FHWA Forecasts of Vehicle Miles Traveled (VMT): Spring 2019

Office of Highway Policy Information
Federal Highway Administration
May 2019

Highlights

Long-Term Economic Outlook

- Based on IHS Markit's Spring 2019 Baseline Economic Outlook, the U.S national economy is expected to grow at a moderate pace through 2047, with real GDP projected to increase at an average annual rate of just under 2.0%. Over the same period, real disposable income per Capita is projected to grow at a slightly slower pace, increasing 1.6% per year.
- Both population and employment growth are expected to average 0.6% annually through 2047.
- Real (or inflation-adjusted) gasoline and diesel prices are projected to increase in the short term, before leveling off and remaining approximately constant through 2047. Over the 30-year forecast horizon, gasoline prices are expected to average about $2.52 per gallon (in constant 2012$), with average diesel prices being slightly higher at $2.65 per gallon.

Nationwide Vehicle Travel Outlook

- Based on the IHS Baseline economic outlook, total VMT by all vehicle types is projected to grow at an average rate of 1.1% annually over the 20 years through 2037 (Table 1). Over the entire 30-year forecast period (2017-2047), the average annual growth rate is projected to decline to 0.8%, as VMT growth is anticipated to slow during the last decade (2037-2047). This outlook represents a move towards more moderate growth rates, diverging from the higher growth over the past 30 years, when total VMT grew at an average rate of 2.0% annually.
- Under the Baseline outlook, travel by light-duty vehicles –the largest category of total motor vehicle travel – is forecast to grow at an average annual rate of 1.1% over the next 20 years (Table 1). Growth in light-duty vehicle use is expected to slow during the following decade, reducing its average annual rate over the entire 30-year forecast period to 0.7%.
- Table 1 also shows that combination truck VMT is projected to grow at an average annual rate of 1.5% over the entire 30-year forecast horizon. Growth in travel by single-unit trucks is projected to average 1.6% over the next 20 years and 1.9% for the entire forecast period. Overall, truck related VMT growth is projected to remain steady through the forecast horizon, in contrast to the slowing growth projected for light-duty vehicle travel.
- Table 1 shows that under the alternative forecasts of U.S. economic growth reflected in the IHS Pessimistic and Optimistic economic outlooks, the 20-year forecast of annual growth in total VMT ranges from 0.9% to 1.3%, while the 30-year forecast ranges from a low of 0.7% to a high of 1.0% per year.

Table 1. Projected Growth in Vehicle Miles Traveled (VMT): Spring 2019

Vehicle Class	Compound Annual Growth Rates					
	Pessimistic Economic Growth Outlook*		Baseline Economic Growth Outlook*		Optimistic Economic Growth Outlook*	
	2017 - 2037 (20 Year)	2017 - 2047 (30 Year)	2017 - 2037 (20 Year)	2017 - 2047 (30 Year)	2017 - 2037 (20 Year)	2017 - 2047 (30 Year)
Light-Duty Vehicles	0.9%	0.6%	1.1%	0.7%	1.2%	0.9%
Single-Unit Trucks	1.1%	1.4%	1.6%	1.9%	2.0%	2.3%
Combination Trucks	1.1%	1.2%	1.5%	1.5%	1.5%	1.5%
Total	0.9%	0.7%	1.1%	0.8%	1.3%	1.0%

*See the following sections for detailed descriptions of the Baseline and alternative economic outlooks.

FHWA Forecasts of Vehicle Miles Traveled (VMT): Spring 2019

Overview

The Federal Highway Administration's spring 2019 long-term forecasts of nationwide VMT are based on long-term economic and demographic forecasts produced by the economic forecasting firm IHS Markit.[1] FHWA's national VMT forecasts are produced using statistical models that incorporate factors affecting historical variation in motor vehicle use; these models are then used to develop forecasts that begin in 2018 and extend through 2047. The following sections highlight the IHS Baseline forecasts of key economic and demographic factors that are expected to influence future growth in passenger and freight travel, and discuss their influence on the resulting VMT forecasts. Following this is a brief discussion of the alternative forecasts of U.S. economic performance provided by IHS and their implications for future VMT growth.

