



Aviation Impacts on Property Values and Management: The Case of Suvarnabhumi International Airport



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ABSTRACT

Many countries have developed policies and measures to deal with the external impact of aviation on the wider community. There is, however, often controversy and lack of acceptance of some measures, such as compensation, in the communities affected by aviation. Such measures are often felt to be ineffective and perceived as unfair. A clear and objective model for determining compensation would be helpful to reduce controversy. The objective of this study is therefore to examine the relationship between aviation impacts and property values in the case of Thailand's Suvarnabhumi Airport for application to the possible improvement of compensation packages. Multiple regression analysis was used to determine the relationship between five common impacts of aviation (safety, noise, scenery, air pollution, and traffic) and property value change, with data from a survey of sample communities around the airport. The results, both for the overall neighborhood and for separate land used types, show that only noise and air pollution demonstrate significant negative relations with property value. The effect of noise drives a higher impact on property price than the effect of air pollution. The main contribution of this research is to improve developing country compensation models by applied measurement from regression analysis to identify factors with significant impacts, using property value change as proxy to measure the impact of the airport. For example, in the case of Thailand, a compensation model should consider noise and air pollution as the main factors rather than consider only noise contour area. The higher weight on noise should be designed to reflect land use types. Furthermore the market value of property loss should be taken into account when designing a compensation package. The survey and regression method used in this study can be adapted for finding relevant factors and suggesting appropriate compensation for other environmental and infrastructure development projects.

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1. Introduction

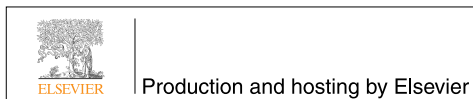
With globalization, demand for air travel is expected to grow significantly, in turn driving an increase in flights and airport developments to provide sufficient capacity to handle this demand. This anticipated

growth in aviation infrastructure has increased concern about aviation-related environmental impacts. Although, economic development can be driven by aviation, the environmental impacts are also a critical concern. The U.S. has placed addressing environmental and energy issues at the heart of the Next Generation Air Transportation System (Next Gen) plan with 5 strategies including cost-beneficial solutions to meet environmental targets from aviation in a verifiable manner [12]. In parallel to the problems, appropriate compensation for these negative externalities has become a common discussion topic and is a reason for this study. In the U.S., it has been estimated that aviation noise negatively affects 2.3 million people while noise nuisance at the UK's Heathrow Airport costs 37–66 million pounds per year in uncompensated loss of human wellbeing. In Thailand, the Airports Authority of Thailand set the budget for noise effect compensation at just over 11.2 billion baht (~USD 366 million²). The initial compensation package

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² 1 USD ~ 30.7 THB.

of 736 million baht was paid when Suvarnabhumi Airport opened. As of February 2011, the actual accumulated compensation for Suvarnabhumi Airport had reached 1.25 billion baht for the NEF³ > 40 and NEF 30–40 zones [1], 11.13% of the total budget for noise compensation. Notwithstanding these payments, there have been disputes and public debates about appropriate compensation packages which would properly compensate for the negative environmental effects on property value changes in the vicinity of the airport.

Although there are various studies discussing the impact of aviation on property values [7,15,19], most of them mainly focus on aviation noise impact on real estate values [3,10,13,18], while potentially ignoring other crucial impacts or factors. There are both negative and positive impacts found by the various studies of residential property and airport noise. A sample of empirical studies on the negative impacts on residential property values due to airport noise can be found in [23]. The study found a decrease in property values linked to the dBA increase in noise level. Aviation noise impact is also a critical form of pollution studied in environmental justice theory. An empirical study used tobit and logit multivariate regression to analyze pollution exposure from a major commercial-service airport and found that ethnicity is the primary cause of the disproportionate burden of aviation noise pollution. [20]. On the other hand, there are also some studies which indicate that the impact of airports on the residential property market can be positive. For example, proximity to London City Airport is highlighted as a positive factor in promotional material for new housing developments in the surrounding area. One benefit suggested for living in close proximity to an airport is enhanced access for those who use the airport frequently [22].

