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Estimating willingness to pay air passenger duty☆

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ABSTRACT

Carbon taxation on air travellers is widely considered an effective way of offsetting environmental externalities and adjusting tourist flows. Despite the popularity of carbon taxation, research investigating travellers' willingness to pay (WTP) such taxes remains scant. Using the air passenger duty (APD) levied by the UK government, this study estimates UK outbound travellers' WTP and further derives the demand curves under six trip scenarios. The contingent valuation method is used to elicit the travellers' WTP based on an online questionnaire survey. Comparative analysis and hierarchical linear modelling reveal that first, travellers are willing to pay more APD for business class and long-haul trips, and second, all of the demand curves are downward sloping with increasing elasticities.

Introduction

Air travel is considered one of the major sources of greenhouse gas emissions (Becken, 2007; Scott, Peeters, & Gössling, 2010). In recent decades, the idea of sustainable tourism has gained momentum, and various efforts have been made to mitigate the air pollution caused by tourism (Gössling & Peeters, 2015). A global trend of encouraging or forcing airline travellers to pay additional fees to compensate for the carbon emissions generated during their trips has emerged as a means to ameliorate their impact. In this way, the negative externalities of travel behaviour are supposed to be internalised, and tourists themselves pay for the environmental consequences. This idea is represented by non-compulsory measures such as the voluntary carbon offset (VOC) programmes in Europe and the US (Jou & Chen, 2015), the carbon neutral programme in Australia (Choi & Ritchie, 2014) and compulsory carbon tax measures, including air passenger duty (APD) in the UK and the carbon tax in Australia.

Unlike VOC programmes, APD is compulsory and, once enforced, applies to all travellers, including those who are not willing to pay that amount. Thus, a common concern is that its implementation may have a negative influence on the tourism industry through decreased visitation, as the taxes are mostly absorbed by the airfares, becoming part of trip prices, and thereby affect demand price-sensitive services such as tourism. The key issue for policymakers is the amount of carbon tax to charge, which is mainly determined by the decisions made by the regulator from the supply side. Such tax rates should be set in an appropriate way that considers the potential market tolerance. However, limited efforts have been made to investigate the amounts of such taxes that air travellers are willing to pay (Jou & Chen, 2015).

Pricing non-market goods (including environmental pollution) has long been of interest in tourism economics, and has been

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examined in various contexts (Herrero, Sanz, Bedate, & Barrio, 2012; Piriyapada & Wang, 2015; Reynisdottir, Song, & Agrusa, 2008). A common valuation method involves eliciting tourists' stated willingness to pay (WTP) to gain certain (marginal) benefits or to offset the damage caused to public welfare. WTP to compensate for negative environmental externalities has been examined by a number of scholars, such as Brouwer, Brander, and Van Beukering (2008) and Choi and Ritchie (2014). However, these studies have mostly addressed non-compulsory carbon offset programmes, and only very limited efforts have been made to study WTP for carbon taxes (Gupta, 2016; Jou & Chen, 2015). While WTP studies have recognised that tourists' WTP may vary among individuals, based on their socio-demographic or psychological traits, few studies have considered trip attributes. Moreover, the empirical findings on WTP and carbon taxes vary by context, and little consensus has been reached (Chang, Shon, & Lin, 2010; Mair, 2011; McKercher, Prideaux, Cheung, & Law, 2010). Consequently, the market demand for carbon emission offsets remains under-researched, and there is considerable scope to develop knowledge and understanding of this issue (van Birgelen, Semeijn, & Behrens, 2011).

It is critical to find out why some tourists are willing to pay (or pay more) for these offsets while others are not, and to evaluate the impact of compulsory offsets on tourism demand. It is also important to examine whether this is an appropriate tool to address the problem of air pollution without damaging the market. In addition, the carbon footprint varies across trips with different flight classes and lengths (Bofinger & Strand, 2013). The carbon emission of a passenger flight grows linearly in relation to its flying time, and the average carbon emission per passenger/kilometre of business class is almost twice that of an economy class passenger (Bofinger & Strand, 2013).