Baseline Economic Outlook

Table 2 summarizes the IHS spring 2019 long-term Baseline forecast of the key measures of U.S. economic activity that are used to develop FHWA's VMT forecasts. As it shows, the U.S. population is projected to grow by 0.6% annually over the 30-year forecast period, a rate well below its historical 1.0% annual growth over the previous 30 years. Aggregate economic output, measured by real GDP (2012$) is anticipated to increase 1.9% annually through 2047, which is also lower than the yearly growth rate the U.S economy has experienced in recent decades.

Table 2. IHS Baseline Long-Term Economic Forecasts: Spring 2019

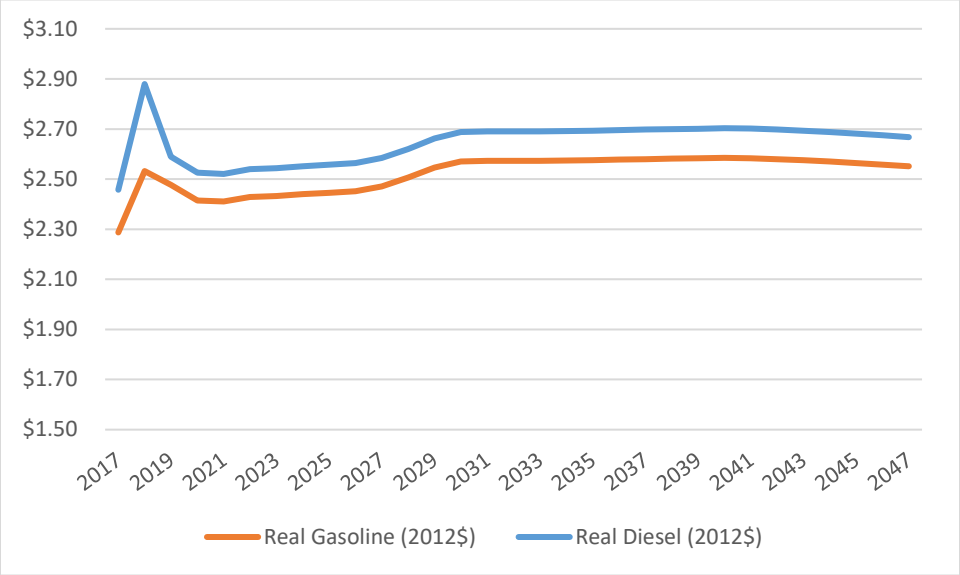
Demographic and Economic Indicators	Historical Growth Rate[2]	Forecast Growth Rate: 2017-47
U.S. Population[3]	1.0%	0.6%
Total GDP (Real 2012$)	2.6%	1.9%
Real Goods Component of GDP (Real 2012$)	3.2%	2.5%
Disposable Personal Income per Capita (Real 2012$)	1.7%	1.6%
Gasoline Price per Gallon (Real 2012$)	0.7%	0.4%

The IHS baseline forecast projects that growth in disposable personal income per Capita will average 1.6% annually over the 30-year forecast period, close to its 1.7% average annual growth rate over the past few decades. Growth in the goods-producing sector of the U.S. economy is expected to outpace overall economic growth, as Table 2 also shows. Gasoline prices are expected to plateau at a long run

[1] http://www.ihs.com/index.aspx
[2] Historical data: 1987 through 2017
[3] The IHS population forecast is based on the Census Bureau's long-term population projections.

average of around $2.58 per gallon (2012$) by the mid-2030s, before declining slightly. Figure 1 presents the long run forecasts of constant-dollar prices of gasoline and diesel.

