ABSTRACT

Sadri, Arif Mohaimin. M.S.C.E., Purdue University, December 2012. Behavioral Models to Understand Routing Considerations and Evacuation Preparation Time in Hurricanes. Major Professor: Satish Ukkusuri.

Due to the vulnerability of hurricanes in the United States and its territories, comprehensive evacuation plans and strategies need to integrate transportation theory with evacuation behavior from a household level. Public agencies and emergency officials need to understand different dimensions of the overall evacuation process in order to mitigate devastating impacts of frequently occurring hurricanes. Route choice during evacuation is a complex process, because evacuees may prefer to take the usual or familiar route on the way to the destination or they might follow the routes recommended by the emergency officials. Depending on the condition of the traffic stream, sometimes they might switch to a different route to obtain better travel time from the one initially attempted. In this thesis, we explain a modeling approach which offers better understanding of the routing strategies taken by the evacuees to reach a safe destination during hurricane evacuation. By using data from Hurricane Ivan, a mixed (random parameters) logit model is estimated which captures the decision making process on what type of route to select while accounting for the existence of unobserved heterogeneity across households. In addition, an ordered probit model with random parameters has been developed to capture the underlying unobserved characteristics in the timing behavior of the evacuees that elapses in between their evacuation decision and actual evacuation. Estimation findings indicate that the choices of evacuation routing strategy and the timing behavior involve a complex interaction of variables related to household location, evacuation characteristics, socio-economic characteristics and some other important characteristics. The findings of this research are useful

to determine different fractions of people in selecting a type of route and evacuees evacuating early or delaying for some time for a given socio-demographic profile once they actually decide to evacuate during a hurricane evacuation.