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Upward Trend in Vehicle-Miles Resumed During 2009

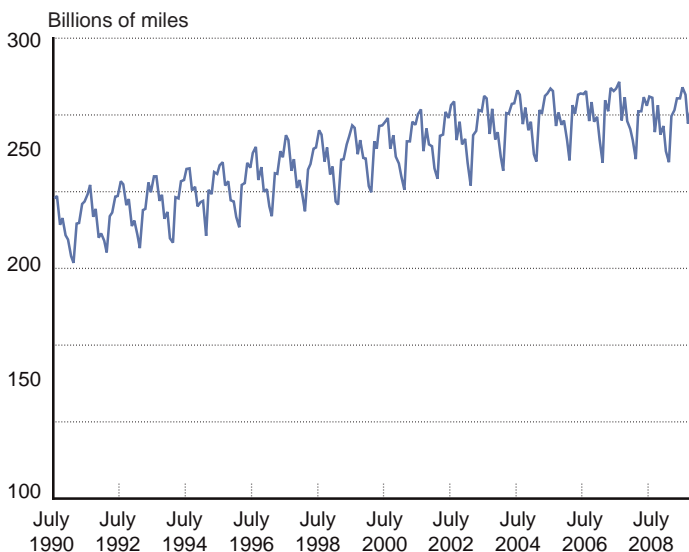
A Time Series Analysis

By Peg Young, Ph.D.

After a 2-year interruption to a long-term upward trend, the number of vehicle-miles traveled (VMT) on the Nation's highways appears to have resumed a pattern of upward growth in 2009. While VMT rises and falls seasonally, the years 2007 and 2008 showed significant monthly declines in VMT after the effects of seasonal fluctuations were extracted from the data.

Vehicle-miles traveled by cars, trucks, and buses on public roads are a key measure of roadway use.¹ Monthly estimates of VMT, produced by the Federal Highway Administration, can illustrate when changes occur in the patterns of the data, in contrast to annual estimates that may not reveal turning points. However, when viewed monthly (as seen in figure 1), consistent seasonal fluctuations tend to dominate the pattern of VMT historical data, making it difficult to determine when turning points occur.

Figure 1: Vehicle Miles Traveled (billions), July 1990–December 2009

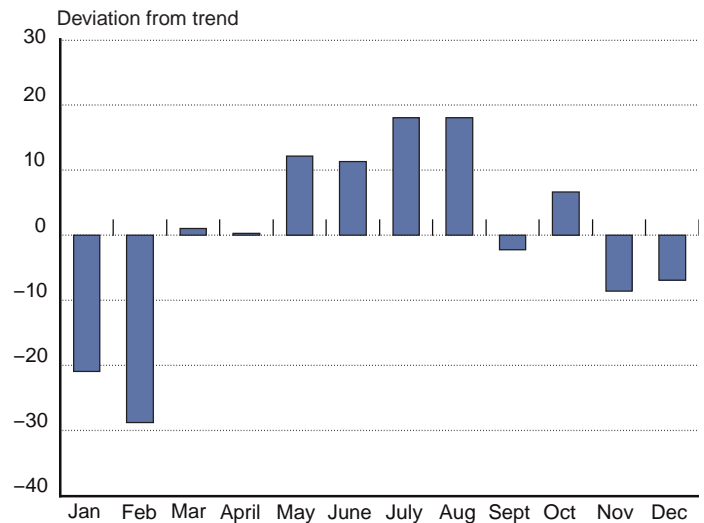


SOURCE: U.S. Department of Transportation, Federal Highway Administration, Traffic Volume Trends, <http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm>.

About the *Transportation Trends in Focus* Series

The *Transportation Trends in Focus* series reports on the underlying trends in key transportation data. Using a variety of statistical analysis techniques, these reports examine recent trends, seasonality, and pattern shifts that the data reveal. This report looks at recent shifts in the long-term upward trend in monthly U.S. vehicle-miles traveled (VMT).

Figure 2: Monthly Seasonal Factors for Vehicle Miles Traveled (billions), July 1990–December 2009



SOURCE: U.S. Department of Transportation, Federal Highway Administration, Traffic Volume Trends, <http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm> and U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation, special tabulations.

¹ A vehicle mile traveled is a measurement of one vehicle traveling one mile regardless of the number of occupants in that vehicle.

