

TOKYO METROPOLITAN UNIVERSITY

首都大学東京

A Study on Input-Output Model and Computable General Equilibrium (CGE) Model
for

**Assessing Economic Impacts of Transportation
Policies on Tourism Promotion**

A case of Japan

PhD Dissertation

Nguyen Van Truong



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By

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From Hanoi, Viet Nam

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Date of submission: July 26th, 2017

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Graduate School of Urban Environmental Sciences

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A dissertation submitted in fulfilment of the requirements for the Degree of PhD of the Department of Tourism Science, Graduate School of Urban Environmental Sciences, Tokyo Metropolitan University.

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Abstract

In early 21st century, the world watches the dramatically contribution of tourism. In 2016, the total contribution of tourism to world GDP was \$US 7,613.3bn, equaled to 10.2% and it is predicted to rise 3.9% annually to \$US 11,512.9bn, equals to 11.4% of GDP in the next ten years (2027). As on the employment, in 2016, tourism contributed 9.6% of total world employment, equaled to 292.22 Mil jobs. It is expected to rise by 2.5% annually to 381.7 Mil jobs in the next ten years (2027), equals to 11.1% of total world employment (WTTC, 2017). In Japan, the valid observation illustrates the same trend of increasing contribution of tourism in term of GDP. In 2016, the total contribution of tourism to GDP was JPY37,326.9 bn (\$US 343.2bn), equaled to 7.4% of GDP, and is forecasted to rise by 1.4% annually to JPY 43,837bn (\$US 403.1bn), equals to 8.2% of GDP in 2027. In term of employment, the total contribution of tourism was 6.9%, equaled to 4.474 Mil jobs in 2016. In the next ten years, 2017, it is expected to rise by 1% annually to 4.854 Mil jobs, equals to 7.6% of total employment of the economy (J. WTTC, 2017).

Despite the significant role of tourism in the economy is attracted by many researchers, factors support the development of tourism so that tourism can contribute greatly to the economy are not comprehensively figured out (Van Truong and Shimizu, 2017). Furthermore, although the roles of transportation on the tourism are acknowledged widely in the literature, the empirical studies on the impacts of transportation on tourism in the macroeconomic (intersectoral) view point are rarely found. The study conducted the survey in the literature on the application of Computable General Equilibrium (CGE) Model and states that up to date, there are two studies out of 69 studies found deal with the relationship between transportation and tourism. The first one is for Hawaii by Konan and Kim (2003). The study imposed some scenarios of changes in tourism expenditure items and found the responses in transportation industries rather than finding the role of transportation on tourism. The second study is for Tanzania by Kweka (2004). The study said that the improvement of transportation infrastructure efficiency can benefit the economy and tourism in two ways in general, first is the reduction of transportation cost to the tourist destinations; second is the improvement of the accessibility to tourist attractions may encourage the growth of tourism. The roles of different transportation types, such as freight and passenger, as well as modes, for instance road, air, rail, and

water were not considered in these two studies.

To address this gap in empirical studies, the objective of this research is to employ conventional Input-Output model to identify the linkage between transportation and tourism industries, then to study on the economic impacts of transportation policies on tourism promotion by using CGE model. These analyses are based on the inter-sectoral database for transportation-tourism analysis such as transportation – tourism Input-Output table and Social Accounting Matrix (SAM) developed from original 518 Rows by 397 Columns Input-Output table of Japan's economy in cooperation with the information from tourism consumption trend survey.

The study steps forward to figure out the differences in economic roles of different transportation types (freight, passenger) and modes (air, road, rail, water) on the tourism industry, which have not been acknowledged before. The reduction of freight transportation cost may reduce the price of tourism commodities and services. On the other side, the reduction of passenger transportation cost encourages the tourist arrivals. The tourism expenditure for services and commodities will be then stimulated by both freight and passenger transportation. This multiple effect of freight and passenger transportation is clearly discussed in this research with inbound tourism sector. This spread effect of passenger transportation cost to the tourism services and commodities is also considered as a contribution of the research to the literature.

The results of research for Japan as a case study indicate that the responses of each types of tourism, for example, domestic, outbound and inbound tourism to each type of transportation modes (air, road, water, rail) are different. The inbound and outbound tourism are very sensitive to the air transportation policies. For instance, the reduction of 20% of air transportation cost can stimulate 15.57% demand and 15.59% gross output of inbound tourism while those of road, water and rail transportation only stimulate less than 0.5% demand and gross output. In the same manner with inbound tourism, outbound tourism rises 6.32% demand and 3.14% gross output along with the reduction of 20% of air transportation cost, while the reduction of 20% cost of road, water, and rail transportation encourage only less than 0.5% of its demand and gross output. In contrast to inbound and outbound tourism, road and railway are more powerful than air transportation to domestic tourism. The reduction of cost of railway transportation can

rise 1.74% demand and 2.56% gross output of domestic tourism; the same amount of reduction in road transportation cost can increase 1.12% demand and 1.07% gross output of domestic tourism. Although Japan is covered with ocean at four sides, the water transportation is minority for tourism. Its cost reduction of 20% can stimulate only 0.22% demand and 0.21% gross output of domestic tourism; these figures for outbound tourism are 0.05% and 0.07%; and for inbound tourism are 0.12% and 0.02% demand and gross output.

The research concludes that transportation is pivotal for tourism. Although this statement is acknowledged in many theoretical studies, this study concludes with the numeric evident from IO model that transportation is the first of top ten consumers and the fifth or sixth of top ten suppliers. The use of CGE model clarifies the shocks in transportation sectors greatly impact on tourism. At the end, some critical research areas will be proposed for future, such as consideration of different behavior of tourist (recreational, business) along with the changes in transportation policies; and since tourism is special industry that its activities are stick with transportation, so the integrating transportation models into CGE models is critical to understand more precisely the impacts of transportation on tourism.

The dissertation is organized by six main chapters, together along with the introduction and the conclusion parts. The first chapter theoretically introduces the role of transportation on tourism development. The second chapter will conduct the survey in literature to clarify to what extend the CGE model is applied. Chapter 3 aims at developing the database (IO table and SAM) for the study. Chapter 4 employs IO model to prove that transportation and tourism are strongly linked. Chapter 5 proposes a theoretical framework to integrate transportation model into CGE model at regional and inter-regional level. Chapter 6 uses CGE model with the injection of transportation cost changes (as cases of transportation policy shocks) to examine the economic impacts of different transportation modes on different tourism types. The conclusions and further research recommendations is expressed in the last part of the dissertation.

Table of content

Acknowledgments	i
Abstract	iii
Table of content	vi
List of figures	ix
List of tables	xi
Abbreviations	xiii
Introduction	1
Research motivations and significances.....	1
Research questions.....	3
Research objectives.....	3
Research methodology and structure.....	4
1 The role of transportation on tourism development	7
1.1 The roles of Transportation on the Economic development.....	7
1.2 Transportation and tourism promotion.....	13
1.3 Quantitative methods to analyze the economic impacts of transportation on tourism.....	20
1.4 Conclusions.....	24
2 Applications of CGE Model in Transportation – Tourism analysis: Literature review	26
2.1 Literature review method.....	26
2.2 The applications of CGE Model in economic impacts of tourism studies.....	27
2.3 The applications of CGE Model in economic impacts of transportation studies.....	30
2.4 The applications of CGE Model in transportation – tourism studies.....	33
2.5 Conclusions.....	36
3 Database development for Transportation-Tourism inter-industrial analysis: Case of Japan	38
3.1 Data collection.....	38
3.2 Original Input-Output table of Japan.....	39
3.3 Tourism consumption trend survey data.....	40
3.4 Tourism satellite account – a link to connect tourism consumption trend survey into input-output table.....	42
3.5 Develop input-output table for transportation – tourism analysis.....	43
3.6 Interactions between industries in Input-Output table.....	51
3.7 The errors of the IO table construction method.....	52
3.8 Social Accounting Matrix (SAM) – Database for CGE Modelling.....	52

3.9	Conclusions.....	55
4	Interdependencies between Transportation and Tourism.....	57
4.1	Importance of an industry in the economy: fundamental concept.....	57
4.2	Importance of tourism industry with multiplier indicator	62
4.3	Importance of tourism industry with HEM.....	65
4.4	Interdependencies between industries: the fundamental concept.....	67
4.5	Interdependencies between transportation and tourism with multiplier.....	69
4.6	Interdependencies between transportation and tourism with HEM.....	71
4.7	Interdependencies between transportation and tourism with Input-Output coefficients.....	74
4.8	Conclusions.....	77
5	Framework to integrate Transportation model into CGE Model to analyze economic impacts of Transportation on Tourism.....	79
5.1	From the previous generation of inter-sectoral analysis: Input - Output (IO) Model	79
5.2	To the next generation: CGE Model.....	84
5.3	CGE Model structure	89
5.4	The possibility of integrating transportation models into CGE models	102
5.5	Framework to integrate Transportation Model into CGE Model	104
5.6	Potential applications of integrating transportation accessibility factors in CGE models	107
5.7	Capability of CGE model in evaluating impacts of transportation policies .	110
5.8	Challenges to integrate Transportation Model into CGE Model.....	111
5.9	Conclusions.....	112
6	Transportation policy based to promote tourism	114
6.1	Tourism situation in Japan.....	114
6.2	Transportation situation	121
6.3	Scenario design for analysis	124
6.4	Analytical framework and treatment of transportation cost changes in CGE model	130
6.5	Domestic tourism demand and multiple impact of transportation cost on inbound tourism	133
6.6	Model closure and procedure.....	135
6.7	Model calibration and validation	139
6.8	Impacts of transportation cost deregulation on nationwide economy	144
6.9	Impacts of transportation policies on tourism.....	148
6.10	Sensitivity analysis	153
6.11	Conclusions.....	159
	Conclusions and recommendations.....	162
	Research conclusions	162

Research contributions	166
Research difficulties and limitations	168
Future research directions	169
References	170
Appendices	178
Appendix 1. CGE empirical studies on relationship among economic, tourism and transport.....	178
Appendix 2. IO table sector and Tourism Satellite Account classification.....	181
Appendix 3. Travel consumption items and Tourism Satellite Account classification	185
Appendix 4a. Domestic tourism consumption amount specified by spending items	191
Appendix 4b. Outbound tourism consumption amount specified by spending items	193
Appendix 4c. Inbound tourism consumption amount specified by spending items..	195
Appendix 5. Input-Output table for transportation-tourism analysis Japan 2011 (Producer's Price).....	197
Appendix 6. Social Accounting Matrix (SAM) for Transportation – Tourism analysis, case of Japan 2011.....	230
Appendix 7. List of industries classified in Input-Output table and SAM for Transportation – Tourism analysis, Japan 2011	263
Appendix 8. Industrial ranking in economy by HEM total linkage indicator.....	267
Appendix 9. Industrial ranking in economic by multiplier indicator	269
Appendix 10. Constant Elasticity of Substitution (from GTAP)	271
Appendix 11a. Results of Impacts on GDP of cross-industry.....	274
Appendix 11b. Results of Impacts on Demand (domestic final demand and export) of cross-industry	279
Appendix 11c. Results of Impacts on gross output (production) of cross-industry ..	284
Appendix 12a. Sensitive test of Constant Elasticity of Transformation σ_{CET} with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry	288
Appendix 12b. Sensitive test of Constant Elasticity of Substitution between Domestic/Import good σ_D with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry	293
Appendix 12c. Sensitive test of Constant Elasticity of Substitution of production factors (L,K) σ_{VA} with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry	298
Appendix 12d. Sensitive test of price elasticity of demand of tourism export σ_P with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry.....	304

List of figures

Figure 0-1-1. Research structure and methodology	4
Figure 1-1. Mechanism of impacts of transportation policies on economy.....	8
Figure 1-2. Impacts of transportation policies on economic development.....	9
Figure 1-3. Three fundamental elements of tourism.....	14
Figure 1-4. Accessibility factors and its effects on tourism	15
Figure 1-5. Relationship between transportation policy and travel cost.....	17
Figure 2-1. Empirical studies using CGE model in literature and some important milestones	28
Figure 2-2. (a) The number of empirical papers using computable general equilibrium (CGE) models to analyze the relationships among tourism, transportation, and the economy; and (b) The number of empirical papers using CGE models to analyze the transportation-tourism relationship.....	34
Figure 3-1. Identify the tourism industries in IO table with TSA as a linkage-An example	43
Figure 4-1. Illustration of multiplier effects	58
Figure 4-2. Output multiplier of domestic, outbound, and inbound tourism as well as other industries on economy – case of Japan	62
Figure 4-3. Multiplier effect of domestic, outbound, and inbound on earning.....	63
Figure 4-4. Direct and total effects of tourism industries on Japanese economy	64
Figure 4-5. Chains of tourism and transport with the most important industries in the Japan economy.....	76
Figure 5-1. Industries/sectors in economy	81
Figure 5-2. Comparison between Input-Output model and Computable General Equilibrium Model.....	84
Figure 5-3. The interactions between economy elements.....	88
Figure 5-4. The structure of the economy in CGE modelling	90
Figure 5-5. 2-stage of minimize the cost of domestic final demand.....	92
Figure 5-6. Effect of income level on consumer demand and maximize the utility.....	93
Figure 5-7. Analytical framework for transportation policy analysis for regional model	106

Figure 5-8. Integrating transportation models into interregional Computable General Equilibrium Model	107
Figure 5-9. Capabilities of CGE model in observing the impacts of transportation policies	110
Figure 6-1. Total contribution of tourism to world economy in term of value	114
Figure 6-2. Total contribution of tourism to the world economy in term of share	115
Figure 6-3. Ranking international tourism expenditure by country/region (US\$100 mil.)	116
Figure 6-4. Trend of inbound tourist to Japan.....	117
Figure 6-5. Consumption trend of inbound tourism.....	118
Figure 6-6. Fluctuation of domestic travelers in Japan	119
Figure 6-7. Domestic travelers' expenditure, same-day trips and overnight trips	119
Figure 6-8. Overnight trips per person and nights per person of domestic tourism.....	120
Figure 6-9. Trend of overseas travel from Japan	120
Figure 6-10. Trend of foreign visitors and Japanese overseas.....	121
Figure 6-11. Freight transportation situation in Japan	122
Figure 6-12. Domestic passenger transportation trend in Japan	123
Figure 6-13. Selection of scenario for policy analysis	127
Figure 6-14. Scenario design for transportation policy analysis	128
Figure 6-15. Analytical framework for transportation policy analysis	131
Figure 6-16. CGE Modelling procedure	137
Figure 6-17. CGE model calibration procedure	140
Figure 6-18. Impacts of transport cost reduction on domestic tourism.....	149
Figure 6-19. Impacts of transportation cost reduction on outbound tourism.....	150
Figure 6-20. Impacts of transportation cost reduction on inbound tourism.....	152

List of tables

Table 2-1. The consideration of transport accessibility factors in CGE models (only papers consider accessibility factors are presented)	32
Table 2-2. Conclusions, strengths, and further recommendations for future research ...	35
Table 3-1. Agencies involved and task in develop original Input-Output table	39
Table 3-2. Format of original 518x397 Input-Output table of Japan, year 2011	40
Table 3-3. Tourism expenditure classified by items and categories	41
Table 3-4. The square form of Japan IO table 2011	44
Table 3-5. I_{Tour}^{row} to disaggregate tourism industries at supply side (rows)	46
Table 3-6. I_{Tour}^{column} to disaggregate tourism industries at demand side (columns)	46
Table 3-7. IO table with transportation services and tourism industries presented	49
Table 3-8. Interactions between non-tourism and tourism industries in Input-Output table	51
Table 3-9. The format of Social Accounting Matrix	53
Table 4-1. Cross-industrial ranking with HEM indicator	66
Table 4-2. The total output and value-added effect on tourism of transportation (per 100JPY transportation final demand)	70
Table 4-3. The total output and value-added effect on transportation of tourism (per 100JPY tourism final demand)	71
Table 4-4. Impacts of transportation on tourism (per 100JPY)	73
Table 4-5. Impacts of Tourism on Transportation (per 100JPY)	74
Table 4-6. Ten dominant industries of domestic and inbound tourism	75
Table 4-7. Ten dominant industries of outbound tourism	75
Table 6-1. Freight transportation situation in Japan	122
Table 6-2. Domestic passenger transportation trend in Japan	124
Table 6-3. Transportation modal share for freight and tourism passenger	129
Table 6-4. Impacts of transportation cost changes on national economy	145
Table 6-5. Changes in gross output and final demand under the transportation cost changes	146
Table 6-6. Impacts on demand and gross output of transportation service industries under the shocks	147

Table 6-7. Impacts of transport cost reduction on domestic tourism	149
Table 6-8. Impacts of transportation cost reduction on outbound tourism	151
Table 6-9. Impacts of transportation cost reduction on inbound tourism	152
Table 6-10. Sensitivity test scenario design	154
Table 6-11. Sensitive test of Constant Elasticity of Transformation σ_{CET} with 20% cost reduction of all transportation modes	155
Table 6-12. Sensitive test of CES Domestic/Import good σ_D with 20% cost reduction of all transportation modes	156
Table 6-13. Sensitive test of factor elasticity of substitution σ_{VA} with 20% cost reduction of all transportation modes	157
Table 6-14. Sensitive test of price elasticity of demand of tourism export σ_P with 20% cost reduction of all transportation modes	158
Table 6-15. Research contributions and future considerations	167

Abbreviations

IO	Input-Output
SAM	Social Accounting Matrix
CGE	Computable General Equilibrium
SCGE	Spatial Computable General Equilibrium
CES	Constant Elasticity of Substitution
CET	Constant Elasticity of Transformation
C-D	Cobb – Douglas
GTAP	Global Trade Analysis Project
RoW	Rest of the World
GDP	Gross Domestic Product
WTTC	World Travel and Tourism Council
HEM	Hypothetical Extraction Method
REMI	Regional Economic Models, Inc.
GIS	Geographic Information System
AI	Artificial Intelligent model
NN	Neural Network
ANN	Artificial Neural Network
AIDS	Almost Ideal Demand System
SEM	Structure Equation Modeling
CBA	Cost-Benefit Analysis
MMRF	Monash Multi-Regional Forecasting
FMD	Foot-and-Mouth Disease
ITS	Intelligent Transportation Systems
MIC	Ministry of Internal Affairs and Communications, Japan
MLIT	Ministry of Land, Infrastructure, Transport and Tourism, Japan
SNA	System of National Account
TSA	Tourism Satellite Account
FOB	Free on Board
CIF	Cost, Insurance and Freight

Introduction

Research motivations and significances

From the arguements of the transportation roles on tourism development

Tourism has become an important industry over the last few decades, and its economic impact, including direct, indirect, and induced effects, has been enormous. Based on a 2014 data set comprised of information from more than 180 countries, travel and tourism contributed \$7,580.9 billion, which is equivalent to 9.8% of the global Gross Domestic Product (GDP), and provided 276,845,000 jobs, which is equivalent to 9.4% of total global employment. Tourism's economic contribution is predicted to increase to an estimated \$11,381.9 billion in the coming years (10.5% of GDP), and activities from tourism are projected to add 356,911,000 jobs by 2025 (10.7% of total global employment) (WTTC, 2015).

Transportation is one of the most important factors that contributes to the success of the tourism industry (Page 2009, Palhares 2003). According to Lamb and Davidson (1996), transportation is crucial in the tourism industry, as it connects supply (production) and demand (market) directly. The role of transportation in tourism is essentially to provide accessibility. It has been widely claimed by many scholars that without accessibility, tourism simply cannot take place (Chew 1987, Prideaux 2000). Accessibility is not only defined as providing ability to tourists to reach destinations, but also using transportation services at destinations once they arrive. These accessibility factors influence tourists' impressions during their trip, and serve as determining factors of the destinations' overall attractiveness (Le-Klähn and Hall 2015, Page and Connell 2014, Boopen 2005, Naudé and Saayman 2005, Gunn and Var 2002, Chew 1987, Robinson 1976).

There are policies to effect to the transportation accessibility of a tourism destination, which are grouped into three categories:

- The first category is policies of infrastructure development. These includes activities of re-structuring the network; construction of new links or facilities, such as new links of roads, railway, or new airport...; improvement of existing ones; or

improving the connectivity of a part or entire network by investing/improve infrastructure...etc.

- The second category is service policies. It may contain the strategies of improvement of travel speed/time for passenger transportation, such as reducing the waiting time, increase frequency; improvement of public transport connectivity, i.e. reducing the transfer time; public transport subsidy, or discount for student...; applying road pricing; taxes of fuel; or introduction of new transportation modes which provide faster traveling, more comfortable, more convenient...
- The final one is regulation policies, for example, the regulation of the emission standard, or restriction of driving may also effect to the accessibility of tourism destination.

The transportation policy may be introduced in individual or in combination of several policies. In one or another way, the introduction of transportation policies may reduce or increase the travel cost, which is expressed in two terms: direct money which the travelers pay for transportation service to bring them from origins to tourism destination and within the tourism destination; and the time they spend for traveling, which can be converted into money term in specific circumstances.

Budget to develop transportation system is always constrained. Many economies are trying to find the answers for the problem of which transportation sector are prioritized to be invested? Even within a transport sector, which projects are prioritized to have the best responses from tourism is a hot topic for discussion.

To the practical facts

Although the transportation is important to the tourism, the applications of inter-industry analyses, such as Input-Output and CGE model to enhance this statment are rarely acknowledged (Van Truong and Shimizu, 2017). Some critical points are drawn out:

- It is rare to recognize an empirical study pointing out the linkage between transportation and tourism with the scientifec figures.
- There is only one empirical study on the interaction between transportation and tourism using Computable General Equilibrium Model. However, the consideration of transportation policies is not clear enough.

- The critical fact that transportation policies (or alternatives) aim to promote tourism need to be appraised, and compared to find out the most effective one. This guarantees to get the best responds from tourism with the most saving alternatives.

Research questions

The fact of lacking the empirical studies on the economic impacts of transportation on tourism by employing CGE model raises some critical questions for the author to find answers for the research questions, namely:

1. How important is transportation on the promotion of tourism?
2. With respect to transportation policy(s), how to assess the economic impacts of transportation on tourism?
3. What models can quantify the impacts?
4. How to develop the database for the analysis?
5. How decision makers/practitioners take advantage of the method for their institutional activities?

Research objectives

Overall goal of the research is to propose a model with integrating transport accessibility factors into CGE models to estimate the economic impacts of transportation on tourism. This model provides a general method to take transportation policies into account in CGE framework. Transportation model will convert policy shocks into cost in term of time or/and monetary. These results are injected into CGE framework to solve for the changes in income, demand/supply, investment/saving as well as import demand and export...etc. of the economy.

To obtain the overall goal of the research, the following detailed objectives need to be archived:

1. Understanding on the mechanism of the relation between transportation and tourism.
2. The survey in literature on the empirical studies to figure out the application of CGE framework in the transportation – tourism area. This objective will provide a comprehensive look on which area of study should be more critical;
3. Development of the database for transportation – tourism analysis relying on

- the CGE model
4. Introduce a theoretical framework to integrate transportation into CGE model to evaluate the impacts of transportation on tourism;
 5. Employ the framework to analyze the economic impacts of transportation policies on the development of tourism as a case study.

Research methodology and structure

The research is structured into six major parts corresponding to six chapters, excluding introduction and conclusion (see Figure 0-1-1). The introduction part briefly presents the research motivations-significances, research questions, research objectives, major methods applied, and the structure of entire study.

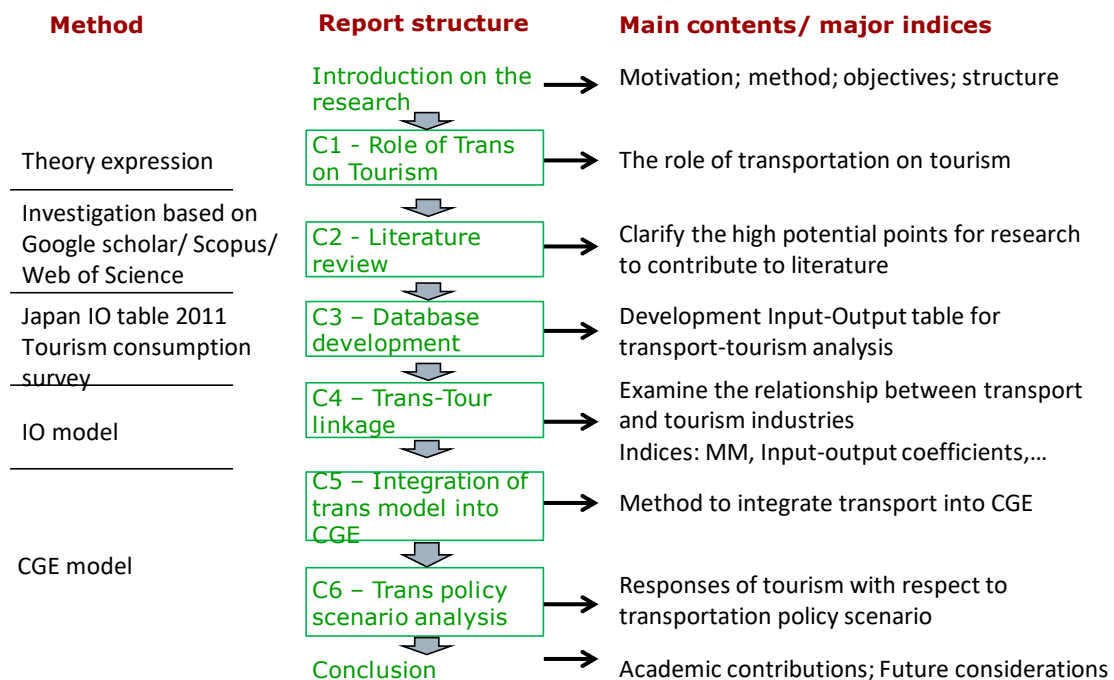


Figure 0-1-1. Research structure and methodology

In the first chapter, the theoretical arguments on the roles of transportation on the economic development and tourism are discussed. Some arguments are presented with practical evidence. This chapter also mentions the quantitative methods widely used to assess the economic impacts of transportation in general and the economic impacts of transportation on tourism in particular.

Chapter 2 focuses on the literature review of the applications of Computable General Equilibrium (CGE) Models to assess the economic impacts of transportation on tourism.

The survey also extends to the studies on the economic impacts of transportation to economy and the economic impacts of tourism. These extensions aim to understand how transportation and tourism industries are treated in CGE frameworks. The understanding of these knowledges will lay the foundation for the developing framework of integration transportation models into CGE models.

The content of *Chapter 3* is about the development the database for the Input-Output and CGE modelling. The development is based on the original Input-Output table of Japan and Tourism Consumption Trend Survey, both of original data is in 2011 calendar year. The methodology of the database development and the results as Input-Output table and SAM for transportation and tourism analysis are presented explicitly in this chapter.

Relying on the results of *Chapter 3*, *Chapter 4* examines the contributions of tourism industries to the Japanese economy. The linkages between transportation and tourism industries are also identified. The main method applied in this part is Input-Output model. Some specific analysis methods are used, such as Input-Output coefficients, Multiplier analysis, Hypothetical Extraction Method (HEM), and Forward-Backward Method. The aim of this part is to answer for the question “is tourism important to the economy?” and “how strong is the linkage between transportation and tourism?”

Before examining the economic impacts of some transportation policy shocks, *Chapter 5* introduces the standard structure of CGE model for a small-open economy. Frameworks to integrating transportation model into regional and inter-regional CGE are presented. Some relevant matters, such as potential applications of the integration framework, and the challenges of integrating transportation model into CGE are also discussed.

Take advantage of the integration framework in *Chapter 5*, *Chapter 6* moves one more step to examine the economic impacts of five scenarios of transportation policy shocks. The experiment illustrates the applications of the integration at basic level, in which transportation cost deregulation scenarios are injected directly into the price, demand, and production models of CGE. In this chapter, the economic roles of four basic transportation modes on the national economy and the various types of tourism, for instance, domestic, outbound, and inbound tourism are recognized. The multiple impacts of passenger transportation cost deregulation on the demand/production of tourism

commodities/services in inbound tourism is also explained in detail. The calibration and validation procedure is included to qualified the model results. The sensitive analysis is also used to check the responses of the model results to the different values of elasticity of substitution.

The *conclusions – recommendations* are presented as the final part of the research. Here, key conclusions of the research, the contributions of the research, research difficulties-limitations are introduced. After all, some critical research topics to address the research area are strongly recommended.

