

UMTRI-2015-10

MARCH 2015

HAS MOTORIZATION IN THE U.S. PEAKED? PART 7: UPDATE THROUGH 2013

MICHAEL SIVAK



HAS MOTORIZATION IN THE U.S. PEAKED?
PART 7: UPDATE THROUGH 2013

Michael Sivak

The University of Michigan
Transportation Research Institute
Ann Arbor, Michigan 48109-2150
U.S.A.

Report No. UMTRI-2015-10
March 2015

1. Report No. UMTRI-2015-10		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Has Motorization in the U.S. Peaked? Part 7: Update through 2013				5. Report Date March 2015	
				6. Performing Organization Code 383818	
7. Author(s) Michael Sivak				8. Performing Organization Report No. UMTRI-2015-10	
9. Performing Organization Name and Address The University of Michigan Transportation Research Institute 2901 Baxter Road Ann Arbor, Michigan 48109-2150 U.S.A.				10. Work Unit no. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address The University of Michigan Sustainable Worldwide Transportation				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes Information about Sustainable Worldwide Transportation is available at http://www.umich.edu/~umtriswt .					
16. Abstract <p>In Part 5 in this series of reports, I examined the changes from 1984 to 2012 in the number of registered light-duty vehicles, and the corresponding changes in distance driven and fuel consumed. The units of the analyses were both the absolute numbers and the rates per person, per driver, per household, and (where appropriate) per vehicle. The main finding of that report was that the respective rates all reached their maxima around 2004. I argued that, because the onsets of the reductions in these rates preceded the onset of the recession in 2008 by several years, the reductions in these rates likely reflect fundamental, noneconomic changes in society. Therefore, these maxima have a reasonable chance of being long-term peaks as well. The present report provides a brief update on these measures through 2013.</p> <p>The main findings are as follows:</p> <p>(1) Despite the population growth, the absolute amount of fuel consumed by light-duty vehicles decreased by 11% during the period 2004 (the year of maximum consumption) through 2013.</p> <p>(2) The reductions in the rates per person, per driver, per household, and (where appropriate) per vehicle from the corresponding maxima (around 2004) to 2013 were greatest for fuel consumed (averaging about 17%), followed by distance driven (about 8%) and number of vehicles (about 5%). (The fact that the reductions were greatest for fuel consumed reflects, in part, the added contribution of the improvements in vehicle fuel economy.)</p> <p>(3) The 2013 rates of vehicles and distance driven were comparable to the rates in the 1990s. The 2013 rates of fuel consumption were lower than the rates in 1984—the first year of this analysis.</p> <p>(4) There is no evidence in the 2013 data that the recent reductions in the rates were temporary. Indeed, out of the seven rates examined for number of vehicles and distance driven, four showed a decrease from 2012 to 2013 and three showed an increase. However, the changes in these rates were all within $\pm 0.7\%$, suggesting that the situation in 2013 was generally the same as in 2012. (All four rates for fuel consumed decreased from 2012 to 2013, with the largest decrease of 1.1%.)</p>					
17. Key Words Light-duty vehicles, distance driven, fuel consumed, motorization				18. Distribution Statement Unlimited	
19. Security Classification (of this report) None		20. Security Classification (of this page) None		21. No. of Pages 16	
22. Price					

Contents

Introduction.....	1
Method	2
Results.....	2
Conclusions.....	13
References.....	14

Introduction

This is the seventh in a series of reports that examines recent motorization trends in the U.S. Part 5 (which summarized Parts 1 through 3 and extended the data through 2012) examined the changes from 1984 to 2012 in the number of registered light-duty vehicles, and the corresponding changes in distance driven and fuel consumed (Sivak, 2014b). The units of the analyses were both the absolute numbers and the rates per person, per driver, per household, and (where appropriate) per vehicle. The main finding of that study was that the respective rates all reached their maxima around 2004. I argued that, because the onsets of the reductions in these rates preceded the onset of the recession in 2008 by several years, the reductions in these rates likely reflect fundamental, noneconomic changes in society (such as increased telecommuting, increased use of public transportation, increased urbanization of the population, and changes in the age composition of drivers). Therefore, these maxima have a reasonable chance of being long-term peaks as well. The present report provides a brief update on these measures through 2013.¹

¹ Part 4 (Sivak, 2014a) examined recent changes in households without a light-duty vehicle from 2005 to 2012, while Part 6 (Sivak, 2014c) analyzed the relationship between road transportation and economic activity since the end of the Second World War.