Figure 1. Price per Gallon of Diesel and Gasoline (2017-2047, 2012$)



Growth in Vehicle Travel under the Baseline Outlook

Under the IHS Baseline economic outlook, steady growth in employment, business investment, and productivity are expected to lead to continuing gradual increases in real economic output (Gross Domestic Product) and real disposable income. In addition, after increasing during the coming decade, energy prices are projected to remain stable. These trends combine with moderating population growth to generate sustained increases in both passenger vehicle and truck travel, although at significantly slower rates than those experienced in recent decades.

In 2017, travel by light-duty vehicles – including automobiles and light-duty trucks used primarily for passenger travel – amounted to 2.88 trillion miles, an increase of about 1% from 2016. Use of light-duty vehicles accounts for nearly 91% of total U.S. motor vehicle travel. As Table 3 reports, growth in light-duty VMT is projected to average 1.1% per year from 2017-2037. Over the following decade, however, growth in light-duty vehicle travel is expected to moderate, so that through the entire 30-year forecast period its growth is projected to average only about 0.7% per year.

Table 3. Baseline Forecasts of VMT Growth: Spring 2019

Vehicle Class	Compound Annual Growth Rates	
	2017 – 2037 (20 Year)	2017 – 2047 (30 Year)
Light-Duty Vehicles	1.1%	0.7%
Single-Unit Trucks	1.6%	1.9%
Combination Trucks	1.5%	1.5%
Total	1.1%	0.8%

Truck travel in the U.S reached 297 billion miles in 2017, increasing by 3.3% from 2016 and accounting for almost all of the remaining 10% of U.S. motor vehicle use.[4] Table 3 shows that truck travel is projected to grow more rapidly than light-duty vehicle travel under the Baseline economic outlook, and is also expected to sustain this growth during the last decade of the forecast period.

Growth in VMT by single-unit trucks is projected to average 1.6% and 1.9% per year for the 20- and 30-year forecast periods, respectively. VMT by combination trucks is also expected to grow steadily throughout this period, reflecting the outlook for sustained growth in transportation-related sectors of the economy: U.S. goods manufacturing and international trade. Combination truck VMT is projected to increase by 1.5% annually over the entire 30-year forecast period.

Finally, Table 3 reports that aggregate VMT by all vehicle classes is projected to grow at an average annual rate of 1.1% over the 20 years from 2017-37. Reflecting the projected slowing of growth in use of passenger vehicles during the last decade of the forecast period, growth in total VMT is expected to average 0.8% annually for the entire 30-year forecast period.

Alternative Economic Outlooks and VMT Forecasts

Over the past two decades, changes in vehicle use, particularly during the 2008-09 recession and prolonged recovery, have highlighted the uncertainty surrounding forecasts of future growth in motor vehicle travel. Important sources of such uncertainty include concerns about prospects for future economic growth, alternative interpretations of the causes of recent declines in vehicle ownership and use (particularly among younger Americans), and the potential effects on vehicle use of dramatic innovations in technology such as the advent of autonomous vehicles. To acknowledge this uncertainty, FHWA provides a range of alternative forecasts for future VMT growth that reflect uncertainty about the outlook for future economic growth, travel behavior, and vehicle technology.[5]

[4] Motorcycles and buses, which are excluded from the forecasts reported in Table 3, together accounted for only about 1% of all U.S. motor vehicle travel during 2017.

[5] Uncertainty about future VMT growth arising from the potential for fundamental changes in travel behavior or vehicle technology is likely to be resolved only with the passage of time, the availability of more detailed

To develop these alternative forecasts, FHWA used projections of population growth, U.S. economic output and its composition, growth in personal income, and energy prices from the Optimistic and Pessimistic scenarios reported as part of IHS' spring 2019 30-year economic outlook. FHWA's alternative forecast of higher total VMT growth relies on IHS' Optimistic economic outlook, which projects stronger growth in productivity, labor force participation, employment, and business investment levels than under the Baseline outlook. These factors – combined with a more robust housing sector and lower energy prices – produce stronger growth in real GDP, goods production, and disposable income than in the Baseline outlook. In turn, under the Optimistic economic outlook, these developments generate significantly faster growth in freight shipments and truck VMT.