1 The role of transportation on tourism development

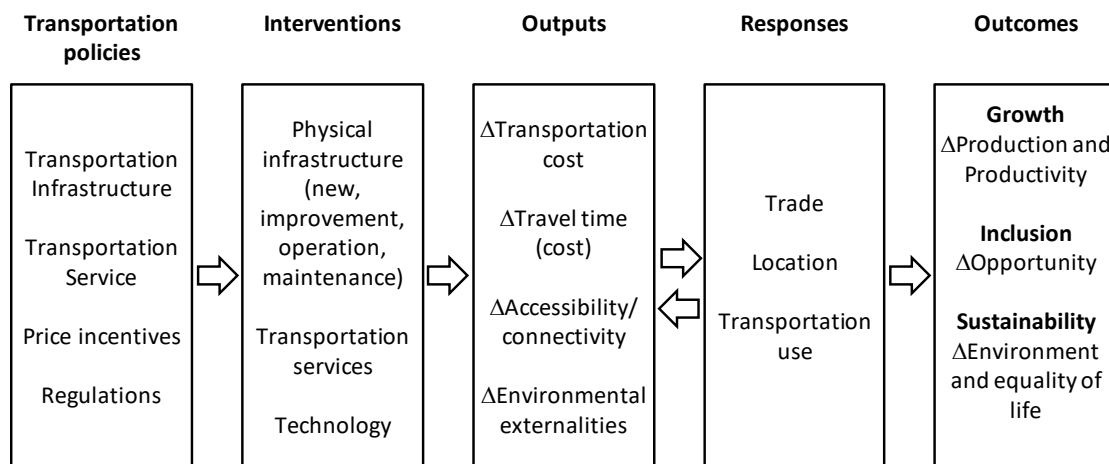
1.1 The roles of Transportation on the Economic development

1.1.1 Transportation policies and its roles to economy

The roles of transportation on the development of economy are widely acknowledged in literature. The impacts of transportation may be on the supply side, or on the demand side, or sometimes both supply and demand. Berg et al., (2017) surveyed the current state of the economic literature on the impact of transportation policies on the economic development and categories transportation policies into three groups: Transportation investment; Price incentives; and Regulations. Transportation investment policies include two sub-groups, the first one is infrastructure investment, for example, investment of new transportation infrastructure (new roads, new rail links, new airports, harbors...), restructuring transportation network, improvement of the existing ones, improvement of the intermodal network connectivity, or investment/improvement of the transportation technologies...; the second one is transportation service investment, which contains the introduction of new transportation modes, improve the frequency of public transportation,...Price incentives include the policies to change the prices or fares of transportation, such as subsidies, taxes to change the road users' behavior, discounts for students or disabilities, toll installations, fares of parking, fuel taxes ... Regulations contain the norm to reduce the transportation emission, like fuel emission standards, driving prohibition; or transportation management...

Berg et al., (2017) explains the mechanism of the impacts of transportation policies on the economy as in the Figure 1-1. The transportation policies can be recognized by the changes in physical infrastructure, such as the appearance of the new infrastructure, the better quality (road surface is smoother, higher speed operation...); or the better transportation services; the appearance or the improvement of transportation technology... The changes may lead to the reduction of transportation cost, travel time; or increase in accessibility and connectivity; the changes also appear in the environment externalities, for example, improve health of communities. Depending on the behaviors of bodies (government, households, firms) in economy, the impacts of transportation policies can reach to some extent. The outcomes of the transportation policies' impacts on the

economy can be seen in three types: Stimulation the economic growth, Inclusion, and Sustainability.



Source: (Berg et al., 2017)

Figure 1-1. Mechanism of impacts of transportation policies on economy

1.1.2 Transportation policies and accessibility

There are various ways to measure transportation policies. The first dimension is the changes in physical units which one can observe by their own eyes are popular. For example, the number of kilometers that new roads, railways, airports are constructed, or those of improvement ones. The changes or improvement in efficiency of transportation are also usually used. For instance, the increases in capacity of upgraded infrastructure, the better quality of road surface, the higher operation speed allowed. Another dimension indicates for the users' satisfactions is also used widely, this dimension usually representative for the transportation services, such as the comfortability, loyalty, security...In many cases, in economic view point, one can also use the scale of budget invested, in monetary term for transportation policy. Depending on to which circumstance transportation policy is referred, the suitable measurement is recommended. Nevertheless, all of measurements mentioned here seem not sufficient.

Rietveld and Bruinsma (1998b) recommend an indicator that brings more precise, more comprehensive view to the transportation policy, called "accessibility". The accessibility is usually estimated based on specific trip purpose, type of user, and destination. There are some but not limited to alternative operations of accessibility:

- Is there any link exists between a location and the network?

- The nearest distance one travels from a location to others.
- The number of connections from a location to others.
- The number of links connected to a location.
- Travel cost measured between locations, in a specific link.
- Travel time from a location to another.
- The total number of people who can reach to a location within a certain transportation cost limit...

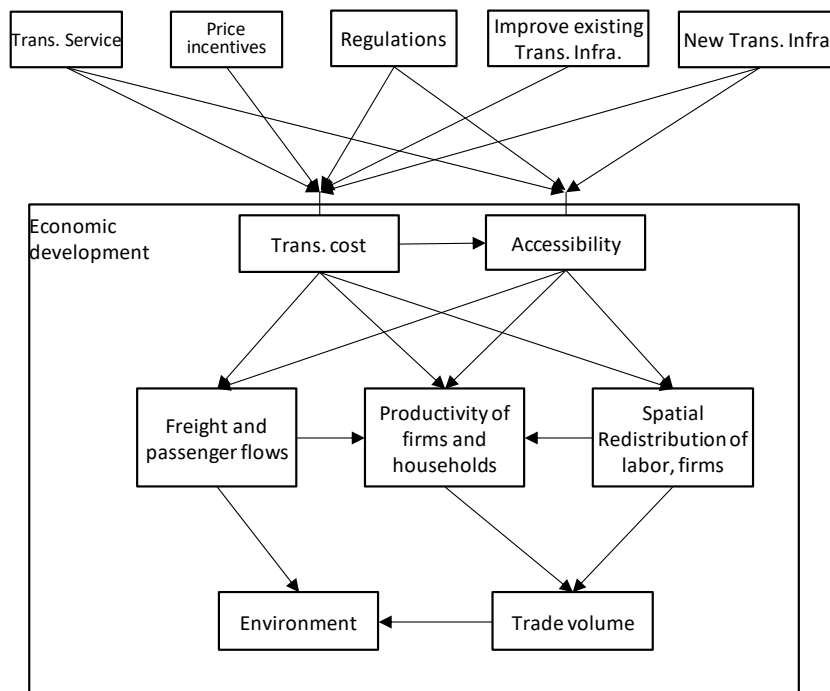


Figure 1-2. Impacts of transportation policies on economic development

The concept of accessibility is wide and can be varied by circumstance, depending on the purpose of a study. It is widely used in economic impacts assessment since it brings more potential use of infrastructure and service development. It is noted that the concept of transportation cost and accessibility are not always the same. For example, an isolated location without transportation connected is considered as non-accessible by road. In this case, the cost of transportation does not exist. If a road link is added to connect the location with the existing transportation network, then one can reach there. The location becomes accessible. Since then transportation cost concept appears after the introduction of a new road link. Figure 1-2 presents the flows of impacts of transportation policies to the development of economy, in which transportation cost and accessibility concepts are distinguished separately.

1.1.3 Transportation infrastructure

The improvement of existing infrastructure or investment of new one will generally improve accessibility to a location (Rietveld and Bruinsma, 1998a). It is quite easy to realize the changes in the criteria of accessibility described in the section above. If a link to a location is improved, the travel speed to the location may be improved. In other words, the travel time and/or travel cost will be saved. In another case, if a link is added to connect to a location, this link can increase opportunity to access to the location and may change the distribution of travel demand on the network under the change of network equilibrium. The impacts of new link would lead to the change in the average travel time/speed entire network.

The investment of transportation infrastructure can shorten the travel distances, or encourage higher speed. There are variety of elements induced, such as the reductions of fuel, cost of labor and capital leading to changes in generalized transportation cost. The results of changes in the form of mode choice, changes in decisions of time of day to avoid congestion... Therefore the trip generation and attraction may be changed (Rietveld and Bruinsma, 1998b). To the firms, the reduction generalized transportation cost is the driving force for the productivity increased. In turn, income of households (value added) and government (taxes), or the GDP of the related regions or nation will be encouraged.

The changes in transportation cost also change in accessibility of locations. The un-uniform of transportation effects to locations may lead to re-distribute the economic impacts spatially. Accessibility is a good indicator to stand for these differences.

Transportation infrastructure effects on regional/national employment. Naturally, transportation infrastructure investment requires labor in association with capital, import goods, as well as other relevant inputs. The interactions among others take place via substitution and the complementary relationships between them. In some circumstances, one input can be substituted by some others. The impacts on the employment also differ by regions due to the differences in growth rates of economy resulted from the different advantages they got from the impacts of transportation infrastructure.

The impacts of infrastructure investment on the trade flow may be manifested of its impacts on generalized transportation cost, labor/employment, capital and spatial

economic. Cost, demand and income of households, and production of firms are closed related to each other's. The reduction of cost will stimulate the demand for inputs of firms and consumption of households. The production of firms will be positively impacted. The increase of value added is the outcomes of the stimulation of productivity. Moreover, the infrastructure even can open up new markets for the economy.

The transportation infrastructure investment has some impacts on environment. For example, the construction a new road may produce some tons of air emission, dust, and noise. The new investment of road may also encourage more vehicles, then induces more emission. The construction also effects on the natural areas such as forest destroy, natural living environment of animals...

1.1.4 Transportation services

Differ to transportation infrastructure, transportation service is laid upon on the infrastructure. Without infrastructure, transportation service cannot function. Again, the roles of transportation infrastructure are emphasized for the services. However, the roles of transportation infrastructure will not be mentioned again this section. The section will discuss the roles of transportation service as its own special characteristics.

The transportation service effects can be distinguished by two elements: the direct impact, such as the reduction of travel time/cost and the indirect impacts. The direct impact may be resulted from these components:

- The increase of travel speed or reduction of travel time (resulted with new transportation modes, higher operating speed allowed by the improvement of infrastructure),
- The increase of frequency (bus, train, or other types of public transportation),
- Reduction of cost or fare.

The indirect impacts consists the elements related to the quality of the transportation services (Rietveld and Bruinsma, 1998c), such as:

- Capacity of working in traveling: The opportunities to work while being in the vehicle,
- Access time saving: the time spend for checking in procedure, boarding time,
- Opportunities for same day-return trips (reduction of expense for overnight),

- Delay time or reliability (difference between schedule and actual time of operation).

1.1.5 Some practical evidences illustrated for economic impacts of transportation

Impacts on growth

The reduction of transportation cost may increase the trade volume, open new markets, stimulate the formation of new industries, and as results, it may change the patterns of trade. The pattern of trade may differ depending on the specific circumstances of transportation infrastructure. The higher trade cost usually indicates the poorer in transportation infrastructure or less accessibility. Atkin and Donaldson (2015) exclusively worked with a sample of goods that are identified at the barcode-level and collected data on the origin location of each product, and estimate the cost of trade. They found that the cost of trade in Ethiopia or Nigeria is four to five times larger than in the US. The study also concluded that the distant consumers even bear more trade cost.

Weisbrod and Treyz (1998) used REMI regional economic model for country sides in Michigan to assess the travel cost effects, logistics cost effects, and “accessibility/agglomeration” effects. The improvement of accessibility can serve to expand the market, allow businesses opportunities to realize the economic scale by serving markets more economically. The improvement of accessibility by highway project can provide businesses with access to a greater variety of specialized labor skills and input products. These improvements then stimulate the productivity.

The transportation policy changes economic activity and income. Damania et al. (2017) combined road survey data and GIS road networks with the Highway Development Management Model to compute the impacts of transportation cost on crop production of farmers in Nigeria. The study found that the decline of transportation cost may not be enough to push the local economy toward, but significantly increases the revenue as well as welfare of the farmers. In the study of Jacoby and Minten (2009) on the willingness-to-pay for a reduction of transportation cost from the canonical agricultural household model and utilizes it to analyze the benefits of a road project in a region of Madagascar. The study shows that the elimination of transportation cost in area would boost the incomes of the remotest households, which facing with the transportation cost of approximately \$75/ton by almost half.

Impacts on Inclusion

The impact of transportation on the inclusion is understood as the various dimensions of poverty that can be affected by a poor transportation. For example, the poor transportation can lead the reduction of trade, negative impacts on labor market outcomes, to some extent on bad education and health, and even crime (Berg et al., 2017). In a research of Emran and Hou (2013) about the relationship between the accessibility to the markets and the poverty of rural areas in China, the research uses straight-line distances to coastline and navigable river, along with the topography of the intervening countries. The results from the research show that better access to both domestic and international market has positive effects on per capita consumption. Fafchamps and Shilpi (2013) researches on the migrants' choice of migration in the developing country as Nepal. For the poor immigrants, travel time to the important facilities, such as banks, road is one of the important indicators for the choice of destinations. There are also correlations between their decisions of destination with the higher income and consumption, higher housing premium, and better access to public amenities.

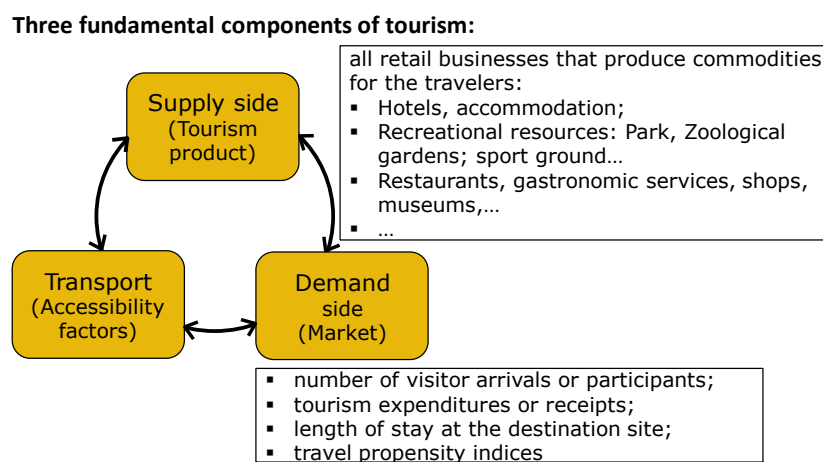
Impacts on sustainability

Although transportation development has great positive impacts on the economy, the development of transportation gets involved with the negative externalities, for instance, traffic congestion, accidents, pollution and health, deforestation, loss of biodiversity, degradation of ecosystems induced by transportation infrastructure (Berg et al., 2017). The evidences from Chicago and Philadelphia about the impacts of traffic congestion on the business cost, productivity and output levels of the metropolitan areas. Even the impacts of traffic congestion are various by industry and by the characteristics of the required inputs. The impacts of raising the production cost may be reduced with traffic congestion reduction strategies (Weisbrod et al., 2003). The bad impacts of transportation on pollution and health are widely recognized. For example, Künzli et al. (2000) estimate the air pollution on public health in Austria, France, and Switzerland caused by transportation. In their work, they found that air pollution is the reason for 6% (40,000 cases) of total mortality per year, and half of all mortality caused by air pollution was attributed to motorized traffic.

1.2 Transportation and tourism promotion

1.2.1 The roles of transportation on tourism

Together with tourism demand and supply (destination) sides, transportation is one of fundamental elements of tourism (Lamb and Davidson, 1996). Transportation not only brings tourists from demand sides (origins) to the supply sides (destinations) but also contributes to destinations as facilitators. Furthermore, the specialty of transportation is that it is not only a tourism facility but also a link to connect all other tourism relevant facilities, such as hotels/accommodations, restaurants, recreational places, museums...regarding to the mobility function, transportation's role is usually seen under the term of accessibility.



Source: Nguyen Van Truong adapted and adjusted based on:
 Stephen L. J. Smith, 1988, *DEFINING TOURISM A Supply-Side View*;
 Lamb Barbara, Davidson Sally, 1996, *Tourism and Transportation in Ontario, Canada: A vital link*;

Figure 1-3. Three fundamental elements of tourism

Litman (2008) elaborated on twelve factors that effect a destination's accessibility, specifically: (i) Transportation modes – quality of transportation options, such as with respect to comfort, and safety; (ii) Transportation network connectivity – density of link and path connections, or directness of travel between destinations; (iii) Travel cost or affordability; (iv) Mobility – travel speed and distance, capacity, or travel time; (v) Integration of the links and modes within the transportation system; (vi) Transportation demand; (vii) User information – availability of reliable information on mobility and accessibility options; (viii) Mobility substitutes – telecommunications and delivery service substitutes for physical travel; (ix) Transportation management; (x) Land use factors; (xi) Prioritization of travel activities; and (xii) The value of inaccessibility or isolation. Improving these accessibility factors can contribute to the economic success of a tourist destination (Currie and Falconer 2014, Celata 2007).

New modes of transportation have revolutionized the tourism industry by improving distance-travel capabilities, travel speed, travel time, and comfort level. The introduction of railway laid the foundation for modern tourism, followed by the revolution of the automobile, which changed the style of regional and inter-regional tourism. International tourism was made possible soon thereafter by innovations in long-haul air transportation, which allowed for tourism in previously unreachable destinations (Chew, 1987). While energy-intensive forms of motorized transportation are preferred for long-haul travel because they save so much time, riding bicycles or walking at the destination can provide tourists with the on-site experiences they desire, such as relaxation or adventure (Millonig and Schechtner 2006, Lumsdon 2000). Cruise ships and ferries, categorized as modes of water transportation, have not only recovered the travel demand at the end of 20th century and into the 2000s (Davenport and Davenport 2006, Zapata-Aguirre and Brida 2008), but have also become tourist destinations in their own right and formed tourism destinations in some cases (Tang and Jang 2010, Hanh 2006).

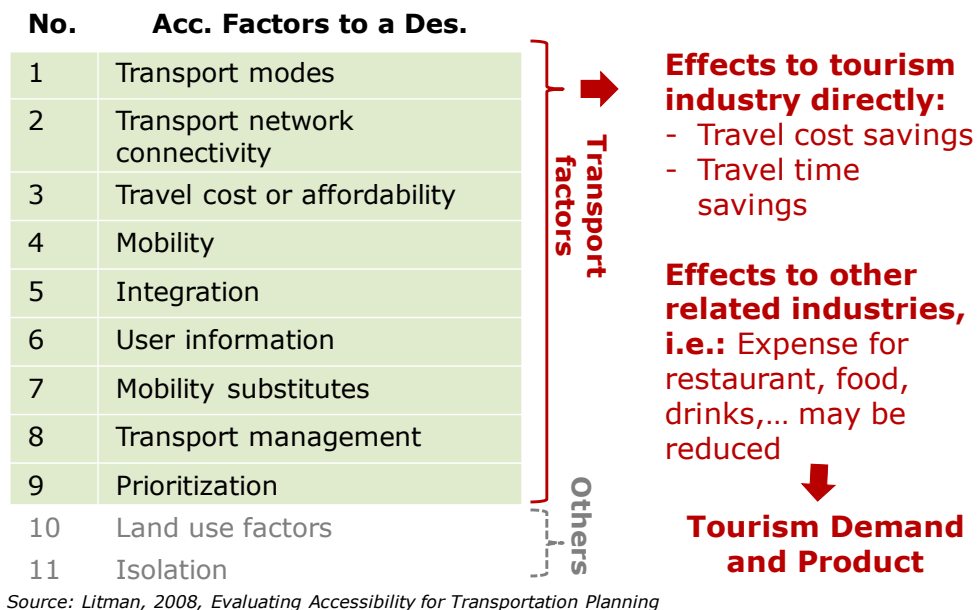


Figure 1-4. Accessibility factors and its effects on tourism

In general, a tourist destination’s accessibility can also be improved by developing the transportation infrastructure network or by improving connectivity between the network and tourist facilities. For example, the distance from a tourist’s place of origin to the desired destination can be reduced by adding a direct link between the two locations within the transportation network. Activities that widen links, or providing well-

organized taxi connections for tourists near central bus or train stations can also improve connectivity between the transportation network and accommodations (Rietveld and Bruinsma 1998, Litman 2008). In some exceptions, improving transportation infrastructure may reduce accessibility. For example, in congested conditions, adding a new link or improving an existing link may increase average transportation costs, due to the potential differences between users' equilibrium and the transportation system's optimum state (termed "Paradox"; Sheffi 1985). This phenomenon can be addressed by integrating management measures into well-designed networks to reduce total travel time. The impact of transportation improvements on tourism may be different for different types of travelers, depending on the role of the link to the destination. For instance, the introduction of an inter-regional high-speed rail line may increase inter-regional accessibility. This development will affect tourism flows from the place of origin to the destination, rather than enhance tourism flows generated at the destination itself (Pagliara et al. 2015, Gutiérrez, González, and Gómez 1996).

Cost is a major consideration determining the demand for a destination. It generally includes two elements: the cost of travel; and the cost of living and other services at the destination (Martin and Witt 1987, Martin and Witt 1988, Bimonte, Ferrini, and Grilli 2015). For tourists, the time they spend traveling represents one portion of the total cost. The time cost varies according to their value of time (Pagliara et al., 2015); i.e., travel costs include the actual amount of money they pay for the transportation service and the cost in terms of their travel time. Travel cost savings result from accessibility improvements (see Figure 1-5).

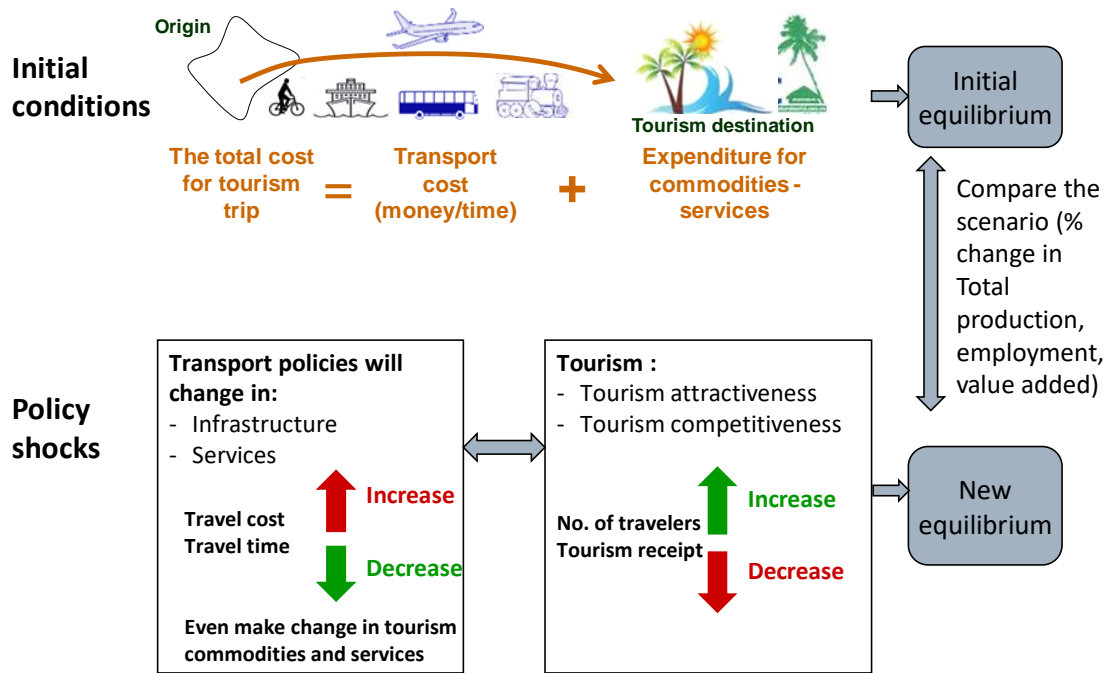


Figure 1-5. Relationship between transportation policy and travel cost

The enhanced quality of related tourism services – specifically, communication and information, booking procedures, restaurants, accommodation, and related transportation services etc. – can not only improve the accessibility of the destination, but can also affect tourists’ preferences. Many studies have shown the importance of travel-related services in tourism. For example, Rheims, Bazin, Beckerich, and Delaplace (2011) stated that the lack of luxury hotels at a destination poses a problem, as business travelers require this type of accommodation. They also noted that limited restaurant services on the weekends can be problematic for the tourism industry. One service practice utilized in the Bahamas, called the “One-stop online booking and Immigration Card”, allows tourists to book and change their reservations online, and interact with their travel companions via email in real time. The Immigration Card, which holds travelers’ information, was designed and produced by the government of the Bahamas to improve security and simplify procedures for tourists. This service improved accessibility and attracted more tourists to the Bahamas (Wignaraja et al., 2004).

1.2.2 Transportation for tourism or tourism for transportation

Gauthier (1970) reviewed in literature and characterized the relationships between transportation and economy into three types: positive, permissive, and negative effects. This argument was developed later into transportation and tourism field by Duval (2007).

Positive effects: This role of transportation on the economic development appears as it direct and positive impacts on the development of economy. In the context of tourism, the roles of transportation appear as its facilitating domestic and international traveling, connect origins to some destinations to benefit the destinations not only in economic but also other aspects, such as culture exchange.

Permissive effects: The permissive role take places when transportation does not directly contribute to the economic development. For example, the introduction of transportation alone is not enough to influence to the economic development. Its role becomes supportive to the economic development. To the tourism context, transportation itself may not be a significant contributing factor to tourism development, but it impacts on the market trends, consumers' preferences...then it induces to the tourism demand, tourism flows as well as tourism receipt.

Negative effects: The negative impacts of transportation on economy occurs when its investment is harmful for the economy, for example, in term of opportunity cost, the investment activities in transportation sector is less productive than some alternatives, in which the resources are used more efficiently. This is usually happened in the cases of misdirected investment. In the case of tourism, for instance, the weak in operation may make the threshold transportation flows and networks between nodes worse. The results in the short term are maybe negative impacts on the tourism travelers.

From the side of tourism, the studies on the roles of tourism on the transportation seem less attractive. However, it is suggested that the tourism development, or more properly, the tourism travel demand can play a substantial role in the demand for introducing new transportation modes or enhancing the existing ones (Duval, 2007). An example is given for the opening of the new direct flight between Auckland and Shanghai is because the increase of Chinese tourists visiting New Zealand and the migration between two countries. Another example is the case of Venice, the dramatically increase in demand of tourism makes the cruise system in Venice overloaded. The need of enhancing the existing cruise public transportation system is critical (WPI, 2012).

1.2.3 Transportation plan for tourism promotion

The impacts of transportation on tourism can be seen in two aspects, freight transportation

effects to the cost of tourism commodities and services and passenger transportation effects directly to the arrival demand. The changes in the tourism arrivals may effect on the consumption demand of tourism commodities and services. Conversely, the changes in the cost of tourism commodities and services also effect to the arrival demand. Gunn and Var (2002) once again emphasizes the vital role of passenger transportation on the tourism in term of providing critical link between market source and tourism destinations. The first consideration of transportation plan is minimization the cost of both freight and passenger transportation in both monetary and time value term.

The intermodal in transportation service and network requires multilateral cooperation in transportation plan. Tourism trips are quite different to other daily trips, such as work trips and school trips. Daily trips usually take place with the specific transportation modes on the un-change routes. In contrast to daily trips, one tourism trip may use several transportation modes combined. Generally, the long-haul travel may utilize the inter-regional/international transportation modes, such as bullet train, air transport, ocean shipping... to reach to the destinations. At destinations, some other transportation modes may get involved. If one of the chains fail to provide the desired quality of service, the satisfaction of entire travel may be spoiled. The planning requires the cooperation of every stakeholders, from local and international government and/or relevant bodies.

Pedestrian orientation: Beside automobile, air, train, ship... the great favorable travelling is enjoyed on foot. There are some exceptions of helicopter/plane tours and cruise tours. The designing and planning are critically considered to handling the increasing volume of travelers as pedestrians after they leave the mass transportation mode. The new routing, new surface preparations are challenges for newer, safer and more satisfying pedestrianism (Gunn and Var, 2002).

The transportation planning also differs spatially as the differences in tourism characteristics. The planning should be considered at three levels (Duval, 2007):

- At global perspective: The routes for traveling are frequently prescribed. Transportation is mostly functional in the context of facilitating flows. Besides, there are some cases, where transportation can be used as branding and marketing.

- At the destination level: The planning should include planning measures, policy measures, implementation action plan, monitoring, resource management, landscape changes, impacts (economic, social) assessment, place promotion and marketing. At this level, transportation is considered not only a facilitator, but also a tourism attraction of destination.
- At the attraction level: At this lowest level, transportation is invested with more focus on the attraction function. The seasonal characteristics, taste of tourism are more paid attention to address the attractiveness of the destination.

1.3 Quantitative methods to analyze the economic impacts of transportation on tourism

Dwyer et al. (2012a) aggregates the researches on the methodologies of 42 authors from 30 universities and 8 countries all over the world and presents the research method in tourism into three categories: quantitative, qualitative and mix among them. In the document, most used methods at the present are captured and discussed. The qualitative approaches are well suited for researching the phenomena in social sciences. It became more popular from the late 1970s and 1980s, and now is gaining broader acceptance. Qualitative approaches are strong capability in providing in-depth knowledge from multiple viewpoints of the understanding the tourism phenomena and experiences, regarding to the academic and non-academic question “why” and “how” in the fields. In contrast to the qualitative approaches, quantitative ones emphasize on the causal or rules or laws of explanations. Quantitative approaches usually deal with the questions of “who”, “when”, “what”, “where”, and also deal with questions of “how” and “why” as the qualitative ones. This section will introduce the most typical quantitative approaches applied in tourism.

Statistical testing method

The first key among quantitative techniques is statistical testing method, which is based on probability theory and logic. There are two different approaches developed by the pioneers to statistical testing: the first one is Fisher’s significance testing approach, which is starting with the single-null hypothesis and the results are judged based on the strength of p-value; another one is Neyman-Pearson’s hypothesis testing approach allows involving both null (H_0) and alternative hypothesis (H_1) and identifies a fixed level of

probability at which the test statistic should be rejected. The significance approach usually does not consider the region of rejection, while the hypothesis testing does not rely on the p-value. However, both are laid on the foundation of probability. In tourism, statistical testing is prevalent to examining the behaviors of tourists in various circumstances, such as tourists' perception of destination images, travel motivations, intention, satisfaction...(Li, 2012).