Method

The number of light-duty vehicles (cars, pickup trucks, SUVs, and vans) was obtained or calculated from the information in FHWA (2015). For 1984 through 2006, this number was the sum of cars and other two-axle, four-tire vehicles. For 2007 through 2013, this number was the sum of short-wheel-base and long-wheel-base light-duty vehicles.

The sources of other relevant data were as follows:

- distances driven by light-duty vehicles: FHWA (2015)
- fuel consumed by light-duty vehicles: FHWA (2015)
- resident population: ProQuest (2014)
- licensed drivers: FHWA (2015)
- households: U.S. Census Bureau (2015)

Some of the underlying data were recently revised for 2012, and this analysis incorporates those revisions.

Results

Absolute numbers of vehicles, distances driven, and fuel consumed

Table 1 presents the numbers of registered light-duty vehicles, distances driven, and fuel consumed from 1984 to 2013. These data are also presented in Figure 1.

Table 1
Registered light-duty vehicles, and the corresponding distances driven
and fuel consumed, 1984-2013. (The maxima are in **red**.)

Year	Vehicles (thousands)	Miles driven (millions)	Gallons consumed (millions)
1984	156,751	1,559,227	94,425
1985	165,730	1,633,637	98,290
1986	170,251	1,690,261	101,481
1987	173,049	1,770,779	102,838
1988	178,348	1,869,075	104,752
1989	180,943	1,932,108	105,754
1990	182,317	1,979,276	104,926
1991	181,636	2,006,400	103,223
1992	183,747	2,079,032	106,950
1993	187,292	2,120,764	110,029
1994	191,072	2,170,723	111,940
1995	194,125	2,228,323	113,677
1996	198,862	2,286,394	116,575
1997	199,973	2,353,295	119,280
1998	203,169	2,417,852	122,158
1999	207,788	2,470,391	125,931
2000	212,706	2,523,346	126,004
2001	221,821	2,569,980	127,081
2002	220,932	2,624,508	130,691
2003	222,857	2,655,987	136,213
2004	228,276	2,727,054	138,819
2005	231,905	2,749,472	136,288
2006	234,525	2,773,025	135,594
2007	235,678	2,691,034	126,393
2008	236,448	2,630,213	120,515
2009	234,468	2,633,248	121,368
2010	230,444	2,648,456	123,039
2011	233,841	2,650,458	123,693
2012	233,761	2,664,060	123,715
2013	236,010	2,677,771	123,770