Under this more optimistic economic growth scenario, passenger vehicle VMT is predicted to outpace the baseline outlook over both the 20 and 30-year forecast periods The modest effect of more rapid economic growth on travel is primarily a result of FHWA's passenger travel model specification, which accounts for the effect of increasing income on the cost of traveling and the dampening influence this is ultimately expected to have on travel demand as personal disposable income continues to increase.[6] The forecasting model attempts to capture dual effects of income growth on household and business travel using light-duty vehicles. On one hand, rising income increases the demand to participate in economic, social, and recreational activities outside the home, which gives rise to increased demand for travel. Meanwhile, rising incomes also increase the effective cost of time spent driving, and thus dampen travel demand.

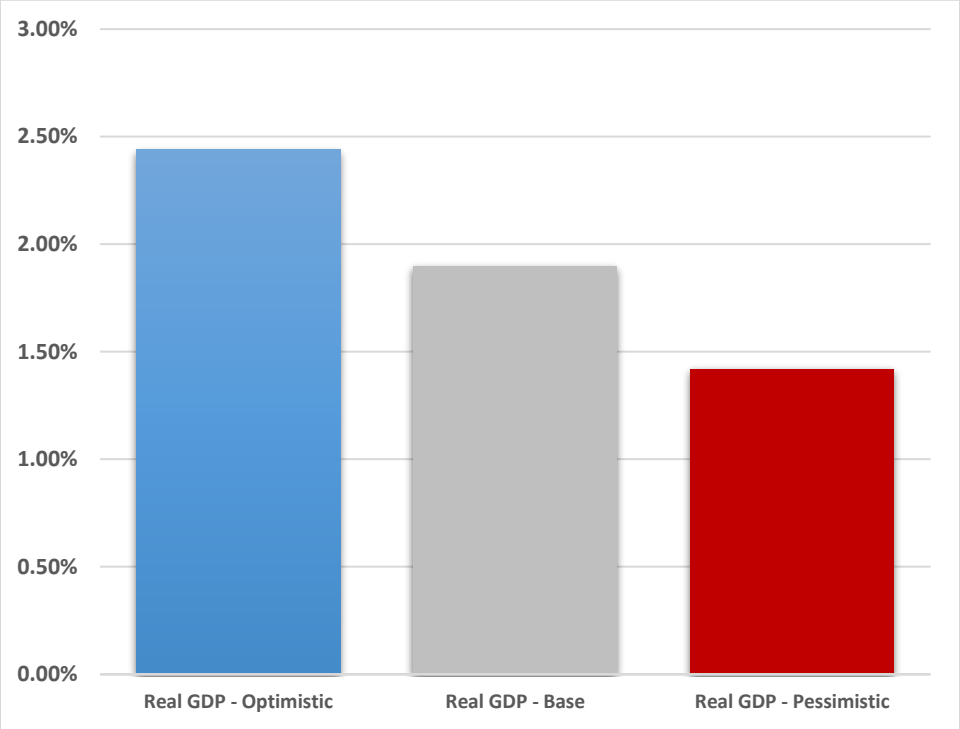
In contrast, FHWA's alternative forecast of lower growth in vehicle use reflects the Pessimistic economic outlook from IHS' spring 2019 forecast. This alternative outlook predicts weaker growth in productivity, labor force participation, and business investment, together with higher interest rates and more rapid price inflation. These factors, combined with less robust activity in the housing sector and higher energy prices, dampen projected future growth in real GDP and personal income relative to the Baseline economic outlook. Under this scenario, slower economic growth leads to lower demand for personal travel, so that passenger vehicle use increases primarily as a result of U.S. population growth. At the same time, slower growth in goods manufacturing, freight shipments, and construction activity dampen growth in truck use significantly from the levels projected in the Baseline forecast.