Regression analysis

The second approach is regression analysis, which aims to develop the relationship between dependent and one or more other independent variables based on statistical or/and collected data with a certain hypotheses or theory. The dependent and independent variables must be tested to be sure that the regression model is built precisely. Rossell³ (2012) emphasized the applications of the approach in tourism are widely attracted. The typical fields are maybe between the tourism demand in term of arrival numbers, length of stay, receipt with other key variables, such as income, price, marketing.

Time series analysis

With the improvement of the data availability recently in tourism areas, the time series analysis and time series modeling have received wide attention during the last 30 years (Cang and Seetaram, 2012). The popularities in time series are tourist arrivals, departures, tourism spending, length of stay at destination, price and cost (of transportation, accommodation, tourism commodities and services...), economic contribution of tourism ... The applications of time series modeling are mostly for tourism forecasting with the time frame recommended for short or medium term.

Demand modeling and forecasting approach

Demand modeling and forecasting technique is wider than time series and it includes three sub-categories: time series, econometric method and artificial intelligence approach. The limitation of time series is that it is constructed not based on any economic theory which underlines the tourists' decision-making process. It, therefore, is not only incapable to analyze the behavior of tourist, but also incapable to assist policy makers to evaluate the policies and strategies to support tourism development (Peng et al., 2012). Econometric method is more advanced in comparison with time series for solving these problems. Artificial Intelligent (AI) model, in other words, Neural Network (NN) or

Artificial Neural Network (ANN) is also widely used nowadays. It typically consists of a number of simple processing element, called neurons, nodes, or units. The structure of this method is likely imitative the structure of biological neural network. The limitations of AI method are the lack of theoretical background and incapable to interpret the results in economic perspective (Peng et al., 2012).

AIDS approach for demand analysis

Another well-known technique for tourism demand analysis is Almost Ideal Demand System (AIDS). This method provides “an arbitrary first-order approximation to any demand system and satisfies the axioms of choice almost exactly. The method aggregates perfectly without invoking the assumption of parallel linear Engel curves. The functional form of this technique is consistent with known households budget data” (Divisekera, 2012).

Structure Equation Modeling

Structure Equation Modeling (SEM), which is also called under other names, such as covariance structure analysis or covariance structure modeling is more advanced comparing to the regression analysis since it allows to incorporate multiple independent and dependent variables as well as latent structure that rely on the observable variables (Lee and Kyle, 2012). Lee and Kyle (2012) conducted the survey over 300 publications applied SEM and concluded the applications of SEM in tourism field mostly categorized into 3 groups: (1) the use of confirmatory factor analysis to determine scale structure, psychometric properties, and for scale purification; (2) test the causal relationships among latent variables; and (3) test the measurement and structural model in variance across groups.

Discrete choice analysis

Discrete choice analysis is recommended in the cases the decisions of tourists are multi-nominal, intrinsically categorical, or unordered. For example, the choice of destination, transportation mode for traveling, the hotel to stay, the attractions to visit...The theory provides the framework to analysis the data at individual level (Morley, 2012). The data for discrete choice analysis includes the variables for the choice decision, the characteristics of the alternatives, characteristics of the individual, and sometimes choice sets. The choices made should be observable and reflect the preferences underlying them.

Panel data analysis

Panel data analysis technique is also used widely in the tourism. This technique is based on the spatial data collected over the time on cross-sectional observations, such as individuals, firms, countries. Therefore it allows researchers study on the dynamics of changes in short time. Seetaram and Petit (2012) emphasizes the merit of this method in comparison with other statistical methods is that, the inferences are relied on the larger sample and the lack of freedom degrees is rarely happens.

Cost-Benefit Analysis

One of the very popular methods used in tourism is Cost-Benefit Analysis (CBA). It contains a systematic process for assessing the costs required and the benefits gained from a policy. CBA is strong in answering the fundamental questions before implementing any policies, programs, or projects: (1) What is the outcomes of the projects/policies? (2) The gains of the projects/policies exceed the costs required? (3) Are there any better projects/policies of the ways to achieve the same outcomes? And so on. Normally, the costs and benefits are estimated in monetary term, and the net benefits are defined from subtracting the cost from the benefits. As such this characteristic, CBA are the first choice for economic appraisal project/policy (Dwyer, 2012).

Input-Output and CGE modeling

To identify the inter-dependencies among industries in the economy, or study on the economic structure, production impacts, even emission...Input-Output model is an appropriate choice. It was first proposed by Leontief (1937) to quantify the production quantities, prices, and allocate industries where commodities and services are produced. The weakness of the system is that it includes simple linear models to link industries and factors with input demands, prices and products; the model relies on the assumption that there is no constrain in the supply side. To overcome the weakness, Johansen (1960) proposed in his own work with 20 industries economy the more flexible, more realistic system called inter-industrial, or inter-sectoral, or CGE framework. The system is based on the Walrasian general equilibrium structure and realistic economic database to solve for levels of demand, supply, and price. Especially, it is strong in assessing economic impacts of policies. After the first introduction, CGE model gradually replaced IO model and have been applying in many fields, such as economic impacts of transportation,

tourism, mega events, climate changes, exchange rates, devaluation, technology improvements, diseases...

1.4 Conclusions

This chapter firstly discusses the roles of transportation on the economic development. Under the economic perspective, the impacts of transportation on economic development are seen under the changes of cost, time, and others. Two majorities of transportation roles, infrastructure and service policies, are well discussed with some evidences from practical studies used to illustrate. The roles of transportation on the tourism development then is presented specifically. Some key points to enhance the transportation planning for tourism promotion are also expressed. At the end of the chapter, the most recent quantitative methods are used in tourism are introduced. This indicates that the relationship between transportation and tourism is observable. The content of this chapter brings some conclusions as follow:

Firstly, there is no doubt about the roles of transportation on the economic development. The impacts on the economy appear in term of the growth (output, income, employment), providing less fortune people reach to the better services and opportunities, sustainable environment, and further is equality of life. The complexity of the impact is expressed in two stages: the temporary impacts at investment/construction stage and the long-term impacts at operation stage. At the later one, in economic viewpoint, the impacts of transportation frequently considered in term of changes in transportation cost, time, and other accessibility criteria.

Tourism, or travel industry is strongly dependent on transportation. Tourism is effected by both freight transportation, which directly impacts on tourism commodities/services; and passenger transportation, without this tourism cannot happen. The impacts of transportation on tourism can express in scale of trade flows for tourists, the demand of travel and spatial distribution of tourism demand.

Finally, the impacts of transportation on the economy and tourism can be observed with econometric approaches. Nevertheless, to observe the relationships between transportation and tourism in inter-industrial viewpoint, Input-Output and CGE model are strongly recommended. Input-Output model is strong to analyze the interactions among

industries in economy, while CGE model is more advanced in evaluating the shocks. In the next chapters of the research, the combination of these two approaches is used to explore the bi-lateral inter-dependency between transportation and tourism and the impacts of transportation designate shocks on the economy and tourism promotion.

2 Applications of CGE Model in Transportation – Tourism analysis: Literature review

2.1 Literature review method

Three scientific databases were used to collect literature for this study: Scopus, which covers the largest number of journals (12,850 journals); Web of Science, which covers the longest period of time (since 1900); and Google Scholar, which does not have keyword or language limitations (Falagas et al., 2008). Empirical articles featuring CGE models, and published between 1960 (the first empirical CGE model by Johansen) and 2015, were reviewed. This survey will initially focus on empirical analyses of the direct interaction between transportation and tourism to understand how activities in the transportation and tourism sectors are simulated in CGE models, and how they interact with each other in an inter-sectoral economy. Second, this survey extends to review literature focused on the transportation-economy relationship and the tourism-economy relationship. Additional factors that can impact tourism, such as exchange rates, oil prices, taxation, environmental factors, climate change, disease, and government policies, will be also surveyed as external influences. These areas were examined to enhance our understanding of how transportation and tourism are treated in CGE models. Empirical studies including neither the transportation nor tourism sector were not considered in this study.

The results from this survey are presented on two levels. On the first level, the key information of the studies is reported according to the following categories: (1) Authors, Publication Year; (2) Countries/regions that the research targets; (3) Data collection period used in the research; (4) Number of sectors simulated in the CGE model; (5) Causality, expressed as the factors affecting the object of the research; (6) Tourism, abbreviated ‘Tour’, indicating whether or not the tourism sector is taken into account in the CGE model; (7) Transportation, abbreviated ‘Trans’, indicating whether or not the transportation sector is taken into account in the CGE model; and (8) Transportation Accessibility, abbreviated ‘Acc’, indicating the transportation accessibility factors that are integrated into the CGE model and the manner in which they are used (see **Appendix 1. CGE empirical studies on relationship among economic, tourism and transport**).

At the second level, only published papers analyzing the relationship between tourism and transportation (or transportation-relevant factors, such as oil prices) with integrated transportation accessibility factors are examined. In terms of transportation accessibility, the 12 factors from Litman (2008), which are articulated in Section 1.2.1, are used as a benchmark for the review (see Table 2-1).

2.2 The applications of CGE Model in economic impacts of tourism studies

CGE models represent the next generation of input-output (IO) models. In the late 1930s, Wassily Leontief developed IO models to quantitatively observe linear interdependencies among economic industries, households, and governmental entities in a given area. IO models can describe both the transactions between a region and the rest of the world, as well as smaller-scale activities within the region itself (Leontief, 1986). The limitations of IO models are clearly articulated in the literature. For example, they hold the unrealistic assumption that the same technology is used to produce the same product in every sector, and that all jobs created through this process are new and permanent jobs with fixed wages (Daniels, 2004). The question of cost-effectiveness in the context of tourism cannot possibly be answered with IO models alone (Briassoulis, 1991). In contrast to IO models, CGE models can more flexibly describe an economy. Since they first appeared, CGE models have regularly been used instead of IO models to simulate the effects of changes in an economy overall, as well as specific changes in individual activities, including employment levels, taxation, imports, exports, and outputs of specific industries (Kumar and Hussain, 2014).

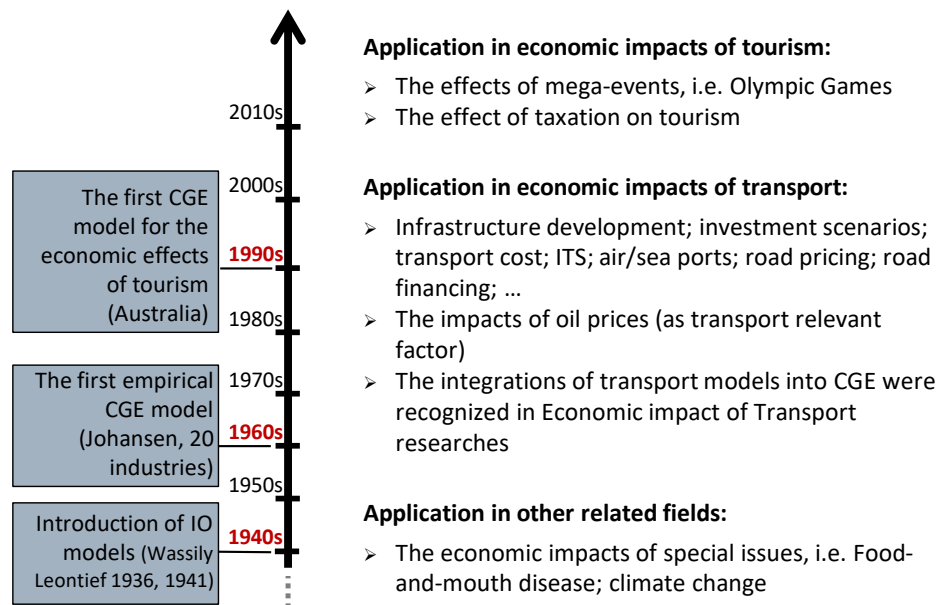


Figure 2-1. Empirical studies using CGE model in literature and some important milestones

The first empirical CGE model was produced by Johansen in 1960, and is known as the Multi-Sectoral Study of Economic Growth. In the model, Johansen ran 20 cost-minimizing industries and a utility-maximizing household sector. Noted by Dixon (2006), “For these optimizing actors, prices played an important role in determining their consumption and production decisions. He employed market equilibrium assumptions to determine prices in his model. It produced a numeric, multi-sectoral description of growth in Norway using Norwegian IO data and estimates of household price and income elasticities derived using Frisch's (1959) additive utility.” Since then, CGE models have become the dominant framework used to assess economy-wide factors, and have gradually replaced other approaches. Following Johansen, Scarf (1967a, 1967b) directly linked theory with the model to estimate the physical equilibrium of competitive price levels and allocations, and designed an algorithm to compute numerically-specified general equilibrium models. These studies were focused on economic activities in North America (Dixon, 2006). By the late 1970s, the first empirical studies using CGE models were applied to developing countries. According to Narayan (2004), Adelman and Robinson (1978) used them to examine Korean data, and Lysy and Taylor (1980) used them on data from Brazil.

Three decades after the first empirical CGE model was introduced by Johansen (1960), the first CGE model for the economic effects of tourism was applied on the Australian

economy (Adams et al., 1993; Adams and Parmenter, 1991, 1995). These empirical studies utilized an IO table from 1989 that listed 108 economic industries, although tourism and transportation were considered as two exogenous, econometric and non-interacting variables. Applying CGE models to the tourism industry became popular in the Americas (USA, Brazil, Argentina, Brazil, Chile, Paraguay, USA, and Uruguay), in European countries (Spain, Denmark, and the United Kingdom), and in developing countries in Asia (China, Indonesia) and Africa (Tanzania).

The effects of mega-events, which play a major role in attracting tourists to the host countries or regions, were also first researched in Australia to ascertain the economic effects of the Sydney Olympic Games in 2000 (Treasury, 1997). This study was based on the bottom-up multi-regional Monash Multi-Regional Forecasting (MMRF) model, which included 14 industries, aggregated from an IO table produced in 1994, to determine the impact of the Sydney Olympics on the Australian economy. The ‘bottom-up multi-regional’ description in the model’s title indicates that economic behavior was measured at the regional level – over six states and two territories – and that national output was estimated as the sum of the regional outputs (Naqvi and Peter, 1996). To understand the impact of a similar event, Adam Blake (2005) used a 123-industry CGE model based on an IO table from 2002 to assess the economic impact of the London Olympics in 2012. Shina Li, Blake, and Cooper (2011) also applied CGE modeling based on IO table data from 2004 to forecast the economic contribution of tourism generated by the Beijing Olympics in 2008. All of these ‘mega-event’ impact assessments executed the CGE model over several time periods to observe the economic behaviors generated before, during, and after the games.

Empirical CGE models not only focus on the interactions among economic industries themselves, but also assess the effects of special events and policies. Blake, Sinclair, and Sugiyarto (2003) made an initial attempt in this respect by employing a CGE model to measure the effects of foot-and-mouth disease (FMD) on agricultural industries, as well as international and domestic tourism, in the context of inter-sectoral linkages in the economy of the United Kingdom. Berritella et al. (2006) used a CGE model to evaluate the impact of climate change on tourism by translating shocks in predicted variations of tourism flows into changes in consumption preferences for domestically produced goods and changes in tourists’ expenditures. The changes in tourists’ destination choices related

to changes in climate were simulated in the model. The impact of oil prices on tourism was acknowledged in the theoretical framework in of Lennox and Schiff (2008), and was later applied in empirical studies on the impact of oil prices on tourism in New Zealand by Lennox (2012), and by Becken and Lennox (2012). The oil price influenced tourism through its impact on income, transportation costs, demand in the tourists' countries of origin, and the relative prices of different goods and services imported to and exported from New Zealand.

The effect of taxation on tourism is an interesting area discussed in the literature. Dixon and Rimmer (1999) researched the effects of direct tax changes on the economy, as well as the relationship between direct tax and tourism by employing dynamic CGE modeling and incorporating the database created by Dixon, Rimmer, and Malakellis (1997). Gooroochurn (2004) used taxation in the theoretical framework for his CGE model, and introduced his first empirical study with Sinclair (2005) by using data from Mauritius. Their study argued that “tourism taxes can increase domestic welfare, since international tourists bear most of the welfare losses associated with higher revenue.” Other empirical studies on the same topic were conducted, by Sugiyarto, Blake, and Sinclair (2003) and by Ihalanayake (2008).

An important common characteristic in the aforementioned tourism impact assessment papers is that transportation is treated as a macro-economic industry. All the behaviors in the transportation industry, as well as other industries, are expressed in terms of the monetary flows with the assumption of equilibrium in quantities of supply and demand in the markets at some set of prices. Clearly, an increase or decrease in price may change consumer demand and the supply of producers. In these papers, the transportation industry appeared in the CGE models, as its impact on travel and logistics costs can alter the supply and demand curves of all industries, including tourism. The tourism industry's economic behaviors, in terms of transportation accessibility, are not integrated in these CGE models.

2.3 The applications of CGE Model in economic impacts of transportation studies

In the literature, transportation impact analyses using CGE models were also utilized by many researchers. Naqvi and Peter (1996) used MMRF models to investigate the impacts

of transportation infrastructure development, namely the Western Ring Road, on the state and national economies of Australia. This experiment compares the MMRF and top-down (single-region) models, and indicates that the MMRF can simulate the importance of the region from which the product originated, as well as the industrial structure of the regional economies. However, the single-region model has limited capabilities in simulating interactions among regions. Kim (1998), Kim, Hewings, and Hong (2004), Kim and Hewings (2009) and Kim, Kim, and Hewings (2011) applied a CGE model to analyze the transportation infrastructure in Korea. In these applications, the CGE model highlighted its capability in analyzing the transportation-economy relationship. The authors claimed that transportation investments can stimulate economic growth, but can also increase price inflation. Policymakers can also rely on the results of the CGE models to set their priorities for transportation infrastructure investments, to ensure the largest possible positive impact on the economy.

The change in transportation costs, as well as in logistics cost policies, were studied by Sakamoto et al (2011) and Haddad and Hewings (1998), for Japan and Brazil, respectively. Sakamoto et al (2011) showed that a reduction in transportation costs through logistics improvements can significantly affect the economy. They also showed that such cost savings encouraged development of a number of firms in the Northern Kyushu region. In the case of Brazil, Haddad and Hewings (1998) employed a CGE model to analyze the importance of transportation infrastructure development and transportation cost policies on regional competitiveness from an economic perspective.

CGE models have also been applied to transportation in many other cases, such as the evaluations of the role of port development conducted by Doi, Tiwari, and Itoh (2001) for Japanese seaport improvement and Ueda et al. (2005) for Haneda airport expansion. The impacts of changes in maritime transportation policy were also analyzed by Ishiguro and Inamura (2005). CGE models have also been implemented to assess the effects of road pricing (Knud J. Munk 2006 and Knud Jørgen Munk 2003), fuel taxes (Conrad and Heng, 2002), and transportation technology, for example Intelligent Transportation Systems (ITS), on economies.

Table 2-1. The consideration of transport accessibility factors in CGE models (only papers consider accessibility factors are presented)

Authors, Public Year	Causality	Tour	Trans	Acc.	Accessibility factor No. (from <i>i</i> to <i>xii</i> , see Litman (2008))											
					(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)	(xii)
(Sakamoto and others, 2011)	Trans (logistics cost) → Eco	x	O	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Kim et al., 2011)	Trans (Highway financing) → Eco	x	O	Yes ⁽¹⁾	x	x	x	0	x	x	x	x	x	x	x	x
(Bröcker et al., 2010)	Trans → Eco	x	o	Yes ⁽⁰⁾												
(Kim and Hewings, 2009)	Trans (network) → Eco	x	O	Yes ⁽¹⁾	x	x	x	0	x	x	x	x	x	x	x	x
(Ando and Meng, 2009)	Trans → Eco	x	O	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Munk, 2006)	Trans (pricing) → Env, Con, Gov budget	x	O	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Schäfer and Jacoby, 2005)	Trans → Eco	x	O	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Kawakami et al., 2004)	Trans (ITS) → Eco	x	O	Yes ⁽⁰⁾	x	x	0	x	x	x	0	x	x	x	x	x
(Kim et al., 2004)	Trans (network) → Eco	x	O	Yes ⁽¹⁾	x	x	x	0	x	x	x	x	x	x	x	x
(Kweka, 2004)	Trans → Tour → Eco	O	O	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Munk, 2003)	Trans (pricing) → Env, Con, Gov budget	x	O	Yes ⁽⁰⁾	x	x	0	0	x	x	x	x	x	x	x	x
(Oosterhaven and Knaap, 2003)	Trans → Eco	x	o	Yes ⁽¹⁾	x	x	0	0	x	x	x	x	x	x	x	x
(Lofgren and Robinson, 2002)	Trans (cost), world prices → Eco	x	o	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Haddad and Hewings, 1998)	Trans (Cost) → Eco	x	o	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Bröcker, 1998)	Trans (cost) → Eco	x	o	Yes ⁽¹⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Miyagi, 1996)	Trans (Infrastructure) → Eco	x	o	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Buckley, 1992)	Trans → Eco	x	o	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x
(Liew and Liew, 1991)	Trans (cost) → Eco	x	o	Yes ⁽⁰⁾	x	x	0	x	x	x	x	x	x	x	x	x

Note:

Tour = Tourism; Trans = Transport; Eco = Economic; Acc. = Accessibility factors; Sec = Sector; Ind = Industry; Gov = Government; Env = Environment; Con = Congestion; FMD = Foot and Mouth Disease; ITS = Intelligent Transport System;

Yes⁽⁰⁾ = Accessibility factor is considered in the CGE model as cost scenario; Yes⁽¹⁾ = Accessibility factor is considered in the CGE model with transport model integration;

“x” = the factor is not considered in the CGE model; “0” = the factor is considered in the CGE model

In the tourism-economy analyses using CGE models, the role of the transportation industry is recognized as an important economic factor. However, the role of tourism in

transportation-economy studies is often neglected or hidden within other industries.

2.4 The applications of CGE Model in transportation – tourism studies

Despite the fact that the role of transportation in tourism has been widely acknowledged in the literature, quantitative research measuring the impact of transportation on tourism using computable general equilibrium (CGE) models is scarce. A CGE model is a system of equations that describes an economy as a whole, the interactions among its parts, the motivations and behaviors of all producers and consumers in the economy, and the linkages among them (Mary E. Burfisher, 2011). CGE models are well-suited to tourism analysis, as they have the capability to simulate the inter-relationships among tourism, other sectors of the domestic economy, as well as the effects of foreign producers and consumers. The model can be adjusted for alternative conditions, and can be used to quantify the effects of actual policies, such as changes in taxation, subsidies, and transportation laws (Dwyer, Gill, and Seetaram 2012; Blake et al. 2006). Specifically, the CGE model can simulate production decisions in multiple industries; therefore, the impacts of alternative transportation scenarios on tourism can be estimated both directly and indirectly, if there are no limitations on the data. There is no doubt that CGE modeling is a useful analytic tool for evaluating different economic scenarios (Konan and Kim, 2003).

Scopus, Web of Science, and Google Scholar databases were searched for empirical papers that used CGE models to evaluate the interactions among transportation, tourism, and the economy. The results illustrate that, of the 69 empirical papers found; 39 (56%) analyzed the tourism-economy relationship. In these papers, transportation is taken into account as an economic industry. There are 24 papers (35%) that analyze the transportation-economy relationship, in which the tourism industry is also categorized as an economic industry, or is hidden in other industries, or is neglected. In the analyses which both transportation and tourism industries present, these industries are included as two exogenous variables in the CGE models. There is no specific interaction between these industries simulated in the CGE models. The interaction between them is illustrated as an inter-industry relationship, similar to those found in other economic industries. There were only 6 (9%) empirical papers found regarding the interaction between transportation (and its relevant factors, such as oil prices) and tourism (see Figure 2-2). Among these 6

papers, there are 4 on the impacts of the oil price, which is considered a driver of transportation costs in tourism. Only 2 papers analyzed the direct transportation-tourism relationship.

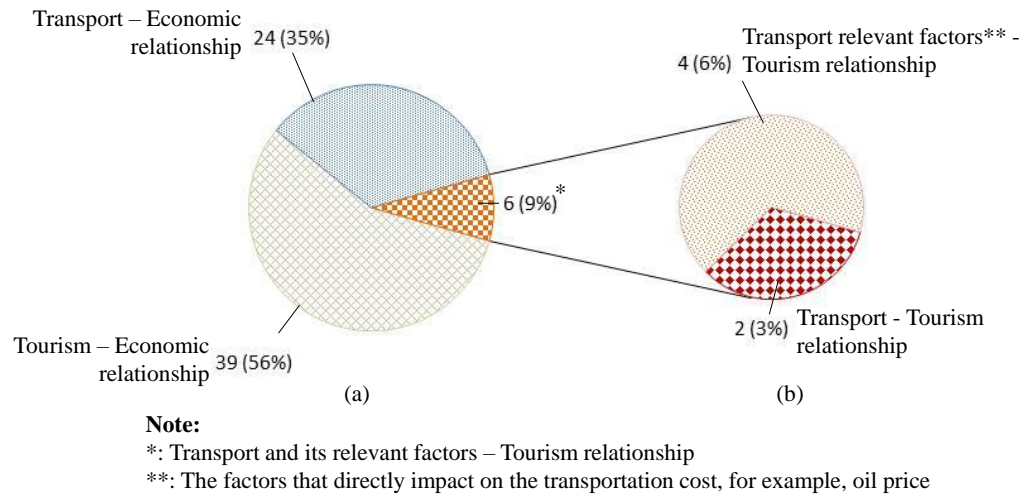


Figure 2-2. (a) The number of empirical papers using computable general equilibrium (CGE) models to analyze the relationships among tourism, transportation, and the economy; and (b) The number of empirical papers using CGE models to analyze the transportation-tourism relationship.

One of the two papers analyzing the interaction between transportation and tourism, by Konan and Kim (2003), examined the Hawaiian economy, which is dominated by tourism. The transportation sector is showcased in their CGE models. Based on an original 131-sector IO table, a 23-sector IO table was aggregated with 16 transportation sectors related to 7 tourism sectors. The model examined the economic role of the transportation sector at six different levels of tourism spending (5%, 10%, 15%, 20%, 25%, and -25%). The economy-wide impact on the Hawaii was also tested, along with the six spending scenarios. The study concluded that changes in tourism spending drove changes in transportation spending in terms of salaries and wages. The results of the study implicitly imply that the transportation sector is endogenously affected by tourism as an exogenous variable, contrary to the assumption that transportation would show an impact on tourism development.

The other paper, by Kweka (2004), developed a CGE model for economies of less developed countries, focusing specifically on tourism’s contribution to the Tanzanian economy. This paper included transportation infrastructure development, and used transportation network improvements as a scenario in the model. The study indicates that

improvements in transportation infrastructure can contribute to tourism in two ways. The first way is by reducing the cost of transportation, marketing, and distribution for tourism, especially in remote locations. The second contribution relates to improved destination accessibility, thereby encouraging growth in the tourism sector. Transportation development in this study is illustrated by integrating a 10% reduction in total marketing and distribution costs in the model.

Table 2-2. Conclusions, strengths, and further recommendations for future research

Conclusions	Advantages	Disadvantages
<p><i>Among the 69 empirical papers using computable general equilibrium (CGE) models, there are:</i></p> <ul style="list-style-type: none"> • 39 papers (56%) on the tourism-economy relationship. • 24 papers (35%) on the transportation-economy relationship. • 6 papers (9%) about transportation and relevant factors, such as oil prices and tourism relationship. Among the 6 papers, there are 4 about oil price-tourism, and • Only 2 papers (3%) on the transportation-tourism relationship. <ul style="list-style-type: none"> + One paper considers the factor of accessibility by integrating plausible cost savings from infrastructure improvements (Kweka, 2004). + One paper does not incorporate accessibility into its CGE model (Konan and Kim, 2003). However, the study seems assessing the responses of transportation to the changes from tourism industry 	<ul style="list-style-type: none"> • The use of CGE models is advanced compared with other approaches, i.e., input-output (IO) models. • The number of empirical studies is significant (69 articles). • Good geographical representation (Americas, Asia, Australia, Europe, and Africa). • Wide range of cases examined. 	<ul style="list-style-type: none"> • Transportation is treated as a normal economic industry in tourism-economy papers. • In contrast, tourism is treated as a normal economic industry, or hidden, or often neglected in transportation-economy papers. • Transportation cost scenarios and additional relevant factors such as oil prices were often used. • Very few transportation accessibility factors were integrated in transportation-tourism analyses with functional linkages. • Spill-over effects of transportation on tourism have not been mentioned in the existing studies.