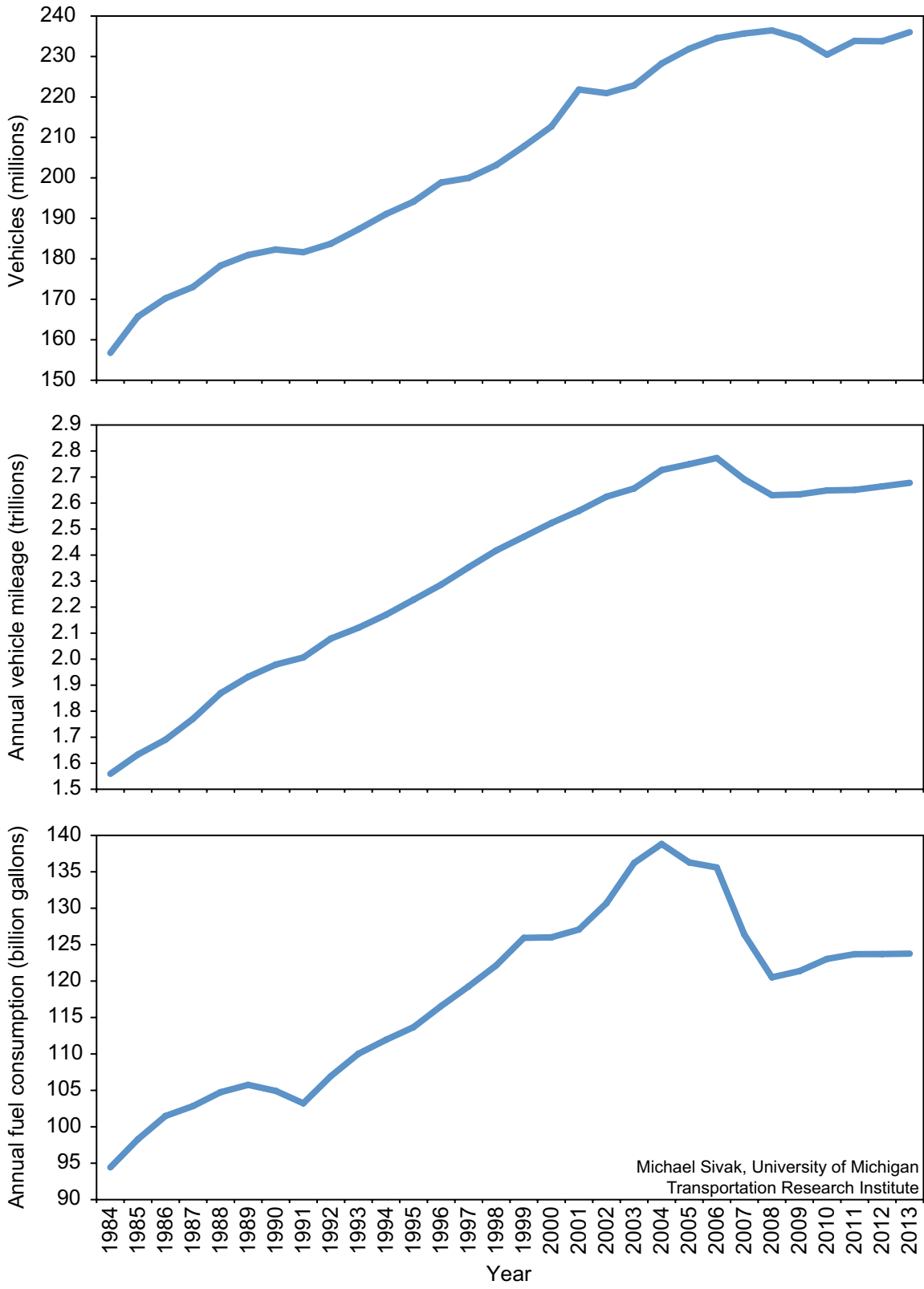


Figure 1. Registered light-duty vehicles, and the corresponding distances driven and fuel consumed, 1984-2013.

The main aspects of the data in Table 1 (and Figure 1) are summarized in Table 2.

Table 2
The main aspects of the absolute numbers in Table 1 (and Figure 1).

Measure	Maximum year	Change from the maximum to 2013	Change from 2012 to 2013
Vehicles	2008	-0.2%	+1.0%
Distance driven	2006	-3.4%	+0.5%
Fuel consumed	2004	-10.8%	0.0%

Rates per person, per driver, per household, and per vehicle

Tables 3, 4, and 5 present the rates of vehicles, distance driven, and fuel consumed per person, per licensed driver, per household, and (where appropriate) per vehicle. These data are also presented in Figures 2, 3, and 4.

Table 3
Registered light-duty vehicles per person, per licensed driver, and
per household, 1984-2013. (The maxima are in **red**.)

