



How Changes in State Gas Tax Rates Affect Prices Motorists Pay at the Pump

An Analysis of Market Impacts in 34 States

MARCH 2022



OVERVIEW

Since 2013, 34 states have increased their state gas tax rates to make much needed investments in our nation’s infrastructure network. Yet at the same time—in the face of rising gasoline prices—some states occasionally resurrect the idea of a “gas tax holiday” to help motorists.

There is a common misconception that a change in state gas tax rates—up or down—automatically triggers a big change in what drivers pay for a gallon of gas.

That is not always the case, according to a March 2022 analysis from the Transportation Investment Advocacy Center (TIAC).

The study, conducted by American Road & Transportation Builders Association (ARTBA) Chief Economist Dr. Alison Premo Black and TIAC Director Carolyn Kramer, found that on average, just 18 percent of an increase, or decrease, in state gasoline tax rates is passed through to motorists in the retail price of gasoline in the two weeks after a change takes effect.

ARTBA examined 177 changes in state gasoline tax rates in 34 states between 2013 and 2021.

The rate changes include measures approved by state legislatures and automatic adjustments based on a pre-determined variable, such as inflation or the wholesale price of gasoline. The changes also included a May 2021 one-month gas tax suspension

in Georgia that was initiated via gubernatorial executive action.

Using data from the Oil Petroleum Information Service (OPIS) and the U.S. Energy Information Administration (EIA), ARTBA’s results continue to mirror those of other academic studies: the price of crude oil is the primary driver of changes in the retail price of gasoline, not gasoline taxes.

As drivers know when they fill up their tanks, gas prices can change daily—even by as much as several cents per gallon. It is not uncommon for the price at one station to differ significantly from a second location right across the street. Supply issues, including refinery and line closures, can send local prices soaring by 10-20 cents-per-gallon in just one day.

Gasoline price variability is nothing new. What most consumers, politicians, and the media may not know is that the motor fuel tax, while folded into the overall price at the pump, is not collected by retail sales outlets.

The federal and most state gasoline taxes are collected either when motor fuel is removed from bulk storage terminals or at the distributor level.¹ For perspective, there are 1,300 fuel terminals and 250 refineries (owned by 185 companies) registered with the federal government to distribute fuel.²

¹ U.S. Congressional Research Service, “The Federal Excise Tax on Motor Fuels and the Highway Trust Fund: Current Law and Legislative History.” February 22, 2016.

² U.S. Internal Revenue Service, Terminal Locations Directory and U.S. Department of Energy National Renewable Energy Laboratory, “High Octane Fuel: Terminal Backgrounder.” February 2016.

Changes in the price consumers pay at the gas station have little to do with any adjustments to the gas taxes used to maintain the roads and bridges they use every day. The “pass through” rate for gasoline and diesel fuel taxes to retail prices is affected by factors like “supply elasticity, including refinery capacity utilization, inventory levels, gasoline content regulations and the utilization of diesel for home heating,” according to one Harvard University study.³

Gas price variability is largely impacted by crude oil prices, refining costs, profit margins, and retail and distribution costs, according to the U.S. EIA.⁴ Its analysis concluded: “It is the variability in crude oil prices and spot gasoline prices that causes most of the variation in retail gasoline prices.”

The Association for Convenience and Petroleum Retailing says factors contributing to varying retail gasoline prices within given geographic areas include distribution costs, regulatory-mandated fuel blend requirements, business costs, market conditions, the brand of fuel, taxes, and individual retail outlet pricing strategies.⁵

State gasoline and diesel fuel taxes are key funding sources for state transportation programs; they account for an average of 46 percent of all user fee revenues collected at the state level and 19 percent of all state highway program funding.⁶

Fuel tax revenues fund different parts of state highway and bridge programs, including construction, repairs, maintenance, operations, salaries, and grants to county and local governments.

State Gas Tax Changes, 2013 to 2021

Thirty-four states increased or decreased their state gas tax rates between 2013 and 2021. The 177 changes to state gas tax rates ranged from one-time increases approved by the state legislatures to automatic changes for variable rates based on formulas written into law.

New Jersey automatically lowered its variable gas tax rate by 8.3 cents-per-gallon on Oct. 1, 2021. Georgia suspended its gas tax for one month in May 2021 when Colonial Pipeline shut down its pipeline in response to a ransomware attack. (See case studies on pages 6-7.)