Empirical papers about the impacts of the oil price on tourism include those by Yeoman et al. (2007) for Scotland, and by Becken and Lennox (2012) and Lennox (2012) for New Zealand. These authors incorporated potential changes in oil prices into the model, and used functional relationships to link the prices and quantities in supply and demand. The effect of the oil price was then translated to the changes in the prices of other commodities in the economy. This phenomenon led to changes in income and inflation, and especially to changes in the cost of transportation. The common factor in these papers was that they analyzed the transportation-tourism relationship, and devised transportation cost scenarios to test the responses of other factors in the economy. Implementing different economic scenarios is a method popular in the literature; however, it seems insufficient

for analyzing the effects of a specific improvement, like assessing the effects of adding a link to the current transportation network, or introducing a new mode of transportation. Evaluating these events may require a special method, as opposed to running different transportation cost scenarios. Integrating transportation accessibility factors into CGE models may be required to describe behaviors of the tourism industry that correspond with changes in transportation accessibility. The integration has been rarely discussed in empirical studies on the transportation and tourism relationship in literature. After carefully surveying the literature, a summary of the conclusions, advantages, disadvantages, and our recommendations for future empirical research with CGE models are listed in Table 2-2.

2.5 Conclusions

Although the role of transportation to tourism is widely discussed in the literature, empirical studies using CGE models to quantify it are very rare. From the descriptive survey of 69 empirical studies using CGE models to quantify the interactions among tourism, transportation and the economy, 39 (56%) papers illustrated the tourism-economy relationship, in which transportation is considered exogenously as an economic industry; 24 (35%) papers studied the transportation-economy relationship, where tourism is usually hidden with other industries or neglected completely; 4 (6%) papers described the relationship between transportation-related factors such as the oil price and tourism; only 1 paper identified the impacts of transportation on tourism and assessed the economic applications of transportation accessibility by using cost reduction scenarios; and the final paper examined the transportation-tourism relationship without taking transportation accessibility factors into account. Generally, the empirical studies surveyed in this review show that transportation plays a very important role in the development of tourism and the economy as a whole. However, the studies only integrate transportation in a general sense by using cost fluctuation scenarios. Empirical studies on the transportation-economy relationship integrated transportation accessibility factors, but studies on transportation-tourism relationship did not incorporate these factors at all.

Although limitations exist, some general conclusions can be drawn from this extensive review of the literature.

First, the theoretical framework that supports the use of transportation accessibility

factors in CGE models to estimate the impact of transportation on tourism was barely recognized. This would be a crucial task for researchers who may be interested in applying CGE models in this field of study.

Second, since the first empirical CGE model was formulated by Johansen (1960), CGE models have been applied in tourism-economy and transportation-economy studies, but not widely in transportation-tourism studies. Quantification of the role of transportation in tourism development has not been well developed either. Further development in this area will be necessary for future empirical analyses that wish to integrate transportation accessibility factors into CGE models.

Third, accessibility factors such as travel costs, infrastructure improvements, and information provision were partially considered in some works, while the other accessibility factors were not acknowledged at all. This may be due to the difficulty of measuring and integrating these factors; however, this matter should be addressed in future work.

Finally, although many studies have stressed the role of transportation on tourism in a non-technical way, it is very important for decision makers and practitioners to have relevant empirical studies with quantitative data so that they can develop transportation policies that effectively promote tourism industries. These studies can serve as excellent tools to evaluate the efficacy of transportation projects aimed at developing tourism.

In summary, the review shows that transportation plays an important role in tourism. However, a lack of understanding of the underlying mechanisms of this relationship requires development of new research methodologies and techniques that consider previously unincorporated variables, such as transportation accessibility factors.

3 Database development for Transportation-Tourism inter-industrial analysis: Case of Japan

3.1 Data collection

The data used for developing the database in this research includes (i) the Input-Output (IO) table at the producer price of Japan; (ii) The Japanese resident tourism consumption trend survey; and (iii) The foreign visitor consumption trend survey. All these three types of data are published in the same calendar year to guarantee the consistency.

As Hosoe (2014) stated in his study about the relationship between errors of inter-sectoral analysis, for example, computable general equilibrium modelling predicted from the errors of IO table that the more detailed and recent IO table, the more accuracy got in later analysis steps. In this study, the most up-dated and detailed IO table of Japan is used. This IO table was published by Ministry of Internal Affairs and Communications in 2015 and presented for economic sectoral interdependencies of the year 2011 (MIC, 2011). The table includes 518 Rows x 397 Columns in intermediate input and demand industries; 26 sectors in final demand; and 11 sectors in value added. In this original IO table, tourism industries are hidden in many industries, such as transportation service, accommodation, food, and beverage, etc.; some of transportation construction sectors, such as road, railway construction are presented explicitly; other transportation construction sectors, such as air, water transportation are not presented or are hidden in other construction sectors. IO table in the year 2011 presents the monetary flow of construction activities for just only one year, while transportation network is the result of the investment in long time. Hence, in this paper, transportation construction industries are not objective to be extracted to consider its inter-relation with tourism industries.

The Japanese resident tourism consumption trend survey was implemented annually at nationwide scale and focused on both domestic and outbound travelers, which are Japanese travelers' spending when they traveled in Japan and in other countries; the sample of the survey is approximately 25,000 persons. The foreign tourism, or inbound consumption trend survey is also conducted annually with approximately 40,000 samples. The all spending attribute before, during and after the travel includes transportation, souvenir, food-drinking, and accommodation, etc. were interviewed and recorded.

3.2 Original Input-Output table of Japan

Since first published in 1955, Input-Output table of Japan is regularly published every 5 years. The Input-Output table 2011 was the result of compilation by jointly cooperating of 10 offices, Ministries and Agencies (see Table 3-1).

Table 3-1. Agencies involved and task in develop original Input-Output table

Agency name	Operation tasks
Ministry of Internal Affairs and Communications	<ul style="list-style-type: none"> • Planning, liaising, coordination, and publication • Computerized tabulation and analysis calculations • Postal services and mail delivery, information and communications (exclusive of those covered by other authorities) • Export and import sectors, within final demand sectors
Cabinet Office	<ul style="list-style-type: none"> • Sewage disposal, public administration, miscellaneous non-profit services, personal services (exclusive of those covered by other authorities) • Final demand sectors (exclusive of export and import sectors) • Gross value-added sectors (exclusive of employee compensation)
Financial Services Agency	<ul style="list-style-type: none"> • Finance and insurance sectors
Ministry of Finance	<ul style="list-style-type: none"> • Salt, alcohol, tobacco, legal, financial and accounting service sectors
Ministry of Education, Culture, Sports, Science and Technology	<ul style="list-style-type: none"> • School lunch, education and research
Ministry of Health, Labor and Welfare	<ul style="list-style-type: none"> • Medicaments, water supply • Medical service, health and hygiene, social insurance and social welfare, nursing care • Worker dispatching services, building maintenance services • Hotels, eating and drinking services, cleaning, barber shops, beauty shops and public baths, movie theaters, ceremonial occasions • Total of compensation of employees, of gross value-added sectors
Ministry of Agriculture, Forestry and Fisheries	<ul style="list-style-type: none"> • Agriculture, forestry and fishery • Beverages and foods manufacturing industries (exclusive of school lunch, liquors, and tobacco), lumber
Ministry of Economy, Trade and Industry	<ul style="list-style-type: none"> • Mining and manufacturing industries (exclusive of those covered by other authorities) • Electricity, gas and heat supply, wholesale and retail trade • Information services, newspaper, publication • Business services (exclusive of those covered by other authorities) • Office supplies
Ministry of Land, Infrastructure, Transport and	<ul style="list-style-type: none"> • Construction, real estate and civil engineering sectors

Agency name	Operation tasks
Tourism	<ul style="list-style-type: none"> Transport, ships and repair of ships, rolling stock and repair of rolling stock
Ministry of the Environment	<ul style="list-style-type: none"> Waste treatment services

Source: (MIC, Japan, 2016)

Based on System of National Account (SNA) 2008 and the revision of Japan Standard Industrial Classification 2007, the National Economic Census and Input-Output Structure Survey were implemented to supplement the existing statistical data available at 10 National Ministries and Agencies/Office(s). The inputs of industries, including raw materials, and gross value-added (labor, capital, land, and others) were estimated based on the production cost survey to construct the make table. On the other hand, the outputs of industries were based on the goods/services surveys of product supply and demand. This is the source to construct use table. Since the inputs and outputs were from many different sources, the figures of inputs and outputs at this step were not fit. Every entry in the tables need to be cross-checked, reconciled, to make consistent and adequate. The result of this process is presented as Input-Output table format, which is shown as in the Table 3-2.

Table 3-2. Format of original 518x397 Input-Output table of Japan, year 2011

Demand side		Intermediate demand				Final demand						Import	Domestic production				
		Industry 1	...	Industry j	...	Industry J ₀ =397	Consumption outside household	Consumption of household	Consumption of government	Public investment	Private investment			Increase in the stocks	Export	Total final demand	
Supply side	Intermediate Input	Industry 1	X ₁₁	...	X _{1j}	...	X _{1J0}						E ₁	F ₁	M ₁	X ₁	
											
		Industry i	X _{i1}	...	X _{ij}	...	X _{iJ0}							E _i	F _i	M _i	X _i
											
	Industry I ₀ =518	X _{I1}	...	X _{Ij}	...	X _{IJ0}							E _{I0}	F _{I0}	M _{I0}	X _{I0}	
	Added sector																
	Domestic production	X ₁		X _j		X _{J0}											

3.3 Tourism consumption trend survey data

There are two surveys are conducted annually to record the information of tourism trips and consumption of Japanese and foreign travelers: (1) Travel and tourism consumption trend survey, and (2) Travel and consumption trend survey of foreigners visiting Japan. Both surveys are relying on the standard statistical framework for economic measurement

of tourism, called Tourism Satellite Account (TSA) to guarantee that all the information collected are consistency.

Table 3-3. Tourism expenditure classified by items and categories

Step 1 for survey data: Group tourism spending
 Unit: Mil. Yen

	Domestic tourism				Oversea tourism (Outbound)				International tourism (Inbound)			
	Spending in Japan		Spending outside of Japan		Spending in Japan		Spending outside of Japan		Spending in Japan		Spending outside of Japan	
	Tourism, recreational, homecoming	Business	Tourism, recreational, homecoming	Business	Tourism, recreational, homecoming	Business	Tourism, recreational, homecoming	Business	Tourism, recreational, homecoming	Business	Tourism, recreational, homecoming	Business
1 Entry fee	2,408,540	284,624	-	-	1,267,014	186,548	-	-	2,410	1,895	-	-
2 Transportation cost												
2.1 Airplane (domestic)	548,051	411,705	-	-	12,656	10,557	32,344	26,183	3,271	2,572	-	-
2.1 Airplane (international)	-	-	-	-	164,660	283,395	204,139	129,798	-	-	-	-
2.3 Railway (bullet train, railway, ski lift)	1,252,369	813,826	-	-	20,759	11,984	16,099	9,285	25,570	20,103	-	-
2.4 Bus	204,853	44,790	-	-	10,303	6,517	27,415	25,812	9,107	7,160	-	-
2.5 Taxi hire	104,046	45,069	-	-	6,530	2,262	-	-	-	-	-	-
2.6 Water transport (coastal)	82,058	7,922	-	-	1,020	-	55,725	6,966	-	-	-	-
2.7 Water transport (ocean)	-	-	-	-	188	24	885	7,239	-	-	-	-
2.8 Car rental and other transportation expense	155,863	25,570	-	-	-	-	-	-	3,390	2,665	-	-
2.9 Gasoline cost	1,066,788	136,388	-	-	6,547	1,509	-	-	-	-	-	-
2.10 Parking, toll road fee, expressway toll	923,179	100,086	-	-	13,004	2,363	-	-	-	-	-	-
3 Accommodation	1,710,176	405,506	-	-	15,948	8,434	169,373	236,015	132,978	104,549	-	-
4 Food costs	1,700,420	370,046	-	-	18,674	9,879	156,829	87,764	81,454	64,041	-	-
5 Agricultural products	150,959	6,439	-	-	-	-	-	-	-	-	-	-
6 Processed agricultural goods	91,801	12,905	-	-	-	-	-	-	-	-	-	-
7 Marine products	174,377	17,044	-	-	-	-	-	-	-	-	-	-
8 Processed marine products	159,627	12,176	-	-	-	-	-	-	-	-	-	-
9 Confectionery	1,226,262	131,164	-	-	24,216	10,230	-	-	14,294	11,238	-	-
10 Other food products	912,119	110,644	-	-	17,766	12,272	102,686	28,499	17,889	14,065	-	-
11 Fiber product	951,882	74,595	-	-	67,341	7,737	83,537	9,982	6,772	5,324	-	-
12 Shoes, bags such	350,050	32,914	-	-	72,486	6,251	120,118	5,130	33,361	26,229	-	-
13 Ceramics and glass products	58,043	713	-	-	-	-	-	-	-	-	-	-
14 Publication	80,436	11,918	-	-	9,612	2,030	-	-	-	-	-	-
15 Wood and paper products	41,943	2,929	-	-	-	-	-	-	-	-	-	-
16 Drug, cosmetic, and film	121,281	17,857	-	-	17,010	4,341	36,219	2,005	22,470	17,666	-	-
17 Electric appliances and related products	182,151	20,545	-	-	20,857	2,799	3,797	122	11,474	9,021	-	-
18 Camera Glasses & Watch	131,120	13,131	-	-	22,800	901	-	-	15,478	12,169	-	-
19 Other manufactured goods	108,444	3,181	-	-	-	-	-	-	18,559	14,591	-	-
20 Hot spring spa facilities Este stop-off	88,806	3,657	-	-	-	-	-	-	-	-	-	-
21 Amusement, Expo, and Sport Facilities, Camping	354,173	6,490	-	-	-	-	32,883	2,594	1,684	1,324	-	-
22 Museums, Zoo and aquariums, visa and passport	111,502	3,958	-	-	42,349	5,479	-	-	1,707	1,342	-	-
23 Sports and arts appreciation	84,324	1,664	-	-	-	-	21,975	3,968	989	777	-	-
24 Exhibition Convention participation fee	15,656	8,650	-	-	-	-	-	-	-	-	-	-
25 Tourist Farm	11,063	42	-	-	-	-	-	-	-	-	-	-
26 Guide fee and playing fish boat, Photo and video	412,178	23,005	-	-	26,400	8,998	41,173	20,254	5,812	4,569	-	-
27 Rental charge	36,275	1,985	-	-	946	451	-	-	716	563	-	-
28 Massage	35,812	10,088	-	-	-	-	-	-	-	-	-	-
29 Photography fee	23,009	268	-	-	-	-	-	-	-	-	-	-
30 Postal and telecommunications charges	14,108	8,876	-	-	879	1,347	3,369	3,745	-	-	-	-
31 home delivery	93,021	12,681	-	-	5,851	187	3,710	280	-	-	-	-
32 Sport equipment, CD, Stationery	96,358	1,411	-	-	3,485	53	-	-	-	-	-	-
33 Travel insurance and credit card admission fee	20,560	41	-	-	29,033	4,972	-	-	-	-	-	-
34 Beauty salons - Barber	235,245	11,512	-	-	13,262	1,154	-	-	-	-	-	-

The first survey focuses on the Japanese residents with the sample expected approximately 25,000 respondents every year. The sample will be then divided into two groups, the domestic travelers and the tourists who visit overseas. The survey was implemented through internet by MLIT, Japan (MLIT, 2011a). The second survey aims at foreigners visiting Japan, then the face-to-face method is preferred; and the international airports and seaports are chosen to interview (such as New Chitose Airport, Hakodate Airport, Sendai Airport, Niigata Airport, Tokyo International Airport (Haneda Airport), Narita International Airport, Komatsu Airport, Mt. Fuji Shizuoka Airport, Chubu International Airport, Kansai International Airport, Hiroshima Airport, Takamatsu Airport, Fukuoka 18 Kukai ports in the airport, Kagoshima airport, Naha airport, Kanmon

(Shimonoseki) port, Hakata port, and Sekihara port). Travel and consumption trend survey of foreigners visiting Japan started conducting since 2010 with the sample is about 40,000 respondents every year (MLIT, 2011b).

The aggregated results of the two surveys are shown in the Table 3-3. The spending amount of each item is presented explicitly with respect to each tourism type, which will be used later to disaggregate into the tourism industries from the original Input-Output table. Domestic tourism includes the activities take place within Japanese territory, then in Input-Output table, domestic tourism spending items are treated as domestic economic activities. Inbound tourism illustrates for the foreigners, who bring money to Japan, purchase and consume tourism commodities/services in Japan, some of tourists will bring some goods to their home countries. The spending items of inbound tourism is then considered as tourism export. Outbound tourism includes two sub-groups of spending. The first one includes the spending items within Japanese territory, we consider these items as domestic activities. Another one includes the spending items take place in other countries. In Input-Output table, these spending items are treated as tourism import.

3.4 Tourism satellite account – a link to connect tourism consumption trend survey into input-output table

As introduced in the previous sections, Input-Output table is constructed based on NSA and tourism consumption surveys rely on TSA. The most important task is to recognize the tourism spending items from original Input-Output table. This task helps to disaggregate the tourism spending items from original Input-Output table precisely. To do so, Tourism Satellite Account classification is used as a link between Input-Output table industries and tourism consumption trend survey items. Figure 3-1 shows an example to recognize the spending items from the survey in Input-Output table. For instance, accommodation expense in domestic and outbound tourism and hotel for inbound tourism and lodging industry in Input-Output table are in the same classification of TSA named inn and other accommodation. Therefore, accommodation expenses for domestic, outbound and inbound tourism should be disaggregated from the lodging industry of Input-Output table. See Appendix 4a, 4b, and 4c for more detail information of every industries and spending items.

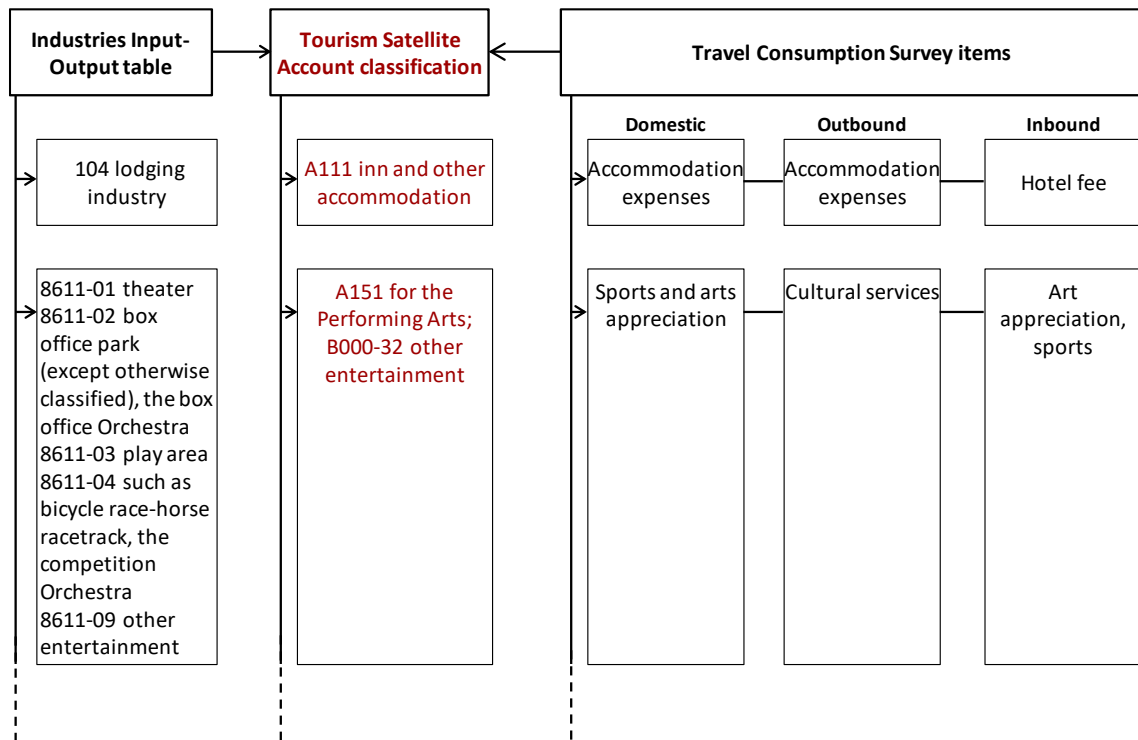


Figure 3-1. Identify the tourism industries in IO table with TSA as a linkage-An example

3.5 Develop input-output table for transportation – tourism analysis

3.5.1 Step 1. Data preparation

Data prepared for developing IO table must be well organized. On one side, the original IO table of Japan, contains the number of rows (518) different with number of columns (397) will be preliminarily treated. In order to implement disaggregation tourism industries from original IO table, this 518Row x 397Column-IO table should be prepared in the square form. To do so, some basic sectors at the supply side (row) are aggregated. The IO table after preparation is square, which includes 397 rows by 397 columns, in other word $n_0=397$ sectors (see the form in Table 3-4).

Table 3-4. The square form of Japan IO table 2011

Demand side		Intermediate demand				Final demand						Import	Domestic production				
		Industry 1	...	Industry j	...	Industry n ₀	Consumption outside household	Consumption of household	Consumption of government	Public investment	Private investment			Increase in the stocks	Export	Total final demand	
Supply side	Intermediate Input	Industry 1	x_{11}	...	x_{1j}	...	x_{1n_0}						E_1	F_1	M_1	X_1	
												
		Industry i	x_{i1}	...	x_{ij}	...	x_{in_0}							E_i	F_i	M_i	X_i
												
	Industry n ₀	x_{n_01}	...	x_{n_0j}	...	$x_{n_0n_0}$							E_{n_0}	F_{n_0}	M_{n_0}	X_{n_0}	
	Added sector																
	Domestic production	X_1		X_j		X_{n_0}											

Transportation in original IO table is explicitly presented in 26-service and 16-equipment industries. Then, the establishment of IO table for transportation and tourism analysis will focus only on the extraction of tourism industries. On the other side, the tourism expenditures obtain from the survey will be organized in 21 spending items; each of them will be then classified into three categories by territory that tourism spending takes place, namely domestic, inbound, and outbound tourism; and two categories of travel purposes, those are business and recreational trips. As the result, there will be 126 tourism industries, which illustrated as 21 spending items*(3tourism categories*2 purpose categories). The information of spending territory will help to identify which expenditures will be the domestic transactions, imports, or exports and allocate those at corresponding entries in IO table. The construction of IO table for transportation and tourism analysis will proceed based on the following steps:

3.5.2 Step 2. Link IO table of Japan to the survey with TSA

The industries in National IO table of Japan 2011 were constructed based on the Tourism Satellite Account (TSA) classification. On the other hand, tourism consumption trend surveys were also designed based on the TSA classification. TSA, therefore, is considered as a connection to identify and allocate the tourism expenditure items into the IO table. As explained, IO table of the year 2011 illustrates the monetary interdependencies of industries in Japan economy within only 1 year, while transportation network is the result of the construction investment for long time, therefore this paper aims at developing the IO table with explicitly presenting the transportation service, equipment and tourism

industries. Transportation infrastructure is not bound in this study.

3.5.3 Step 3. Extract domestic tourism compensation from existing industries

We hypothesize that tourism purchases/spends for the intermediate inputs/outputs from other sectors at the same rate. The corresponding added values, final demands as well as imports and exports are also hypothesized to be extracted at that rate. This hypothesis seems not be realistic since considering all the transactions of a tourism industry with relevant ones are totally similar, however, it is acceptable in the situation of lacking detailed data.

Assume that in the supply side, the total output X_i of industry i includes the amount of tourism spending: domestic business X_i^{Dom-B} , domestic recreational $X_i^{Dom-Rec}$, outbound business X_i^{Out-B} , outbound recreational $X_i^{Out-Rec}$, inbound business X_i^{In-B} , inbound recreational X_i^{In-Rec} . In the demand side, the subscript j will be utilized instead of i in each spending amount. The identity matrix I_{Tour}^{row} to disaggregate the tourism industries from the supply side will then built as shown in the Table 3-5. This matrix is (n_0+l, n_0) dimension, where n_0 is number of industries obtained in Table 3-4; $l = 126$, is the number of industries that contain tourism spending. I_{Tour}^{row} contains 21 sub-matrices which each of those is $(7, 1)$ matrix to extract the tourism and non-tourism from the industry at supply side of the original IO table. The first entry of sub-matrix is non-tourism disaggregation factor, and the others are tourism disaggregation factors. In the same manner with I_{Tour}^{row} , I_{Tour}^{column} is built with 21 sub-matrices, each of them is $(1,7)$ matrix.

Table 3-5. I_{Tour}^{row} to disaggregate tourism industries at supply side (rows)

	Industry 1	...	Industry j	...	Industry n
Industry 1	1	...	0	...	0
⋮	⋮		⋮		⋮
Industry i^{NT}	0	...	dis_i^{NT}	...	0
Industry i^{Dom_B}	0	...	$dis_i^{Dom_B}$	...	0
Industry i^{Dom_Rec}	0	...	$dis_i^{Dom_Rec}$	...	0
Industry i^{Out_B}	0	...	$dis_i^{Out_B}$	...	0
Industry i^{Out_Rec}	0	...	$dis_i^{Out_Rec}$	...	0
Industry i^{In_B}	0	...	$dis_i^{In_B}$	...	0
Industry i^{In_Rec}	0	...	$dis_i^{In_Rec}$	...	0
⋮	⋮		⋮		⋮
Industry n	0	...	0	...	1

Table 3-6. I_{Tour}^{column} to disaggregate tourism industries at demand side (columns)

	Industry 1	...	Industry j^{NT}	Industry i^{Dom_B}	Industry i^{Dom_Rec}	Industry i^{Out_B}	Industry i^{Out_Rec}	Industry i^{In_B}	Industry i^{In_Rec}	...	Industry n
Industry 1	1	...	0	0	0	0	0	0	0	...	0
⋮	⋮		⋮	⋮	⋮	⋮	⋮	⋮	⋮		⋮
Industry i	0	...	dis_i^{NT}	$dis_i^{Dom_B}$	$dis_i^{Dom_Rec}$	$dis_i^{Out_B}$	$dis_i^{Out_Rec}$	$dis_i^{In_B}$	$dis_i^{In_Rec}$	...	0
⋮	⋮		⋮	⋮	⋮	⋮	⋮	⋮	⋮		⋮
Industry n	0	...	0	0	0	0	0	0	0	...	1

Note:

- The superscript *Dom*, *Out*, *In* denote for the *Domestic*, *Outbound*, *Inbound* tourism category respectively; the acronym *B*, *Rec* stand for the purposes *Business*, *Recreational* trips. In this paper, the term “*Tour*” generally illustrates the tourism spending of each combination of tourism category and purpose
- The *NT* describes the acronym of *non-tourism* spending in IO table

For domestic expenditures, the disaggregation factors for demand side and supply side of the same industries are the same. The corresponding disaggregation factors for supply $dis_i^{Dom_B}$, $dis_i^{Dom_Rec}$ and for demand are calculated as in equation Eq. 3-1 and Eq. 3-2 as below:

$$dis_i^{Dom_B} = \frac{X_i^{Dom_B}}{X_i} \quad \text{and} \quad dis_i^{Dom_Rec} = \frac{X_i^{Dom_Rec}}{X_i} \quad \text{Eq. 3-1}$$

$$dis_j^{Dom_B} = dis_i^{Dom_B} \quad \text{and} \quad dis_j^{Dom_Rec} = dis_i^{Dom_Rec} \quad \text{Eq. 3-2}$$

3.5.4 Step 4: Extract outbound and inbound tourism expenditures in IO table

Unlike domestic tourism that all the transactions occur in Japan territory by Japanese residents; the outbound tourism expenditures include two parts, the first one, $X_i^{Out_SIJP}$ (*Spend Inside of Japan*), takes place in Japan and by Japanese, and the second one, $X_i^{Out_SOJP}$ (*Spend Outside of Japan*), is the amount that Japanese residents bring money to other countries to buy tourism services and commodities, some of items will be brought back to Japan. The disaggregation factor of outbound tourism for supply (row) side and demand (or column) is different and determined as in the equations below:

$$dis_i^{Out_B} = \frac{X_i^{Out_SIJP_B}}{X_i} \quad \text{and} \quad dis_i^{Out_Rec} = \frac{X_i^{Out_SIJP_Rec}}{X_i} \quad \text{Eq. 3-3}$$

$$dis_j^{Out_B} = \frac{X_j^{Out_SIJP_B} - X_j^{Out_SOJP_B}}{X_j} \quad \text{and} \quad \text{Eq. 3-4}$$

$$dis_j^{Out_Rec} = \frac{X_j^{Out_SIJP_Rec} - X_j^{Out_SOJP_Rec}}{X_j}$$

Conversely, inbound tourism is defined as travelers from other countries who arrive at Japan and use their money to purchase tourism commodities and services in Japan, some of them bring their purchased goods back to origin countries. In macroeconomic point of view, the expenditures spent by inbound tourists will be extracted as export commodities (see Eq. 3-14).

