



# Do Driving Restrictions Reduce Congestion?

*Lessons from Beijing*

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The city of Beijing continues to grow rapidly, not only in population, but also in the number of vehicles on its roads. Although this increased mobility has benefits, the city has become one of the most polluted and gridlocked in the world. Driving restrictions have often been regarded as a silver bullet by various countries and regions seeking to mitigate congestion and pollution problems—including Beijing. However, as has been observed in areas that introduced similar programs, this type of command-and-control policy produces unintended consequences, and Beijing is no exception.

During July 17 to 20, 2007, Beijing became the first city in China to implement a driving restriction policy. It was estimated that this

four-day experimental restriction—a trial run for the 2008 Olympic Games—took about 1.3 million automobiles off the roads. After the Olympics, evidence of reductions in traffic congestion and pollution encouraged the government to continue with a similar but less restrictive program. The congestion index—which measures congestion on a scale from 0 to 10—was reduced substantially, shrinking from 7.95 in 2007 to 5.93 in 2009, even though the vehicle population increased by 26 percent in 2007.

But the effect did not last very long. In 2010, the congestion index jumped back to 7.80. In 2010, 2011, and 2012, the government revised the measures, restricting all automobiles from being driven one day per week based on license plate number. This

was enforced by a 100 yuan fine each time two consecutive violations were committed more than three hours apart by the same person. With this revision, supported by more than 2,000 surveillance cameras all over the city and frequent patrols, the driving restriction policy in Beijing was expected to take one-fifth of the city's 4.2 million cars off the road each weekday.

In addition, Beijing began issuing license plates by lottery. Only 240,000 plates were issued in 2011, compared with 700,000 the previous year.

The challenge presented by a driving restriction policy lies in people's natural preference for fast and convenient transportation, and their ability to circumvent rationing policies of this sort. We looked more closely at this phenomenon in Beijing, and examined two questions: Are car owners discouraged from driving because of this policy? If, instead, car owners are sidestepping the driving restrictions, who are the rule breakers?

We used data from a household travel survey in Beijing to answer these questions, specifically looking at "simple tours"—a round trip in which an individual starts from home as an anchor and visits another place with a single purpose on a single day. For the simple tours, 31.7 percent were made by bus, 17.1 percent by car, 15.5 percent by walking, and 12.2 percent by subway. The rest were shared by bicycle, powered two-wheelers, and other modes. To identify whether and to what degree driving restrictions would change individual choices of transportation, we used a model that controlled for different variables that may be correlated with mode choice, such as the distance of a trip and the number of bus stops along the way. We found that the driving restriction policy in Beijing does not significantly influence an individual's choice to drive.

To learn more about the rule breakers, we identified 730 cars that were subject to the restriction rules. Of those, 349 car users, or about 47.8 percent, broke the driving restriction rules. These rule breakers tended to be male, earn higher incomes, and travel during peak hours. In addition, the probability of breaking driving restrictions was higher if the trip destination was farther away from the city center, in a place not as well served by public transit, and equipped with fewer surveillance cameras or police patrols.

Drivers in Beijing have found other ways to circumvent the driving restriction policy, as well. For instance, we found that 92 car owners (about 12.6 percent) who were subject to driving restrictions left home before 7:00 a.m., possibly choosing to leave early to avoid the driving restrictions. Other tactics include purchasing multiple cars with different license plate numbers, covering or borrowing license plates—or even purchasing them on the budding black market.

According to the Beijing Municipal Commission of Transportation, the driving restrictions and the license plate policy together have been effective in curbing air pollution and traffic congestion. But our research suggests that these command-and-control policies are only effective for a very short period of time. Relieving the city of these negative consequences of driving will require more market-oriented transportation policies and a more comprehensive policy package that combines other available tools, such as congestion tolls, expansion of the subway system, parking fees, fuel taxes, and high-speed transit facilities. ●

#### FURTHER READING

Wang, Lanlan, Jintao Xu, Xinye Zheng, and Ping Qin. 2013. Will a Driving Policy Restriction Reduce Car Trips? A Case Study of Beijing, China. EfD discussion paper 13-11. Washington, DC: Environment for Development and RFF.