Over the course of the next twenty-five years, the car fleets of economically developed nations will likely undergo a substantial transformation in their powertrains, shifting away from the current paradigm of internal combustion engines fuelled by oil-derived fossil fuels to low-carbon propulsion systems such as Electric Vehicles. This transformation is being motivated by the requirement for the transport system to contribute to the achievement of national and international climate change targets, such as the recent Paris agreement which aims to limit global temperate rises to well below 2 degrees Celsius.

The transformation of the car fleet is being facilitated by set of government policies which cover such issues as stimulating research and development activity in order to advance the state of low-carbon powertrain technology and encouraging the adoption of low-carbon cars through favourable taxation structures and purchase incentives. The efficacy of these strategic activities is contingent on the ability of the government to exert control over the structure of the car stock. However, there are situations where the sovereignty of this control is diminished due to the policies being deployed by agents that also affect the structure of the car stock. An example of such a situation is where the domestic policy of one nation inadvertently extends into another, which may generate effects that are not aligned to the priorities of the host nation.

This paper presents a case study of such a situation by examining how the fuel duty policy enacted in the Republic of Ireland may have affected the structure of the car fleet in Northern Ireland. Historically, the fuel duty on road diesel in the Republic has been lower than that in effect in the North, which combined with favourable exchange rates, has led to diesel in the Republic having been as much as 30 pence (0.3 GBP) per litre cheaper. This price differential represents a spatial arbitrage opportunity, where drivers in one area (i.e. the North) can derive an advantage (i.e. lowering their costs) from purchasing a commodity in a nearby area (i.e. in the Republic). The specific hypothesis examined in this research is that the effect of this price differential in diesel fuel diminishes as distance from the border between the Republic and the North increases (i.e. a distance decay effect). This is pursued through a spatial analysis of the car fleet registered in the North which focuses on the proportion of diesel cars present in local car stocks.

This examination brings to light how the ability of a nation to manage the composition of their car fleet is not only dependent on the set of domestic polices which are deployed within a nation but also on the domestic policies in effect in adjacent nations. This paper proceeds by providing an overview of spatial arbitrage and how this phenomenon has been investigated in transport studies to date. Following this, the methodology followed in order to test the research hypothesis is detailed and the results of the analysis are presented. To conclude the paper, a number of policy relevant interpretations are proposed from the evidence that is presented.