Household’s location choice, transport accessibility and car ownership

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Abstract
It is well known that car ownership in cities is lower than in rural areas and many studies have considered the car ownership decisions conditional upon the location choice (see for instance Dargay (2002), Potoglou and Kanaroglou (2006), and Pyddoke and Creutzer (2014)). The choices of residential location and car ownership are probably interrelated. Choice for a rural area implies in many cases the necessity to own a car. The same may be true for the choice to locate in a suburban area, depending on the availability of public transport. For those living in or close to city centers, parking may be difficult and or expensive, while accessibility of public transport is often much better. These considerations suggest that one should regard decisions about residential location and car ownership as mutually related. This is indeed the main aim of this paper.

We estimate a residential sorting model of the type proposed by Bayer and Timmins (2007) that allows us to investigate the determinants of the household location choice and the household car ownership decision. A recent literature has emphasized that household location choices are not only affected by the accessibility to employment opportunities but also by accessibility to urban amenities (Brueckner et al. (1999);
Glaeser et al. (2001)). The literature recognises also the significant impact of education on the value attached to the employment accessibility and amenities. E.g. higher educated workers have more specialised skills and attach a higher value to urban amenities. This suggests that the quality of transport infrastructure is an important determent of household’s residential location choice. Moreover, it is well-known that high property prices force the lower-income households to settle in the suburbs where the supply of public transport is scarcer. This absence of an alternative to the car transport involves transport expenditures that often increases with the distance from the city centre. Consequently it is important to introduce the decision to own a car into the model. We include car ownership into the definition of a choice alternative. Naturally, we expect public transport availability to be less important for the car-owners. This model allows us to study the impact of a major improvement in public transport on car ownership, house prices and neighbourhood characteristics of a major European capital.

Our model is basically a logit model of the Berry-Levinsohn-Pakes type (Berry et al., 1995). That is, we take into account unobserved heterogeneity among the neighborhoods and estimate the model in two steps. The first step is the estimation of a conventional logit model that includes alternative-specific constants and cross terms of housing and household characteristics. The alternative specific constants can be interpreted as the utilities attached to the choice alternatives by the average household. In the second estimation step, these average utilities are further analyzed, while taking into account the probable correlation between the unobserved heterogeneity term and the housing price in the neighbourhood.

We estimate the model for the Greater Copenhagen Area (GCA). Copenhagen (the capital city of Denmark) is the centre of the GCA. The GCA is the political, administrative, and educational centre of Denmark and accounts for more than 40% of Denmark’s GDP, one third of Danish population, and 1 million workplaces. The estimation of the equilibrium sorting model is based on the data derived from the administrative register data for owner-occupiers with residence in the GCA for the year 2008 spread over 167 zones designed for the purpose of detailed traffic modelling. Moreover, we do not only distinguish between living in a house or an apartment in the
GCA, but also between being a car owner or not in both housing situations. Finally, we estimate two models: one referring to the single wage-earner households and one referring to the dual wage-earners households. The set of considered indicators for accessibility to transport facilities includes: the average distance to the nearest motorway ramp, the average distance to the nearest METRO station, and the accessibility of employment. We estimate the willingness to pay for different types of households for the considered aspects of transport accessibility.

Special attention is paid to the role of public transport and car ownership in location choice. Car ownership and use are relatively expensive in Denmark and the share of multiple car households is low, even though the share of households with two workers is high. Many workers therefore have to use public transport and presumably accessibility to this facility is an important determinant of location choice.

Our results confirm that public transport availability is less important for the car-owners. Moreover, the results suggest that the higher educated tend to concentrate in particular areas. This is also confirmed by the available data, i.e. the share of the higher educated is much larger in the north parts of the metropolitan region than elsewhere.

References