

Fujii, Takamune; Futamura, Mariko

Conference Paper

Impediments to International Air Transportation Services in Japan: Measuring the Border Effect in Main Japanese Airports

46th Congress of the European Regional Science Association: "Enlargement, Southern Europe and the Mediterranean", August 30th - September 3rd, 2006, Volos, Greece

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Fujii, Takamune; Futamura, Mariko (2006) : Impediments to International Air Transportation Services in Japan: Measuring the Border Effect in Main Japanese Airports, 46th Congress of the European Regional Science Association: "Enlargement, Southern Europe and the Mediterranean", August 30th - September 3rd, 2006, Volos, Greece, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

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**Impediments to International Air Transportation Services in Japan:
Measuring the Border Effect in Main Japanese Airports**

June 15, 2006

Takamune FUJII

Faculty of Business Administration, Aichi University

370 Kurozasa, Miyoshi-cho, Nishikamo-gun, Aichi 4700296 Japan

tel: +81-561-36-1111/fax: +81-561-36-5553

mailto: tkfujii@vega.aichi-u.ac.jp

and

Mariko FUTAMURA

Faculty of Business Administration, Aichi University

Kurozasa, Miyoshi-cho, Nishikamo-gun, Aichi 4700296 Japan

tel: +81-561-36-1111/fax: +81-561-36-5553

mailto: futamura@vega.aichi-u.ac.jp

Impediments to International Air Transportation Services in Japan: Measuring the Border Effect in Main Japanese Airports

Takamune FUJII and Mariko FUTAMURA^{*}

June 15, 2006

Abstract:

Although recent globalization allows us traveling abroad easier ever, the number of foreign passengers is still scarce. Government of Japan worries about this problem and makes some policy to attract foreign travelers. In this paper, we investigate the barrier against international air passenger transportation services in Japan by quantifying the “border effect.” In order to measure this effect, we estimate the gravity equation with “border” dummy variable for explaining intra- and international passenger flow in Japan. “Border” dummy is introduced to quantify the impeding effect for crossing national border. If the dummy variable has negative coefficient, international passenger flow in Japan is smaller than intranational passenger flow. The result demonstrates that a certain “border effect” exists in international air travel. This result implies that international air passenger flow is diminished seriously by some impediments such as political regulation, institutional inefficiency, and so on. For increasing foreign visitors in Japan, Japanese policymakers and related enterprises should take more essential measures than “Visit Japan Campaign”, which is the advertising campaign promoted by GOJ.

Keywords: International Air Transportation, Border Effect, Airport Services, Passenger Air Services, Effectiveness of Transportation System

JEL Classification: F13, F22, L93, R40

^{*} Authors thank to the participants in 10th ATRS World Congress at Nagoya, Japan, especially Peter Morrell and Lu Cherie for their helpful comments.

1. Introduction: The International Airport Policy in Japan and the problems

Accompanied with recent globalization, many Japanese passengers travel abroad and the number of travelers grows consistently. In recent decade, annual Japanese overseas travelers grew more than 10%, from 15.3 (1995) to 16.8 millions (2004), despite the many external shocks such as 9.11 terror or SARS. However, inbound passengers in Japan are considerably scarce. The number of inbound travelers is just 6.1 millions in 2004. This is fewer than the half of outbound passengers, despite the number grew drastically in this decade, as shown in figure 1. Because of this imbalance, Japanese travel balance is seriously indebted, and this deficit is one of main reason of heavy deficit of Japanese services balance. Government of Japan (hereafter GOJ) considers this situation as serious problem, and began to struggle to invite foreigners into Japan from 2003. For this campaign to invite foreign traveler, GOJ funded 20 billion Japanese Yen in 2003 and the amount is growing annually, 35 billion Yen in 2005 (JNTO 2005a). This huge budget is spent on various explorations such as advertisement expenditure and so on, those are called “Visit Japan Campaign (VJC)”¹.