Year	Vehicles per person	Vehicles per driver	Vehicles per household
1984	0.665	1.009	1.835
1985	0.697	1.056	1.910
1986	0.709	1.067	1.925
1987	0.714	1.069	1.934
1988	0.729	1.095	1.958
1989	0.733	1.093	1.949
1990	0.730	1.092	1.953
1991	0.718	1.075	1.926
1992	0.716	1.061	1.921
1993	0.721	1.082	1.943
1994	0.726	1.089	1.968
1995	0.729	1.099	1.961
1996	0.738	1.108	1.996
1997	0.733	1.094	1.980
1998	0.737	1.098	1.982
1999	0.745	1.110	2.000
2000	0.754	1.116	2.031
2001	0.778	1.160	2.050
2002	0.768	1.137	2.021
2003	0.768	1.136	2.003
2004	0.780	1.148	2.038
2005	0.785	1.156	2.046
2006	0.786	1.156	2.050
2007	0.782	1.146	2.032
2008	0.778	1.135	2.025
2009	0.764	1.119	2.001
2010	0.745	1.097	1.961
2011	0.750	1.104	1.950
2012	0.745	1.104	1.931
2013	0.747	1.112	1.927

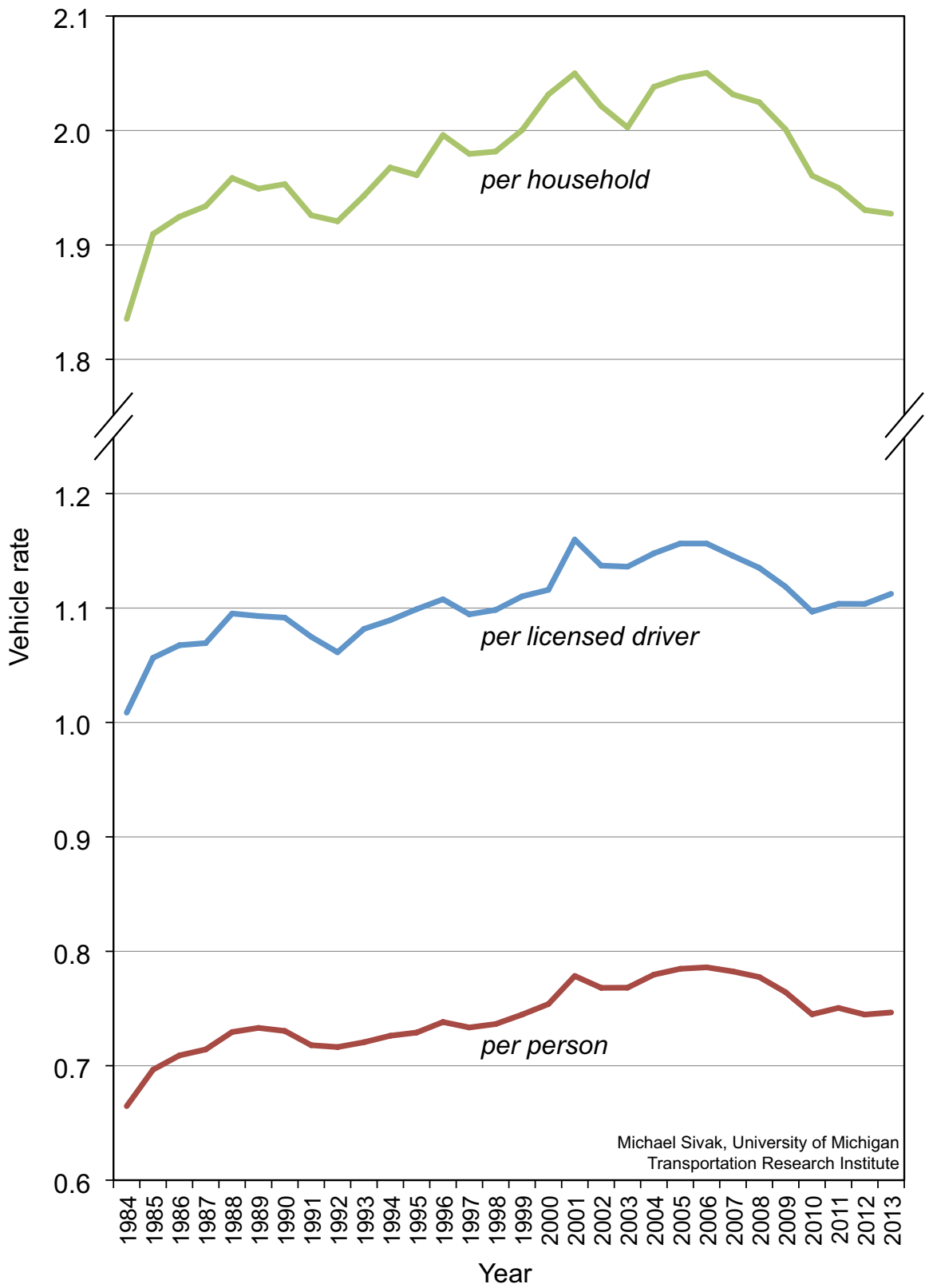


Figure 2. Registered light-duty vehicles per person, per licensed driver, and per household, 1984-2013.