Despite a variety of studies on the relationships between aviation factors and property values, there are limited studies on how to incorporate these relationships into implementation of environmental policies, the design of appropriate compensation packages or models, and the determination of influencing factors. In the case of Suvarnabhumi Airport, evidence from international standards for airport management and practice has shown that environmental policies, especially those using economic instruments such as compensation schemes, are both ineffective and poorly implemented, causing many problems for the government, businesses, and the community. Appropriate compensation schemes need to be adjusted in order to fit with the local context and should capture all relevant factors. A study of Suvarnabhumi Airport found that new properties in the area affected by severe noise before 2006 tend to decline substantially in value. Prices of new properties sold after airport operations began in 2006 were 19.15% lower in the most severely affected area and 8.55% lower in the outer noise contour zone [5]. In addition, a broad study of noise impact on renters of apartments and dormitories in affected areas around Suvarnabhumi Airport shows that willingness to accept compensation in Thailand when the noise level increases is lower than in European studies [5]. Similar research of traffic noise impact on high-rise buildings and areas surrounding a new motorway that links Bangkok to Suvarnabhumi Airport and Pattaya indicated that there is a high traffic noise impact on the foreground and front façade of buildings, implying that these areas are inappropriate for residential purposes [17].

The purpose of this study is to investigate the property value impact of aviation, the relationship between various aviation impact factors, and the overall impact in order to develop a concept for a suitable compensation scheme based on the case study of Suvarnabhumi Airport,

Thailand. This particular case is interesting because it allows a comparison between before and after situations for a brand new airport in a part of Bangkok previously unaffected by an airport. In most situations the airport has been in place for many decades, so the “before” case is very difficult to measure.

The data used for the impact examination was mainly derived from primary data e.g., questionnaire surveys and key informant interviews in communities near the airport. In addition, we considered evidence about the effect of aviation obtained from official databases and secondary research. Moreover, comparison and analysis of aviation policies among major international airports in several countries were carried out to investigate their effectiveness and identify relevant input factors. The discussion and recommendations in this paper can provide practical guidance for improving the compensation scheme and aviation policies for the study area and also for other cities.

2. Overview of the study area

2.1. The Suvarnabhumi International Airport, Thailand

Suvarnabhumi Airport is an international airport serving Bangkok, Thailand covering an area of about 8000 acres (3300 ha). It is managed by the Airport of Thailand Public Company Limited (AOT), which has an agreement with the government granting it all businesses, rights, assets and staff, and liabilities. The airport was designed to accommodate 45 million passengers per year; however the AOT expects that its future capacity will be about 100 million passengers per year. It is a centerpiece of Thailand’s transportation infrastructure and services with the investment amount of 188.8 billion baht (US\$ 4.979 billion⁴), by which it was built with the purpose of enhancing Thailand to become an aviation hub for the region. The airport site is geographically located in Racha Thewa in BangPhli district, Samut Prakan Province. It was officially opened for limited domestic flight services on 15 September 2006, and for most domestic and all international commercial flights on 28 September of the same year.

The growth of aviation activities has manifestly changed the patterns of land use near airports, especially the development of real estate, residential, commercial and industrial enterprises, and has been observed to substantially affect property values in the vicinity of airports. In terms of the corporate social responsibilities operations according to AOT’s CSR Report (2011), AOT has provided for the monitoring of environmental quality through the use of an Environmental Impact Assessment (EIA). AOT set up its emergency fund to compensate communities which have potential noise impacts based on surveying the affected areas by AOT staff; however, the choice of compensation is still not effective in satisfying the impacted communities, and has caused disputes. AOT’s EIA shows that two years after the Airport opening, compensation of only 402 million THB had been paid by AOT for purchasing in the areas with NEF more than 40 (220 million THB) and improving 10 buildings in areas with NEF 30–40 (182 billion THB) [18]. This compensation amount was allocated by AOT through following the compensation process and criteria based on the EIA, which included an operational plan for mitigating noise impact.

2.2. Possible aviation impacts and mitigations based on EIA

According to the Suvarnabhumi Environmental Impact Assessment (EIA) study by TEAM [21], it investigated an area affected by noise which encompassed 70 sq km around the airport, dividing it into a high-impact noise zone (Noise Exposure Forecast, NEF is over 40 dB) and a moderate-impact noise zone (NEF is between 30 and 40 dB). Noise levels during both construction and operational phases were collected. For the construction phase, construction equipment created the

³ NEF is a noise descriptor to contribute in the calculation of airport noise levels and contours map for determining the airport noise mitigation measures and monitoring plan. NEF 30–35 means Noise Exposure Forecast at Leq 60–65 dB this is the Airport noise affected areas and noise insulation shall be applied, NEF 35–40 means Noise Exposure Forecast Leq 65–75 dB this is more severe airport affected areas and noise insulation or other mitigations shall be applied, and NEF > 40 means Noise Exposure Forecast at Leq > 70 dB this is most severe airport noise affected areas, none of any residential areas or sensitive receptors are allow to be inside of this areas, the compensation or land purchase shall be applied.

⁴ Exchange rate year 2006 from BOT 37.9286 Baht/USD.

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