Of the 177 changes, the rate increased 122 times and decreased 55 times.

State gas tax increases averaged 2.8 cents-per-gallon nationwide, but half a penny—0.5 cents—reached consumers at the pump, according to ARTBA’s model. The average decrease in the tax rates was 1.3 cents per gallon, 0.2 cents passed to the consumer.

During this time the average retail gas price fluctuated between \$1.19 per gallon in Wisconsin (April 23, 2020) and \$4.71 per gallon in California (Nov. 25, 2021).

³Justin Marion & Erich Muehlegger, “Fuel Tax Incidence and Supply Conditions,” HKS Faculty Research Working Paper series, RWP 10-014, John F. Kennedy School of Government, Harvard University. March 2011.

⁴U.S. Energy Information Administration, What Drives U.S. Gasoline Prices?, October 2014.

⁵NACS Gas Price Kit, “Factors That Affect Gas Prices,” March 2022.

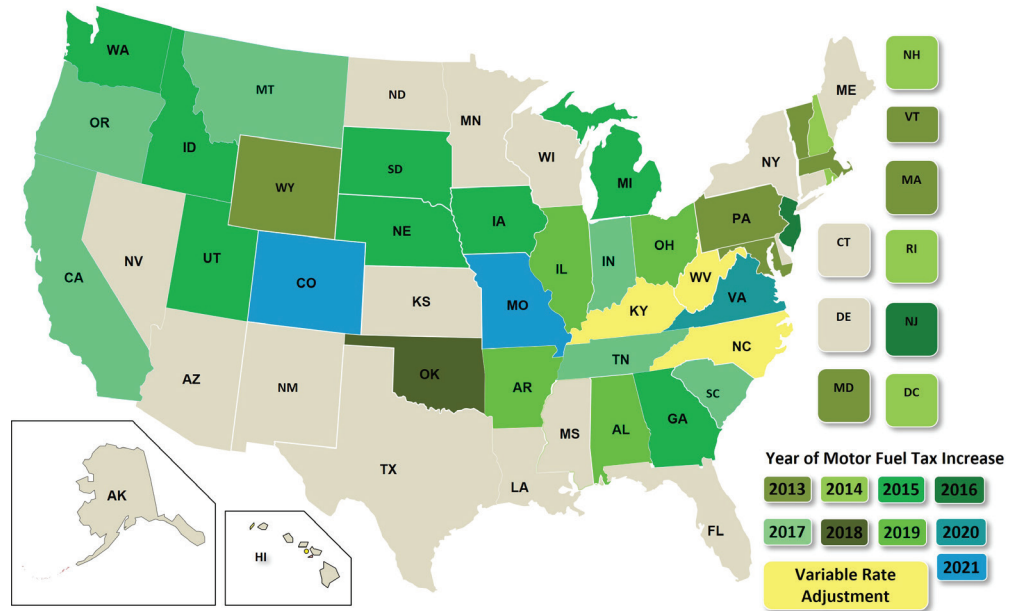
⁶U.S. Department of Transportation, Federal Highway Administration Highway Statistics 2020, Table SF-1.

The daily change in state retail gas prices fluctuated between an 8.8 cents-per-gallon decline to an increase of 27 cents-per-gallon. The 27-cent price spike in Indiana in Aug. 2015, was driven by a shutdown in one of three fuel lines at a BP refinery because of mechanical problems. This increase came as the price of crude oil dipped to a six-year low.⁷