On the supply side, inbound tourism satisfies only demand from rest of the world (RoW) but does not provide any intermediate inputs for other industries. The disaggregation factor of inbound tourism for supply (row) side should be set as 0:

$$dis_i^{In_B} = 0 \quad \text{and} \quad dis_i^{In_Rec} = 0 \quad \text{Eq. 3-5}$$

On the demand side, the disaggregation factors of inbound business and recreational tourism will be:

$$dis_j^{In_B} = \frac{X_j^{In_B}}{X_j} \quad \text{and} \quad dis_j^{In_Rec} = \frac{X_j^{In_Rec}}{X_j} \quad \text{Eq. 3-6}$$

3.5.5 Step 5: Construct IO table for transportation - tourism analysis

At this step, the non-tourism expenditure of industry i is defined by the non-tourism disaggregation factors for both supply and demand side:

$$dis_i^{NT} = 1 - \sum_{Tour} dis_i^{Tour} \quad \text{Eq. 3-7}$$

$$dis_j^{NT} = 1 - \sum_{Tour} dis_j^{Tour} \quad \text{Eq. 3-8}$$

The matrix $X^{NT-Tour}$, $Add^{NT-Tour}$, and $F^{NT-Tour}$ present the both tourism and non-tourism of intermediate industries, value added, and final demand will be determined by the equation Eq. 3-9 to Eq. 3-11.

$$X^{NT-Tour} = I_{Tour}^{row} X I_{Tour}^{columns} \quad \text{Eq. 3-9}$$

$$Add^{NT-Tour} = Add I_{Tour}^{columns} \quad \text{Eq. 3-10}$$

$$F^{NT-Tour} = I_{Tour}^{row} F \quad \text{Eq. 3-11}$$

where,

$X^{NT-Tour}$: the square n_0+126 by n_0+126 matrix contains non-tourism and tourism industries

$X=[x_{ij}]$: matrix of intermediate input/demand of original IO table

x_{ij} : the intermediate input industry j purchases from industry i

$Add^{NT-Tour}, Add$: the value added matrix contains non-tourism, tourism industries and its part of original IO table respectively

$F^{NT-Tour}, F$: the final demand matrix contains non-tourism, tourism industries and its part of original IO table respectively

$I_{Tour}^{row}, I_{Tour}^{column}$: the identity matrix to disaggregate the supply and demand

3.5.6 Step 6: Allocate tourism import and tourism export in IO table

By using equation Eq. 3-9 and Eq. 3-11, every entry of the import and export at final demand of tourism industry is extracted from corresponding industry i at the same rate as shown in the equation Eq. 3-1. This may lead the results of tourism import and export of matrix $X^{NT-Tour}$ differ with those of actual survey and the equilibrium condition of the economy as shown in Eq. 3-16 is not satisfied. In order to fix this problem, the overseas spending amount that Japanese travelers for business and recreational purposes spend outside of Japan $X_i^{Out_SOJP_B}$, $X_i^{Out_SOJP_Rec}$ will be allocated at import entries $M_i^{Out_SOJP_B}$, $M_i^{Out_SOJP_Rec}$ corresponding with the industry i ; and the amount that inbound travelers spent in Japan for business and recreational purposes $X_i^{In_B}$ and $X_i^{In_Rec}$ should be allocated as export. We have:

For import:

$$M_i^{Out_SOJP_B} = X_i^{Out_SOJP_B} \text{ and } M_i^{Out_SOJP_Rec} = X_i^{Out_SOJP_Rec} \quad \text{Eq. 3-12}$$

The non-tourism amount of import entry of industry i , M_i^{NT} will be calculated as:

$$M_i^{NT} = M_i - (M_i^{Out_SOJP_B} + M_i^{Out_SOJP_Rec}) \quad \text{Eq. 3-13}$$

For export:

$$E_i^{In_B} = X_i^{In_B} \text{ and } E_i^{In_Rec} = X_i^{In_Rec} \quad \text{Eq. 3-14}$$

And the non-tourism amount of export of industry i , E_i^{NT} will be calculated as:

$$E_i^{NT} = E_i - (E_i^{In_B} + E_i^{In_Rec}) \quad \text{Eq. 3-15}$$

The result of Input-Output table for transportation and tourism analysis is presented in the form below:

Table 3-7. IO table with transportation services and tourism industries presented

Demand side		Intermediate demand							Final demand														
		Non tourism industries			3 Tourism categories*2 travel purposes There are 21 industries each				Consumption outside household	Consumption of household	Consumption of government	Public investment	Private investment	Increase in the stocks	Export	Total final demand	Import	Domestic production					
		Industry 1	...	Industry j	...	Industry n0	Industry 1 ^{Tour}	Industry g ^{Tour}											Industry 21 ^{Tour}	Total intermediate demand			
Supply side	Intermediate Input	Non tourism industries		Industry 1	...	Industry j	...	Industry n0	Industry 1 ^{Tour}	Industry g ^{Tour}	Industry 21 ^{Tour}	Total intermediate demand	Consumption outside household	Consumption of household	Consumption of government	Public investment	Private investment	Increase in the stocks	Export	Total final demand	Import	Domestic production	
		Industry 1	...	Industry i	...	Industry n0	Industry 1 ^{Tour}	...	Industry k ^{Tour}	...	Industry 21 ^{Tour}	Total intermediate input	E ₁ ^{NT}	F ₁ ^{NT}	M ₁ ^{NT}	X ₁ ^{NT}
		Industry i	...	X _{ij} ^{NT-NT}	X _{ig} ^{NT-Tour}	E ₁ ^{NT}	F ₁ ^{NT}	M ₁ ^{NT}	X ₁ ^{NT}
		Industry n0	E _n ^{NT}	F _n ^{NT}	M _n ^{NT}	X _n ^{NT}
...	...	...	...	...	...	...	...	...	...	...	...	E ₁ ^{Tour}	F ₁ ^{Tour}	M ₁ ^{Tour}	X ₁ ^{Tour}	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	E _k ^{Tour}	F _k ^{Tour}	M _k ^{Tour}	X _k ^{Tour}	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	E ₂₁ ^{Tour}	F ₂₁ ^{Tour}	M ₂₁ ^{Tour}	X ₂₁ ^{Tour}	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	ΣE	ΣF	ΣM	ΣX	...	...	...	...	...	...	...
Value Added Sectors	Consumption expenditure outside households																						
	Compensation of employees																						
	Operating surplus																						
Depreciation of fixed capital																							
Indirect tax																							
Current subsidy																							
Total value added	Add ₁ ^{NT}	...	Add _j ^{NT}	...	Add _n ^{NT}	Add ₁ ^{Tour}	...	Add _g ^{Tour}	...	Add ₂₁ ^{Tour}	ΣAdd												
Domestic production	X ₁ ^{NT}	...	X _j ^{NT}	...	X _n ^{NT}	X ₁ ^{Tour}	...	X _g ^{Tour}	...	X ₂₁ ^{Tour}	ΣX												

3.5.7 Step 7: Check the equilibrium condition for each industry

The result of the construction of the IO table for transportation and tourism analysis is presented in the Table 3-7. In this table, four main areas, namely *NT-NT*, *NT-Tour*, *Tour-*

NT, and *Tour-Tour* are recognized as the transaction areas of non-tourism to non-tourism, non-tourism to tourism, tourism to non-tourism, and tourism to tourism industries respectively. The representatives for these four areas are indicated respectively as x_{ij}^{NT-NT} , $x_{ig}^{NT-Tour}$, $x_{kj}^{Tour-NT}$, and $x_{kg}^{Tour-Tour}$. The total domestic production described for rows of non-tourism and tourism industries will be:

$$\sum_{j=1}^{n_0} x_{ij}^{NT-NT} + \sum_{j=1}^l x_{ig}^{NT-Tour} + F_i^{NT} - M_i^{NT} = X_i^{NT} \quad \text{Eq. 3-16}$$

$$\sum_{j=1}^{n_0} x_{kj}^{Tour-NT} + \sum_{j=1}^l x_{kg}^{Tour-Tour} + F_k^{Tour} - M_k^{Tour} = X_k^{Tour} \quad \text{Eq. 3-17}$$

For columns of non-tourism and tourism industries, total domestic demand will be:

$$\sum_{i=1}^{n_0} x_{ij}^{NT-NT} + \sum_{k=1}^l x_{kj}^{Tour-NT} + Add_j^{NT} = X_j^{NT} \quad \text{Eq. 3-18}$$

$$\sum_{i=1}^{n_0} x_{ig}^{NT-Tour} + \sum_{k=1}^l x_{kg}^{Tour-Tour} + Add_g^{Tour} = X_g^{Tour} \quad \text{Eq. 3-19}$$

where,

- x_{ij} : the intermediate input industry j purchases from industry i
- n_0, l : the number of industries in the original matrix as shown in Table 3-4, $n_0=397$; and the number of tourism industries, $l=3*2*21=126$
- F, M, Add, X : final demand, import, added value, and total output of industry

The extraction of tourism industries is successful if the equilibrium is satisfied:

$$X_i^{NT} = X_j^{NT} \quad (i=j); \text{ and } X_k^{Tour} = X_g^{Tour} \quad (k=g) \quad \text{Eq. 3-20}$$

3.6 Interactions between industries in Input-Output table

Table 3-8. Interactions between non-tourism and tourism industries in Input-Output table

Demand side / Supply side		Intermediate demand						Final demand											
		Non tourism industries			Tourism industries			Final demand											
		Agriculture	...	Air transport	...	Food	Agri...	Airtrans	Food	Total intermediate demand	Consumption outside household	Consumption of household	Consumption of government	Public investment	Private investment	Increase in the stocks	Export	Total final demand	Import	Domestic production
Intermediate Input	Non tourism industries	Interactions among 58 non-tourism industries (18 transport industries)			Supply from non-tourism to tourism industries			Domestic Final demand of Non-Tourism						Non-Tourism export		Non-Tourism import			
	Tourism industries	Supply from Tourism to non-tourism industries			Interactions among 21*3=63 tourism industries			Domestic Final demand of Tourism						Tourism export		Tourism import			
	Total intermediate input																		
Value Added Sectors	Consumption expenditure outside households	Earning of non-tourism industries			Earning of tourism industries														
	Compensation of employees																		
	Operating surplus																		
Total value added		Add ₁ ^{NT} ... Add _j ^{NT} ... Add _n ^{NT}			Add ₁ ^{Tour} ... Add _g ^{Tour} ... Add ₂₁ ^{Tour}			ΣAdd											
Domestic production		X ₁ ^{NT} ... X _j ^{NT} ... X _n ^{NT}			X ₁ ^{Tour} ... X _g ^{Tour} ... X ₂₁ ^{Tour}			ΣX											

Table 3-8 presents the format of Input-Output table resulted from the disaggregation. Tourism industries are divided into 3 categories, namely domestic, outbound and inbound. Each category includes two sub-groups, denote for two types of trip purposes: recreational and business trips. In turn, each sub-group contains 21 spending items represents for 21 industries in the economy.

The table presents explicitly the information of every tourism industry. In production side, industries purchase intermediate inputs and added (labor, capital ...) to produce the goods/services for other industries as intermediate inputs, some amount will be used to satisfy the final demand of households and government, the left amount will be exported to RoW. In the intermediate, there are four major areas indicate the interaction between industries in the economy. The top-left corner shows the interactions among non-tourism industries; the low-left corner shows the supplies of tourism industries to the non-tourism industries; the top-right corner illustrates the supplies of non-tourism industries for tourism industries; and the last corner (low-right) describe the supplies of tourism industries for the demand from tourism industries.

3.7 The errors of the IO table construction method

This research utilized the most detailed updated qualified IO table issued by Japan. Therefore, the error of the resulted IO table, if any, incurred from this database is equal to that of the original IO table. To minimize this type of error, an assessment process to guarantee the consistency, comprehensiveness, and precision of the source data is strongly required. Another error maybe appears from the hypothesis that the tourism expenditure share in intermediate input/output, final demand, import, and value-added sectors are extracted from the industry in which they are hidden in at the same rate. This hypothesis may not reflect the reality since the required shares of inputs from industries to produce a unit of output depend on the own characteristics of the industries; those shares are usually not the same. Nevertheless, in the condition that the detailed information is not possible to investigate, this hypothesis is acceptable. The other errors, if any, could be difficult to measure.

3.8 Social Accounting Matrix (SAM) – Database for CGE Modelling

Social Accounting Matrix (SAM) is a data system presented in a matrix form that consistently and completely shows the transactions/interdependencies of a closed or opened social economic system. Basically, SAM contains all the information from Input-Output table with extend to national accounts and product accounts in a consistent framework. In SAM, national accounts are arranged to emphasize the receipts of factor incomes and their disbursement for various spending institutions, for example, firms, households, and government (Sánchez Cantillo, 2004). In SAM, households can be divided into several groups depending on the research requirement, for example, by location likes urban/rural households, by income likes rich and poor, or by labor skill like trained and un-trained...etc. Beside information contains as Input-Output table, the information in SAM is more completed to indicate all the transactions of the economy, such as income, consumption, savings-investment, international trade (import/export), trade balance (or capital transfers from RoW).

SAM is in symmetric form and captures the initial equilibrium conditions in the socio-economic system. This is the most fundamental and richest database feeding to CGE modeling. If this database is not accurate reflecting the economy, the results from CGE modeling tend to be misleading.

Table 3-9. The format of Social Accounting Matrix

	1 Intermediate demand			2 Factor		3	4	5	6	7	
	Com 1	...	Com. n	Labor	Capital	HH, Gov Consumption	Saving- Investment	RoW	Trade & Transport margin	Total	
1 Intermediate supply	Commodity 1	Domestic intermediate input					Domestic consumption	Investment demand	Export demand		Total demand
	...										
	Commodity n										
2 Factors	Labor	Labor input								Total Labor Demand	
	Capital	Capital input									Total Capital Demand
3 Household, Government income				Income from Labor	Income from Capital					Total Income	
4 Saving-Investment						Saving		Capital transfer from RoW			Total Saving
5 RoW	Imported good									Exchange outflow to RoW	
6 Trade and transport margin											
7 Total	Total supply			Total Labor supply	Total Capital supply	Total spending	Total Investment	Exchange inflow from RoW			

Table 3-9 is schematic form of SAM used for this study. The first column area indicates the demand of each industry with intermediate inputs, labor, capital, and import goods for its production. Each entry in this area denotes for the payment of a respective industry for the respective input. The value of the entry also stands for the income amount of the supplied industry got from the demanded industry. On the supply side, the value in row entries indicate the goods supplied from an industry to the market. The goods from the industry can be used as intermediate inputs for other industries, to satisfy the final demand of households and government, to satisfy the investment demand, and to export.

The second column presents the total labor and capital endowment of the nation and the respective income paid by the firms from hiring these factors for the production. The column 3 is for the consumption information of households and government. Some of the amount from income will be used for savings. In the next column (4), the demand for investment goods are shown. Households and government use savings from domestic income and amount of capital transfers from RoW to purchase the investment goods. The total savings for the investment is shown in the row (4), the total value of this row equals to domestic saving plus capital transfer from RoW. The column 5 and row 5 present for the international trade (export and import respectively) of home country with the RoW.

For studying purpose, the tax, subsidy is hidden in value-added sectors. The transportation margins of all transportation sectors in the economy are presented explicitly. 63 tourism industries corresponding to three categories (domestic, inbound,

and outbound) are clearly described in the intermediate supply and demand side. By including all the data of the transactions described above, the SAM comprehensively describes the whole economy, and ready to serve CGE modeling.

In SAM, if we use i to denotes for the industry/account i in the supply side, j to denotes for that in the demand side, and T is the SAM matrix, where t_{ij} is the payment from the column account j to the row account i . The balance must be hold for each industry/account:

Total receipt of industry/account i :

$$y_i = \sum_j t_{ij} \quad \text{Eq. 3-21}$$

Total expenditure of industry/account j :

$$y_j = \sum_i t_{ij} \quad \text{Eq. 3-22}$$

The balance is indicated as:

$$y_i = y_j \quad (i=j) \quad \text{Eq. 3-23}$$

Other identities of the SAM are presented as:

$$\sum Labor\ Income = \sum Labor\ factor\ input \quad \text{Eq. 3-24}$$

$$\sum Capital\ Income = \sum Capital\ factor\ input \quad \text{Eq. 3-25}$$

$$\sum Income = \sum Labor\ Income + \sum Capital\ Income \quad \text{Eq. 3-26}$$

$$\sum Spending = \sum Income \quad \text{Eq. 3-27}$$

$$\sum Domestic\ Savings \quad \text{Eq. 3-28}$$

$$= \sum Income - \sum Domestic\ consumption$$

$$\text{Capital transfer from RoW} = \sum \text{Import} - \sum \text{Export} \quad \text{Eq. 3-29}$$

$$\begin{aligned} \sum \text{Savings} &= \sum \text{Domestic Savings} \\ &+ \text{Capital transfer from RoW} \end{aligned} \quad \text{Eq. 3-30}$$

$$\begin{aligned} \text{Exchange inflow from RoW} & \\ &= \sum \text{Export demand} \\ &+ \text{Capital transfer from RoW} \end{aligned} \quad \text{Eq. 3-31}$$

$$\text{Exchange outflow to RoW} = \sum \text{Imported goods} \quad \text{Eq. 3-32}$$

3.9 Conclusions

In this chapter, the original Input-Output table of Japan 2011 is used associate with the consumption trend surveys for domestic travelers and foreign tourists to construct the Input-Output table for transportation and tourism analysis. The new Input-Output table contains industries of transportation service and tourism presented explicitly, which support transportation-tourism analysis in the further stages. The new Input-Output table is compiled based on the assumption that all the inputs (intermediate, factors, import goods) and the outputs of a tourism industry are at the same rate with the total spending of that tourism in the industry the tourism is hidden in. There are some conclusions for this chapter as follow:

Firstly, transportation is pivotal to the tourism development. Nevertheless, as lack of the transportation and/or tourism data in the IO table is one of the important reasons that the inter-sectional analysis applied for inter-relationship among them is rarely acknowledged. The successfully construction of IO table for transportation and tourism analysis will open a wide door for the next steps of further relevant researches.

Secondly, in the compiling process of Input-Output table for transportation and tourism analysis, the existing IO table and the data provided in travel consumption trend surveys

play critical roles. The quality of the later analysis depends on the quality of the data sources. The quality of the new Input-Output table for transportation-tourism analysis is qualified since it is the result of the most updated, most detailed, and valid original data of Input-Output table and consumption trend survey; and the link between industries in original Input-Output table with the consumption spending items is done with the unique classification system, such as Tourism Satellite Account.

Finally, due to the encouraged characteristic of transportation to tourism industries, the use of inter-sectoral framework, such as Input-Output model to identify the linkages between transportation and tourism; and Computable General Equilibrium (CGE) model to assess the economic impacts of transportation policies on tourism and vice versa at macroeconomic point of view is rational and crucial. This kind of analysis is especially meaningful for the economy which tourism is dominant. Further, the integrated transportation models into the inter-sectoral analysis framework, which are widely acknowledged in literature for assessing the economic impact of transportation (Bröcker, 1998; Kim et al., 2004, 2011; Munk, 2006; Oosterhaven and Knaap, 2003), but very rare for transportation and tourism may help uncover the mechanisms and behaviors of tourism production under a variety of transportation policies outside of homogenized economic interactions. Transportation models provide a methodology to determine transportation accessibility effects under alternative transportation policies, and convert these effects into cost or time savings; these criteria will be the input of the inter-sectoral framework.

4 Interdependencies between Transportation and Tourism

Input-Output model is the analytical framework introduced by Wassily Leontief in the late 1930s-beginning of 1940s (Leontief, 1941, 1936), who was awarded by Nobel Prize in Economic Science in 1973. The form of IO framework contains a system of linear equations, each of which describes the distribution of an industry's product or the inputs of an industry throughout the economy. The fundamental purpose of Input-Output model is to identify the interdependence of industries in an economy (Miller and Blair, 2009). The model was widespread applied since early 1950s. Its extensions are also incorporated with detail of economic activities over time and/or space; or to connect the IO model with other economic analysis tools. The applications of the model are acknowledged not only at regional level, but also inter-regional or even international scale. The system illustrates for interactions among industries' inputs and productions associated with the employment, social accounting metrics.

The section attempts firstly to identify the importance of tourism to the Japanese economy, then find out the interdependence of tourism and transportation based on the database developed in the Chapter 3. For this task, the keys industries in the economy is identified by its multiplier (output and income/value-added) to the economy-wide and Hypothetical Extraction indicators. The importance of tourism industry to the Japanese economy is seen from ranking industries in the economy with multiplier and HEM indices. The interdependence of transportation and tourism is measured by the input-output coefficients, multiplier and HEM indicators focus on industrial level.

4.1 Importance of an industry in the economy: fundamental concept

4.1.1 Multiplier effect concept

Multiplier is an important indicator in inter-industrial analysis, it is measured as the endogenous changes in outputs of the industries/sectors in the economy, income earned of households in each industry/sector comes from the new output, the employment in term of jobs expected to be generated from the new output, and the value-added created in each industry/sector in the economy from the new output when there is an injection(s) of new demand of goods and/or services into the circular flow of income.

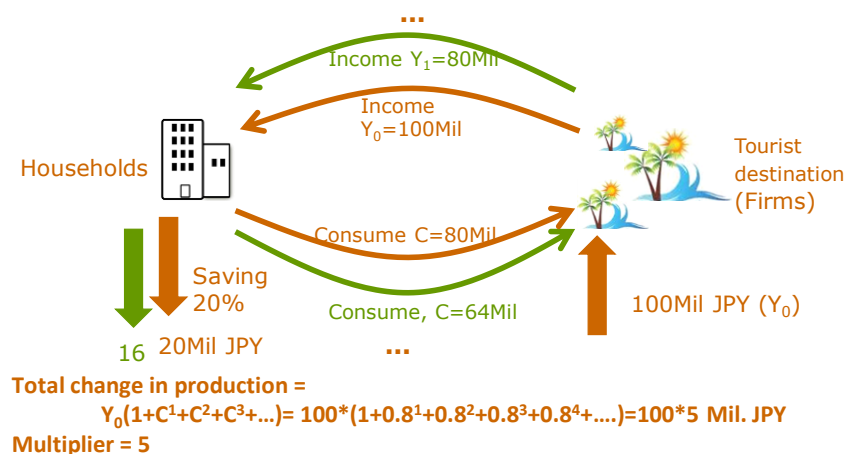


Figure 4-1. Illustration of multiplier effects

An illustration of multiplier is given as in the Figure 4-1 for a simple economy with two bodies of households and firms, which is representative to the manager of the tourist destination. If there is a decision to invest a new tourism facility worth 100 mil. JPY¹ to attract more tourists to the destination. Because the firms are owned by the households, then the total investment will become the income of the households. Households get some income from the providing labors for the investment. They use 80% of the income (80mil JPY) to purchase the tourism commodities/services (for traveling, food, beverage, and recreational services), another 20% they save. In the second circular, the firms use 80mil JPY to invest a new facility (an attraction, hotel, or restaurant...). Again, since the households own the firms, then the investment amount of 80mil JPY becomes the income of households. The households use 80% of this income (64mil JPY) to satisfy their demand and the left amount 20% (16mil JPY) they save. The circular will be repeated forever in the two-body economy. At the end, the total output economy will get from these economic activities will be 500 mil JPY, five times higher than the initial investment amount Y₀=100 mil JPY. The multiplier in this example is measured as five (5).

It is easy to realize that the magnitude of the multiplier indicator presents for the strength of an industry/sector to the economy. The larger multiplier is, the higher importance the industry is for the economy. The notion of the multiplier also indicates the role of saving portion to the magnitude of the multiplier indicator. If the households spend more (or save

¹ The amount of initial investment Y₀= 100mil JPY is used for the numeric illustration purpose only. It does not have meaning in the practical view.

less) the multiplier will increase. Conversely, the households spend less (or save more), then the multiplier will be reduced. In macroeconomic perspective, households are encouraged to consume more to stimulate the economy-wide, even though the households tend to save more money for their contingencies.

An output multiplier for a sector is defined as the total value of production in all sectors of the economy that is necessary to satisfy a unit of monetary worth of final demand for that sector's output. The value-added multiplier is the new value-added created in each sector in response to the initial exogenous shock to that initial shock (Miller and Blair, 2009). Usually, value-added multiplier is better indicator to describe the contribution of a sector to the economy than output multiplier. Since it captures the truly value that added to the sector during production process. In Input-Output table, it is determined as the difference between the total output of the sector and the cost of its intermediate inputs.

There are two types of output multiplier depending on the consideration of the households in IO modeling. If the household is excluded in to IO modeling, then the multiplier derived consists of direct and indirect effects. It is also known as simple multiplier, and the IO model set for identifying this simple multiplier is often known as an Input-Output model that is open with respect to households. In contrast, if the household is considered as an extra sector in the IO modeling, in other words, household is included in the IO modeling, or the Input-Output model that is closed with respect to households, then the output multiplier derived from the modeling will be total multiplier, which consists of direct, indirect, and induced effects.

In the case of total multiplier, since the account of households is included into the Input-Output model and a sector of the economy, its activities are as same as those of an industry in the economy. From the supply side (the last row of the Input-Output table), the households provide labor as their goods/services to other industries for the production. They got income from the payment of the industries. From the demand side (shown in the last column of the Input-Output table), the households utilize some income to purchase the goods/services available in the market, produced from other industries for their consumption. These activities will then generate additional monetary flow in the economy. It is clear that, total multiplier contains the effects spread among industries and the effects to the non-industrial sector (households). In this section, in order to distinguish the effects

of an industry to the other industries and the effects to the non-industry as households, the simple output multiplier is used in association with the value-added multiplier. For this reason, from now on, the term *output multiplier* is used instead of *simple output multiplier*.

From the schematic form of Input-Output table as shown in Table 3-7, the equation Eq. 3-16 and Eq. 3-17 can be written as in general form as follow:

$$AX + F - M = X \quad \text{Eq. 4-1}$$

If set vector of import M equals to diagonal import coefficients matrix (Imp) multiple by output vector X : $M = Imp.X$, then the Eq. 4-1 can be:

$$A.X + F - Imp.X = X \quad \text{Eq. 4-2}$$

$$\text{Or: } X = (I + Imp - A)^{-1}F \quad \text{Eq. 4-3}$$

Set $L = (I + Imp - A)^{-1} = [l_{ij}]$ is known as Leontief inverse matrix or the total requirement matrix, then Eq. 4-3 is simplified as:

$$X = LF \quad \text{Eq. 4-4}$$

Form these equation, the multiplier of total output of industry j can be derived from the form below:

$$m_{oj} = \sum_{i=1}^n l_{ij} \quad \text{Eq. 4-5}$$

Value-added includes the income of households from providing labor and capital to the economy. Value-added multiplier of an industry to the households can be obtained from the formula below:

$$V = Va.L = [v_{ij}] \quad \text{Eq. 4-6}$$

$$m_{Vaj} = \sum_{i=1}^n v_{ij} \quad \text{Eq. 4-7}$$

where,

- Va : the vector of gross value-added indicates the portion of the income (from labor/capital) of the households with respect to the industry. In the case that value-added sector is divided into k sub-sectors, then Va is a matrix k by j .
- m_{o_j} : the multiplier of total output of industry j
- m_{Va_j} : the value-added multiplier of industry j

4.1.2 Hypothetical Extraction concept

Hypothetical Extraction Method (HEM) is used to quantify the loss of the economy when an industry is hypothetically removed from the economy. The loss of the economy when an industry is removed is measured by comparing the initial gross production of the economy and its value of the economy without the industry. The magnitude of the loss is used to represent for the importance of that industry to the economy.

HEM is also used to measure the backward and forward linkage separately. For example, at the demand side of a n -industry economy, if the industry j hypothetically purchases no inputs from any other industries of the economy, in other words, the backward linkages of industry j are removed. This is done by removing the column j from the technical coefficient matrix A . The loss of the gross production of the economy comparing to the initial value is considered as the backward linkage with HEM method. In contrast, if from the supply side, the industry j (at supply side it is often called as i , $i=j$) provides no intermediate outputs to other industries for production. The action is done with removing the row i in the output coefficient matrix B . The difference between pre- and post-total gross output, which calculated based on B and value-added vector is considered as the forward linkage with HEM. If the industry j is eliminated at both supply and demand side, then the difference between pre- and post-gross output represents for the total linkage with HEM.

The loss of gross output of the economy if industry j is Hypothetically Extracted is determined as:

$$\Delta X^{Extract\ j} = \sum_{i=1}^n X_i - \sum_{i=1}^n X_i^{Extract\ j} \tag{Eq. 4-8}$$

where,

- X_i : the gross output of industry i at initial condition, which all industries are remained
- $X_i^{Extract j}$: the gross output of industry i in the condition that industry j is hypothetically extracted from the economy
- $\Delta X^{Extract j}$: the loss of the national gross output if industry j is hypothetically extracted from the economy

4.2 Importance of tourism industry with multiplier indicator

In this section, the values of output multipliers obtained from the Eq. 4-5 are sorted in the order for visually illustrating the importance of various industries to the nationwide economy. The results of the output multiplier are shown in the Figure 4-2 and those of value-added are shown in the Figure 4-3.