Table 4
Distances driven per person, per licensed driver, per household, and per registered vehicle, 1984-2013. (The maxima are in **red**.)

Year	Miles driven per person	Miles driven per driver	Miles driven per household	Miles driven per vehicle
1984	6,612	10,032	18,256	9,947
1985	6,866	10,414	18,823	9,857
1986	7,039	10,598	19,108	9,928
1987	7,309	10,943	19,790	10,233
1988	7,645	11,477	20,524	10,480
1989	7,828	11,670	20,813	10,678
1990	7,929	11,851	21,203	10,856
1991	7,931	11,873	21,274	11,046
1992	8,105	12,009	21,732	11,315
1993	8,159	12,248	22,002	11,323
1994	8,250	12,376	22,354	11,361
1995	8,368	12,616	22,511	11,479
1996	8,487	12,735	22,950	11,497
1997	8,631	12,880	23,296	11,768
1998	8,765	13,071	23,582	11,901
1999	8,853	13,199	23,783	11,889
2000	8,943	13,237	24,100	11,863
2001	9,018	13,436	23,750	11,586
2002	9,125	13,508	24,013	11,879
2003	9,155	13,540	23,868	11,918
2004	9,314	13,711	24,349	11,946
2005	9,304	13,710	24,258	11,856
2006	9,294	13,673	24,243	11,824
2007	8,933	13,080	23,196	11,418
2008	8,649	12,626	22,522	11,124
2009	8,584	12,562	22,472	11,231
2010	8,562	12,605	22,533	11,493
2011	8,506	12,510	22,101	11,334
2012	8,488	12,577	22,002	11,397
2013	8,471	12,621	21,867	11,346