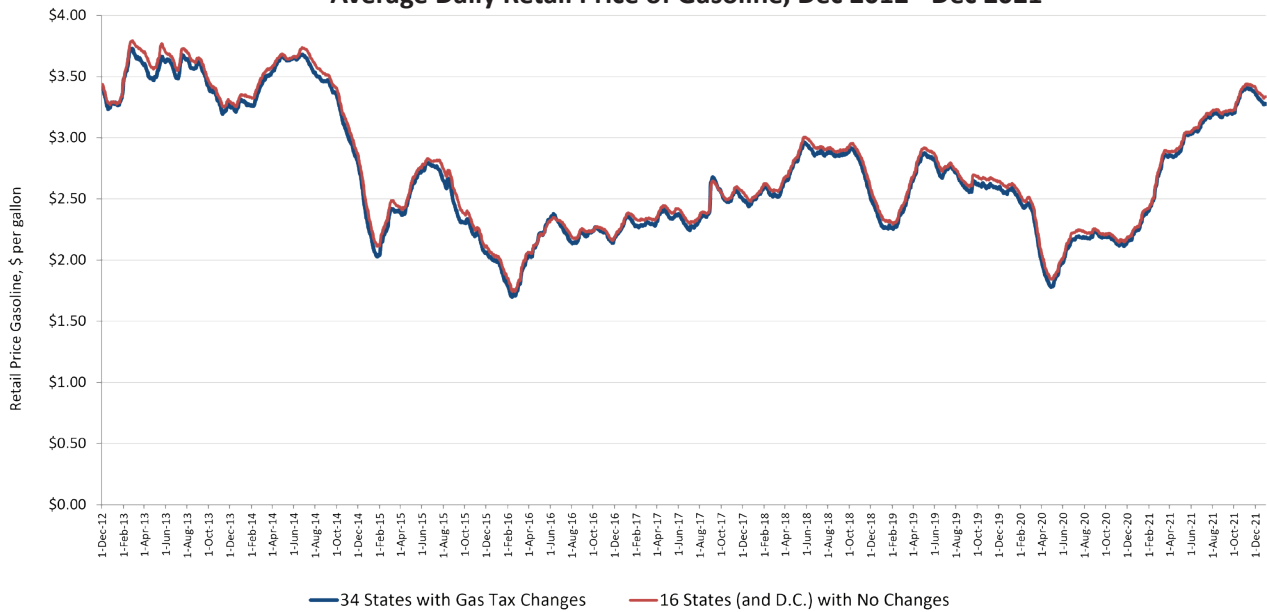
For the 122 times that the state gas tax rate increased, the average retail pump price also increased on 48 of those days. The state average retail price declined on 63 of the days that an increase in the state gas tax went into effect. On 11 occasions the gas tax rate increased, the retail price remained unchanged.

For states where the gas tax rate decreased, the average retail gas price also declined in 43 instances. In eight cases the state gas tax declined, and the retail gas price increased. The retail price of gasoline stayed constant the other four times.

State Gas Tax Legislative Changes: 2013 - 2021



Average Daily Retail Price of Gasoline, Dec 2012 - Dec 2021



⁷ Chris Morisse Vizza, Indiana Journal & Courier, "High gas prices are here for a while." 8/14/2015.

As part of the analysis, ARTBA also examined changes in retail gas prices for the 15 days preceding a state gas tax rate change. The model found there was no significant relationship between daily pump prices and the anticipation of a gas tax increase.

Most striking, the data in the chart on page 4 shows there was little difference between the average gas price in states that changed their tax rate, compared to those that did not, over the examined nine-year period.

The average gas tax rate in the 34 states with changes increased by 8 cents-per-gallon, from 24 cents to 32 cents. States that did not increase their rates had an average tax rate of 22 cents-per-gallon.

If the changes in a state gas tax rate were fully passed on to consumers, as suggested by proponents of so-called gas tax holidays, the divergence between these two sets of prices would be expected to grow over time. That has not been the case.

Variable Gas Tax Rates

State gas taxes continue to be an important part of state transportation funding.

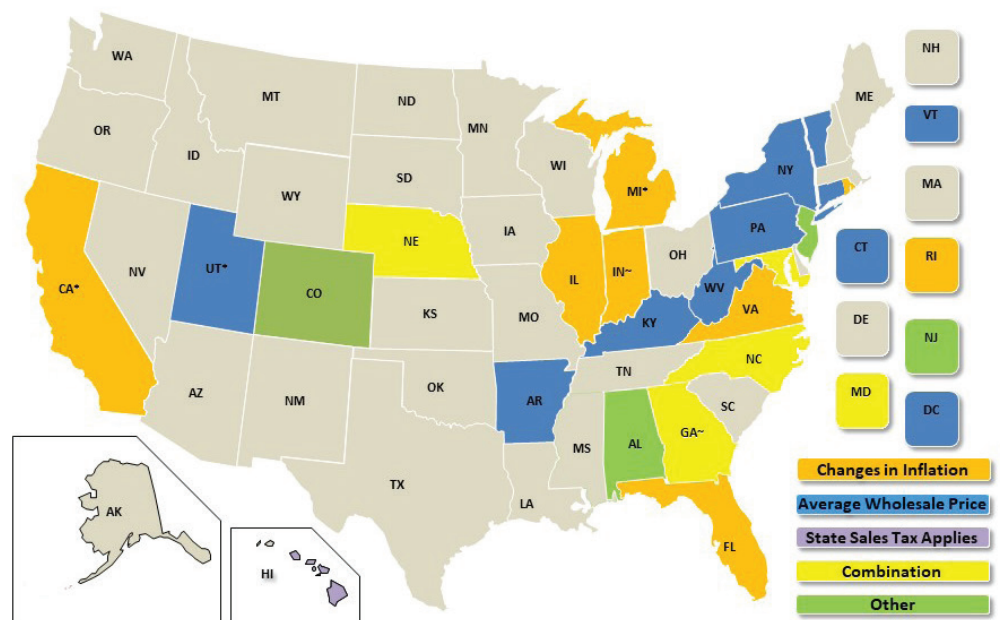
Most state gas tax increases or decreases are done through the legislative process. In most states a simple majority is sufficient to pass a bill—in 15 states⁸ a supermajority may be necessary. Colorado and Missouri voters must approve any tax increase that will generate more than a certain amount.