To illustrate the important differences in future economic trends affecting vehicle use among the alternative economic outlooks, Figures 2-4 below compare forecast growth in real GDP, personal disposable income, and gasoline prices in the Pessimistic and Optimistic scenarios to the Baseline outlook. As shown in Figure 2 , real GDP is anticipated to grow about 2.4% per year over the 30-year forecast period under the Optimistic outlook, compared to 1.9% annual growth projected for the Baseline scenario, but is projected to average only about 1.4% annually in the Pessimistic scenario.

information about personal travel, and experience with real-world deployment of advanced vehicle technologies. Thus FHWA's forecasts of future VMT growth do not attempt to incorporate these sources of uncertainty.

[6] For more information on the VMT models, please refer to the technical document at: http://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_model_dev.cfm

Figure 2. Real GDP Growth under Alternative Economic Outlooks (30-Year Average Annual Growth)



Similarly, Figure 3 shows that growth in real personal disposable income per person is forecast to average about 1.7% per year in the Optimistic scenario, only slightly above its projected annual growth of 1.6% in the Baseline outlook, but well above the 1.4% annual rate projected under the Pessimistic economic outlook. Finally, Figure 4 illustrates that inflation-adjusted retail gasoline prices are expected to increase at about 0.3% annually under the Optimistic scenario, whereas the Baseline and Pessimistic economic outlooks predict average yearly growth in gasoline prices of 0.4% and 0.8% respectively.

Figure 3. Growth in Real Personal Disposable Income per Capita under Alternative Economic Outlooks (30-Year Average Annual Growth)

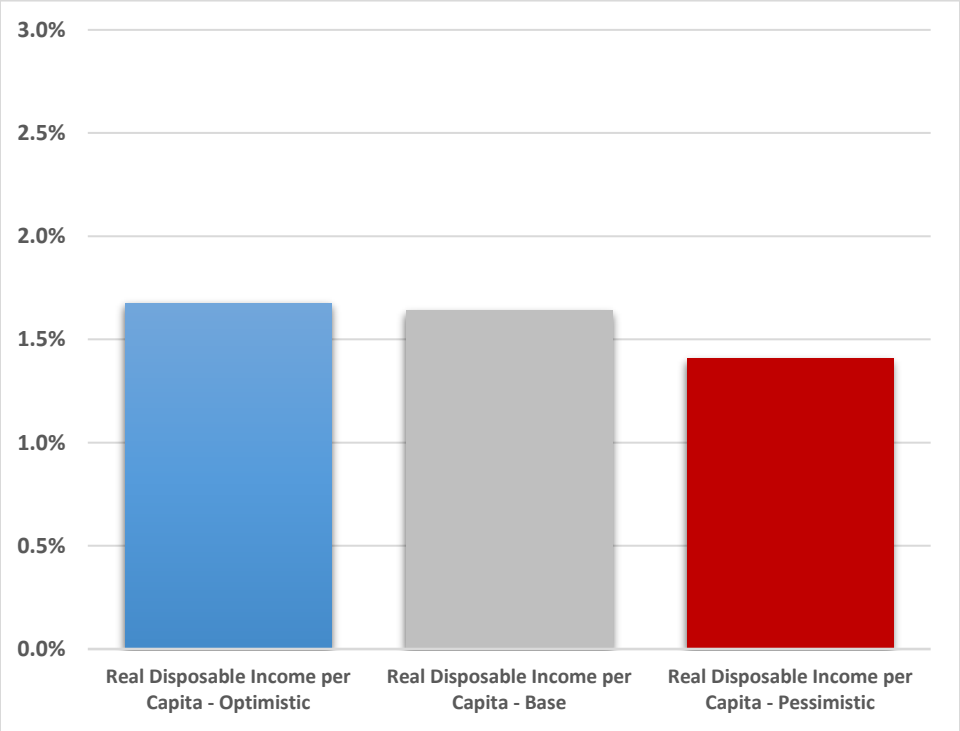


Figure 4. Changes in Real Gasoline Prices under Alternative Economic Outlooks (30-Year Average Annual Change, scale resized)