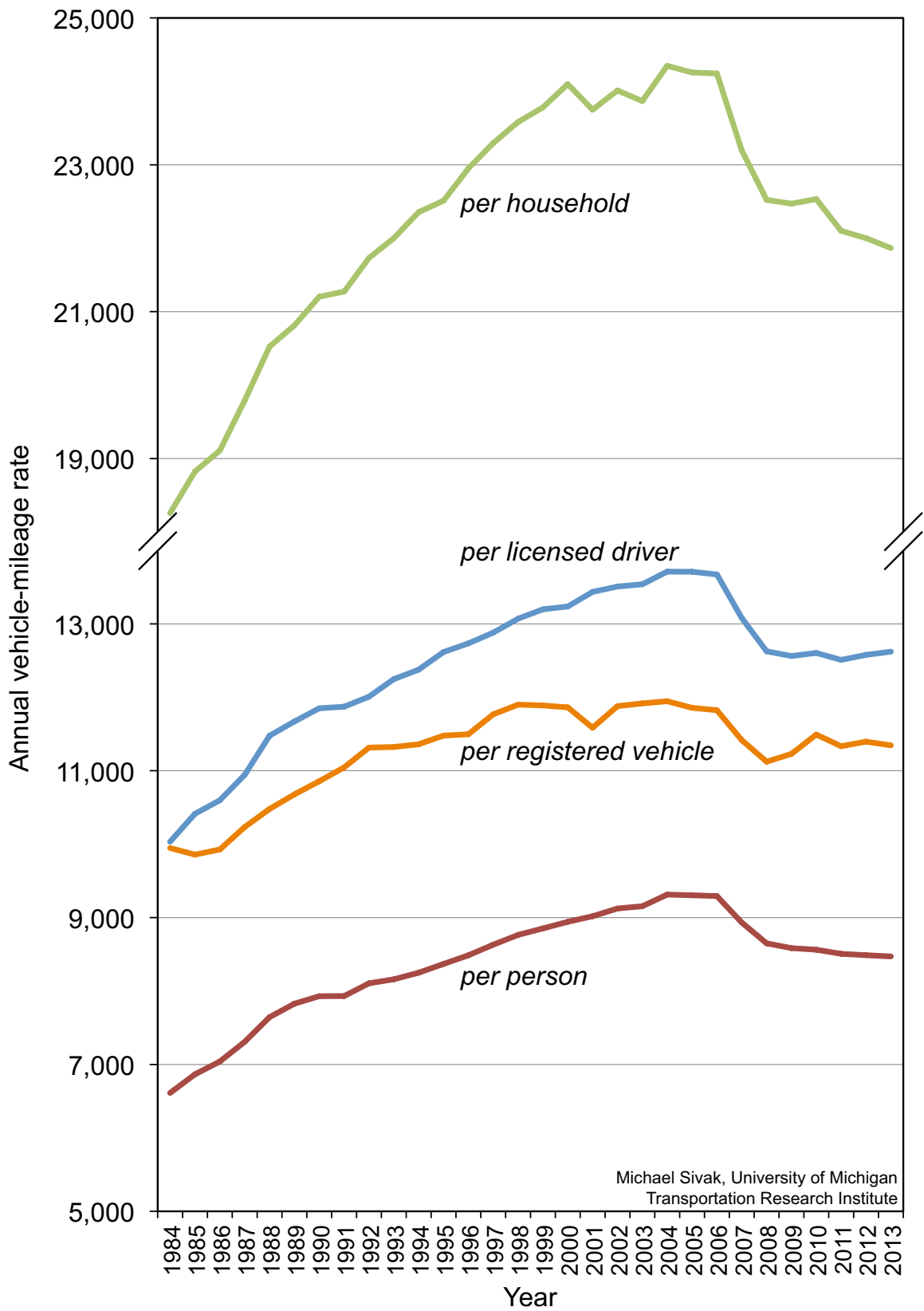


Figure 3. Distances driven per person, per licensed driver, per household, and per registered vehicle, 1984-2013.

Table 5
Amount of fuel consumed per person, per licensed driver, per household, and per registered vehicle, 1984-2013. (The maxima are in **red**.)

Year	Gallons per person	Gallons per driver	Gallons per household	Gallons per vehicle
1984	400.4	607.5	1105.6	602.4
1985	413.1	626.6	1132.5	593.1
1986	422.6	636.3	1147.2	596.1
1987	424.4	635.5	1149.3	594.3
1988	428.4	643.2	1150.3	587.3
1989	428.5	638.8	1139.2	584.5
1990	420.3	628.2	1124.0	575.5
1991	408.0	610.8	1094.5	568.3
1992	416.9	617.8	1117.9	582.1
1993	423.3	635.5	1141.5	587.5
1994	425.4	638.2	1152.7	585.9
1995	426.9	643.6	1148.4	585.6
1996	432.7	649.3	1170.1	586.2
1997	437.5	652.8	1180.8	596.5
1998	442.8	660.4	1191.5	601.3
1999	451.3	672.8	1212.3	606.1
2000	446.6	661.0	1203.4	592.4
2001	445.9	664.4	1174.4	572.9
2002	454.4	672.6	1195.7	591.5
2003	469.5	694.4	1224.1	611.2
2004	474.1	698.0	1239.5	608.1
2005	461.2	679.6	1202.4	587.7
2006	454.4	668.6	1185.4	578.2
2007	419.6	614.3	1089.5	536.3
2008	396.3	578.5	1032.0	509.7
2009	395.6	579.0	1035.7	517.6
2010	397.8	585.6	1046.8	533.9
2011	397.0	583.8	1031.4	529.0
2012	394.2	584.1	1021.7	529.2
2013	391.5	583.4	1010.7	524.4