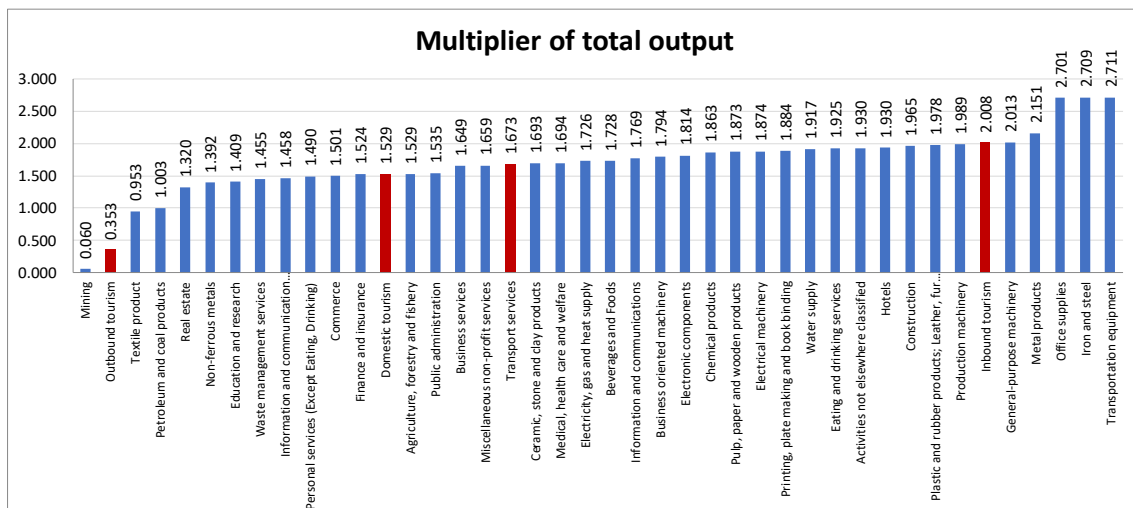


Figure 4-2. Output multiplier of domestic, outbound, and inbound tourism as well as other industries on economy – case of Japan

As shown in the Eq. 4-4, the outputs of the industries are driven by final demand, then the output multiplier of an industry is measured as its total output production derived by a final demand of 1 JPY worth increased. The results illustrate that transportation equipment industry is the strongest in the economy in term of output multiplier, each final demand worth 1 JPY increases for this industry's product, that demand will contribute to the economy 2.711 JPY worth. The one with lowest output effect to the economy is mining, its output multiplier is 0.060. In between the range, inbound tourism output

multiplier (2.008) is quite high in the economy as its impact behaves likely an import industry. Domestic tourism output multiplier (1.529) is in the medium range among industries in the economy.

Since outbound tourism consists two expenditure components, domestic expenditures and oversea ones, so the output multiplier is resulted from the relative relationship between domestic and oversea expenditures. The domestic expenditure usually positively effects to the nation economy. Conversely, oversea spending indicates for the bringing money from domestic budget by domestic travelers to the other countries for tourism commodities and services. These activities are considered as the leakages to the domestic economy. Output multiplier of outbound tourism is then reduced as the increase of the oversea spending. To some extent, the output multiplier of outbound tourism can be zero or even negatively effects to the national economy.

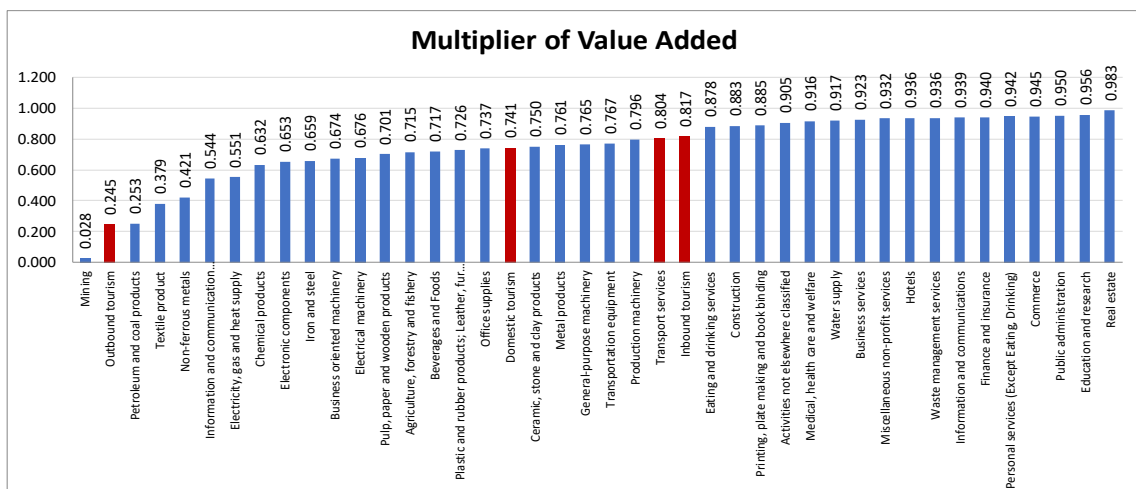


Figure 4-3. Multiplier effect of domestic, outbound, and inbound on earning

Regarding on the value-added multiplier, the industry contributes the most to the economy is real estate industry. 98.3% of its final demand will turn into the income of the industry. Mining is still the industry contributing the lowest to the economy in term of value-added since only 2.8% of its final demand transfers into the income. The added multiplier of inbound tourism (81.7%) is relative high among industries of the economy. Added multiplier of domestic tourism (74.1%) is at medium rank. Outbound tourism added multiplier is about 24.5% worth of final demand, just a little higher than mining, the lowest contribution industry.

Tourism total spending: 21,639,312 Mil. JPY					
	Dom Tour	Outbound Tour	Inbound Tour	Sum	%
Total direct spending	19,736,938	786,352	1,116,021	21,639,312	2.30% of Domestic output
Output Multiplier	↑ 30,170,345 (1.529)	↓ 277,230 (0.353)	↑ 2,241,242 (2.008)	32,688,818	3.48% of Domestic output
Direct earning (GDP)	9,780,735	593,156	407,631	10,781,522	2.26% Total GDP
Earning (GPD) Multiplier	↑ 14,622,192 (0.741)	↓ 192,321 (0.245)	↑ 911,841 (0.817)	15,726,354	3.30% Total GDP

↑

(+) Inbound/domestic tourism strongly impacts to the economy

(-) In contrast, Outbound tourism is the leakage industry

If tourism spend 100 JPY, the economy will get 151 JPY total output; 49.8 JPY income for its own, and 72.7 JPY income for whole economy

Figure 4-4. Direct and total effects of tourism industries on Japanese economy

In general, tourism industry, which is aggregation of domestic, inbound and outbound tourism industries contributes to the economy 1.51 times its spending. 49.8% of its spending will turn into the own income of tourism industry and 72.7% spending will turn into the income of the whole economy. The impacts of inbound and domestic tourism are much higher than that of outbound tourism since the leakages of the overseas spending. For this phenomenon, there are several points need to be discussed for the question on how to reduce the negative impact of outbound tourism:

- The first option should be reduction of overseas spending and encourage the domestic ones: this target may be achieved in some extent with the persuasive programs for domestic travelers. However, the challenge is that the travelers are always curious about the tourism services/commodities of the other countries and they tend to try. The trying the new services may be a part of the trip purpose.
- The second option is the reduction of the overseas trips number and encourage them utilize the domestic tourism services instead of the overseas ones. Nevertheless, this objective is not easy to obtain. The travel basically categorized into two groups with different characteristics: the business trips are mainly for promoting the business activities, the recreational purposes of course stick to the business trips as the minor activities, the demand of business travel comes from the business requirement rather than from the relaxation; and the purposes of recreational trips are mostly for the relaxation, adventure, and experiences...to some extent, policies or persuasive

campaigns can reduce a little overseas travel demand if the travelers see their benefit when decide to travel in domestic instead of overseas.

The strategies to reduce the negative impacts of overseas tourism need to be studied seriously in practice. Based on the specific circumstance, the specific strategies will be decided to apply based on their feasibilities. Extra methods may need to use to support the decision.

4.3 Importance of tourism industry with HEM

Employing the Eq. 4-8 to identify the loss of the gross output of the economy when an industry j is hypothetically extracted. The loss will then be converted to the percentage of gross output loss as in the Eq. 4-9, the results of this calculation are shown in the column (3) of the Table 4-1. $\Delta X^{Extract j}(\%)$ indicates for the importance of the industry in term of its scale in the economy. There is another indicator standing for the loss of the gross output of the economy if one JPY worth of industry j is extracted, called gross output loss per one JPY word of industry j , loss per unit ($lpu_j^{Extract j}$) as shown in Eq. 4-10. This criterion represents for the effectiveness of each JPY worth of industry j to the economy. The results of this calculation are shown in the column (5) of Table 4-1.

$$\Delta X^{Extract j}(\%) = \frac{\sum_{i=1}^n X_i - \sum_{i=1}^n X_i^{Extract j}}{\sum_{i=1}^n X_i} \quad \text{Eq. 4-9}$$

$$lpu_j^{Extract j} = \frac{\sum_{i=1}^n X_i - \sum_{i=1}^n X_i^{Extract j}}{X_j} \quad \text{Eq. 4-10}$$

In the economy, the importance of an industry is usually normalized to compare with the average level. If the normalized value is less than 1, the importance of the industry is lower than the average level. In contrast, if the normalized value is larger than 1, then the importance of an industry is higher than the average level. The normalized indicators are derived by the Eq. 4-11 and Eq. 4-12.

$$\overline{\Delta X}^{Extract j} = \frac{n \cdot \Delta X^{Extract j}(\%)}{\sum_{j=1}^n \Delta X^{Extract j}(\%)} \quad \text{Eq. 4-11}$$

$$\overline{lpu}_j^{Extract j} = \frac{n \cdot lpu_j^{Extract j}}{\sum_{j=1}^n lpu_j^{Extract j}} \quad \text{Eq. 4-12}$$

The results of normalized values $\overline{\Delta X}^{Extract j}$ and $\overline{lpu}_j^{Extract j}$ are indicated in column (4) and (6) in the Table 4-1 respectively. The column (7) is arranged to indicate the ranking the importance of industries in the economy in order from the most to the least important. The value of column (7) equals to the value of column (4) multiple by that of column (6). Note that this calculation of column (7) is for the ranking purpose only.

Table 4-1. Cross-industrial ranking with HEM indicator

No.	Industry	Total lost of gross output %	Total lost of gross output normalized	Gross output lost per 1JPY HE	Gross output lost per 1JPY HE normalized	Importance of the industry
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(4)*(6)
1	Construction	7.095%	3.346	1.269	1.272	4.255
2	Transportation equipment	6.532%	3.081	1.347	1.349	4.156
3	Medical, health care and welfare	5.629%	2.655	0.878	0.880	2.336
4	Beverages and Foods	4.039%	1.905	1.154	1.156	2.201
5	Electricity, gas and heat supply	3.138%	1.480	1.392	1.394	2.063
6	Chemical products	3.525%	1.662	1.206	1.208	2.008
7	Business services	5.400%	2.546	0.770	0.771	1.963
8	Transport services	3.903%	1.840	0.941	0.942	1.734
9	Petroleum and coal products	2.674%	1.261	1.348	1.350	1.702
10	Eating and drinking services	2.971%	1.401	1.200	1.202	1.685
11	Information and communications	4.023%	1.900	0.822	0.824	1.565
12	Electrical machinery	2.195%	1.035	1.371	1.374	1.422
13	Tourism	2.100%	1.035	0.998	1.354	1.402
14	Iron and steel	3.089%	1.457	0.952	0.954	1.389
15	Information and communication ele	1.843%	0.869	1.466	1.469	1.276
16	Production machinery	1.985%	0.936	1.299	1.301	1.218
17	Commerce	4.622%	2.180	0.464	0.465	1.013
18	Metal products	1.496%	0.705	1.387	1.389	0.980
19	Public administration	2.737%	1.291	0.653	0.654	0.844
20	Finance and insurance	2.442%	1.152	0.716	0.717	0.826
21	Electronic components	1.541%	0.727	1.080	1.082	0.786
22	General-purpose machinery	1.282%	0.604	1.278	1.280	0.774
23	Business oriented machinery	1.054%	0.497	1.540	1.543	0.767
24	Plastic and rubber products; Leathe	1.414%	0.667	1.039	1.041	0.694
25	Pulp, paper and wooden products	1.198%	0.565	1.021	1.023	0.578
26	Real estate	2.803%	1.322	0.370	0.371	0.490
27	Agriculture, forestry and fishery	1.084%	0.511	0.872	0.874	0.446
28	Personal services (Except Eating, I	1.431%	0.675	0.619	0.620	0.418
29	Office supplies	0.353%	0.167	2.504	2.508	0.418
30	Printing, plate making and book bir	0.659%	0.311	1.216	1.218	0.378
31	Activities not elsewhere classified	0.611%	0.288	1.147	1.149	0.331
32	Water supply	0.503%	0.237	1.034	1.036	0.245
33	Non-ferrous metals	0.674%	0.318	0.699	0.701	0.223
34	Ceramic, stone and clay products	0.539%	0.254	0.794	0.795	0.202
35	Textile product	0.299%	0.141	1.203	1.205	0.170
36	Miscellaneous non-profit services	0.436%	0.206	0.797	0.798	0.164
37	Hotels	0.300%	0.141	1.080	1.082	0.153
38	Education and research	1.028%	0.485	0.279	0.279	0.135
39	Waste management services	0.255%	0.120	0.635	0.637	0.076
40	Mining	-0.049%	-0.023	-0.608	-0.609	0.014

In term of percentage loss of gross output, tourism industry is ranked as the 18th among cross industries. If we hypothetically extract tourism industry from the existing economy, the loss in gross output of entire economy would be 2.1%. The normalized value of this figure (1.035) indicates that the importance of tourism is higher than the average level among industries. The information implies that, in term of industry's scale, tourism is just a little higher than the average level in the economy.

In term of gross output loss per one JPY worth extracted from the economy, the extraction of each JPY worth of tourism industry may prejudice 0.9977 JPY worth of gross output of economy. This number is normalized as 1.354, relative high among other industries. As discussed, the importance of an industry should be based on its both scale and effect per one JPY worth. The last column of the Table 4-1 provides the information about the industrial ranking. Tourism is at 13th rank in the 40-industry economy. Construction and transportation equipment are the most key industries of the economy. Transportation service industry is at the 8th rank, just above Petroleum and coal products, Eating and drinking services, Information and communications, and Electrical machinery industries.

4.4 Interdependencies between industries: the fundamental concept

4.4.1 Backward and Forward linkage with Input-Output coefficients

In a n -industry economy, if an industry j increases its demand to produce more goods/services, this means it will purchases more products from other relevant industries for its inputs. This causation direction is from demand side, and one usually uses the term *backward linkage* to indicate this kind of interconnection of a particular industry with other industries from which it purchases the inputs. On the other hand, if industry j increases its output, or provides more output to the market, this means the additional goods/services of industry j are available for other relevant industries to use for their inputs. This causation direction is from the supply side, and the term forward linkage is used to illustrate this interconnection of a particular industry with other relevant industries to which it provides its output.

Backward linkage:

Backward linkage of an industry j is the measurement amount, by which the production of industry j depends on the interindustry inputs. It is defined by the summation of the

elements in the j^{th} column of technical coefficient matrix $A = [a_{ij}]$. The backward linkage measured by this way is usually called direct backward linkage since technical coefficients stand for the direct effects only. The notation of direct backward linkage $BL(d)$ of industry j is shown as below:

$$BL(d)_j = \sum_{i=1}^n a_{ij} \tag{Eq. 4-13}$$

Extent the concept for a specific industry, the direct backward linkage of a particular industry j to an industry i is measured by the direct input coefficient a_{ij} indicates for the purchased portion of industry j from industry i .

Forward linkage:

With the same fashion of direct backward linkage, direct forward linkage is defined based on the output coefficient matrix $B = [b_{ij}]$ as following notation:

$$FL(d)_j = \sum_{i=1}^n b_{ij} \tag{Eq. 4-14}$$

This concept is also extent to identify the linkage of an industry with another one from the supply side view as the same manner with the backward linkage.

4.4.2 Multiplier between industries

Interdependencies among industries, for example tourism and transportation in the economy are measured by the multiplier indexes as the same fashion with the Eq. 4-5 and Eq. 4-7. However, the effects will target to the tourism and transportation industries instead of economywide. The total output multiplier is obtained based on the Leontief's multiplier matrix in the equation $X = [I - A + M]^{-1} F$ for an open economy; where I , A , M , F and X is respectively unit matrix, input coefficients matrix, diagonal matrix of import coefficients, total final demand vector, and total output vector. Sectoral value-added multiplier is resulted by multiplication of value added coefficients of that sector with the corresponding row in the inverse matrix $[I - A + M]^{-1}$. Specifically, the Eq. 4-5 and Eq. 4-7 can be re-written for the industry as follow:

$$m_{o_j}^* = \sum_{i=1}^n l_{ij}^* \quad \text{Eq. 4-15}$$

$$m_{va_j}^* = \sum_{i=1}^n v_{ij}^* \quad \text{Eq. 4-16}$$

where,

* : denotes for the focus on the target industry, for instance, transportation and tourism only

4.4.3 Identifying interdependencies between industries with HEM

At industrial level, the loss of gross output of the industry i if industry j is Hypothetically Extracted is determined as the same as manner with the loss of national gross output:

$$\Delta X_i^{Extract j} = X_i - X_i^{Extract j} \quad \text{Eq. 4-17}$$

where,

X_i : the gross output of industry i at initial condition, which all industries are remained

$X_i^{Extract j}$: the gross output of industry i in the condition that industry j is hypothetically extracted from the economy

$\Delta X_i^{Extract j}$: the loss of the gross output of industry i if industry j is hypothetically extracted from the economy

4.5 Interdependencies between transportation and tourism with multiplier

Table 4-2 illustrates the results of tourism multipliers are endogenous by the change of transportation as exogenous industries; Table 4-3 describes the multiplier effect of the conversed direction. The output multiplier stands for the scale of the total impacts; whereas value-added multiplier does for the value that is earned by the injection of the industry in the production (Miller and Blair, 2009); to describe comprehensively the inter-relationship among transportation and tourism in the economic context, this section utilizes both output and value added multiplier. For numerical illustration purpose, the multiplier effect of the increase 100JPY in final demand is used instead of 1JPY.

Table 4-2. The total output and value-added effect on tourism of transportation (per 100JPY transportation final demand)

Industries	Transport to Tourism output multiplier (JPY)			Transport to Tourism value added multiplier (JPY)		
	Domestic tourism	Outbound tourism	Inbound tourism	Domestic tourism	Outbound tourism	Inbound tourism
	1 Railway transport (passengers)	1.807	0.171	-	0.895	0.129
2 Railway transport (freight)	0.767	0.038	-	0.380	0.029	-
3 Road transport service (bus, taxi)	2.198	0.166	-	1.089	0.125	-
4 Road freight transport (except self-transport)	2.426	0.190	-	1.202	0.143	-
5 Self-transport (passengers)	1.657	0.897	-	5.777	0.677	-
6 Self-transport (freight)	7.885	0.369	-	3.908	0.278	-
7 International shipping	3.410	0.257	-	1.690	0.194	-
8 Coastal and inland water transport (passengers)	49.772	4.422	-	24.665	3.336	-
9 Coastal and inland water transport (freight)	8.838	0.785	-	4.380	0.592	-
10 Harbor transport service	0.858	0.049	-	0.425	0.037	-
11 International air transport	11.361	1.145	-	5.630	0.864	-
12 Domestic air transport (passengers)	17.375	1.752	-	8.610	1.321	-
13 Domestic air transport (freight)	16.160	1.629	-	8.008	1.229	-
14 Aircraft service except air transport	16.160	1.629	-	8.008	1.229	-
15 Consigned freight forwarding	2.649	0.252	-	1.313	0.190	-
16 Storage facility service	0.996	0.077	-	0.493	0.058	-
17 Services relating to transport	1.041	0.073	-	0.516	0.055	-
18 Postal services and mail delivery	0.773	0.125	-	0.383	0.094	-
19 Transport equipment	1.215	0.066	-	0.602	0.050	-

Table 4-2 indicates the coastal and inland water passenger transportation is the most promotive for the tourism in both total output and value added, each unit initial final demand can stimulate domestic and outbound tourism respectively 49.772%, 4.422% in total output and 24.665%, 3.336% in value added. The second most effective for the tourism promotion is given for air transportation industries, which encourage domestic and outbound tourism respectively from 11.361% - 17.375% and 1.145% - 1.752% in total output; from 5.630% - 8.610% and 0.864% - 1.321% in value added.

Inbound tourism in this study does not produce any intermediate product, so the changes in the final demand of every domestic industry in general and transportation industry in particular seems not effect on the inbound tourism total output. Conversely, the inbound tourism greatly effects on the domestic industries as well as transportation services in comparison with domestic and outbound tourism (see Table 4-3). The effect on all transportation industries obtained from injecting a final demand unit in inbound tourism is 13.486% for total output; more than twice as that if inject a unit final demand in domestic tourism, and as almost 20 times as that in outbound tourism. In added value, the identical great contribution of inbound tourism is also recognized in comparing to domestic and outbound tourism; the total earing of all transportation industries is 4.526% for each unit of final demand inbound tourism, those for domestic and outbound tourism

is 2.307% and 0.267% respectively. Nevertheless, the table also presents the leakages of outbound tourism for economy in some transportation industries, such as international shipping, harbor transportation service, and coastal and inland water transportation etc. the leakages are led by the spending of Japanese residents in oversea larger than that in domestic.

Table 4-3. The total output and value-added effect on transportation of tourism (per 100JPY tourism final demand)

Industries	Tourism to Transport output multiplier (JPY)			Tourism to Transport value added multiplier (JPY)		
	Domestic tourism	Outbound tourism	Inbound tourism	Domestic tourism	Outbound tourism	Inbound tourism
1 Railway transport (passengers)	0.160	0.052	0.205	0.111	0.036	0.142
2 Railway transport (freight)	0.023	0.000	0.033	0.013	0.000	0.019
3 Road transport service (bus, taxi)	0.117	0.070	0.123	0.089	0.053	0.093
4 Road freight transport (except self-transport)	1.330	0.057	1.806	0.978	0.042	1.327
5 Self-transport (passengers)	0.845	0.068	1.088	-	-	-
6 Self-transport (freight)	0.485	0.017	0.505	-	-	-
7 International shipping	0.000	0.110	0.001	0.000	0.011	0.000
8 Coastal and inland water transport (passengers)	0.002	0.001	0.002	0.001	0.000	0.001
9 Coastal and inland water transport (freight)	0.119	0.009	0.192	0.050	0.004	0.080
10 Harbor transport service	0.095	0.068	0.153	0.059	0.042	0.095
11 International air transport	0.024	0.005	0.063	0.005	0.001	0.013
12 Domestic air transport (passengers)	0.032	0.011	0.053	0.006	0.002	0.011
13 Domestic air transport (freight)	0.006	0.000	0.010	0.001	0.000	0.002
14 Aircraft service except air transport	0.005	0.003	0.014	0.001	0.001	0.003
15 Consigned freight forwarding	0.085	0.001	0.115	0.055	0.001	0.075
16 Storage facility service	0.273	0.015	0.341	0.165	0.009	0.206
17 Services relating to transport	0.312	0.022	1.401	0.197	0.014	0.883
18 Postal services and mail delivery	0.140	0.052	0.170	0.114	0.043	0.138
19 Transport equipment	2.318	0.710	7.215	0.462	0.142	1.438
Sum	6.373	0.696	13.486	2.307	0.267	4.526

In overall, the comparison of the results shown in the Table 4-2 and Table 4-3 suggests that the role of transportation to promote tourism and that of tourism to promote transportation do not be necessarily equal. In general, transportation industries play a vital role in strongly stimulating the tourism (Table 4-2), while tourism industries less contribute to transportation (Table 4-3). The pair interaction among transportation and tourism industries is not the same pattern. Coastal and inland water passenger transportation and air transportation are the keys to encourage tourism, however, in the opposite direction; transportation equipment and road freight transportation are the most beneficial from tourism in term of both total output and value added.

4.6 Interdependencies between transportation and tourism with HEM

Interdependencies between tourism and transportation in the economy are also measured by the multiplier and HEM indexes, but focusing on the industrial level rather than economy level. Table 4-2 illustrates the results of tourism multipliers and HEM indicators

are endogenous by the change of transportation as exogenous industries; Table 4-3 describes the multiplier effect and HEM criteria of the conversed direction. The total output multiplier stands for the scale of the total impacts; whereas value-added multiplier does for the value that is earned by the injection of the industry in the production (Miller and Blair, 2009); HEM is suitable to describe the decrease of gross output if an industry is hypothetically extracted from the economy. This section combines multiplier and HEM to present comprehensively inter-relationship between transportation and tourism. For numerical illustration purpose, the multiplier effect of the increase 100JPY in final demand and the decrease of gross output per 100JPY extraction (with HEM) are used instead of 1JPY.

With multiplier indicators, Table 4-2 indicates the coastal and inland water passenger transportation is the most promotive for the tourism in both total output and value added, each unit initial final demand can stimulate domestic and outbound tourism respectively 49.772%, 4.422% in total output and 24.665%, 3.336% in value added. The second most effective for the tourism promotion is given for air transportation industries, which encourage domestic and outbound tourism respectively from 11.361% - 17.375% and 1.145% - 1.752% in total output; from 5.630% - 8.610% and 0.864% - 1.321% in value added. Inbound tourism in this study does not produce any intermediate product, so the changes in the final demand of every domestic industry in general and transportation industry in particular seems not effect on the inbound tourism total output. Conversely, the inbound tourism greatly effects on the domestic industries as well as transportation services in comparison with domestic and outbound tourism (see Table 4-3). The effect on all transportation industries obtained from injecting a final demand unit in inbound tourism is 13.486% for total output; more than twice as that if inject a unit final demand in domestic tourism, and as almost 20 times as that in outbound tourism. In added value, the identical great contribution of inbound tourism is also recognized in comparing to domestic and outbound tourism; the total earing of all transportation industries is 4.526% for each unit of final demand inbound tourism, those for domestic and outbound tourism is 2.307% and 0.267% respectively. Nevertheless, the table also presents the leakages of outbound tourism for economy in some transportation industries, such as international shipping, harbor transportation service, and coastal and inland water transportation etc. the leakages are led by the spending of Japanese residents in oversea larger than that in

domestic.

On the other side, HEM suggests a different identification. With multiplier, water passenger transport plays as the most important transportation sector for promoting tourism; but with HEM air transportation, road transportation (self), and water transportation appear as the key sectors for domestic and outbound tourism. Table 4-3 also shows totally difference between multiplier and HEM; multiplier indicates that outbound tourism contributes to the economy to some extent in both total output and value added while HEM suggests that removing outbound tourism may contribute more to the economy.

In overall, the comparison of the results shown in the Table 4-2 and Table 4-3 suggests that the role of transportation to promote tourism and that of tourism to promote transportation do not be necessarily equal. In general, transportation industries play a vital role in strongly stimulating the tourism (Table 4-2), while tourism industries less contribute to transportation (Table 4-3). The pair interaction between transportation and tourism industries is not the same pattern. Water transportation, harbor transportation service and air transportation are the keys to encourage tourism, however, in the opposite direction; transportation equipment, road freight transportation, and self-transportation are the most beneficial from tourism.

Table 4-4. Impacts of transportation on tourism (per 100JPY)

Code of Industries	Transport to Tourism output multiplier (per 100JPY final demand)			Transport to Tourism value added multiplier (per 100JPY final demand)			Gross output lost of Tourism if Transport is hypothetically extracted (per 100JPY gross output of transportation extracted)		
	Domestic tourism	Outbound tourism	Inbound tourism	Domestic tourism	Outbound tourism	Inbound tourism	Domestic tourism	Outbound tourism	Inbound tourism
1	1.807	0.171		0.895	0.129		-1.649		-0.619
2	0.767	0.038		0.380	0.029		0.998		0.214
3	2.198	0.166		1.089	0.125		-2.270		-0.629
4	2.426	0.190		1.202	0.143		-1.712		-0.609
5	1.657	0.897		5.777	0.677		12.827	-3.539	
6	7.885	0.369		3.908	0.278		-8.056		-1.300
7	3.410	0.257		1.690	0.194		-4.471		-1.146
8	49.772	4.422		24.665	3.336		10.819	-3.322	
9	8.838	0.785		4.380	0.592		-7.735		-2.688
10	0.858	0.049		0.425	0.037		5.796		1.474
11	1.361	1.145		5.630	0.864		18.444	-6.603	
12	7.375	1.752		8.610	1.321		18.626	-6.660	
13	16.160	1.629		8.008	1.229		18.558	-6.590	
14	16.160	1.629		8.008	1.229		17.917	-6.508	
15	2.649	0.252		1.313	0.190		-1.636		-0.795
16	0.996	0.077		0.493	0.058		0.664		-0.042
17	1.041	0.073		0.516	0.055		3.263		0.924
18	0.773	0.125		0.383	0.094		0.291		-0.315
19	1.215	0.066		0.602	0.050		-0.970		-0.219

Table 4-5. Impacts of Tourism on Transportation (per 100JPY)

Code of Industries	Tourism to Transport output multiplier (per 100JPY final demand)			Tourism to Transport value added multiplier (per 100JPY final demand)			Gross output loss of Transport if Tourism is hypothetical extracted (per 100JPY gross output of tourism extracted)		
	Domestic tourism	Outbound tourism	Inbound tourism	Domestic tourism	Outbound tourism	Inbound tourism	Domestic tourism	Outbound tourism	Inbound tourism
1	0.160	0.052	0.205	0.111	0.036	0.142	-0.113	0.336	-0.272
2	0.023	0.000	0.033	0.013	0.000	0.019	-0.018	0.065	-0.038
3	0.117	0.070	0.123	0.089	0.053	0.093	-0.115	0.180	-0.222
4	1.330	0.057	1.806	0.978	0.042	1.327	-1.093	2.474	-2.110
5	0.845	0.068	1.088	-	-	-	-0.719	2.634	-1.364
6	0.485	0.017	0.505	-	-	-	-1.471	5.463	-2.708
7	0.000	0.110	0.001	0.000	0.011	0.000	0.440	3.731	0.019
8	0.002	0.001	0.002	0.001	0.000	0.001	0.000	0.001	-0.001
9	0.119	0.009	0.192	0.050	0.004	0.080	-0.058	0.633	-0.234
10	0.095	0.068	0.153	0.059	0.042	0.095	0.129	2.355	-0.252
11	0.024	0.005	0.063	0.005	0.001	0.013	-0.025	0.101	-0.103
12	0.032	0.011	0.053	0.006	0.002	0.011	-0.022	0.063	-0.061
13	0.006	0.000	0.010	0.001	0.000	0.002	-0.004	0.023	-0.011
14	0.005	0.003	0.014	0.001	0.001	0.003	-0.004	0.002	-0.016
15	0.085	0.001	0.115	0.055	0.001	0.075	-0.066	0.213	-0.136
16	0.273	0.015	0.341	0.165	0.009	0.206	-0.219	0.655	-0.411
17	0.312	0.022	1.401	0.197	0.014	0.883	-0.203	1.237	-1.501
18	0.140	0.052	0.170	0.114	0.043	0.138	-0.103	0.173	-0.213
19	2.318	0.710	7.215	0.462	0.142	1.438	-1.521	5.536	-8.210
	6.373	0.696	13.486	2.307	0.267	4.526	-5.185	25.873	-17.842

Note: The code of industries used in Table 4-4 and Table 4-5 are presented hereafter.

