William Swan is certainly the best qualified person to synthesize what we know about air travel forecasting, because most of what we know comes from the careful analyses he conducted at Boeing and elsewhere. In this paper, Dr. Swan shares with us his findings based on years of thoughtful perusal of published and unpublished air trip data. I recommend everyone who is interested in forecasting the business of air travel to read this piece. The paper exudes his experience in the business, which enables him to elucidate much better I can. To fulfill the obligation that I have accepted as a discussant, I would like to comment on his paper from the viewpoint of economics.

I have found a number of points in Dr. Swan’s paper that are unique to his view and are worth mentioning, two of which particularly drew my attention. One is Dr. Swan’s view of airline competition, and the other concerns the methodological issue in air travel forecasting:

- Competition increases as network develops in the air transport market, regardless of whether or not the open skies policy is introduced. Many of the gains from open skies may have already been observed in a partially liberalized network. Also note that much of the market discipline over price and innovative services comes from new carriers, not necessarily from heritage carriers.

- The three forecasting methods — trend fitting, gravity model, and simulation — are complementary. Trend fitting provides useful estimates of baseline growth; the gravity model provides us with useful estimates of the size of the potential demand within the un-served market after the open skies policy is introduced; simulation provides estimates of extra growth due to the introduction of the open skies policy.

In this commentary, I discuss each of the above points in turn, from the perspective of an academic economist.
1. Airline competition and open skies in the North East Asian market

Transport demand has been growing in North East Asia (NEA)\(^1\), as regional relationships develop with regional trade and tourism. The integration of the region’s air transport market has been called for, but the progress has been slow in the NEA. At this moment, the international air transport market in the NEA is under strict control of ASAs, dominated by the legacy airlines that meet the majority ownership rule. In the meantime, domestic markets are monopolized by national carriers. It is a widely shared view that the institutional constraints surrounding the air transport market in NEA have severely hindered the emergence of Asian carriers who cover the overall NEA market through efficient hub networks. Therefore, expectations are high for the implementation of the open skies policy in the NEA region.

A small but significant sign of progress has been made toward opening the skies in the region. Since 2003, Tokyo’s Haneda Airport and Seoul’s Gimpo Airport have been connected by program charter flights. In the fall of 2007, a triangular route was completed by adding new routes between Haneda Airport and Shanghai’s Hongqiao Airport (in September), and Gimpo Airport and Hongqiao Airport (in October). Although flights are international, this triangular route utilizes airports that are mainly used as domestic hubs. Therefore, these routes can be considered to belong to a new category of routes. Expanding this “third category route” may be a way to achieve the liberalization of the air transport business in the NEA region, as has been proposed by Yamaguchi (2008).

In case of the Japanese domestic market, liberalizing the air transport business in the NEA definitely helps new carriers to grow. As is seen from the geographical formation of Japan (Figure 1, taken from Yamaguchi et al, 2008), Haneda Airport is essentially the sole domestic hub, from which all lucrative domestic routes emanate. Along with the severe capacity constraint at Haneda,\(^2\) the routes with distances shorter than 1,000 km face head-to-head competition with the high-speed railway system, Shinkansen. Thus, the domestic air transport market in Japan is not a very optimistic business prospect for new entrants. The integration of the NEA skies substantially improves the attractiveness of the market, especially for new entrants. New players in the Japanese air transport market will help push competition in the industry further for both for domestic and international routes.

While partial liberalization such as the creation of “third-category routes” is definitely a step forward, there is still a lot of ground to be covered before the NEA open skies policy is implemented. While I share Dr. Swan’s view on the flexibility of the market mechanism and its

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\(^1\) NEA comprises Japan, Mainland China (including Hong Kong) and South Korea.

\(^2\) The capacity constraint at Haneda Airport will remain at least until 2010, the year when the construction of the fourth runway is scheduled to be completion,
capability to circumvent government regulation, in view of the situations in NEA, increased institutional drive toward liberalization in the NEA region may prove more fruitful than in the cases of the EU and Australia - New Zealand.

2. Economic Forecasting

A) Data issues

Data problems in forecasting have been pointed out by many economists. Discussions of such problems date back to the early history of econometrics. Indeed, in his first book published in 1928, Oskar Morgenstern, a co-founder of game theory, listed three propositions regarding economic forecasting (cited by Margaret, 1929: 313):

I. Forecast in economics by the methods of economic theory and statistics is “in principle” impossible.

II. Even if it were possible to develop a technique of economic forecasting, such a technique would be incomplete, by virtue of its necessary limitation to methods based on knowledge of economics alone; it would therefore be incapable of application in actual situation.

III. Moreover, such forecasts can serve no useful purpose. All attempts to develop a formal technique for forecast are therefore discouraged.

Morgenstern casts serious doubt about the quality of economic data and questions whether the data with which economic forecasters must deal are accurate enough for their purposes.

Dr. Swan is well versed in problems such as likely reporting errors in air travel data. Because detailed O-D data are not easily available, Dr. Swan suggests the next best approach using the airline schedule data. He states that the bulk of forecasting effort involves getting the data right. One recommended practice is to combine the data with the immigration service data to distinguish the local passengers from the connecting passengers during the construction of the O-D data. Dr. Swan also warns that forecasters should pay attention to the missing data associated with ground transfer.

