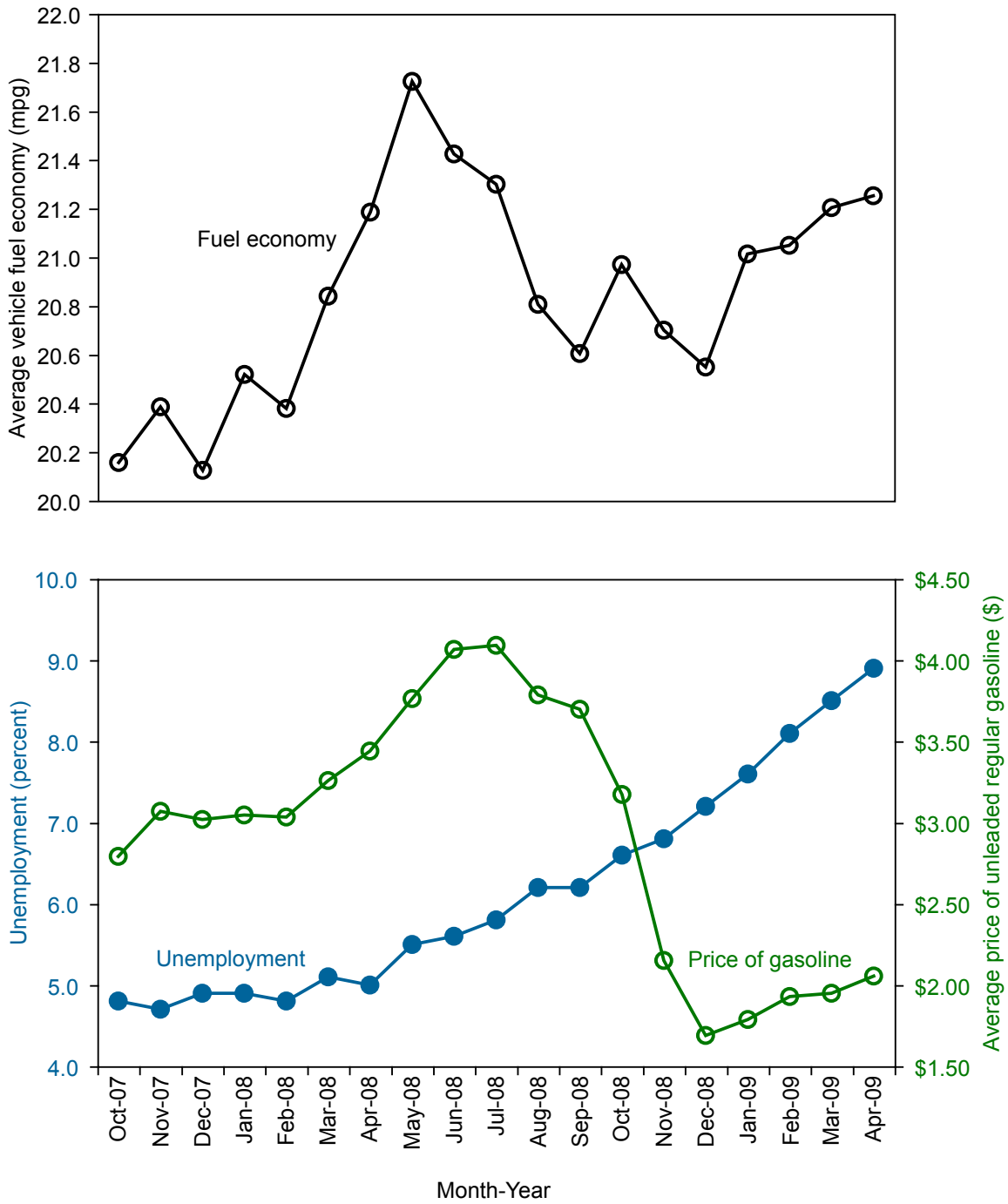


Figure 2. Average fuel economy of purchased new light-duty vehicles (top panel), and the unemployment rate and the price of unleaded regular gasoline (bottom panel).

Conclusions

The average fuel economy of purchased new light-duty vehicles improved from 20.2 mpg in October 2007 to 21.3 mpg in April 2009. The present findings suggest that during this period both the unemployment rate and the cost of gasoline influenced buyers' decisions concerning the fuel economy of vehicles purchased. On the other hand, the number of vehicles purchased, while strongly influenced by the unemployment rate, did not appear to be affected by the price of gasoline.

The present analysis suggests that there were two different processes influencing vehicle-purchase decisions with respect to fuel economy. In early 2008, when the unemployment rate was relatively low, the increased price of gasoline led to an increase in the purchases of those relatively expensive vehicles that are fuel-efficient. This ended when gasoline prices declined in late 2008. However, as unemployment continued to rise into early 2009, purchases of large and expensive vehicles (which, in general, are relatively fuel inefficient) declined more than purchases of small and inexpensive vehicles (which, in general, are relatively fuel efficient). Thus, with relatively low gasoline prices and high unemployment, the fuel economy of the new-vehicle fleet improved by an increase in the proportion of purchases of inexpensive vehicles.

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