Code of Industry	Name of Industry	Code of Industry	Name of Industry
1	Railway transport (passengers)	11	International air transport
2	Railway transport (freight)	12	Domestic air transport (passengers)
3	Road transport service (bus, taxi)	13	Domestic air transport (freight)
4	Road freight transport (except self-transport)	14	Aircraft service except air transport
5	Self-transport (passengers)	15	Consigned freight forwarding
6	Self-transport (freight)	16	Storage facility service
7	International shipping	17	Services relating to transport
8	Coastal and inland water transport (passengers)	18	Postal services and mail delivery
9	Coastal and inland water transport (freight)	19	Transport equipment
10	Harbor transport service		

4.7 Interdependencies between transportation and tourism with Input-Output coefficients

In order to have an overall look at the inter-relation among transportation industries and tourism, all the tourism industries in the Table 3-7 are aggregated into three major categories, which are domestic, outbound, and inbound tourism. All transportation service industries will be also aggregated into one; transportation equipment also appears together with transportation service in this analysis. Table 4-6 and Table 4-7 illustrate the top-ten dominant industries of domestic, inbound and outbound tourism respectively in term of both supplying and consuming based on the tourism direct input and output coefficient. The top-ten dominant industries of tourism are ranked in top-down order. The direct input coefficients of an industry provide the information about the proportion of intermediate input supplied by production industries per a unit of that industry's total

output. Whereas, the direct output coefficients suggest the proportions of purchases from industries at demand side. The larger value of input/output coefficient is, the higher proportion of intermediate commodity that an industry purchases/sell from/to another.

Table 4-6. Ten dominant industries of domestic and inbound tourism

Top 10 dominant industries of domestic tourism					Top 10 dominant industries of inbound tourism (Since inbound tourism does not produce any intermediate input, its consumers are not shown)			
Rank	Industry	Suppliers	Rank	Industry	Consumers	Rank	Industry	Suppliers
1	Beverages and Foods	0.0632	1	Transport services	0.0907	1	Business services	0.0769
2	Business services	0.0591	2	Commerce	0.0389	2	Petroleum and coal products	0.0722
3	Commerce	0.0488	3	Beverages and Foods	0.0262	3	Beverages and Foods	0.0617
4	Mining	0.0410	4	Eating and drinking services	0.0216	4	Commerce	0.0497
5	Transport services	0.0253	5	Medical, health care and welfare	0.0149	5	Transportation equipment	0.0389
6	Agriculture, forestry and fishery	0.0242	6	Chemical products	0.0144	6	Transport services	0.0373
7	Petroleum and coal products	0.0205	7	Business services	0.0124	7	Chemical products	0.0229
8	Electricity, gas and heat supply	0.0195	8	Public administration	0.0114	8	Electricity, gas and heat supply	0.0195
9	Chemical products	0.0165	9	Information and communications	0.0097	9	Agriculture, forestry and fishery	0.0182
10	Information and communications	0.0149	10	Textile product	0.0096	10	Electronic components	0.0148

Table 4-7. Ten dominant industries of outbound tourism

Top 10 dominant industries of outbound tourism								
Rank	Industry	10 Domestic suppliers	Rank	Industry	10 Foreign suppliers	Rank	Industry	10 Dominant consumers
1	Business services	0.2502	1	Beverages and Foods	-0.12	1	Transport services	0.64
2	Pulp, paper and wooden products	0.0528	2	Commerce	-0.05	2	Commerce	0.26
3	Construction	0.0527	3	Agriculture, forestry and fishery	-0.04	3	Information and communications	0.05
4	Real estate	0.0489	4	Chemical products	-0.02	4	Business services	0.04
5	Information and communications	0.0343	5	Electricity, gas and heat supply	-0.01	5	Transportation equipment	0.04
6	Activities not elsewhere classified	0.0183	6	Waste management services	-0.01	6	Hotels	0.04
7	Printing, plate making and book binding	0.0135	7	Personal services (Except Eating, Drinking)	-0.01	7	Eating and drinking services	0.03
8	Electronic components	0.0113	8	Eating and drinking services	-0.01	8	Chemical products	0.03
9	Finance and insurance	0.0110	9	Transport services	-0.01	9	Medical, health care and welfare	0.03
10	Transportation equipment	0.0099	10	Textile product	-0.01	10	Personal services (Except Eating, Drinking)	0.02

The valuable recognition found in the Table 4-6, and Table 4-7 is that the transportation plays as the most dominant consumer for all types of tourism. As a supplier, transportation appears as different roles for different types of tourism. For domestic tourism, transportation service industry is the first dominant consumer and the top-five provider (see Table 4-6). Per each unit of tourism product, transportation-services industry consumes 9.07% as its input; on the other side, transportation-services industry supplies 2.53% per each unit of total input of tourism. For inbound tourism, transportation equipment and service are ranked as the top-five and six suppliers with the supplied amounts for the inbound tourism are approximate 3.89% and 3.73% respectively. Since the inbound tourism is defined as the international travelers coming to Japan as tourism destination and demand for services, in this point of view, it does not produce any commodity for the economy; inevitably, its consumers are not existing to show up in the table.

For outbound tourism, it contains two parts of expenditure, namely domestic and international; the Table 4-7 illustrate the relative expenditure among domestic and international spending: the column “10 domestic suppliers” appears as positive since the outbound tourism contributes to the economy greater than the spending oversea, and the column “10 foreign suppliers” appears negative since the leakage to other countries is greater than domestic contribution. In domestic, outbound tourism seems spend the most for business services in order to arrange for the travel oversea; however, in other countries, the greatest spending is for beverages and foods. The spending of outbound tourism for transportation services and equipment in domestic and foreign countries are approximately equal (~1% difference).

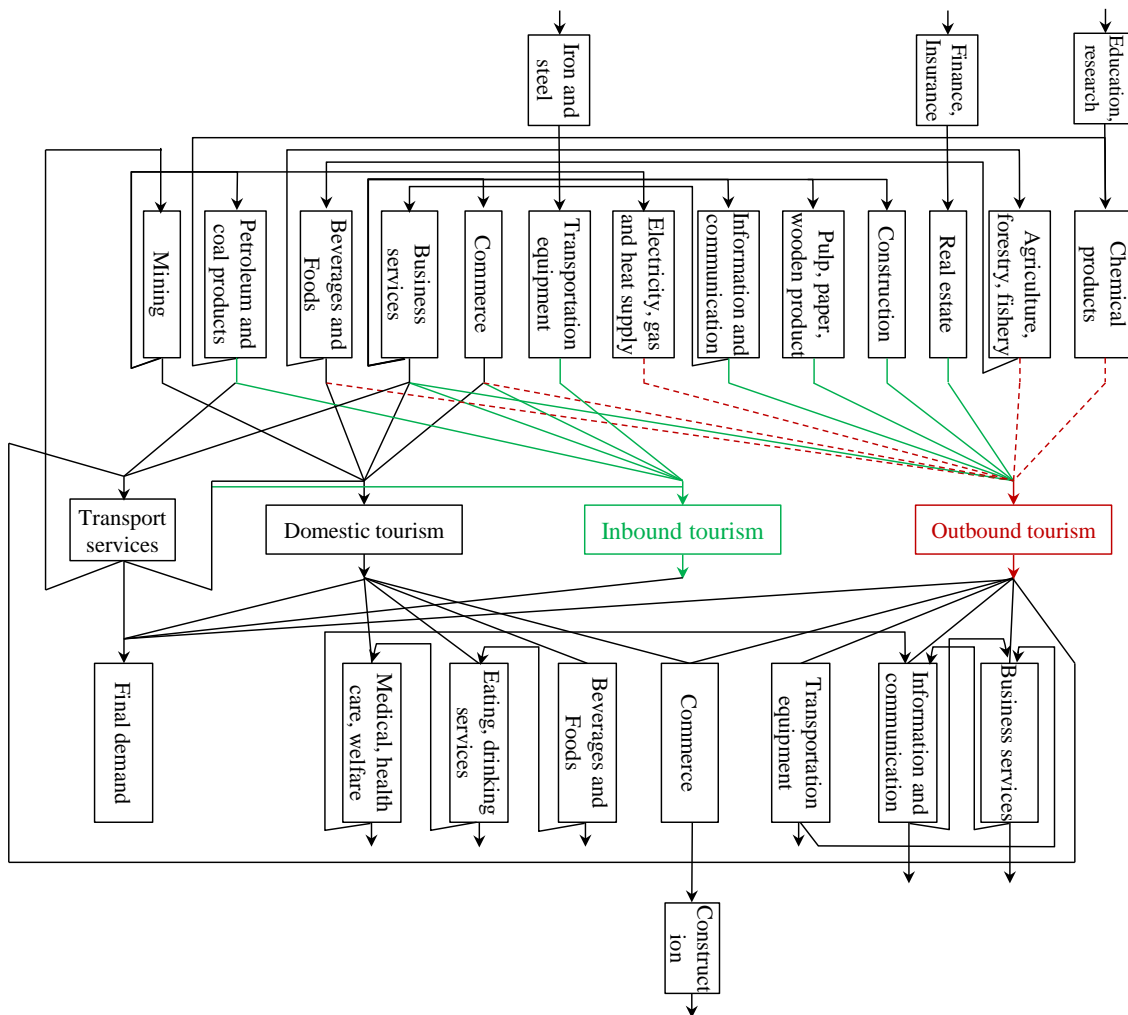


Figure 4-5. Chains of tourism and transport with the most important industries in the Japan economy

Figure 4-5 is prepared to illustrate the general view on the interactions between

transportation and tourism with the most important industries in the economy.

4.8 Conclusions

Linkage analysis provides powerful tools in identifying the interdependencies among industries; nevertheless, there are some major drawbacks remaining. The first, linkage analysis not able to simulate the economic behaviors come after the analysis assumption. In HEM, if an industry i is hypothetically extracted from the economy, in other word, it would not purchase input from other industries, and the other industries would shift their demand to the goods of other industries or rest of the world, which is substitutable. This might change the price at demand or/and supply side, or even at international trade. The second, it is quite challenge for linkage method to find answers for the questions about economic impacts of transportation (or its relevant) policies on tourism. These problems can be solved with using inter-sectoral analysis frameworks, such as Computable General Equilibrium (CGE) model (Cardenete and Sancho, 2006).

The chapter identifies the linkages between transportation and tourism, which is worthy but attracts less attention from scholars. Input-output coefficients, multiplier, and HEM are used; each method has its own advantage and disadvantage and depends on the specific circumstance, the appropriate method is recommended; in this chapter, the combination of these three methods brings a comprehensive view on the linkages as well as the contribution of transportation to tourism and vice versa. Although, there are some cons, some conclusions are presented:

The first, in term of multiplier, inbound tourism quite strongly impacts on the Japanese economy, while domestic tourism impact is at medium level and outbound tourism impact is quite small due to the leakage of oversea spending. The economy can be encouraged if inbound and domestic tourism are promoted. In term of HEM indicator, the loss of gross output when tourism industry is hypothetically extracted from the economy indicates that tourism is at average important level due to its limited scale.

The second, as a consumer, transportation service is the most important industry for all domestic, inbound and outbound tourism; on the other side, as a supplier, it is the top fifth or sixth of tourism industries. There have been many theoretical studies conclude on the importance of transportation on the tourism; by input/output coefficients, multiplier

criteria, and HEM this analysis once again confirms by empirical figures that transportation is a vital for tourism.

The third, transportation plays different roles with the different types of tourism. Transportation is a key actor to promote tourism. In the opposite direction, inbound tourism appears as the strongest industry to promote domestic economic activities in general, and transportation industries in particular; its contribution to transportation in term of total output and value added is appropriate as twice as that of domestic tourism. In contrast, outbound tourism expresses the weak contribution to the economy since brings money for tourism services in other countries.

In summary, this chapter shows that transportation plays an important role in tourism. The first, second and the third points above suggest that it is high potential for transportation to encourage tourism industry, and tourism industry can contribute more to the economy by increase its gross output and value-added scale. However, a lack of researches as well as understanding of the underlying mechanisms of this relationship at macroeconomic view point requires development of further researches to full fill in methodologies, techniques, and variables of transportation policies. More comprehensive measure, such as CGE is strongly recommended for further analysis.

5 Framework to integrate Transportation model into CGE Model to analyze economic impacts of Transportation on Tourism

5.1 From the previous generation of inter-sectoral analysis: Input - Output (IO) Model

5.1.1 The concept of input-output model

In early 19th century, there was the boom of economic statistical information published by private and public agencies. However, the information published mostly for reference purposes and there was no relationship with the specific analysis method. As the result, in one hand, there was an enormous economic theory introduced without any facts and in the other hand, there was a huge economic facts without theory (Leontief, 1986). In the late 1930s, Leontief successfully combined the economic facts and theory with a framework, so called Input-Output or Inter-industry analysis. This framework presents the relative relationships among economic industries, sectors, bodies with the stable flows of good and service. The information is much detailed and complex in comparison with the traditional statistical data. Moreover, the method allows us to take advantage of such economic relationships to bring into the range of the economic models that stick with the theories.

Input-output analysis is a method of systematically quantifying the mutual inter-relationships among the various sectors of the complex economic system theory (Leontief, 1986). The term of economic system here refers to a region such as a city, or a metropolitan area, or a nation. It is used even for such a large area as world economy or even for an enterprise. The relationships among the industries, sectors in the system is described by a range of linear mathematical equations that satisfy the balanced condition among total input of a commodity/service and its aggregate output in a period, usually say, a year.

The fundamental database required for input-output analysis is input-output table. It is defined as a matrix describes the flow of goods/services between all individual sectors of the national/regional economy over a period. The data in input-output table is expressed

in value term, which is equalized to the quantity of goods/services multiple with its prices. Anyway, in all later works, the prices of goods/services are normalized into 1 unit of currency to simplify the manipulation procedure and technique but does not affect to the results of the analysis (Harberger, 1964). All the relationships between industries/sectors will then expressed as quantity per 1 unit of currency.

Another form of illustrating an economy is input-output coefficients. The input coefficients a_{ij} show the input requirement from an industry i to produce a unit product of industry j . The complete table of input-output coefficients describes the input requirement of every industry to others in pair. It is usually called as a structure table, or a technical coefficient matrix/table.

In theory, it is possible to describe the economy as detailed as it actually is in the fact. However, this task requires huge manpower, time, financial budget, and high requirement of technology since the transactions among elements/industries/sectors are complicated. In practice, ones usually combine activities of economy into specific groups to make the system become simpler but still satisfy the requirement of research purposes.

5.1.2 The basic structure of input-output model

Let simplify the economy as n_0 industries, on the demand side, there is one domestic final demand sector, one export, and one import. On the supply side, there is a value-added sector, which provide labor, capital, land... as an input for the production. Let's set x_{ij} denotes for the amount of the product of sector i absorbed by sector j as its input; Y_i is the quantity of product delivers to the domestic final demand sector; E_i , M_i are the trades with outside regions through the border of the given area (a region or nation...), which are called as Export and Import respectively. Since export brings income to the domestic economy and Import is the spending of domestic economy to purchase the product from outsiders, so export will hold positive sign while import will hold negative. X_i is total product introduced to the market after production, so called total output, and the total input required to produce the total output of industry j will be denoted as X_j (see Figure 5-1).

Demand side Supply side		Intermediate demand					Final demand			Import	Total output
		Industry 1	...	Industry j	...	Industry n ₀	Dom. Final demand	Export	Total final demand		
Intermediate Input	Industry 1	x_{11}	...	x_{1j}	...	x_{1n_0}	Y_1	E_1	F_1	M_1	X_1
	⋮
	Industry i	x_{i1}	...	x_{ij}	...	x_{in_0}	Y_i	E_i	F_i	M_i	X_i
	⋮
	Industry n ₀	x_{n_01}	...	x_{n_0j}	...	$x_{n_0n_0}$	Y_{n_0}	E_{n_0}	F_{n_0}	M_{n_0}	X_{n_0}
Added sector		V_1		V_j		V_{n_0}					
Total input		X_1		X_j		X_{n_0}					

Figure 5-1. Industries/sectors in economy

The input coefficients of all sectors of the economy can be written as:

$$a_{ij} = \frac{x_{ij}}{X_j} \tag{Eq. 5-1}$$

The total output of n sector-economy can be illustrated by a set of n equations as below:

$$\begin{aligned} x_{11} + \dots + x_{1j} + \dots + x_{1n_0} + Y_1 + E_1 - M_1 &= X_1 \\ \dots & \\ x_{i1} + \dots + x_{ij} + \dots + x_{in_0} + Y_i + E_i - M_i &= X_i \\ \dots & \\ x_{n_01} + \dots + x_{n_0j} + \dots + x_{n_0n_0} + Y_{n_0} + E_{n_0} - M_{n_0} &= X_{n_0} \end{aligned} \tag{Eq. 5-2}$$

Substitute input coefficients a_{ij} into the Eq. 5-2 we have Eq. 5-3 as below:

$$\begin{aligned} a_{11}X_1 + \dots + a_{1j}X_j + \dots + a_{1n_0}X_{n_0} + Y_1 + E_1 - M_1 &= X_1 \\ \dots & \\ a_{i1}X_1 + \dots + a_{ij}X_j + \dots + a_{in_0}X_{n_0} + Y_i + E_i - M_i &= X_i \\ \dots & \\ a_{n_01}X_1 + \dots + a_{n_0j}X_j + \dots + a_{n_0n_0}X_{n_0} + Y_{n_0} + E_{n_0} - M_{n_0} &= X_{n_0} \end{aligned} \tag{Eq. 5-3}$$

And we can write this equation as:

$$[A][X] + [Y] + [E] - [M] = [X] \quad \text{Eq. 5-4}$$

where,

- X : the vector of total output
- A : matrix of input coefficients parameters
- Y, E, M : vector of domestic final demand, export, and import respectively

$$[A] = \begin{bmatrix} a_{11} & \cdots & a_{1j} & \cdots & a_{1n_0} \\ \vdots & & \vdots & & \vdots \\ a_{i1} & \cdots & a_{ij} & \cdots & a_{in_0} \\ \vdots & & \vdots & & \vdots \\ a_{n_01} & \cdots & a_{n_0j} & \cdots & a_{n_0n_0} \end{bmatrix} \quad \text{Eq. 5-5}$$

$$[Y] = \begin{bmatrix} Y_1 \\ \vdots \\ Y_i \\ \vdots \\ Y_{n_0} \end{bmatrix}; \quad [E] = \begin{bmatrix} E_1 \\ \vdots \\ E_i \\ \vdots \\ E_{n_0} \end{bmatrix}; \quad [M] = \begin{bmatrix} M_1 \\ \vdots \\ M_i \\ \vdots \\ M_{n_0} \end{bmatrix}; \quad [X] = \begin{bmatrix} X_1 \\ \vdots \\ X_i \\ \vdots \\ X_{n_0} \end{bmatrix}$$

For added (Labor, Capital, Land...) sector, the following procedure explains how to calculate the requirement of value added input:

$$\begin{aligned} a_{n+1,1}X_1 + \cdots + a_{n+1,j}X_j + \cdots + a_{n+1,n_0}X_{n_0} + F_{n+1} &= X_{n+1} \\ F_{n+1} &= Y_{n+1} + E_{n+1} - M_{n+1} \\ a_{n+1,j} &= v_j = \frac{V_j}{X_j} \end{aligned} \quad \text{Eq. 5-6}$$

where,

- $a_{n+1,j}$: the value-added required to produce one unit of output product
- F_{n+1} : Total final demand vector
- V_j : value added required of industry j
- v_j : value added required to produce one unit of product of industry j

In value term, with p_i is the price of good i , the input-output model system can be written as:

$$\begin{aligned}
 & p_1 a_{11} + \dots + p_i a_{i1} + \dots + p_{n_0} a_{n_0,1} + wv_1 = p_1 \\
 & \dots \\
 & p_1 a_{1j} + \dots + p_i a_{ij} + \dots + p_{n_0} a_{n_0,j} + wv_j = p_j \qquad \text{Eq. 5-7} \\
 & \dots \\
 & p_1 a_{1n_0} + \dots + p_i a_{in_0} + \dots + p_{n_0} a_{n_0,n_0} + wv_{n_0} = p_{n_0}
 \end{aligned}$$

The Eq. 5-7 can be converted into the matrix form as follow:

$$\begin{bmatrix} p_1 \\ \vdots \\ p_i \\ \vdots \\ p_{n_0} \end{bmatrix}^T \begin{bmatrix} a_{11} & \dots & a_{1j} & \dots & a_{1n_0} \\ \vdots & & \vdots & & \vdots \\ a_{i1} & \dots & a_{ij} & \dots & a_{in_0} \\ \vdots & & \vdots & & \vdots \\ a_{n_0,1} & \dots & a_{n_0,j} & \dots & a_{n_0,n_0} \end{bmatrix} + w \begin{bmatrix} v_1 \\ \vdots \\ v_i \\ \vdots \\ v_{n_0} \end{bmatrix}^T = \begin{bmatrix} p_1 \\ \vdots \\ p_i \\ \vdots \\ p_{n_0} \end{bmatrix}^T \qquad \text{Eq. 5-8}$$

$$\text{Or } [P]^T[A] + w[V]^T = [P]^T$$

And prices of industrial good can be calculated as:

$$[P]^T = [W]^T [I - A]^{-1} \qquad \text{Eq. 5-9}$$

“*T*” denotes for the transpose matrix of the respective matrix

where,

- W : the cost paid by different industries per unit of output
- $[W]^T = w[V]^T$: Transpose vector of added cost per unit of output

5.1.3 The changes of technology and scenario analysis

The technological structure of each sector of the economy is presented by the column vector of the input coefficients and the corresponding coefficient of value added. The change of technology is illustrated as the changes in the magnitude of the technical coefficients. The introduction of new commodities or industries is presented as the appearance of new commodities or industries in the input-output table; in contrast, the disappearance of old commodities or industries is illustrated by the elimination of respective technical coefficients in the input-output table (Leontief, 1986).

In input-output table, one industry can produce several types of goods depending on the types of technologies availability in that industry. Of course, each technology will affect

to the cost of the corresponding commodity or service. This means, even in one industry, the goods or services might be different, so do the total input/output of goods.

In practical analyses, the input-output model usually takes the form of comparisons of some alternative scenarios. Each based on the set of assumptions on the level of demand, changes in input coefficients of intermediate inputs and flow of added...the application of input-output model is ambitious not limited to the single, static analysis but also multi-regional, multi-sectoral, dynamic, and long run analysis for a group of many regions or even entire the world economy (Isard, 1951; Miller, 1969).

5.2 To the next generation: CGE Model

5.2.1 Disadvantages of input-output model

Category	IO model	CGE model
Functions	Can describe: <ul style="list-style-type: none"> ➤ The economic transactions between sectors within a region ➤ The economic interactions between regions 	
Advantages/ disadvantages comparison	<ul style="list-style-type: none"> ➤ Based on linear mathematical models (Miller and Blair 1985) ➤ The unrealistic <ul style="list-style-type: none"> ○ Fixed technology, ○ No constrains in supply side ○ Hard to simulate the behavior with respect to price change 	<ul style="list-style-type: none"> ➤ Can more flexibly describe an economy ➤ Can model the impacts of specific changes in individual activities: i.e.: employment levels, taxation, Imports, exports, outputs of specific industries ➤ Be possible to integrate sub-models into its, transport accessibility (in term of cost/time changes)

Figure 5-2. Comparison between Input-Output model and Computable General Equilibrium Model

There is no doubt that input-output model is the huge attempt to inter-industry, inter-regional analysis and this approach brings great achievement to the economic applications. However, the modelers should keep in mind that there several weaknesses remain. The understanding on this will help researchers keeps the results of the modelling in the reasonable limit area:

Firstly, there is only linear equations in the system.

Input-output model relies on the linear equations. The total output of every industry is calculated based on the demand side, prices of commodities/services, and the technologies of corresponding industries. This means, if there are any changes in the demand, prices of goods, or the technologies, the total output/input of the industries will be following changed at the same rates. In fact, the different industries behave differently with the changes of the system elements, then the responses in the endogenous variables, such as output, consumption...are also different. This characteristic leads a serious problem in modelling the distinguished industries upon the shocks of various exogenous variables.

Secondly, there is no constrains on supply side.

From the structure of input-output model, it is realized that there is no constrain assumptions in supply side. Ones can simulate the changes of the supply according to the limitation on the demand. For example, the supply can well responses with the twice, triple, or even more of the demand. This is not realistic in practice. For example, in the tourism destination, the number of hotels as well as restaurants, recreational facilities... are always specific. The maximum number of overnight travelers that destination can serve equals to the capacity of the accommodation; the restaurants and recreational facilities also can serve upon on their maximum capacities. In modelling this, if the demand, in term of traveler number increases over the capacities of tourism destination facilities, model still works without asking the modeler if the destination supply is enough capacities to satisfy the exceed of the demand.

Thirdly, fixed technology system or no substitution in the economy

The standardized input matrix is considered as the core of input-output model, in which the magnitude of a_{ij} stands for the input from industry i absorbed by industry j to produce a unit of industry j commodity. In input-output model input coefficients are assumed as constant during a period. Means, there is no changes in relative proportions of inputs.

In the real economy, in some cases of production, based on the inputs' prices, the firms can choose alternative inputs to substitute for some others to maximize the profit. For example, a beverage industry produces orange juice to the market will need several inputs as labor, sugar, water, domestic oranges and imported oranges. Because of some reasons, the world price of oranges increase in comparison with the price of domestic oranges. In

order to minimize the production cost of orange juice, the firm will tend to purchase more domestic orange instead of imported ones.

On the demand side, the substitution is also acknowledged in consumers behavior. i.e. a consumer purchases 40% apples and 60% bananas to consume at specific prices of apple and bananas. If the price of bananas relatively reduce 20% compare with the price of apples, the consumer might purchase more 10% bananas to substitute apples. At the end, the relative proportions of commodities for consuming is changed. In this example, after the price changed, 30% apples and 70% of bananas will be purchased.

Fourthly, homogenous output

In input-output model, one sector can produce several commodities or services. However, in the cases of the proportion of the commodities are still fixed during analysis. For instance, an agriculture of a given region can produce several products, such as, wheat, banana, peach. In input-output table, these commodities are modeled as relative proportion among agriculture products. These proportions will be assumed not change during the modelling even prices of wheat, banana, and peach will be later changed. A numeric illustration for this example, the relative proportions of wheat, banana, and peach of agriculture industry are 30%, 30%, and 40% respectively, and if the total output of the industry increase 100 million JPY, then the relative increase in output of three products will be 30 million JPY, 30 million JPY, and 40 million JPY respectively.

Deep understanding on these limitations will help modelers avoid the overestimations or biases in the research assumptions, modelling process as well as the results. The audiences and readers also can understand the interpretation of the analysis results without any misleading.

5.2.2 Concept of CGE Model

Two decades after Leontief introduced the input-output model, Johansen (1960) developed a well-known model for the 23-sector economy: 20 real production sectors, one sector stands for Rest of the World (RoW), one sectors stands for the production of other investment goods, and one sector stands for unspecified goods. The 20 real production sectors have inputs of labor, capital, and raw materials as intermediate inputs. On the production side, Cobb-Douglas production function was employed to model the minimization of production cost of the firms. In this stage, the fixed production

coefficients for intermediate inputs hypothesis was used between sectors, and intra-sectoral flows were neglected. The prices of industrial products were estimated based on input prices under zero profit condition. On the other side, demand was estimated based on linear utility function with respect to budget constraint. This model is recognized as the first CGE model in the world.

Computable General Equilibrium Model is a system of equations that describe an economy as a whole and the interactions among its parts. The term *computable* in the model refers to the ability of the model in quantifying the effects of a shock on an economy; the term *general* describes that the model can encompass all economic activity in an economy simultaneously, which includes production, consumption, employment, taxes-savings, trade, and the linkages among them; the term *equilibrium* illustrates the balance condition of the economy in term of supply and demand (Mary E. Burfisher, 2011).