In addition to the legislative process, 22 states have variable-rate formulas that adjust the cents-per-gallon charge at the pump based on external factors, including changes in the wholesale price of gasoline, general economic inflation, construction prices, or other triggers.

Most of these states evaluate their gas tax rate annually and adjust based on the factors included in their variable-rate formula.

ARTBA’s analysis found that neither legislative nor automatic variable rate gas tax increases have a significant impact on what consumers pay at the pump.

22 States + DC Use Variable-Rate State Gas Taxes



⁸ National Conference of State Legislators, “Supermajority Vote Requirements to Pass the Budget.” 11/9/2018.

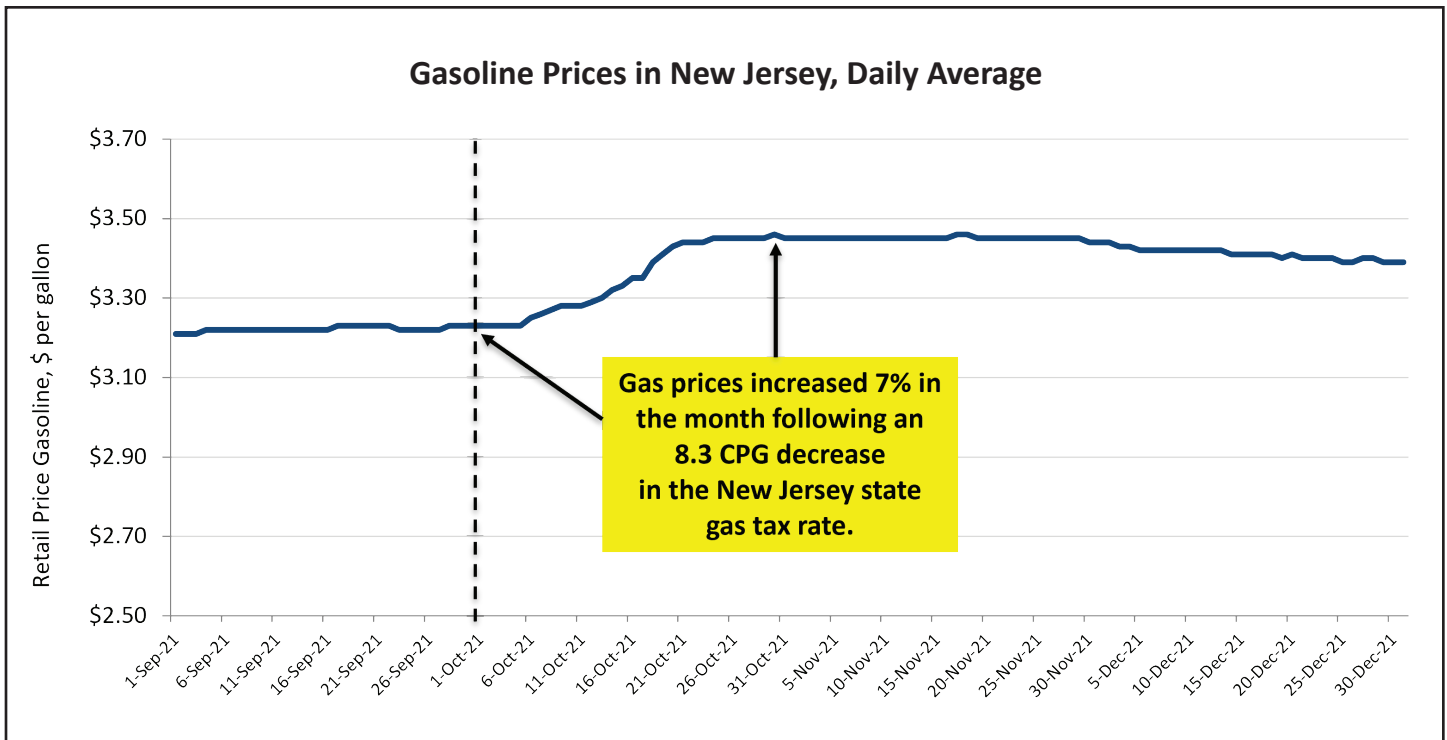
CASE STUDY:

What Happened When New Jersey Decreased the State Gas Tax 8.3 Cents

Sometimes politicians seeking to provide relief for consumers facing high pump prices have called for a “gas tax holiday” of several months to save drivers money.

Recent evidence from New Jersey suggests that this is not necessarily the case. New Jersey’s gas tax changes automatically each year on Oct. 1, based on the transportation department’s program of work and the transportation revenues collected in the past year. Because of the economic recovery in 2021, New Jersey gas tax revenue was higher than expected. As required by law, the New Jersey Treasury Department decreased the gas tax for the coming fiscal year.

On Oct. 1, 2021, the New Jersey state gas tax decreased 8.3 cents. The retail price of gasoline stayed unchanged for three consecutive days. Then it began to increase as crude oil prices rose. The daily average retail price of gasoline increased seven percent by the end of the month. Despite the decrease in the state gas tax rate, consumers actually paid more for gasoline every day through the end of 2021.



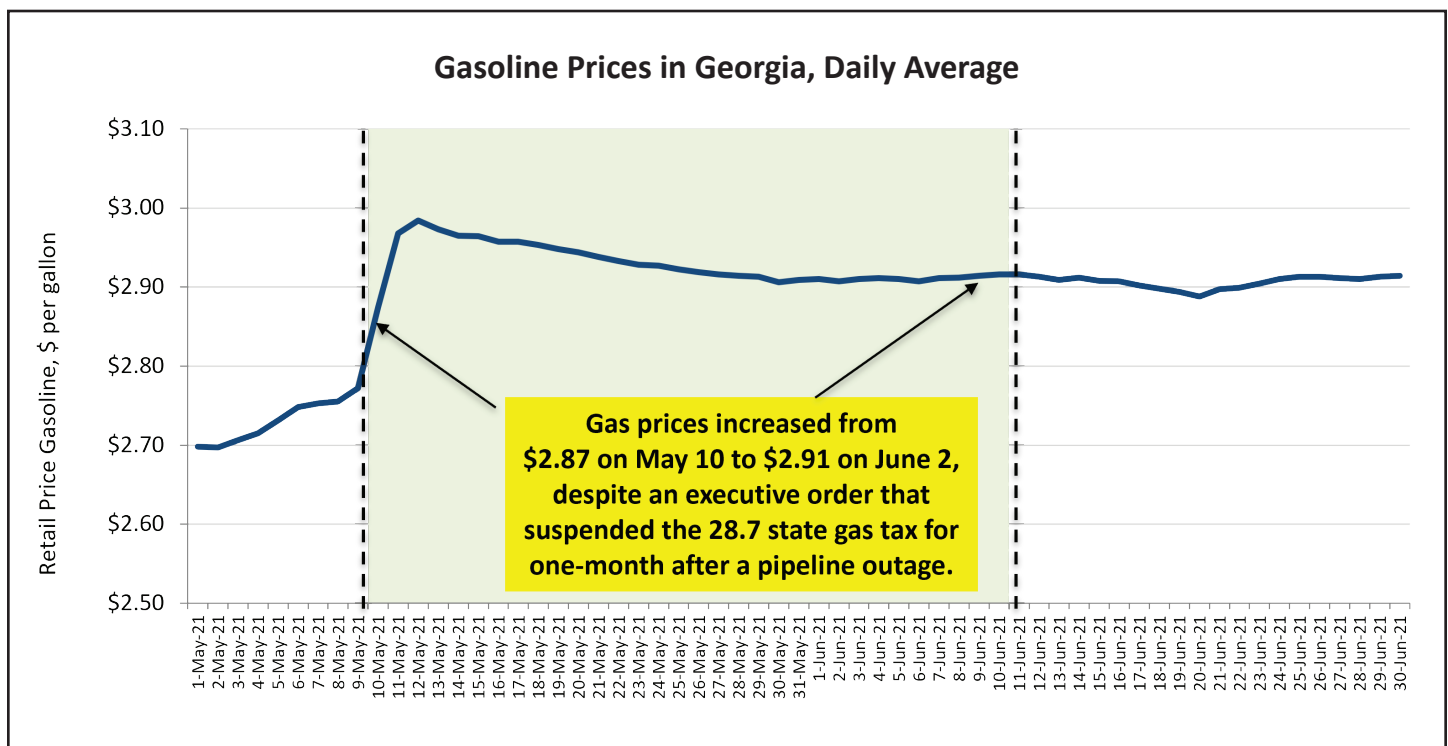
CASE STUDY:

Gas Tax Suspension in Georgia

On May 10, 2021, Georgia Gov. Brian Kemp suspended the state gas tax for one month after a computer hack shut down a key pipeline in the state. He also suspended weight limits on tanker trucks to deliver fuel.⁹

The 28.7 cents-per-gallon rate was suspended through executive order on May 10 and was reinstated June 2.

The average retail price of gasoline on May 10 was \$2.87 and kept climbing for the next few days, peaking at \$2.97 on May 14. The average price declined slightly over the month and was \$2.91 on June 2 when the gas tax was reinstated. Despite an increase of 28.7 cents in the gas tax rate that day, the average retail price of gasoline remained at \$2.91 for the month of June.



⁹ Associated Press, "Kemp Extends Georgia Gas Tax Waiver Due to Pipeline Outage." 5/14/2021.

About OPIS

Oil Price Information Service (OPIS) is one of the world's most comprehensive sources for petroleum pricing and news information. In 1980, OPIS pioneered "rack" price discovery for thousands of wholesalers, and now maintains the world's most comprehensive database of U.S. wholesale petroleum prices, publishing more than 30,000 rack prices each day at over 1,500 terminals in nearly 400 market locations.

In 1999, OPIS launched the first retail fuel pricing database in North America. With its unique ability to map retail prices back to wholesale markets, it quickly launched a retail margin service. OPIS now receives daily gasoline and diesel prices for more than 130,000 retail outlets in the U.S. and Canada. OPIS prices are used by AAA, Microsoft (MSN Autos), Garmin, MapQuest and dozens of other website and mapping companies, in addition to its core oil company base.

About the Model

A fixed effects regression model includes a series of group-specific constant terms to take into account unobserved characteristics that do not change over time. The model can be expanded to include a time trend variable to capture time-specific effects. By using a fixed effect specification, the model considers unique factors at the state level and over different time periods that would have an impact on the state level retail price of gasoline. For example, if a state is located near a refinery, that would have a consistent impact on the competitive environment and an individual state's retail price of gasoline.

The model estimates the log of the daily state retail price of gasoline. The independent variables are the log of the price of Brent crude oil for 30

days prior to each observation, the log of the state gas tax related rate and a variable to capture the impact of the rate change on prices over a 15-day period. Additional models examined the impact of the rate change in the 15 days preceding the effective date. The final model includes fixed effects for states and each month of the year, plus an interactive term to capture any combined state and monthly time effects.

Overall, there were over 169,200 observations included in the data set. The overall r-squared of the model was .73, indicating the independent variables in the model explain about 80 percent of the variation in the dependent variable, the daily change in the retail price of gasoline.

About the Authors

This research was conducted by Dr. Alison Premo Black, senior vice president and chief economist for the American Road & Transportation Builders Association (ARTBA) in Washington, D.C.

Dr. Black, who earned her Ph.D. in economics at The George Washington University in the Nation's Capital, also holds an M.A. in International Economics and Latin American Studies from the Johns Hopkins School of Advanced International Studies.

Since joining ARTBA in 2000, Dr. Black has led teams and authored over 100 studies examining state transportation funding and investment patterns.

Carolyn Kramer, senior director of state funding policy and director of the Transportation Investment Advocacy Center (TIAC), is responsible for significant research and background work on the report. Kramer has tracked and analyzed over 1,000 state and local ballot initiatives, 600 state legislative measures, and the reelection rates of over 3,000 state lawmakers since 2012.



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