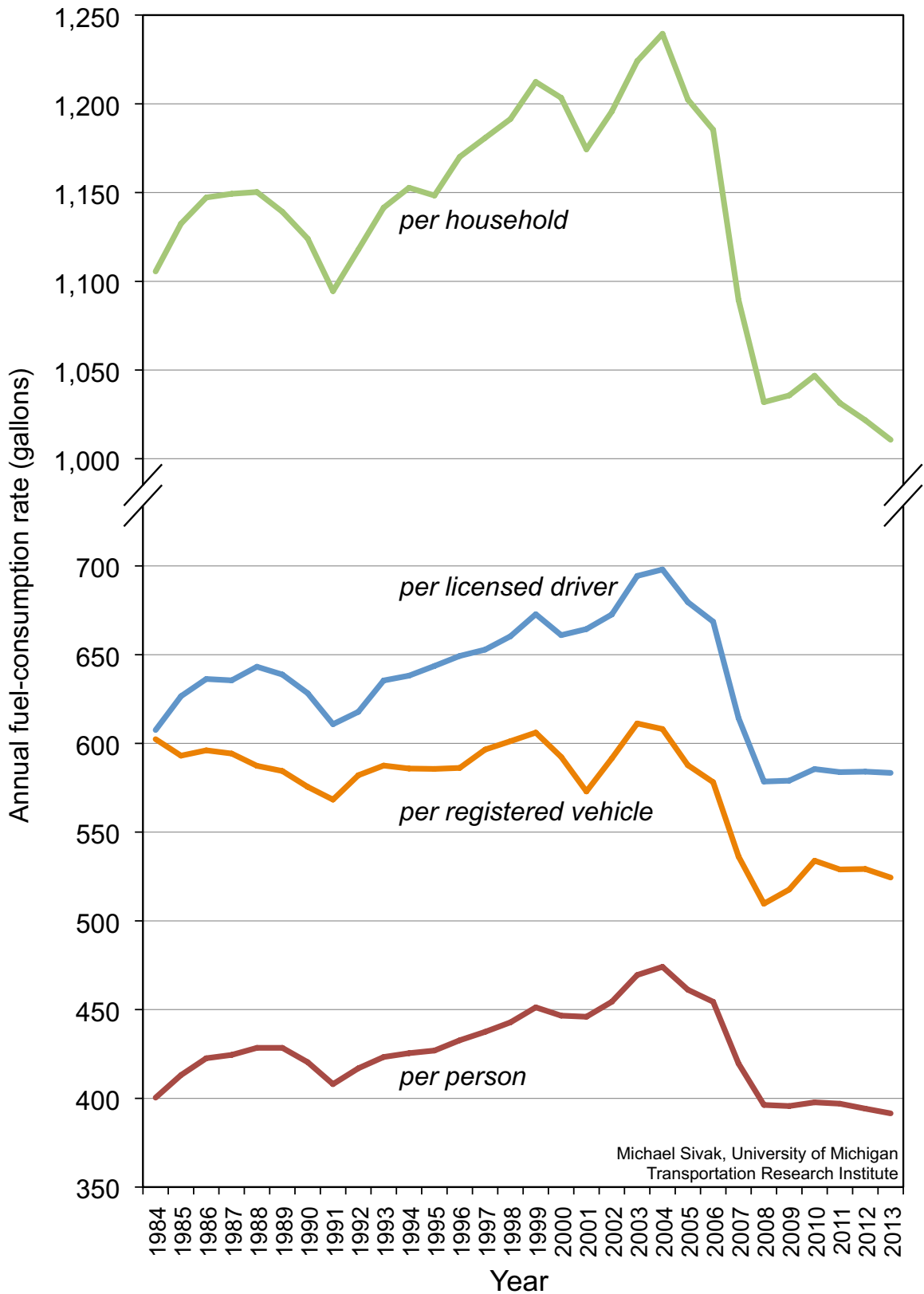


Figure 4. Amount of fuel consumed per person, per licensed driver, per household, and per registered vehicle, 1984-2013.

The main aspects of the data in Tables 3 through 5 (and Figures 2 through 4) are summarized in Table 6.

Table 6
The main aspects of the rates in Tables 3 through 5 (and Figures 2 through 4).

