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Estimating the effect of air pollution on road safety using atmospheric temperature inversions

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ABSTRACT

Does air quality influence road safety? We estimate the effect of increased air pollution on the number of road traffic accidents in the United Kingdom between 2009 and 2014. To address concerns of spurious correlation we exploit atmospheric temperature inversions as a source of plausibly exogenous variation in daily air pollution levels. We find an increase of 0.3–0.6% in the number of vehicles involved in accidents per day for each additional $1 \mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$. The finding suggests that less safe roads may present a large and previously overlooked cost of air pollution. The results are robust to a number of specifications and across various sub-samples.

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1. Introduction

Road traffic accidents generate large costs in the form of material damages, loss of life and bodily harm. In the United Kingdom alone, the UK Department for Transport estimates the total cost of reported traffic accidents in 2014 at *GBP*16.3bn (Department for Transport, 2016). Any factor influencing the frequency of accidents is then of great relevance to social welfare. We ask if air pollution is one such factor that contributes to increases in the number of traffic accidents. This question is motivated by recent evidence indicating that short-term fluctuations in air pollution impair productivity and human behaviour in ways that could plausibly affect road safety.

Air pollution is known to be responsible for serious adverse health effects including respiratory illness and cardiovascular