<Insert Figure 1>

It is beneficial to Japan that the number of foreign travelers increases in Japan not only for decreasing the deficit in service account but also fostering domestic services sectors, especially travel-related sectors such as hotel, travel agency, transportation, and so on. However, simple advertisement or other promotion activities may have only limited effect for attracting foreign passengers. Exact information about how high the barriers against visiting Japan, or what is the origin of barrier, is essential to make effective policy. It may be difficult to identify the reason why foreign visitors are so scarce comparing with Japanese overseas travelers. There are many possible reasons in Japan, for instance, topographical situation (far from most of developed economies),

¹ For detail information about this campaign, please see the official web site. On this site, promotional movies by Prime Minister Koizumi and many information about the campaign or sightseeing guide can be shown. Visit Japan campaign official web site: <http://www.visitjapan.jp/>

language (difficult to communicate by English), inferior airport infrastructure (narrow international airports, especially Narita²), expensive air transportation fee and landing fee, limited market access to international air transport services (to international scheduled/charter flight or airport services), disturbing policy (irritant immigration process or restriction for issuing entry visa), high consumer prices and exchange rate. If main origin of the barrier is “natural” one, such as distance among countries, there are little measures to attract more foreign passengers to Japan. However, if the other reasons are more crucial, GOJ may be able to increase foreign visitors by taking appropriate measures. Moreover, if the height of the barriers against visiting Japan is extremely high, merely advertisement or promotion policy will be in vain and result in wasting the huge budget, and more substantial political measures or institutional improvement shall be conducted. In this paper, we quantify the height of barrier against international transportation from/to Japan, which is originated from “unnatural” reasons, such as distance or economic size of foreign economies by using famous gravity model. If our results show that barrier associated with natural reasons is more crucial than that with unnatural reasons, it is not easy to increase foreign visitors to Japan and VJC policy will not be effective. On the contrary, if our results show that the barriers associated with unnatural reasons is extremely high, VJC policy will have only limited effect to increase foreign travelers and more drastic policy measures should be introduced. We will expect to get policy implication from our empirical results.

Following sections are constructed as follows: In next section, we survey the measures for quantifying the barriers against crossing the national border and discuss about which measures should be chosen in this paper. In section 3, the methodology we introduce and the dataset is explained. The empirical results are shown in section 4, and in the last section, we conclude this paper and make some discussion about policy implications.

² Narita international airport, the largest international in Japan, has only two runways, one is 4000m long and another is 2200m long. Moreover, unfortunately shorter runway is not appropriate for long international flight because it is too short for full-fueled jumbo jet airplane to take off. Because of the political reason, it is impossible to expand this airport immediately. Other major international airport, Kansai international airport and Chubu Centrair International Airport have just one runway.

2. Quantification of the “barrier”: former literature

There are many studies analyzing how high the barriers when the goods/persons cross the national border. Associating with the goods transfer, the situation is relatively simple. Most crucial measure for disturbing international goods transfer is tariff. However, in many cases, barriers are not only tariff but also various non-tariff measures (MTMs). Then, we must quantify these non-tariff measures to specify the barriers rigidly. In case of trade in services, including international air transportation, the situation is more serious. Most of barriers are intangible and difficult to quantify. To quantify these “invisible barriers”, former literatures employ mainly four methodologies³.

First method is measuring the price differences between world price and domestic price and estimating tariff equivalents. If the indigenous price of some goods/services is more expensive than world price, the price difference will be attributed to barriers or protections. Then, the height of barrier can be estimated by measuring price differentials and calculating the rate of price differences, similar to tariff rate (tariff equivalent). This methodology is adopted mainly by the studies associated with international goods transportation. Hafbauer and Elliott (1994) quantify the cost of trade protection in United States by using this method, and Sazanami, Urata and Kawai (1995) conduct similar analysis in Japan. Hoekman (1995) and Bosworth et al. (2000) apply this method to measure the impediments to trade in services. This methodology is very effective if the information about world and indigenous price is available. However, in this paper, we intend to analyze to the transportation of passengers and cannot acquire the price differentials.

