***Analysing the impact of online freight platform using data from chinese cities***

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## Overview

Driven by rapid economic development, population growth, urbanization and industrialization, road freight transportation have been one of the largest contributors to the surging oil demand and carbon emission growth globally, and especially in developing countries in the last few decades. However, in the context of Paris Agreement, as all countries need to take immediate actions to mitigate their carbon emissions, road freight transportation become one of the hardest sectors to decarbonize. This is in part due to the lack of readily available alternative low-carbon fuel technologies (e.g. battery, hydrogen) to replace existing internal conustion enegine (ICE) vehicles. Another important factor is the low operational efficiencies of the trucking sector, especially in developing countries.

The recent advances in information and communication technologies has brought about a valuable opportunity to reduce market inefficiencies. The wide availability and affordability of smart phones and mobile applications have enabled the establishment of digital platforms to effectively match shippers with trucks and carriers, using a business model that is very similar to Uber. By significantly reducing the freight matching cost and the possibility of empty backhauls, the Uberization of road freight may have great potential in improving overall performance of the road logistics system. In view of this important new trend, this research intends to evaluate the impact of this technological disruption on the energy performance of the trucking sector. Specifically, recent data from over 300 cities in China is utilized for investigation.

## Methods

The data used in this research are sourced from China’s trucking industry. Trip information from 2000 active trucks are collected for the period of October - November 2018, containing over 50000 consecutive road freight trips. Detailed information includes truck locations and trip characteristics, such as cargo weight, origin and destination locations of the trips. Other available information include truck and commodity attributes for the covered trips, such as vehicle type, vehicle length, carrying capacity, curb weight and cargo commodity type, as well as fuel type.

The share of empty running is defined and calculated in this study. Data on locations and trips are first matched to calculate the share of empty miles for all recorded trips. The produced results are then further used for an in-depth investigation to evaluate the impacts of numerous trip, vehicle and geographic factors on the trucks’ empty running behavior.

## Results

This section presents the estimated share of empty running for the entire sample, as well as results for different subsamples using several ways of classification. Aggregate share of empty running is defined as the ratio of total empty running distance against total trip distance at the sample/subsample level.

Next, distribution of share of empty running is compared against categorization of commodities, vehicles, trip distances, vehicle carrying capacity, and geographic origins, respectively. The results suggest that commodity types, vehicle types, and trip distances have clear impacts on empty running by trucks, whereas vehicle carrying capacity and geographic origins of the recorded trips do not betray a strong effect.

Overall, Uberization seem to have indeed generated an important impact on the operational efficiency of the road freight system and energy performance of individual truckers, by substantially facilitating the dissemination of freight information and reducing wasted truck miles. The effects seem to be pervasive and significant across all trip characteristics, including commodity types, vehicle types, vehicle carrying capacity, trip distances, and geographic locations. This implies the low effectiveness of the freight matching process in China’s conventional trucking sector, and the urge to utilize the latest technologies to improve efficiency.

## Conclusions

The rapid development of the information and communication technologies in the last decade have “Uberized” a number of industries and is now starting to transform the freight trucking sector. By overcoming market inefficiencies and creating economy of scale, the digitalization of the road freight system could potentially greatly improve its operational efficiencies and thereby boosting its energy performance. Along these lines, this research utilizes recent trucking data sourced from China’s road freight sector to provide a quantitative evaluation of the Uberization’s impact on one of the key energy efficiency indicators of the trucking industry. The results suggest that the online freight platform does bring about a significant reduction in the overall percentage of empty running for the analyzed sample.

## References

IEA. 2017. *The Future of Trucks*, OECD/IEA, Paris