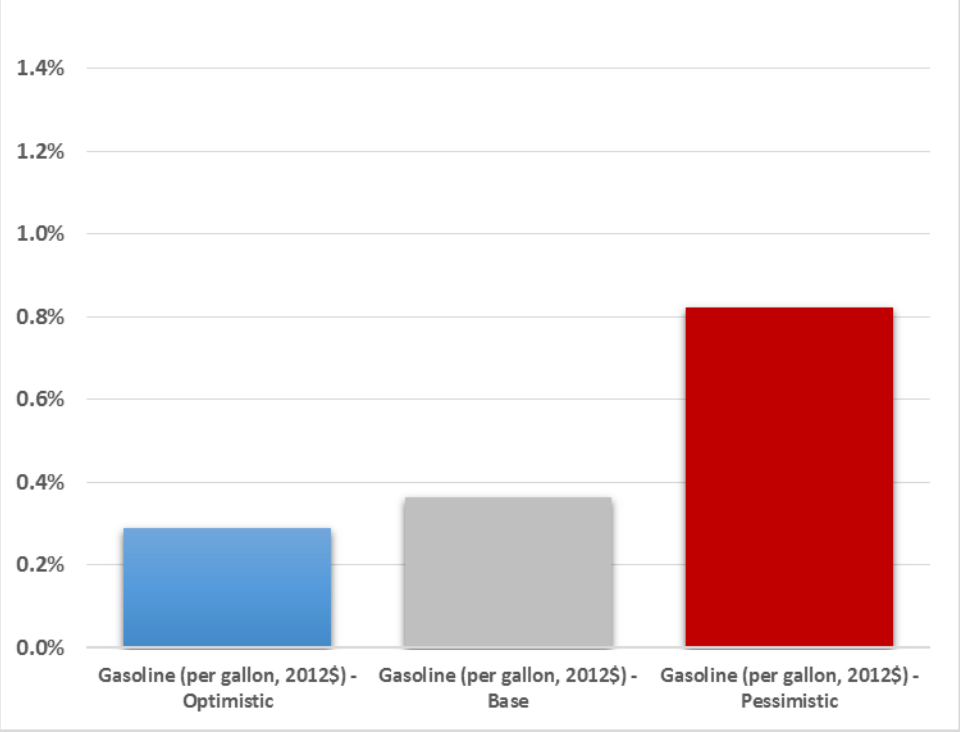


Table 4 reports alternative forecasts of future growth in VMT under the Optimistic and Pessimistic economic outlooks; the range between them again reflects the effect of uncertainty about future economic growth. These alternative outlooks have a pronounced effect on the forecast of future growth in light-duty vehicle use during the first 20-year period, with the difference ranging from 1.2% in the optimistic scenario to 0.9% under the pessimistic scenario. This range tightens slightly during the last ten years of the forecast period, however, as the countervailing effect of income growth incorporated in the model tends to maintain the forecasts within a certain range. In contrast, the difference between the forecasts of 20 and 30-year growth in truck travel between the Optimistic and Pessimistic economic outlooks is much larger, since they reflect fundamentally differing outlooks for the investment and manufacturing sectors of the U.S. economy. Because light-duty vehicles account for the largest share of total VMT, however, the long-term 30-year forecast of total VMT varies only within a comparatively narrow range between the Optimistic and Pessimistic economic outlooks.

Table 4. Alternative Forecasts of VMT Growth: Spring 2019

Vehicle Class	Compound Annual Growth Rates			
	Pessimistic Economic Outlook		Optimistic Economic Outlook	
	2017 - 2037 (20 Year)	2017 - 2047 (30 Year)	2017 - 2037 (20 Year)	2017 - 2047 (30 Year)
Light-Duty Vehicles	0.9%	0.6%	1.2%	0.9%
Single-Unit Trucks	1.1%	1.4%	2.0%	2.3%
Combination Trucks	1.1%	1.2%	1.5%	1.5%
Total	0.9%	0.7%	1.3%	1.0%

Acknowledgement

Volpe, The National Transportation Systems Center, U.S. Department of Transportation has performed the modeling underlying these forecasts and provided technical assistance to the Federal Highway Administration.