Second method is so called “frequency measure”. This measure is constructed by counting the types of disturbing measures and calculating the ratio of employed measures to total measures. This measure is suitable for estimating invisible barriers, and some studies employ this for quantifying the barriers among trade in services, for

³ Various methods for quantifying non-tariff measures are summerlized in Deardorff and Stern (1998).

instance, Ando (2002, 2005) calculate the frequency ratio in main East Asian economies.

Third method is constructing indices of disturbance effect on various types of barriers. At first, the seriousness of each type of disturbance is specified, and next, indices of barriers are calculated as the weighted average of this seriousness in each sector. To use this method, scholars must define the seriousness of each disturbance arbitrary and cannot avoid some difficulty for objectiveness. However, because this method allows to make indices of barriers which is invisible and hard to quantify relatively easier, some literatures employ this method to quantify the barriers to trade in services. For instance, Warren (2000) employs this method to quantify the barriers in telecommunications industry, McGuire, Schuele and Smith (2000) employs for maritime industry, and McGuire and Schuele (2000) employs for banking services. These two (second and third) methods are effective for quantifying intangible barriers, but we cannot adopt these methodologies because detail information about various types of disturbing measures in international air transportation sector is not available for us.

The last method, and the method we adopted, is estimating “border effect”. Border effect is defined as the comprehensive impact which goods or services affected when these are crossing the national border. If some goods are delivered between two regions within same country, there is no border effect for this interregional transportation. However, these are delivered between two regions in another countries, there may be some border effect. If there is significant difference between intranational transportation and international one in amount despite the distance between two regions and the economic size are very similar, the reason of this difference can be attributed to national border. Then, we can estimate this border effect by using interregional gravity model with “national border dummy” variables. This methodology is firstly employed in McCallum’s seminal work (McCallum 1995) for estimating the effect of Canada-US interregional trade, and many followers adopt to quantify the effect of various national borders, for instance, Helliwell (1996, 2002), Anderson and Smith (1999a, 1999b), Morshed (2003), Chen (2004), and Okubo (2004). Klodt (2004) applies this method for quantifying the effect on German intra/international air passenger flow and finds serious border effect. In this paper, we basically adopt the Klodt’s methodology and quantify the border effect on Japanese air passenger flow. The detail of the methodology is

explained in the next section⁴.

3. Gravity model and the border effect

In this section, we introduce our estimation methodology for quantifying the border effect. The basic model is interregional gravity equation. In this model, air passenger flow between two regions is explained by distance and economic size of two regions. Basic estimation equation is defined as log-linear form,

$$LN(T_{ij}) = LN(Y_i) + LN(Y_j) + LN(D_{ij}) + C. \quad (1)$$

Where T_{ij} is the air passenger flow between region i and region j , Y_i and Y_j is per capita GDP of region i and region j respectively, D_{ij} is the physical distance between regions i and j , and C is constant. If per capita GDP of two regions are larger, passenger flow is expected to increase more because the citizens of these regions will be wealthier. Then, per capita GDP of each region is expected to have positive coefficient. On the contrary, if the distance between two regions is longer, passenger flow will decrease. Then, distance is expected to have negative coefficient.

To specify the border effect as barrier against international passenger flow, we introduce “border dummy” variable in equation 1. Gravity equation with border dummy is defined as follows:

$$LN(T_{ij}) = LN(Y_i) + LN(Y_j) + LN(D_{ij}) + B_{ij} + C. \quad (2)$$

Where B_{ij} is border dummy variable, which is equal to 1 for international passenger flow and 0 for intranational (within same country, Japan) passenger flow. This variable extract the pure “unnatural” effect from national border to air passenger flow by controlling the “natural” effect, economic size and distance. If this variable has positive coefficient, the coefficient shows significant border effect in Japan. In other words, positive coefficient implies that there is serious barrier against international air travel in Japan and drastic political / institutional reform should be introduced by government

⁴ There are some criticism for this border effect methodology, for instance, Anderson and Van Wincoop (2001, 2004), Feenstra (2002), and so on. They suspect that the border effect reflects directly the barrier because some unrelated factors with trade barrier are contained comprehensively. For more discussion, please see these references.

and air transportation authorities.