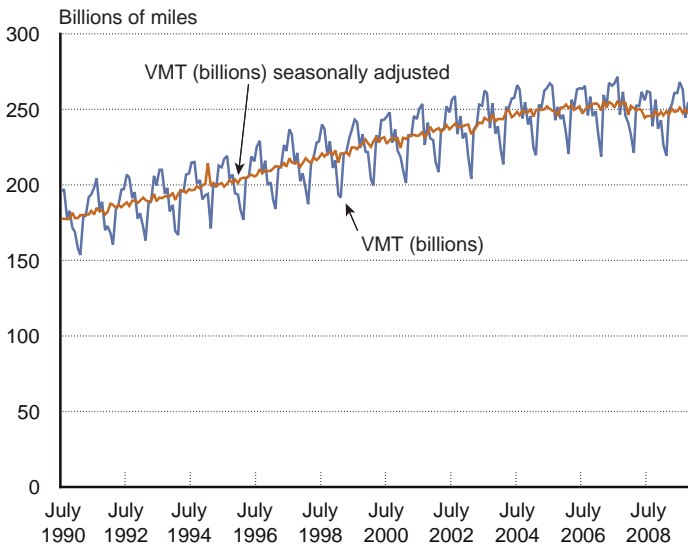
Underneath the regular seasonal repetition, an upward trend existed in the growth of VMT for much of the period since 1990 (figure 2). However, the most recent years may be indicating a change in that growth pattern. Does a slowdown exist, and, if so, when did it start? Has the decline ended? Has upward growth resumed? A more detailed analysis of the trend data can help answer these questions.

The pattern of the VMT data over time can be described in terms of three components: trend, seasonal, and irregular. To observe the underlying trend, the data series can be statistically decomposed to allow removal of the seasonal component.²

As seasonality changes little from year to year, it is appropriate to calculate the “fixed” seasonality to quantify the average variation for each month of the year as compared to the long-term trend. Figure 2 shows that the summer travel months of May through August result in higher than average VMT values, while the winter months, November through February, result in lower than average VMT values.

Once the seasonal component has been removed (referred to as seasonal adjustment), the long-term trend, along with any remaining irregular components, of the VMT data becomes clearer. Figure 3 provides a plot of the seasonally adjusted VMT data over time. The upward growth of VMT seems to

Figure 3: Vehicle Miles Traveled—Actual and Seasonally Adjusted, July 1990–December 2009



SOURCE: U.S. Department of Transportation, Federal Highway Administration, Traffic Volume Trends, <http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm> and U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation, special tabulations.

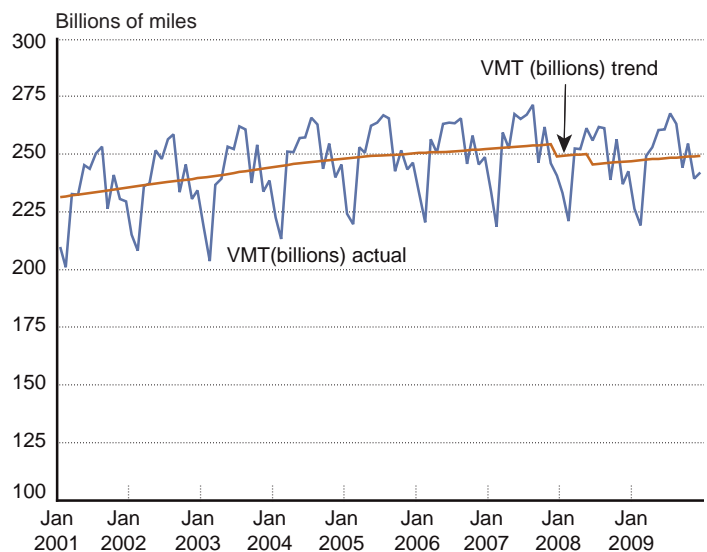
² Statistical decomposition of the VMT time series is calculated through STAMP (Structural Time Series Analyser, Modeller and Predictor) software. For more information on the software, go to: <http://www.timberlake.co.uk/>.

level off around 2005 to 2007, after which VMT appears to decline, starting around November 2007, but leveling off around March 2008.

Even with seasonality removed, it is difficult to ascertain without further analysis whether the summer months of 2009 portrayed an increase or a continuation of the leveling off.

The irregularity of the seasonally adjusted series in the data can be statistically removed to show only the smoother, long-term trend. This yields, in figure 4, the statistical component that represents the underlying trend for the more recent years.³ As can be seen in the graph, the trend shows a strong upward growth, with an average increase of approximately 350 million VMT per month, until June 2004. The monthly average increase in the trend then slowed to approximately 200 million VMT per month from July 2004 through November 2007. This slowdown may possibly be attributed to the volatility in gasoline prices. The major drop in the trend occurred around December 2007, which coincides with the beginning of the current recession. From December 2007 through June 2008, VMT declined at a rate of approximately 1,200 million (1.2 billion) per month. From July 2008 through December 2009, VMT seems to show signs of resuming its upward growth, at an average monthly increase in the trend of 200 million VMT. ↻

Figure 4: Vehicle Miles Traveled (billions)—Actual and Trend, January 2001–December 2009



SOURCE: U.S. Department of Transportation, Federal Highway Administration, Traffic Volume Trends, <http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm> and U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation, special tabulations.

³ Only the last 9 years are shown so the reader can observe the recent major drop in VMT more clearly.