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How does a driving restriction affect transportation patterns? The medium-run evidence from Beijing

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How Does a Driving Restriction Affect Transportation Patterns? The Medium-run Evidence from Beijing

Abstract: This paper uses data from 2009 to 2014 to study the medium-run impact of the driving restriction on transportation patterns in Beijing. Due to Chinese traditional avoidance of the number 4, 7.5% fewer cars are banned from driving on dates when 4 is specified, compared to other dates. Exploiting this variation, the analysis shows that the driving restriction significantly improves traffic condition in the restricted hours without worsening it during the unrestricted hours. Bus and taxi ridership increases accordingly, but very few drivers are motivated to take rail. Over years, the driving restriction exhibits a stronger effect on the evening traffic condition. The underlying factors for the time trend are further explored.

Keyword: Driving Restriction; Traffic Congestion; Transportation Patterns

1. Introduction

Over the past twenty years, Beijing has experienced unprecedented growth in the number of motor vehicles. From 2001 to 2014, the total number of motor vehicles grew from 1.1 million to 5.4 million, with the number of private cars growing from about 0.51 million to 4.3 million. During the same period, Beijing invested heavily in the construction of roads and other public transportation infrastructure; from 2000 to 2009, roads increased from 2470 kilometers to 6247 kilometers in the urban areas.¹ However, like many other big cities, Beijing's efforts in road construction were dwarfed by the increase of new vehicles, and traffic congestion became worse. Beijing has been ranked as one of the most congested cities in the world by many international organizations (for example, IBM 2010). Besides causing serious traffic congestion, the growing fleet is also widely believed to constitute a major source of Beijing's poor air quality.

To solve both problems, Beijing has experimented with a driving restriction policy of different versions. During the 2008 Olympics, Beijing prohibited drivers from driving every other day (the odd-even driving restriction). After the Olympics, the city government decided to continue the driving restriction but only prevented cars from driving once every week (the once-a-week driving restriction). Besides Beijing, Mexico City, Bogotá, Santiago, São Paulo, and New Delhi have all experimented with driving restriction policies in one way or another. A driving restriction policy has become an increasingly popular response to traffic congestion and air pollution.

¹ Source: Beijing Transportation Research Center.

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