In this paper, we focus our analysis to air passengers arrival to / departure from Tokyo Metropolitan area mainly because of data availability⁵. The data of air passenger flow is derived from ICAO (2004) for International scheduled flight and MLIT (2003) for domestic flight. These statistics show also flight distance between Tokyo (Narita International Airport for International flight and Tokyo International Airport and Narita International Airport for domestic flight⁶). Per capita GDP is obtained from World Bank (2005) for foreign economies and ESRI (2005) for Japanese prefectures. The determinations, data sources and expected signs of our variables are summarized in table 1.

<Insert Table 1>

4. Empirical Results

This section shows our empirical results. We estimate three regressions, for inbound passengers, outbound passengers, and total international passengers (inbound plus outbound). Because of technical reasons, we use the weighted least squares (WLS) technique to our estimations, weighted by the frequency of scheduled flight. Table 2 shows the regression results.

<Insert Table 2>

At first, regression 1 presents the result of estimation for inbound air passengers. In

⁵ One of the main reason for omitting other international airports, Kansai and Chubu Centrair, is the scarcity of scheduled international flights arriving / departing these airports. This scarcity is mainly because of the relatively smaller area and inferior facility than Narita.

⁶ Tokyo Metropolitan area has two airports, Tokyo International Airport and Narita International Airport, and former is mainly used by domestic flight careers and latter is mainly used by international flight careers. In rigidly, these two airports are located not near (about 2 hours by train). However, we regard these two airports as located same area for the technical reasons of the estimation.

this regression, all natural factors, per capita GDP and distance, have coefficients of expected sign. GDP shows positive and statistically significant coefficient. This means that the citizens of wealthier economies / prefectures tend to travel to Japan / Tokyo than those of less wealthier economies / prefectures. Distance shows negative and statistically significant sign. This result suggests that it is difficult to travel to foreign country / region far from home country / region. The coefficient of border dummy is negative and statistically significant at 1% level. This implies there is serious border effect in Japan. In other words, some unnatural factors, except for economic size and distance, disturb foreign travelers to visit Japan. It may be bad news for Japanese policymakers who struggle to increase foreign visitors. The size of coefficient is nearly one. Because our regression equation is log-linear form, this size is considerably large. If we assume that the original form of regression equation is Cobb-Douglas form, the coefficient suggest that foreign travelers face nearly three times as high barrier as domestic travelers do in Japan. Because this estimated barrier is considerably high, the VJC policy may not work sufficiently. Before expending huge budget for advertising or promoting activities, Japanese policymakers should consider more essential measures for increasing foreign visitors.

In other two estimations for outbound passengers and total passengers, the results are similar to first regression. Per capita GDPs have positive, and distances have negative signs. The coefficients of border dummy are negative and statistically significant, and the size of coefficients is more than one. These coefficients mean there is enormously high barrier not only against foreign visitors but also Japanese overseas travelers, and may imply the existence of structural problem in Japanese international air transportation services. Japanese policymakers and related enterprises may have to take essential measures to solve this serious problem.

5. Conclusion and policy implication

In this paper, we quantify the barrier against international air passenger transportation services in Japan by estimating the “border effect.” In order to measure this effect, we estimate the gravity equation with “border” dummy variable for explaining intra- and international passenger flow in Japan. The regression results

indicate that there is considerably high barrier against not only foreign visitors but also Japanese overseas travelers. These results imply the existence of structural problem in Japanese international air transportation services. We cannot specify the reasons of this barrier or structural problem. However, probably “unnatural” factors, such as political regulation, institutional inefficiency, play important role. To diminish this barrier, simple advertising and promotion measures (VJC measures) will not work sufficiently. Japanese policymakers and related enterprises should take essential measures to diminish the barrier and inviting foreign travelers.

