

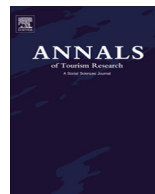


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The income elasticity of air travel: A meta-analysis



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ABSTRACT

There is much disparity in estimates of the income elasticity of air travel across the literature. We examine this disparity by applying meta-regression techniques. Controlling for several issues, including publication selection bias, while our preferred baseline income elasticity estimate of 1.186 is consistent with air travel being a luxury and a slightly immature market, there are several features of the literature which sway the income elasticity away from this baseline. For instance, the income elasticity increases to 1.546 on international routes, yet decreases to 0.633 when air fare is included in a dynamic specification of demand, *ceteris paribus*. Other characteristics of the literature, such as those involving various data and estimation choices, have less influence on the reported income elasticity.

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Introduction

Many studies have estimated the demand for air travel, reporting a multitude of elasticity estimates. While literature reviews (Brons, Pels, Nijkamp, & Rietveld, 2002; Kremers, Nijkamp, & Rietveld, 2002; Oum, Waters, & Yong, 1992) have surveyed estimates of the price elasticity of air travel (defined as the ratio of the percentage change in demand for air travel to the percentage change in air fare), no study has systematically reviewed estimates of the income elasticity of air travel (defined as the ratio of the percentage change in demand for air travel to the percentage change in consumer income).

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Knowledge of the income elasticity of air travel is useful for a number of reasons. First, the income elasticity is important in terms of forecasting air travel. For instance, a higher positive value of the income elasticity implies a greater response of air travel to changes in income, thus placing greater (lesser) pressure on air transport systems during periods of rising (falling) income. Second, the magnitude of the income elasticity provides information on how consumers view air travel, be it a luxury (i.e., income elasticity exceeds 1) or a necessity (i.e. income elasticity lies between 0 and 1). With such information available, if consumers view some routes (e.g., international travel) as luxuries, yet others (e.g., domestic travel) as necessities, airlines can better target promotion strategies to different market segments. Third, several studies (Department of Transport, 2013; Graham, 2000, 2006) rely on the income elasticity to classify air transport market maturity. For instance, Graham (2000) defines an immature market as having an income elasticity exceeding 1 (i.e., growth potential is higher), a fully mature market as having an income elasticity at or below 1 (i.e., growth potential is lower), and a fully saturated market as having an income elasticity of 0 (i.e., no growth potential). Hence, knowledge of the income elasticity can shed light on market maturity, which can facilitate decision-making in regards to exploring investment opportunities in higher-growth markets. Fourth, air transportation management and regulators rely on pricing to reduce congestion and pollution. However, the effectiveness of pricing policies depends on the income elasticity of air travel, for rising incomes may offset the influence of price on air travel. Accordingly, knowledge of the income elasticity is important when evaluating the efficacy of such policies. Fifth, understanding what drives income elasticity estimates in the literature can suggest avenues for future research.

In light of these reasons, similar to meta-analyses of the income elasticities of tourism (Crouch, 1992), water (Dalhuisen, Florax, & de Groot, 2003), cigarettes (Gallet & List, 2003), money (Knell & Stix, 2005), and meat (Gallet, 2010), this paper utilizes meta-regression analysis (MRA) to quantitatively survey the literature on the income elasticity of air travel. Specifically, unlike traditional qualitative literature reviews, which can suffer from the subjective decisions of the reviewer to attach too little or too much importance to particular elasticity estimates, we apply statistical techniques to assess the impact of various features of the literature on the income elasticity. By doing so, statistical tests are used to address several issues, such as sampling error, mis-specification, and publication selection biases, in order to arrive at underlying estimates of the income elasticity.

Briefly, we find several attributes of the literature significantly impact estimates of the income elasticity of air travel. For instance, once we control for other study characteristics, our results show that the income elasticity has historically been largely insensitive to location, as the literature has found it to be similar across Asia, Australia and New Zealand, Europe, and North America (principally the United States). Yet the income elasticity for international flights does tend to be higher than domestic flights. Also, the chosen econometric specification of air travel demand, most noticeably the choice of independent variables and the functional form of demand, influences the reported income elasticity. However, a number of other features (e.g., those involving data aggregation and estimation method) have less influence on the income elasticity. In the sections that follow, the meta-regression model is presented, followed by the estimation results, while the paper concludes with a summary of the findings.

Meta-regression model

Our data collection and meta-regression analysis followed the recently established MAER-NET guidelines (Stanley et al., 2013). Utilizing search engines (i.e., Econlit, Social Science Research Network (SSRN), and Google Scholar), as well as perusing studies that have reviewed literature related to tourism and air travel demand (i.e., Brons et al., 2002; Crouch, 1992, 1994, 1995; Gillen, Morrison, & Stewart, 2007; Kremers et al., 2002; Lim, 1997, 1999; Oum et al., 1992), we initially identified 51 studies that provide estimates of the income elasticity of air travel. Of these 51 studies, three assess the impact of income on island tourism (Garín-Muñoz, 2006; Garín-Muñoz & Montero-Martin, 2007; Nelson, Dickey, & Smith, 2011) using air passenger arrivals as the measure of tourism. Since this measure is similar to that used by studies of air travel demand, we chose to include these studies in the analysis.

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