ERSA 2025 – Extended Abstract

The environmental damage attributable to the transport sector renders it more important than ever to understand the determinants of travel behaviours. Indeed, land-use and transport policies are often touted as among the most important instruments we can use to promote shifts towards more sustainable travel behaviours, mainly by reducing excessive car-use and promoting development paradigms which encourage multi-modal travel, like the 15-minute city (OECD, 2018; Mouratidis, 2024). Yet, the relative importance of who we are and where we live in influencing these behaviours remains somewhat unclear. What's more, our understanding of how these instruments determine behaviours, and their importance over time, is somewhat limited. On one hand, this is because these mechanisms are contingent on spatial and temporal contexts, while on the other hand, they exert heterogenous impacts across population cohorts, all of which leads to potential issues surrounding the extent to which selection mechanisms bias the observed relationship between local built environments and travel behaviours (Guan, Wang and Cao, 2020).

Using the change in built environment characteristics brought about by residential relocations, I explore the relative importance of these variables in shaping commuting behaviours, controlling for socio-demographic variables and trip-specific characteristics, across the UK. To isolate the potentially heterogenous impacts these events may have on different population cohorts, the sample is split using two distinct approaches. The first splits the sample based on self-reported reasons for moving. The idea being that these reasons may capture any underlying preference heterogeneity which may link travel behaviours to local built environments (Handy, Cao and Mokhtarian, 2006; Næss, 2014; Humphreys and Ahern, 2019; Guan, Wang and Cao, 2020; Zhao and Cao, 2020; Tao *et al.*, 2023). The second splits the sample based on the occurrence of a major life-event, such as having children, getting married, or changing job. These life events are assumed to place individuals at similar stages in their mobility biography, thus capturing unobserved heterogeneity in how life stages influence the relationship between travel behaviors and local environments(Bagley and Mokhtarian, 2002; Dargay and Hanly, 2007; Chen and Lin, 2011; Scheiner and Holz-Rau, 2013; Beige and Axhausen, 2017; Zhao and Zhang, 2018; Whittle *et al.*, 2022).

Empirically, individual-level longitudinal data and highly disaggregated spatial data are used. More specifically, individual-level data is sourced from Waves 1-9 (from 2009/2010 to 2018/2019) of the *UK Household Longitudinal Study*. This survey captures a range of social,

economic, and attitudinal information about the lives of (all) members of 40,000 households through annual interviews (University of Essex and Institute For Social and Economic Research, 2024). The individuals contained within this sample are nested in Lower layer Super Output Area (LSOAs). LSOAs represent each respondents' residential area(s) in each survey wave. LSOA's consist of 400-1,200 households and have a usually-resident population of between 1,000 and 3,000 persons, facilitating assessments of travel behaviours at highly disaggregated spatial scales (Office for National Statistics, 2021). The spatial data I employ consists of spatial accessibility indicators (developed by (Verduzco Torres and McArthur, 2024)), land-use data (developed by (Fleischmann and Arribas-Bel, 2022)), property market data (developed by (Ahlfeldt, Heblich and Seidel, 2023)), transport infrastructure data (provided by (Ordnance Survey, 2024)), public transport network and access data (provided by (UK Department of Transport, 2024)), and point-of-interest location data (developed by (Ballantyne and Berragan, 2024)) are geocoded at the LSOA level, allowing me to develop a comprehensive picture of local built environments.

The research design is based on a staggered treatment effect framework. The final sample includes 2,213 individuals who relocate once during a 6-year period, with data captured in the years surrounding relocation (i.e., $-5 \leq t \leq 0$). This setup allows for comparisons between individuals who relocate in a given year and those who do not, taking advantage of the timing of relocations as an exogenous event. The assumption of random relocation timing is supported by the relatively tight housing market in the UK during the study period, allowing for a causal interpretation of the findings.

Methodologically, a series of linear probability models, utilising person, region, and year fixed-effects are employed as the main estimator whereby the key dependent variable captures changes in the commute mode choice of individuals. The base variable contains five distinct modes, including: private car, taking public transport (split into rail-based and bus transport), cycling, and walking, while changes are captured by switching from any of these modes to another since the previous survey wave. The main independent variable is an interaction term that captures the effect of relocation in a given year, allowing for the identification of relocation-related changes in commuting behavior. Given that individuals are removed from the sample after relocating, traditional biases around staggered treatment effects are minimized. For robustness, mixed-effects binary logistic regression models are used to account for unobserved individual-level preference variation, with random effects incorporated to capture unobserved heterogeneity.