Reference:

- Anderson, James E. and Eric van Wincoop (2001), Gravity with Gravitas: A Solution to the Border Puzzle, *NBER Working Paper* 8079
- Anderson, James E. and Eric van Wincoop (2004), Trade Costs, *NBER Working Paper* 10480
- Anderson, Michael A. and Stephen L.S. Smith (1999a), Do National Borders Really Matter? Canada-US Regional Trade Reconsidered, *Review of International Economics* 7.2, pp219-227
- Anderson, Michael A. and Stephen L.S. Smith (1999b), Canadian Provinces in World Trade: Engagement and Detachment, *Canadian Journal of Economics* 32.1, pp22-38
- Ando, Mitsuyo (2002), The Pervasiveness of Non Tariff Measures in APEC Countries, *COE Discussion Paper*, No.0201, Keio University
- Ando, Mitsuyo (2005), Estimating Tariff Equivalents of Core and Non-core Non-Tariff Measures in the APEC Member Economies, in Philippa Dee and Michael Ferrantino eds., *The Effects of Non-Tariff Measures and Trade Facilitation: Quantitative Methods for Assessing*, World Scientific, Singapore, pp235-287
- Bosworth, Malcolm, Christopher Findlay, Ray Trewin and Tony Warren (2000), Price-Impact Measures of Impediments to Services Trade, in Christopher Findlay and Tony Warren eds., *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London, pp42-51

- Chen, Natalie (2004), Intra-National versus International Trade in the European Union: Why do National Borders Matter?, *Journal of International Economics* 63.1, pp93-118
- Deardorff, Alan V. and Robert M. Stern (1998), *Measurement of Nontariff Barriers*, University of Michigan Press, Ann Arbor, MI
- Economic and Social Research Institute (ESRI), Cabinet Office, Government of Japan (2005), *Annual Report on Prefectural Accounts 2002*, National Printing Bureau, Tokyo
- Feenstra, Robert C. (2002), Border Effects and the Gravity Equation: Consistent Methods for Estimation, *Scottish Journal of Political Economy* 49.5, pp491-506
- Helliwell, John F. (1996), Do National Borders Matter for Quebec's Trade?, *Canadian Journal of Economics* 29.3, pp507-522
- Helliwell, John F. (2002), Measuring the Width of National Borders, *Review of International Economics* 10.3, pp517-524
- Hoekman, Bernard (1995), Assessing the General Agreement on Trade in Services, in Will Martin and L. Alan Winters eds., *The Uruguay Round and the Developing Economies*, *World Bank Discussion Paper*, No.307, World Bank
- Hufbauer, Gary C. and Kimberly A. Elliott (1994), *Measuring the Costs of Protection in the United States*, Institute for International Economics, Washington D.C.
- International Civil Aviation Organization (ICAO) (2004), *Traffic by Flight Stage 2002*, ICAO, Montreal
- Japan National Tourist Organization (JNTO) (2005a), *JNTO White Paper of International Tourism 2004*, International Tourism Center of Japan, Tokyo
- Japan National Tourist Organization (JNTO) (2005b), *Statistics on Tourism for Japan 2004*, International Tourism Center of Japan, Tokyo
- Klodt, Henning (2004), Border Effects in Passenger Air Traffic, *Kyklos* 57.4, pp519-532
- McCallum, John (1995), National Borders Matter: Canada-U.S. Regional Trade Patterns, *American Economic Review* 85.3, pp615-623
- McGuire, Greg and Michael Schuele (2000), Restrictiveness of International Trade in Banking Services, in Christopher Findlay and Tony Warren eds., *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London,

pp201-230

McGuire, Greg, Michael Schuele and Tina Smith (2000), in Christopher Findlay and Tony Warren eds., *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London, pp172-188

Ministry of Land Infrastructure and Transport (MLIT) (2003), *Statistical Yearbook of Air Transportation 2002*, All Japan Air Transport and Service Association, Tokyo

Morshed, A.K.M. Mahbub (2003), What Can We Learn from a Large Border Effect in Developing Countries?, *Journal of Development Economics* 72.2, pp353-369

Okubo, Toshihiro (2004), The Border Effect in the Japanese Market: A Gravity Model Analysis, *Journal of the Japanese and International Economies* 18.1, pp1-11

Sazanami, Yoko, Shojiro Urata and Hiroki Kawai (1995), *Measuring the Costs of Protection in Japan*, Institute for International Economics, Washington D.C.