The data issues suggested by Dr. Swan are valuable; however, it is a daunting task for academics to follow his suggestions because of a lack of experience, skills, and the labor required for data construction. Thus, here I reiterate a proposal made by many in the past and strongly urge government authorities and airlines to release more data of better quality in the public domain. The cost of collecting and maintaining air travel data has decreased significantly with the increased proliferation of information technology in both airlines and governments.
Forecasting Methods — where Empiricism and Fundamentalism meet

Forecasting involves the use of information at hand — hunches, formal models, data, etc — and makes statements about the likely course of future events. Conditional on the quality of the data, Dr. Swan covers three methods for forecasting the future demand on air transport: trend fitting, gravity model, and stimulation. He suggests that the best practice for forecasting at the O-D level uses a mixture of all three methods, each of which has its own advantage in the analysis of particular aspects of forecasting. Trend fitting is useful in the estimation of baseline growth; the gravity model provides us with useful estimates of the size of the potential demand within the un-served market after the open skies policy is introduced; stimulation provides estimates of extra growth due to the introduction of the open skies policy.

It is interesting to note that the “best practice of forecasting” suggested by Dr. Swan corresponds well with the current practice of policy evaluations used in existent economic literature. Since this policy evaluation technique, though state-of-the-art, is nevertheless at a nascent stage of development, I believe that Dr. Swan’s suggested practice is recommendable as a complement to the existing policy evaluations in the field of economics. In this chapter, I would like to explain what I mean by policy evaluations, and how this policy-evolution method corresponds to Dr. Swan’s practice.

In theory, there are two ways to conduct policy evaluations, namely, a reduced-form analysis and a structural analysis. The former approach to policy evaluation requires finding a control group in the data, while the latter approach requires creating a control group in a simulation analysis. In the context of this paper, a control group represents a set of O-D routes that have the same characteristics as the focus group, with the exception that only the focus group and not the control group is affected by the open skies policy.

Sometimes, when it is impossible to find a control group under a particular policy, there appears to be no apparent opportunity to conduct a reduced-form analysis. This is indeed the problem that arises in forecasting the effect of the open skies policy in the NEA region. Heterogeneity across O-D routes is so grave that it is impossible to find O-D routes outside the NEA region with the same characteristics as those located in the NEA region.

This identification problem has already been well recognized in the literature on trade policies. Stiglitz (2001: 522) succinctly summarizes the problem while concluding the volume entitled Rethinking the East Asian Miracle (cited in Ohashi, 2005)
The problem of interpreting the [Asian] miracle, crisis, and recovery is that we have an unidentified system: we do not have the controlled experiments that would allow us to assess what would have happened.

In such a case, one can still conduct a policy evaluation by following two steps. The first step is using the observed data along with an economic model to recover the estimated parameters of the underlying economic primitives that are invariant to the policy environment. These primitives include airline and airport operating costs and air transport demand functions. The second step involves using the model to simulate changes in the equilibrium outcomes resulting from changes in the underlying policy. This two-step method is referred to as a structural approach, in which a control group is created by using an economic model. Although several assumptions must be made for the structural approach, the use of this approach is becoming increasingly popular in cases where it is difficult to apply the reduced-form approach.

This structural approach is used in existing works such as Gillen et al (2002) and Yamaguchi (2008) to forecast the economic impact of the open skies policy in the NEA region. For this approach to be successful, the model used for the exercise must closely approximate the economic environment under study. This first stage of this approach — estimation of economic primitives — is similar to the method of trend fitting, because both methods focus on the existing O-D routes. The second-stage of the simulation procedure contains the aspects of both the methods of the gravity model and stimulation. As Dr. Swan states, stimulation involves examining the changes in the existing routes accrued by a counterfactual policy change, i.e., the implementation of the open skies policy in the NEA region, whereas the gravity model is employed to investigate the effect of the entry of new airports that were not served prior to the implementation of the open skies policy. Some academics and business analysts see the second stage of the simulation procedure in policy evaluations as problematic and unreliable. Therefore, Dr. Swan’s approach is recommended for those who conduct policy evaluations in the air transport market using structural analysis: such individuals can also use Dr. Swan’s approach to check whether their results are robust.

3. Conclusion

Forecasts are produced by forecasters and consumed by clients. Forecasters and clients are different groups of agents, and the procedures and desires of the two groups often do not coincide. Granger and Machina (2006: 87) summarize how to evaluate alternative forecasting methods:

Alternative forecasts and forecasting methods are typically evaluated by means of statistical
loss functions, which are often chosen primarily on the grounds of statistical convenience, with little or no reference to the particular goals or preferences of the client. [...] Whereas statistical science is like any other science in seeking to conduct a “search for truth” that is uninfluenced by the particular interests of the end user, statistical decisions are like any other decision in that they should be driven by the goals and preferences of the particular decision maker. Thus, if one forecasting method has a lower bias but higher average squared error than a second one, clients with different goals or preferences may disagree on which of the two techniques is “best” --- or at least, which one is best for them. (Granger and Machina, 2006: 87)

In his paper, Dr. Swan provides a number of rules of thumb to draw useful information from publicly available data. Dr. Swan’s views are based on statistical science, and he warns us how not to be fooled by likely reporting errors partly accrued by statistical decisions. I argued in this paper that Dr. Swan’s suggestions can be serve as an excellent complement to the forecasting techniques often used in academics.

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