Preliminary results suggest that travel-induced self-selection plays a relatively minor role in influencing commuting behavior after residential relocation. While I anticipated that individuals with a predisposition for sustainable travel modes (e.g., cyclists or public transport users) might be more likely to move to locations that support such behaviors, the evidence does not strongly support this hypothesis. The effect of self-selection appears to be weak, suggesting that the built environment's role in shaping travel behaviors is not as strongly contingent on individual preferences as previously thought. This finding contributes to the growing body of literature questioning the magnitude of travel-induced self-selection (Guan, Wang, and Cao, 2020), particularly in the context of residential relocations.

In contrast, relocation for work-related reasons emerges as one of the most significant drivers of changes in commuting behavior. Individuals who move due to work tend to exhibit the largest shifts in commute mode choice, with a pronounced shift towards more sustainable modes such as public transport and cycling. This suggests that work-related relocations provide an important opportunity for intervention, as these moves are often accompanied by changes in the accessibility of labor markets, potentially reducing reliance on private cars. These findings align with previous research highlighting the central role of employment-related factors in shaping travel behavior (Humphreys and Ahern, 2019; Zhao and Cao, 2020), reinforcing the argument that policies targeting labor market accessibility could have a large impact on promoting sustainable commuting practices.

Other sample splits, based on life-events such as marriage or having children, report more mixed results. While changes in life-stage appear to have a limited direct impact on commute mode choice, there are some indications that certain life-events—particularly the birth of children—are linked to an increase in private car use. This suggests that the presence of children may lead to greater reliance on personal vehicles, possibly due to a combination of convenience, time pressures, and limited public transport options for families.

These findings lead to an important theoretical contribution to the role of selection in travel behavior. While much of the existing literature has focused on the broad concept of self-selection, our results suggest that different types of selection—such as work-related relocation and life-stage transitions—may exert varying impacts on travel behavior. This nuanced view of selection highlights that not all forms of self-selection are equal. Specifically, work-related selection appears to be a stronger driver of behavior change than personal preference or life-stage transitions, challenging the assumption that individuals are primarily moving to areas that

fit their pre-existing travel habits. Instead, our findings suggest that the interaction between labor market access and residential choice could provide a fresh lens through which to understand the determinants of travel behavior.

Empirically, this work bridges two otherwise divergent literatures. A longstanding justification for relocation studies is that relocations provide windows of opportunity in which pre-existing habits and behaviours become disrupted, and can subsequently change, in response to some internal (i.e., person-specific changes) or external (i.e., changes in/to local environments) event (Thomas, Poortinga and Sautkina, 2016; Beige and Axhausen, 2017; Thronicker and Klinger, 2019; Wang, Mao and Wang, 2020; Johansson Rehn, Olsson and Friman, 2024). Yet, many relocation studies lack a convincing spatial dimension (i.e., by only incorporating "urban" and "rural" classifications), something typically stemming from data limitations or from limited spatial scales/scopes (for exceptions see: (Clark, Chatterjee and Melia, 2016; De Vos, Ettema and Witlox, 2018; Adhikari, Hong and Frank, 2020)), while others tend to lack a convincing temporal dimension. While both strands address issues surrounding residential self-selection, where one lacks in temporal understanding, the other lacks in spatial understanding, thus presenting a major knowledge gap concerning the relative importance of local built environment characteristics in influencing travel behaviours, when compared to individual life-events and selection mechanisms (Müggenburg, Busch-Geertsema and Lanzendorf, 2015; Guan, Wang and Cao, 2020).

Further analysis will explore the role of local built environments in this context. As expected, changes in land-use characteristics, such as increased land-use mixing, are associated with shifts towards more sustainable travel modes. However, the relative importance of these factors appears to be contingent on the nature of the relocation itself, with work-related relocations showing a stronger link to changes in commute mode compared to other types of moves. This reinforces the idea that selection mechanisms—specifically related to employment opportunities—may interact with the built environment to influence travel behaviors in complex ways.

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