This study aims to contribute to the dialogue by comparing tourists' WTP and demand curves across trips in different flight classes and of different lengths. Specifically, it elicits outbound UK tourists' WTP for APD via the contingent valuation method (CVM), derives the demand curves and compares the WTP amounts and demand curves between six (2×3) trip types incorporating two flight classes and three travel distances. The study addresses several interrelated research questions: *Are outbound UK tourists willing to pay for APD and, if so, how much? How does WTP vary across trips of different flight classes and travel lengths? Based on the derived WTP, how do current APD rates affect the demand for air travel?*

Literature review

Environmental externality and APD

As a natural evolution of the sustainable tourism paradigm, a large volume of literature examines environmental externalities in the tourism industry, ranging from greenhouse gas (GHG) reduction to natural resource preservation and environmentally friendly forms of tourism. The term 'externality' is often used to refer to the unintended consequences of economic agents' actions. The consequences of negative environmental externalities are usually suffered by the public. A widely accepted reason for negative externality is that the market fails to account for social costs, as no one owns his or her share of a sustainable environment to sell to polluters and no market or price exists. The result is the 'tragedy of the commons' (Patt, 2017).

Therefore, if these social costs were included in the prices of private production and consumption activities, i.e., if they internalised the environmental externalities, economic agents would have an incentive to produce and consume less, or to do so in a cleaner way. A common practice is to approximate a market price for the external cost of the pollution caused by corporations and individual consumers. For corporate and industrial pollution, current international examples of emission trading schemes (ETS) can be found in various countries and regions, including Australia (the Carbon Pricing Mechanism), the European Union (the EU Emissions Trading Scheme), Japan (the Voluntary Emission Trading Scheme) and the UK (the CRC Energy Efficiency Scheme). A typical ETS is a 'cap-and-trade' system, in which the cap on the total allowances of greenhouse gas emission creates scarcity in the market, and the emission allowance trading between participants turns this allowance into commodities based on the Earth's capacity for carbon cycling, and the potential cost of correcting for air pollution, e.g., by planting more trees (Vlachou & Pantelias, 2017). Another example is the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) adopted at the 39th session of the ICAO Assembly in 2016. It was created for the aviation industry, and requires airlines to buy carbon offsets to compensate for their CO_2 emissions. Unlike the ETS, CORSIA does not impose a cap on the total emission allowance, but instead prices carbon offsets in a direct and straightforward way.

Many countries have since the early 1990s adopted a carbon tax on individual consumers as a cost-effective measure to correct for environmental externality and reduce carbon dioxide emissions. A case in point is the APD introduced by the UK government. APD is an excise duty levied on travellers originating from a UK airport – destinations are split into different bands according to the distance from a country's/territory's capital city to London. The duty charged is also based on a distinction between economy and business class flights. The duty is subject to annual changes by the government, but the current situation is that there are two bands of APD. Band A covers destinations zero to 2000 miles from London with a sliding scale of duty according to the class being travelled in. Band B is for travel to destinations over 2000 miles from London. There are three categories of APD for each band, depending on the class of travel. The top rate of APD is for smaller aircraft, typically personal jets of 20 tonnes or more that are equipped to carry fewer than 18 passengers.

As a typical tourism regulatory tool, APD is levied on those best able to pay and predominantly on overseas visitors who cannot vote in the UK. It thus can be an effective revenue-raising mechanism and a way of retaining tourism income (Seetaram, Song, & Page, 2014). Although many economists agree that carbon taxes are a cost-effective way to reduce GHG emissions (Baumol & Oates, 1988; Mankiw, 2006), the potential consequences of APD enforcement have been a source of dispute, particularly in the travel trade.

For example, Seetaram et al. (2014) questioned the environmental benefits claimed for APD, as it did not sufficiently consider how the perceived problems associated with tourism could be politically harnessed for wider tax revenue purposes, despite its