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Weather to travel to the beach

Muhammad Sabir, Jos van Ommeren *, Piet Rietveld

Department of Spatial Economics, VU University, Amsterdam, The Netherlands

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ABSTRACT

Weather conditions have a strong effect on certain leisure destinations choices causing extreme road and parking congestion. An important question is then to what extent travelers react to these forms of congestion by switching to other travel modes. Using information from a national travel survey from 1996 till 2005, we analyze trips from the home to beach destinations in the Netherlands and examine the influence of weather on the probability of making beach trips by car. We take into account that the distance to the beach affects the decision to travel to the beach as well as the decision to travel by car. Our findings suggest that modal choice of beach travelers is sensitive to weather-induced congestion on roads to the beach. Our results imply that, conditional on making a beach trip, car use decreases by about 15% during higher temperatures inducing a 50% increase in train use. Furthermore, the distance elasticity of demand for beach trips is clearly negative and about −0.40, suggesting that the monetary value of visiting a beach during the summer is in the order of €10–20. Appropriate pricing of parking near beaches is suggested as a solution to reduce congestion and cruising for parking externalities.

1. Introduction

Leisure choices and therefore transportation choices are strongly affected by weather. For example, weather is an important determinant of tourist destinations (Smith, 1993; Gómez-Martín, 2005; Rutty and Scott, 2010). Weather also plays an important role regarding the choice of day-to-day activities, although there are strong local and seasonal differences. For example, in winter in the French Alps, it is attractive for residents to go skiing when it freezes and there are blue skies. In contrast, in the Netherlands one would go ice skating. As a consequence, in many countries, certain types of weather conditions cause extreme road congestion on certain roads and lead to overloaded parking lots forcing drivers to cruise for parking (van Ommeren et al., 2012). An important question is then to what extent leisure travelers react to this congestion by switching to public transport or alternative travel modes (Small and Verhoef, 2007).

We focus on trips to beach destinations in the Netherlands, which has a moderate climate with few hot days that are attractive to go to the beach. So, a nice sunny day may bring thousands of people to the beach (Becker, 1998; Gómez-Martín and Martínez 2012; Kammler and Schernewski, 2004). As a result, on the few days that it is hot there is extreme congestion on roads close to the beach as well as parking congestion at the beach as travelers aim to arrive at the same destination around the same time (Arnott et al., 1991). This congestion problem receives relatively little attention in transportation research and policy, although it receives quite some attention in the media.[1] We emphasise that public authorities do not use economic tools to reduce demand for travel to the beach by car or car parking near beaches during peak hours, although

* Corresponding author. Address: VU University, Department of Spatial Economics, De Boelelaan 1105, 1081 HV, Amsterdam, The Netherlands. Tel.: +31 205986096.

E-mail address: jos.van.ommeren@vu.nl (J. van Ommeren).

[1] A policy response sometimes used near popular beaches is to provide shuttle services to the beach during summer time from parking places some kilometers away from the beach, so that beach travelers can easily park their car and travel the last part of their trip by shuttle bus.

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time-varying pricing of parking at beaches may result in strong welfare gains as both demand for parking as well as travelling to beaches will be reduced (Vickrey, 1954; Arnott and Inci, 2006). Furthermore, it is extremely expensive to increase supply of roads as well as parking near beaches, because peak demand occurs only a limited number of days per year. In addition, increasing road and parking supply would have negative environmental consequences, as most beaches are part of environmentally protected areas.

Although the Netherlands is a coastal country and has many sand beaches (behind dunes), the main cities are not extremely close to the beach, so for large parts of the population, these beaches are not nearby (e.g. from Amsterdam it is at least 40 min by car to the beach). As a result, congestion close to beaches is extreme on certain hot days, because environmental policy restricts the building of holiday accommodations close to the sea. As a result, during hot weather roads towards beaches are extremely congested as very few visitors can stay overnight here. During hot weather, almost all visitors go back and forth on the same day. This study focuses on the impacts of weather-induced congestion on trip making to beaches, i.e. we examine the effect of weather on the choice between going to the beach or to other destinations for leisure activities.