Measure	Maximum year(s)	Latest year prior to the maximum year(s) that had a rate lower than the 2013 rate	Change from the maximum to 2013	Change from 2012 to 2013
<i>Vehicles</i>				
per person	2006	1999	-5.0%	+0.3%
per driver	2001	1999	-4.1%	+0.7%
per household	2001, 2006	1992	-6.0%	-0.2%
<i>Distance driven</i>				
per person	2004	1995	-9.1%	-0.2%
per driver	2004	1995	-7.9%	+0.3%
per household	2004	1992	-10.2%	-0.6%
per vehicle	2004	1993	-5.0%	-0.4%
<i>Fuel consumed</i>				
per person	2004	pre 1984	-17.4%	-0.7%
per driver	2004	pre 1984	-16.4%	-0.1%
per household	2004	pre 1984	-18.5%	-1.1%
per vehicle	2003	pre 1984	-14.2%	-0.9%

Conclusions

Trends in the absolute numbers

The trends in the absolute numbers of light-duty vehicles, distances driven, and fuel consumed were of less interest in this study than the corresponding rates. This was the case because the changes in these absolute numbers reflect, in part, the ever-growing population. However, fuel consumed by light-duty vehicles decreased by 11% from 2004 (the year of maximum consumption) to 2013 (see Table 2), despite the population growth of 8% during this time period (ProQuest, 2014).

Trends in the rates per person, per driver, per household, and per vehicle

Maximum years. As is evident from Table 6, the rates tended to reach their maxima around 2004.

2013 rates in the context of the rates from 1984 through 2013. The 2013 rates of vehicles and distance driven were comparable to the rates during the 1990s (see Table 6). The 2013 rates of fuel consumption were lower than the rates in 1984—the first year of this analysis.

Changes from the maximum years to 2013. The reductions in the rates from the corresponding maxima to 2013 (see Table 6) were greatest for fuel consumed (averaging about 17%), followed by distance driven (about 8%) and number of vehicles (about 5%). The fact that the reductions were greatest for fuel consumed reflects, in part, the added contribution of the improvements in vehicle fuel economy (Sivak and Schoettle, 2015).

Changes from 2012 to 2013. Out of the seven rates for number of vehicles and distance driven, four showed a decrease from 2012 to 2013 and three showed an increase. However, the changes in these seven rates were all within $\pm 0.7\%$, suggesting that the situation in 2013 was generally the same as in 2012. All four rates for fuel consumed decreased from 2012 to 2013, with the largest decrease of 1.1%.

References

- FHWA [Federal Highway Administration]. (2015). *Highway statistics* (annual). Available at: <http://www.fhwa.dot.gov/policyinformation/statistics.cfm>.
- ProQuest (2014). *ProQuest statistical abstract of the United States, 2015* (3rd ed.). Bethesda, MD: Author.
- Sivak, M. (2014a). *Has motorization in the U.S. peaked? Part 4: Households without a light-duty vehicle* (Report No. UMTRI-2014-5). Ann Arbor: The University of Michigan Transportation Research Institute. Available at: <http://deepblue.lib.umich.edu/bitstream/handle/2027.42/102535/102988.pdf>.
- Sivak, M. (2014b). *Has motorization in the U.S. peaked? Part 5: Update through 2012* (Report No. UMTRI-2014-11). Ann Arbor: The University of Michigan Transportation Research Institute. Available at: <http://deepblue.lib.umich.edu/bitstream/handle/2027.42/106404/102994.pdf>.
- Sivak, M. (2014c). *Has motorization in the U.S. peaked? Part 6: Relationship between road transportation and economic activity* (Report No. UMTRI-2014-36). Ann Arbor: The University of Michigan Transportation Research Institute. Available at: <http://deepblue.lib.umich.edu/bitstream/handle/2027.42/110116/103145.pdf>.
- Sivak, M. and Schoettle, B. (2015). *Average sales-weighted fuel economy of purchased new vehicles* [updated monthly]. Available at: http://www.umich.edu/~umtriswt/EDI_sales-weighted-mpg.html.
- U.S. Census Bureau (2015). *Households, by type: 1940 to present*. Available at: <http://www.census.gov/hhes/families/files/hh1.xls>.