Warren, Tony (2000), The Impact on Output of Impediments to Trade and Investment in Telecommunications Services, in Christopher Findlay and Tony Warren eds., *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London, pp85-100

World Bank (2005), *World Development Indicator 2004*, World Bank, Washington D.C.

Figure 1: Arrivals to / Departures from Japan (1990-2004)
Source: JNTO (2004b)

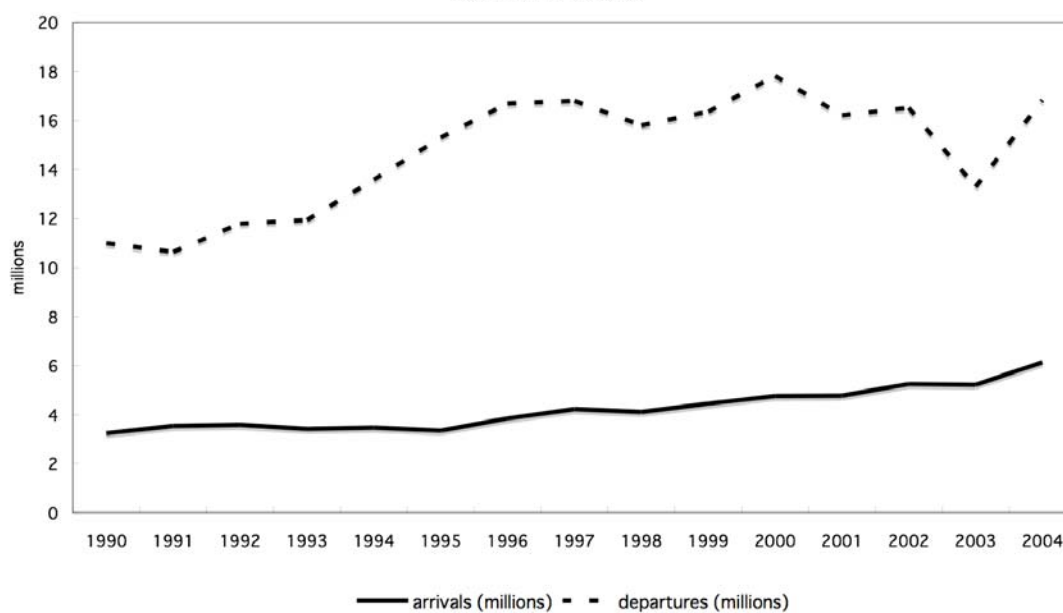


Table 1: Summary of variables

	Definition	Source	expected sign
Dependent variable			
T_{it}	Annual number of air passengers between two airports (Natural log)	ICAO (2004) for international and MLIT (2003) for domestic	
Independent variables			
Y_i	Per capita GDP in country/region i (Japan/Tokyo) (Natural log of US\$)	World Bank (2005) for foreign economies and ESRI (2005) for Japanese prefecture	+
Y_j	Per capita GDP in country/region j (Natural log of US\$)	Same as above	+
D_{ij}	Flight distance between two airports (Natural log of kilometers)	Same as T_{ij}	-
B_{ij}	Border dummy (1 for international flight and 0 for domestic flight)		+

Table 2: Regression results (weighted least squares, weighted by frequency of scheduled flight)

Variables	regression 1 (inbound passengers)	regression 2 (outbound passengers)	regression 3 (total passengers)
Y _j	0.217*** (0.005)	0.165*** (0.005)	0.196*** (0.003)
D _{ij}	-0.030*** (0.007)	-0.039*** (0.007)	-0.024*** (0.005)
B _{ij}	-0.958*** (0.015)	-1.144*** (0.015)	-1.044*** (0.011)
C	11.718*** (0.054)	12.315*** (0.057)	12.572*** (0.039)
Adj. R-squared	0.158	0.173	0.160
N	113	113	113

note: Standard errors are in parentheses.

*** indicates statistically significant at 1% level.