Previous studies differ considerably from our study, in particular since the choice of transport mode is not considered For example, Adams (1973) shows that certain weather conditions have a negative effect on going to the beach using weather perception methods, and does not consider the mode of transportation.[2] The current study considers the impacts of weather conditions on the *revealed* simultaneous choices of beach trips and transportation mode. We explicitly allow for the effect of the distance to the beach (from the residence location) on these choices.

When analysing transport decision-making, one has ideally to include the decision to make a certain type of trip (e.g., a visiting restaurant), the decision where to travel to (which depends for example on the spatial choice set of restaurants as well as the quality of the restaurants) as well as the travel mode decision. Usually, one of the decisions is ignored or made exogenous (e.g. by choosing only trips to restaurants). One of the difficulties is that transport is a derived demand, so when weather conditions change, this will not only affect typical transport decisions such as which transport mode to choose, but also whether or not to make a certain type of trip. This is of particular importance in the context of leisure trips, because particularly these types of trips are influenced by weather conditions. This is not the case with all types of trips. For example, the decision to work hardly depends directly on weather, so the demand for commuting is not affected by weather through a change in demand for working.

In the current paper, we focus on travel to the beach from residence locations. This enables us to make simplifying assumptions that are needed given the nature of the data used. First, from each residence location in the Netherlands, there is an extremely limited range of attractive beach locations. For each municipality, we know the travel distance to each beach location in the choice set. So for each residence municipality, we are able to calculate the average travel distance to the beach (based on actual trips made by individuals residing in this municipality). Because most persons in a certain municipality choose the same beach, it is useful to think of the beach choice decision as being one-to-one with the travel distance decision. Second, we assume that the average travel distance to the beach is exogenous with respect to the residence location. In other words, it is assumed that households who choose their residence location do not include beach trips in the residence location decision. This seems a reasonable assumption as almost all households make only a few trips to the beach each year.

To simplify the interpretation of the empirical results, we use a selective sample of car-owning individuals that make a leisure trip on a certain day during the summer months (so we exclude commuting, business and shopping trips). Consequently, we model the decision to visit the beach on a certain day, conditional on the decision to make a leisure trip on that day. The latter makes sense, because few individuals really choose between a commuting and a beach trip. Note that we only include car-owning individuals. It is also possible to include individuals without cars, but as these refer to only 8% of the sample and these individuals have a different choice set for modal choice, interpretation is facilitated by focusing on car-owning individuals.

Given this set-up of the model, one may estimate a nested logit model, where individuals (i) make a decision to travel to a certain beach location which defines the travel distance (ii) make a mode choice decision when travelling to the beach. By estimating the nested logit model, we are able to calculate the (marginal) effect of weather conditions (and other variables) on the decision of travelling to the beach by a certain travel mode. This is useful, because weather conditions strongly affect the demand for leisure and are therefore the underlying cause of congestion on the roads.

We emphasise that weather may have a direct and an indirect effect, through changes in congestion, on transport mode choice, conditional on the choice of the location. In particular, for travelling by bicycle, the direct effect may be large because cycling will be more attractive during certain types of weather (e.g., when it does not rain). However, regarding the choice between train and car travel, the direct effect is likely small, or even absent, so the indirect effect through congestion is the dominant one. So evidence of effects of weather variables on the choice between train and car travel, conditional on the destination, is indirect evidence of the importance of weather-induced congestion on roads to beaches.

[2] Also in other studies the choice of transport node is not explicitly treated. See for example de Freitas 1990) who employs a heat budget model for Australia. Other examples are Moreno and Amelung (2009), Hamilton and Maren (2004) and Becken (2010) where changes in climate and weather on beach visits are addressed. Braun et al. (1999) report that climate change will have a negative influence on the north German costal region as a vacation destination. Bigano et al. (2006) report that tourists are attracted to sunny yet mild climate. Hamilton (2004) shows that Northern European countries become more attractive during summer for German tourists.