┌─ ■ 博士學位論文紹介 ■ ─

논 문 제 목 : 대중교통투자가 가정의 자동차 소유율과 이용율에 미치는 영향에 대한 계량분석학적 연구
                (The Effect of Public Transit Investment on Automobile Ownership and
                Use in Households)
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Very few modeling efforts have examined quantitatively whether the quality of public transit influences automobile ownership and use decisions. This study develops econometric models to predict the effect of access to and distance to public transit on automobile ownership and miles driven. Attention focused on the households residing in National Ambient Air Quality Standard(NAAQS) non-attainment metropolitan areas(NMSA) using data from the 1995 Nationwide Personal Transportation Survey.

The models developed can be distinguished from previous studies by the use of an Ordered Logit model(ORL) to predict the number of automobiles owned, and predicting total miles driven for multi-vehicle households. The main features in the model of automobile ownership are 1)using the inverse square root of transit distance as a measure for transit accessibility and 2)estimating the number of drivers in a household using a probit model. The transit variable reflects the sensitivity of households toward the transit distance as well as providing a way to represent households with no access to transit.

Statistical tests for the homogeneity of the models over different regions(e.g. NMSA and not NMSA) show that a single model with dummy variables for cities is valid for modeling the number of drivers and the number of automobiles owned. However, separate models of VMT are needed for single-vehicle and for multi-vehicle households, but not for different regions.

Important findings in the analysis are 1)the number of vehicles owned is roughly proportional to the total VMT, 2)income is the primary determinant of the proportion of adults($>$ 16 years old) who are drivers, and the number of drivers is the primary determinant of the number of automobiles owned, 3)the presence of children is not a significant factor in VMT, 4)better access to public transit reduces the number of drivers, and therefore, the number of automobiles owned, and 5)the VMT of multi-vehicle households is more sensitive to transit than one-vehicle households.

Public transit simulations are performed in the second part of the study, and the key findings show that effective VMT reductions can be achieved by improving the access to public transit. Providing transit access for all households in NMSA and a reduction of the distance to the nearest transit stop to 0.1 miles reduces the total VMT by 11% (approximately 60 billion miles in NMSA). This reduction is caused by a 9% decease in the number of automobiles(approximately 5.6 million vehicles) and a 3% reduction in average miles per-vehicle.

A VMT reduction of this magnitude is comparable to the effect of a 50% increase in the price of gasoline(using the average long-run elasticity of 0.26 from recent survey). Since the main effect of improved access to public transit on total VMT is to reduce the number of vehicles, this policy will reduce congestion on roads, as well as the pollution from vehicle emissions.