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Analysis of Vehicle Ownership Attributes in Western Province, Sri Lanka

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Vehicle ownership affects the ability of available road transport infrastructure to bear transport demand that is distributed across vehicle categories without causing traffic congestion and delay. This paper develops a mathematical model to predict motor vehicle ownership based on household characteristics. The model is tested using household visit surveys in the Western Province of Sri Lanka (CoMTrans study, 2014). The Province has the country's highest population density (1,600/km^2) and road density (0.9 km/km^2) as well as a motor vehicle ownership of 206 vehicles per 1,000 people. The modelling is aggregated by the vehicle categories of motorcycles, three-wheelers, vans, and cars (including jeep, and pickup). The motor vehicle fleet is made up of 51% motorcycles, 20.2% three-wheelers, 6.7% vans, and 17.7% cars, apart from commercial vehicles. The purchasing cost of motor vehicles in Sri Lanka varies sharply due to different taxes imposed on importation. Binary Logistics Regression is developed in this study for six different scenarios to investigate the effect of five different socioeconomic factors on ownership of different vehicles in a household ranging from the least to the most expensive vehicle category. After removing households with missing values, the resulting estimation sample consisted of 35,850 households. It was found that the decision to own a private vehicle depends on the attributes of household size, average monthly household income, percentage of workers per household, percentage of school and kindergarten children per household, and the percentage of males in a household. Based on this analysis, middle- and low-income households demonstrate a preference for motorcycle and three-wheeler ownership, while high income households show a greater likelihood of car ownership. Furthermore, results confirmed that income had a positive effect on motor vehicle ownership and the type of vehicle they own; more so than any other socioeconomic variable. Households with more members prefer to own a van than a car. The number of members in a household is also seen to have a positive impact on both the type as well as number of vehicles. It is also found that the ownership of vehicles in a household increases when the percentage of males in a household increases: upon comparison of coefficients, this was observed to be strongest in the case of the ownership of motorcycle and three-wheeler and for vans. It was also found that owning a van is influenced by the number of school and kindergarten students in a household. Results show that the percentage of workers in a household has less influence on car ownership compared to motorcycle ownership: households tend to have more than one motorcycle when there have more workers. Finally, the analysis of household motor

vehicle ownership could be refined using further variables such as the demand for public transportation, the number of drivers in a household and their ages, perception of the quality transportation services, and land use attributes.

Keywords: *Vehicle Ownership, Household Characteristics, Regression Analysis, Western Province, Household Visit Survey*