The Figure 5-3 illustrates for the simplified typical economy which contains three bodies: government, households and firms. Firm j will purchase intermediate inputs from firm(s) i , capital input (from government or firms or households), and labor from households to produce its good(s). When purchases, firm j has to pay money to the firm(s) i , government, and households. These payments from firm j naturally become the income of firm i , government, households. Firm i , in turn, use this income to buy inputs for its production; and government – households use amount of the income to purchase commodities for consuming, another part of income amount they save for investment. The firm j has to pay several types of taxes during its production, such as sale tax, tax on import goods as input for the production...; households also have to pay tax to the government based on the income they got from the providing employment to the firms, consuming the consumption goods and investment.

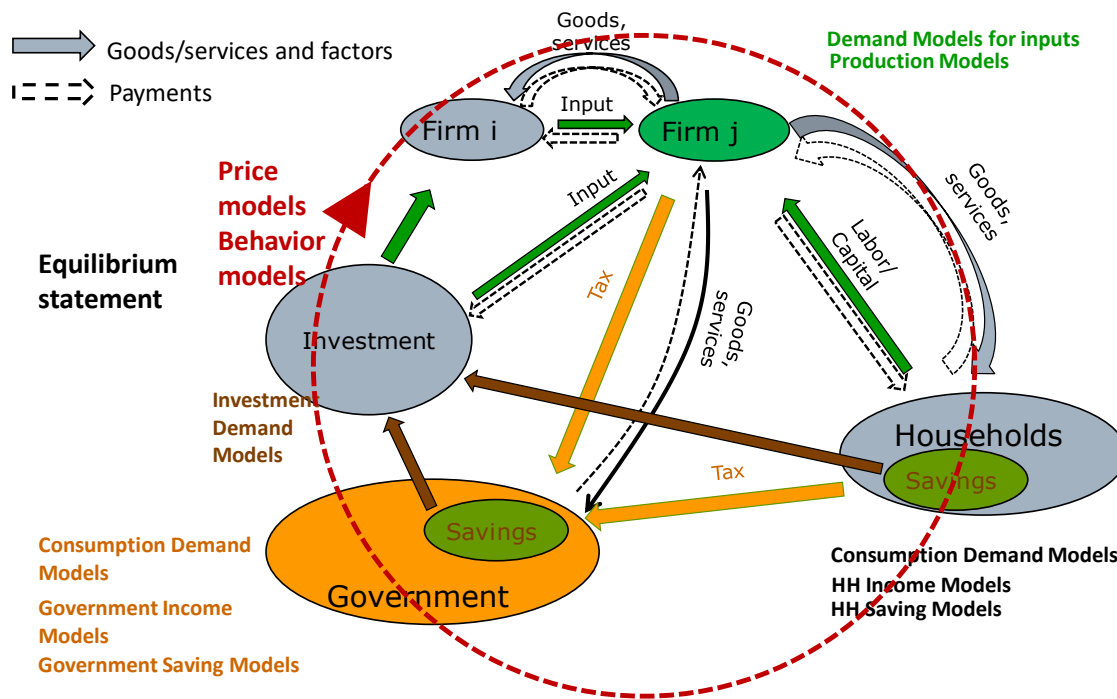


Figure 5-3. The interactions between economy elements

All of these activities are linked each other by relationships of good flows through production, sale process incorporate with the set of prices of goods and factors. The firms try to maximize their profit through optimization of cost for production. Households and government try to maximize their utility under the constrains of their budget (or income). At equilibrium condition, the bodies satisfy with their activities of production, consumption, investment at some sets of prices.

An advantage of Computable General Equilibrium Model is that it describes the real economy by measuring all variables in terms of physical quantities and the relative prices at which goods/commodities are exchanged for each other, for instance, two unit of metal product per one unit of agriculture product. Computable General Equilibrium Model can be utilized at all forms, all scale to model the supply, demand, factors of market, savings-investment, trade, taxation, transport cost...nevertheless, there are some typical forms/scales of Computable General Equilibrium Model, which are classified as follow:

Static and dynamic Computable General Equilibrium Model

Static CGE model provide information of an economy before and after the economic shock. For example, the investment of new express way may stimulate the production of several related regions, or provide more employment. This model is strong in indicating

the winners and losers in the economy under the shock. However, the weakness of static modelling is that it cannot illustrate the process of adjustment. In static CGE model, the total factors of production in the economy is assumed as fixed supply, for instance, the scale of labor force is fixed and the quantity of the capital equipment is unchanged. There are only changes in the wage and rental rates of labor and capital and the redistribution of production factors among industries as model experiment.

Dynamic CGE model describes an economy's responses to a shock in long run trajectory. To do dynamic CGE modeling, ones should develop the based model upon on time path, which based on the series of observations/statistical data during specific time period. Over the time, the supply and productivity of an economy's stock of labor, capital grows without the shock. When a shock is applied, the changes in timing and level of capital accumulation will make changes in the economic growth trajectory. The changes in capital stock may lead the changes in the rate of return to capital, then savings and investment behavior will change. Different with the static, dynamic CGE model provide the reacts of an economy through the differences between baseline time path model and the time path with application of shock (Mary E. Burfisher, 2011).

Regional and inter-regional Computable General Equilibrium Model

Regional or single-country model refers models which are applied for one region or one country. The model is closed if there is no inflows or outflows of trade described in the model. If the region/country has economics relations with outside regions/countries illustrated with trade inflows (imports) and outflows (exports), it is called open country model. The treatment of open economy model is usually more complicated than close economy model as the special treatment of import and export as well as world prices of its incorporate with the exchange rate.

Inter-regional model describes the economy and the interactions of two or more countries or regions in terms of production, consumption, trade, taxes, etc. In the multi-region model, the links among regions or countries are illustrated through the trade or capital flows.

5.3 CGE Model structure

Computable General Equilibrium Model can be based on the database as input-output

table or Social Accounting Matrix. This section will express the structure of CGE model based on SAM.

5.3.1 Setting the economy and nest of production functions

In Social Accounting Matrix constructed in the Chapter 3, factors of production are divided into two elements: Labor and Capital; all the import goods are assumed to be as intermediate inputs for production. The system does not deal with the tax and foreign exchange policies, so all the tax elements and foreign exchange information are omitted in this study. The structure of economy is simplified into three stages as shown in Figure 5-4.

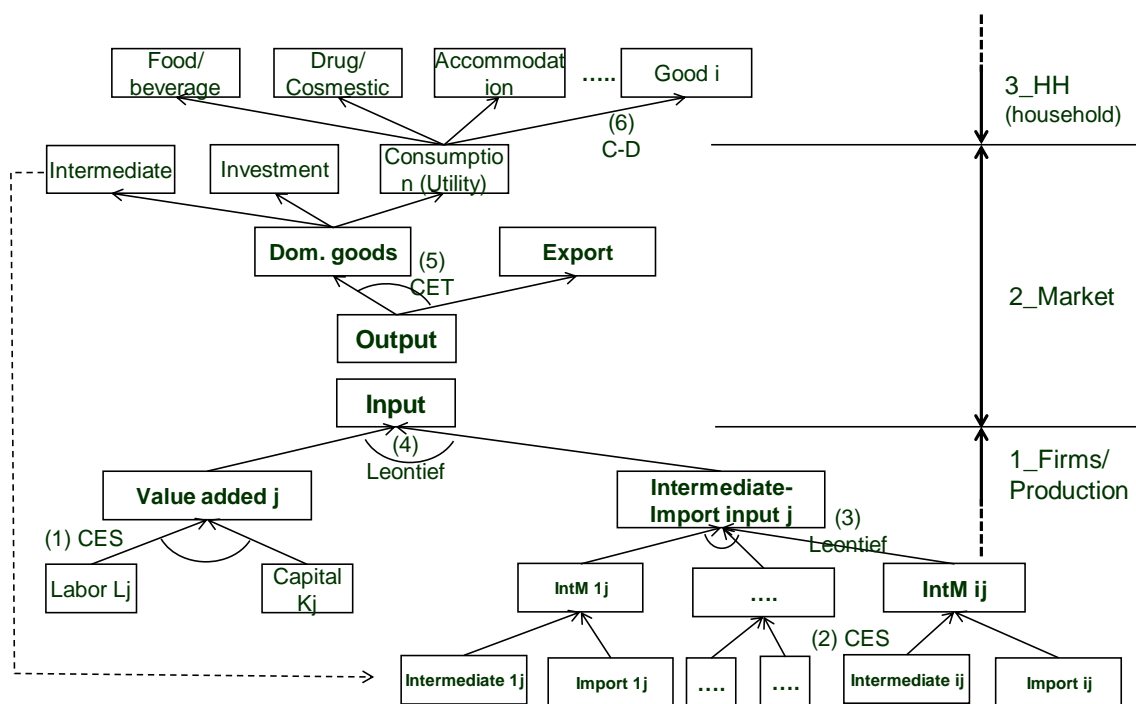


Figure 5-4. The structure of the economy in CGE modelling

In the first stage, firms hire factors of production as labor, capital and intermediate inputs to produce goods and services to the market. In this stage, the production process is 3-level nest of production functions. The lowest level presents the Constant Elasticity of Substitution (CES) production of intermediate composite goods from domestic and import intermediate goods based on Armington (1969). Domestic intermediate and import intermediate are assumed imperfect substitutes even though they are at the same sector. In this study, all import goods are assumed to be intermediate inputs for the production; no import good is used for final demand. In upper level, intermediate composite is Leontief of all intermediate-import goods. On the other side, composite

value added is Constant Elasticity of Substitution of Labor and Capital, in value added composite production, labor and capital are assumed to be possible to substitute each other. In the third level, total input of the production is Leontief of value added composite and intermediate composite.

At the second stage, some of goods and services among total are exported, the rest of output are supplies for domestic uses. The output transformation is assumed as Constant Elasticity of Transformation between domestic goods and export goods. Some of domestic goods are used as intermediate goods of other industries for production; some are used as investment goods; the rest is used as consumption goods of households and government. The utility function of households and government is assumed as Cobb – Douglas, which is described in the third stage of the economy structure. The detailed forms and solutions for all related functions of the economy will be presented in the following sections.

5.3.2 Household and Government behavior

In this study, the households and government are combined into one group to stand for consumption sector. Households and government own labor force and capital as factors for production. Households and government tend to endow all of its factors to firms to get income. A part of this income amount is used to purchase goods and services in the market that produced by firms. With the constrains of income, households and government aim to maximize their utility. The behavior of households and government in consumption is assumed based on Cobb – Douglas utility function

$$\text{Maximize utility } U = \prod_{i=1}^n f_{ci}^{\beta_i} \tag{Eq. 5-10}$$

With subject to total expense equal to budget

$$\sum f_{ci} p_i (1 + Tr_i + Td_i) = \sum (l_j w + k_j r) - S_{HG} \tag{Eq. 5-11}$$

where,

- U : utility of households and government
- f_{ci} : consumption of good i
- β_i : calibrated share parameter of good i in utility function ($0 \leq$

- $\beta_i \leq 1$ and $\sum \beta_i = 1$)
- l_j, k_j, w, r : endowment of labor and capital factors and their wage and rental rate respectively
- S_{HG} : the saving of households and government
- Tr_i, Td_i : transport and trade margin of industry i

This problem is solved by employing Lagrange multiplier method. Call λ as Lagrangian multiplier, the Lagrangian function is obtained as:

$$L(f_{ci}, \lambda) = \prod_{i=1}^n f_{ci}^{\beta_i} + \lambda \left[\sum f_{ci} p_i (1 + Tr_i + Td_i) - \sum (l_j w + k_j r) + S_{HG} \right] \quad \text{Eq. 5-12}$$

Applying the first order for this equation, we got the solution as follow:

$$f_{Di} = \frac{\beta_i [\sum (l_j w + k_j r) - S_{HG}]}{(1 + Tr_i + Td_i) P_i} \quad \text{Eq. 5-13}$$

Cost minimization process of domestic final demand

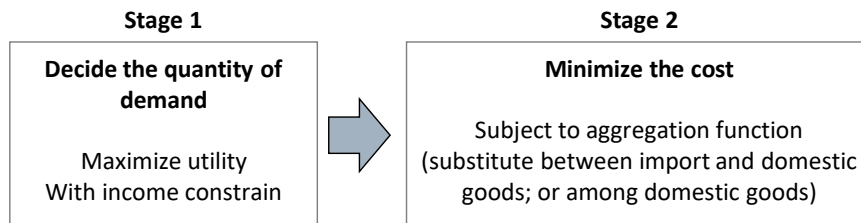


Figure 5-5. 2-stage of minimize the cost of domestic final demand

In CGE model, domestic consumers usually decide to consume in two stages (Figure 5-5): the first stage, they decide the quantity of each good/service in their basket based on their preferences depicted in the utility function, which illustrates the consumers' satisfaction on each combination of commodities/services in their baskets of consumption. With a given utility function, consumers choose the combination of goods/services in their basket which generates the maximum satisfaction at given prices of goods/services and their budgets. In the second stage, consumers minimize the expenses by deciding the proportion of goods/services can be replaced by other alternatives. For example, the trips to the resort with more expensive price can be replaced by the trip to the beach with the

cheaper price; or the proportion of import goods can be reduced and replaced by domestic goods with cheaper prices. The parameter depicts for this behavior named as elasticity of substitution.

The maximization of utility under budget constraint

The Figure 5-6 illustrates the behavior of consumer with the food and beverage commodities. The red line shows the budget constraint line. The area below the red line is the area that consumer can purchase food and beverage with the given income. If the consumer wants to use more food, he has to reduce the beverage. The maximum quantity of food he can choose is $Q_{f\ max}$, at this point, the quantity of beverage is zero (0). If he wants to purchase all beverage ($Q_{B\ max}$), then he will have zero quantity of food. The area above the red line describes the purchase over the income, which consumer is not capable to purchase.

Assume that, with the budget constraint and a given price set, consumer can purchase many combinations of Q_B beverage and Q_f food. Each combination will generate a value of utility. The point (Q_{B1}, Q_{f1}) that the slope of budget constraint and the slope of the utility curve are equal. Means that the consumer maximizes utility at the point that the marginal utility per additional unit of money spend on each good is equal.

Behavior of consuming with the income level

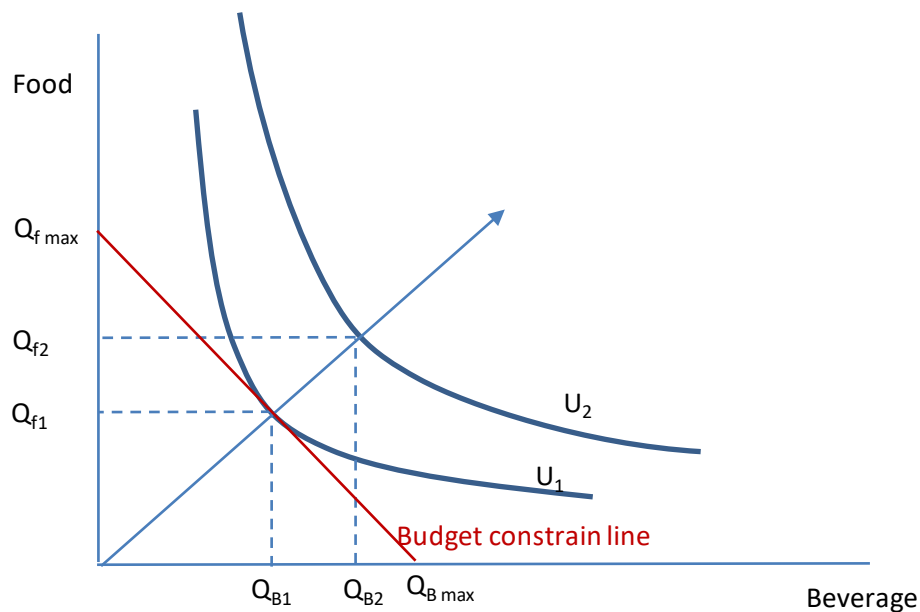


Figure 5-6. Effect of income level on consumer demand and maximize the utility

The Figure 5-6 also depicts the response of the demand with respect to the change of income. If the income of consumer increases, he may increase the quantity of goods and services and vice versa. In the figure above, the consumer maximizes his utility at the point (Q_{B1}, Q_{f1}) , which is also considered as the equilibrium point. If the income increases and the relative prices of food and beverage are fixed, the quantities of beverage and food will be purchased will be (Q_{B2}, Q_{f2}) . At this point, the utility with respect to the new income level is also maximum, and the tangency of the utility curve, which is also the budget constraint line respects with new income and the initial one is parallel. This means that the new curve and line are the same fashion with the initial ones. Note that this figure shows the case of substitution value of food and beverage is 1 (homothetic utility function), that applied in this study. The other utility functions rather than homothetic will be illustrated with different shapes/styles.

5.3.3 International trade and small-country assumption

5.3.3.1 Small-country assumption

Different with close economy, an open economy CGE model deals with the transactions between domestic economy and Rest of the World (RoW), which depicted as inflows of goods from other countries to the domestic economy, import; and outflows of goods from domestic economy to other countries, so called export.

In single-country CGE modelling, for simplicity, we assume that the economy is small that its activities do not significantly impact on those of RoW. Then the world import prices and export prices are imposed exogenously for the model. This study does not deal with the exchange rate policies, then under the assumption of small economy, the import prices will not change, and the prices of export good i will be dependent on the domestic prices of respective industrial goods.

5.3.3.2 Imperfect substitution between domestic and import goods – Armington's assumption

Applying CGE model for an open economy requires modelers to consider the differences/similarities between goods produced domestically, and the goods imported or exported. It is clear that goods in the same industry can be substituted by each other. The common question is, how much the imported goods can substitute for the domestic goods and vice versa. In order to minimize the production cost, if the prices of import goods

increase, would the firms stop purchasing imported goods for production; on the other hand, if the prices of domestic goods are higher than imported goods, would the firms use all imported goods instead of domestic goods. We also have the same question on the domestic goods and export good with the same situations of the relative prices of domestic and export goods.

In fact, it does not make sense, if an industry export and import the same good simultaneously, for example, it is non-sense if automobile industry exports 1000 cars while imports 400 cars of the same type. In this case, the industry should export 600 cars as net export and import 0 car. Actually, data in Input-Output table and Social Accounting Matrix usually presents both information of import and export of the same industry. This means, there are still inflow and outflow of the same good of an industry. In other words, there is a difference between realistic transaction and the theory.

To solve this problem, we differentiate the imported goods and exported ones even they are the same types. The different degree of imported and exported goods is illustrated by the elasticity of substitution parameter. The imported and exported goods are more significantly different, the smaller the elasticity parameter is, or less elastic.

In CGE modelling, we assume that substitution is applied in pairwise of domestic-imported goods and domestic-exported goods rather than between imported and exported goods. Then each pair of domestic-imported and domestic-exported goods will have one elasticity of substitution parameter to illustrate the substitution behavior. The assumption of substitution between domestic and imported goods is proposed by Armington (1969).

5.3.3.3 International trade: Import demand

CES production function of domestic intermediate and import intermediate goods for input

This function indicates the production process at the lowest level of the production structure in Figure 5-4. All the import goods are assumed to be used as intermediate goods for the production. Domestic intermediate goods and import intermediate goods in the same sector are not perfect substitution under assumption of Armington (1969). With the same fashion of CES of labor and capital presented above, in the CES of domestic and import intermediate goods, we assume that in each combination of domestic intermediate

good from industry i absorbed by industry j includes two components: domestic intermediate and import intermediate goods. Firms try to minimize the cost of production or maximize the profit subject to the production preference:

Minimize $P_{int-ij}Int_{ij} + P_{mj}M_{ij}$

Subject to production function:

$$IntM_{ij} = \eta_{intM_{ij}} \left[\alpha_{intij} Int_{ij}^{\frac{\sigma_M-1}{\sigma_M}} + (1 - \alpha_{intij}) M_{ij}^{\frac{\sigma_M-1}{\sigma_M}} \right]^{\frac{\sigma_M}{\sigma_M-1}} \quad \text{Eq. 5-14}$$

where,

- $IntM_{ij}$: Domestic-Import intermediate composite good of industry i absorbed by industry j
- $\eta_{intM_{ij}}$: calibrated scale parameter
- α_{intij} : calibrated share parameter of domestic intermediate input among the composite
- $P_{int-ij}; Int_{ij}$: Price and the demand of domestic intermediate good to produce the composite $IntM_{ij}$
- $P_{mj}; M_{ij}$: Price and demand of import intermediate good to produce the composite $IntM_{ij}$
- σ_M : substitution parameter between domestic intermediate good and import good under assumption of Armington (1969)

By employing Lagrange multiplier method with first order condition, we got the solution for this production function:

Demand of domestic intermediate good:

$$Int_{ij} = IntM_{ij} \frac{1}{\eta_{intM_{ij}}} \left(\frac{\alpha_{intij}}{(1 + Tr + Td)P_{intij}} \right)^{\sigma_M} \left[\alpha_{intij}^{\sigma_M} [(1 + Tr_i + Td_i)P_{intij}]^{1-\sigma_M} + (1 - \alpha_{intij})^{\sigma_M} P_{M_{ij}}^{1-\sigma_M} \right]^{\frac{\sigma_M}{1-\sigma_M}} \quad \text{Eq. 5-15}$$

Demand of import intermediate good:

$$M_{ij} = IntM_{ij} \frac{1}{\eta_{intM_{ij}}} \left(\frac{1 - \alpha_{intij}}{P_{M_{ij}}} \right)^{\sigma_M} \left[\alpha_{intij}^{\sigma_M} [(1 + Tr_i + Td_i)P_{intij}]^{1-\sigma_M} + (1 - \alpha_{intij})^{\sigma_M} P_{M_{ij}}^{1-\sigma_M} \right]^{\frac{\sigma_M}{1-\sigma_M}} \quad \text{Eq. 5-16}$$

Dual price of composite good:

$$P_{intM_{ij}} = \frac{1}{\eta_{intM_{ij}}} \left[\alpha_{intij}^{\sigma_M} [(1 + Tr_i + Td_i)P_{intij}]^{1-\sigma_M} + (1 - \alpha_{intij})^{\sigma_M} P_{M_{ij}}^{1-\sigma_M} \right]^{\frac{\sigma_M}{1-\sigma_M}} \quad \text{Eq. 5-17}$$

where,

- Tr_i : Transportation margin of industry i
- Td_i : Trade margin of industry i
- $P_{intM_{ij}}$: dual price of domestic-import intermediate composite

5.3.3.4 Transformation between domestic and export goods

All the goods after production will be transformed into domestic goods and goods for international market (exported goods) under imperfect transformation. In the CGE models which deal with the international trade policies, it is popular to see the changes of the relative price between domestic and export goods.

In the multi-country model, the export demand of a country will be the import demand of other country that it exports to. This case, the international demand for export goods is dependent on the elasticity of substitution between domestic and import goods under Armington (1969) assumption. Since the strong relationship among countries, if the value of elasticity of substitution is high, then the changes, for example, increase in relative price in the world export price can lead other country to make a large substitution toward their domestic goods. In contrast to the value of high elasticity of substitution, the import demand will become low to indicate for the inelastic of export demand of the country.

In the single country model, the export demand is not described by the import demand of other countries, then we cannot apply import elasticity of substitution concept. Suppose that the export demand elasticity, denoted by η . The firms will decide the proportion of

domestic goods and export goods under the constant elasticity of transformation (CET) function. The maximization profit problem of the firm i to transfer the total domestic production into international and domestic market without international exchange rate can be expressed:

Maximize the profit:

$$P_i^E (1 + Tr_i + Td_i)E_i + P_i^D (1 + Tr_i + Td_i)D_i - P_i X_i$$

Subject to transformation function:

Eq. 5-18

$$X_i = \eta_{CETi} \left[\alpha_{Di} D_i^{\frac{\sigma-1}{\sigma}} + (1 - \alpha_{Di}) E_i^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

where,

- X_i : Gross domestic output of industry i
- D_i : Domestic supply of i -th industry
- E_i : Export good of industry i
- Tr_i, Td_i : Transport and Trade margin of industry i
- P_i^E, P_i^D, P_i : Price of export good, domestic good and gross output good of industry i , this case does not consider exchange rate so $P_i^E = P_i^D = P_i$
- α_{Di} : Calibrated share parameter of domestic supply of industry i
- η_{CETi} : Calibrated scale parameter of transformation of industry i
- σ : Elasticity of transformation between domestic and export of i -th good

The solutions for the transformation function are presented in the following:

$$E_i = X_i \frac{1}{\eta_i} \left(\frac{1 - \alpha_{Di}}{(1 + Tr + Td)P_i} \right)^\sigma \left[\alpha_{Di}^\sigma [(1 + Tr + Td)P_i]^{1-\sigma} + (1 - \alpha_{Di})^\sigma [(1 + Tr + Td)P_i]^{1-\sigma} \right]^{\frac{\sigma}{1-\sigma}}$$

Eq. 5-19

$$D_i = X_i \frac{1}{\eta_i} \left(\frac{\alpha_{Di}}{(1 + Tr + Td)P_i} \right)^\sigma \left[\alpha_{Di}^\sigma [(1 + Tr + Td)P_i]^{1-\sigma} + (1 - \alpha_{Di})^\sigma [(1 + Tr + Td)P_i]^{1-\sigma} \right]^{\frac{\sigma}{1-\sigma}}$$

Eq. 5-20

5.3.3.5 Capital transfer from Rest of the World

In Social Accounting Matrix, RoW account at row is presented as the exchange outflow of home country to RoW. This is the total spending of home country on every import good. The RoW at column shows the home country's foreign exchange inflow, which is export sales of every commodity produced by every industry of the economy. the colume RoW also illustrates the transfer of capital from RoW to the saving-investment account. Based on this definition, the capital transfer from RoW can be written as:

$$S_{RoW} = \sum_{j=1}^n M_j - \sum_{i=1}^n E_i \quad \text{Eq. 5-21}$$

where,

- S_{RoW} : Capital transfer from RoW
- M_j : Import demand for industry j
- E_i : Export good of industry i

Note that the equation above obtained in equilibrium condition and the prices of export and import goods are normalized as unity. The equation also illustrates that capital transfer from RoW is equal to trade balance in term of value but opposite sign.

5.3.4 Production function and firm behavior

As described in the nest of production functions in the Figure 5-4 the production structure in this study includes three levels, illustrated with 3 types of production functions, namely: Constant Elasticity of Substitution preference of Labor and Capital; CES of domestic intermediate input and import intermediate input; and Leontief production function.

CES production function of labor and capital

For the aggregation labor and capital, the firms minimize the cost of inputs subject to Constant Elasticity of Substitution production function:

$$\begin{aligned} &\text{Minimize } wl_j + rk_j \\ &\text{Subject to: } VA_j = \eta_{VAj} \left[\alpha_{lj} l_j^{\frac{\sigma_{VA}-1}{\sigma_{VA}}} + (1 - \alpha_{lj}) k_j^{\frac{\sigma_{VA}-1}{\sigma_{VA}}} \right]^{\frac{\sigma_{VA}}{\sigma_{VA}-1}} \end{aligned} \quad \text{Eq. 5-22}$$

where,

- VA_j : Value added composite good of industry j
- η_{VAj} : scale parameter of industry j
- α_{lj} : calibrated share parameter of labor input among value added composite good of industry j
- l_j, k_j, w, r : labor, capital factors and their wage and rental rate respectively
- σ_{VA} : substitution parameter between labor and capital

This problem is solved by employing Lagrange multiplier method as explained in the previous section. The demand of labor, capital and the dual price of composite good for this production function will be:

$$l_j = VA_j \frac{1}{\eta_{VAj}} \left(\frac{\alpha_{lj}}{w} \right)^{\sigma_{VA}} \left[\alpha_{lj}^{\sigma_{VA}} w^{1-\sigma_{VA}} + (1 - \alpha_{lj})^{\sigma_{VA}} r^{1-\sigma_{VA}} \right]^{\frac{\sigma_{VA}}{1-\sigma_{VA}}} \quad \text{Eq. 5-23}$$

$$k_j = VA_j \frac{1}{\eta_{VAj}} \left(\frac{1-\alpha_{lj}}{r} \right)^{\sigma_{VA}} \left[\alpha_{lj}^{\sigma_{VA}} w^{1-\sigma_{VA}} + (1 - \alpha_{lj})^{\sigma_{VA}} r^{1-\sigma_{VA}} \right]^{\frac{\sigma_{VA}}{1-\sigma_{VA}}} \quad \text{Eq. 5-24}$$

Dual price of VA_j will be: Eq. 5-25

$$P_{VAj} = \frac{1}{\eta_{VAj}} \left[\alpha_{lj}^{\sigma_{VA}} w^{1-\sigma_{VA}} + (1 - \alpha_{lj})^{\sigma_{VA}} r^{1-\sigma_{VA}} \right]^{\frac{\sigma_{VA}}{1-\sigma_{VA}}}$$

Leontief production function of domestic intermediate and value added

In the production structure, the Leontief preference is applied in the level 2 and level 3. The Leontief production function assumes that the combinations of the inputs to produce good are fixed technology. The Leontief in level 2 and level 3 can be combined as follow:

$$\text{Minimize the cost } VA_j P_{VAj} + \sum_{i=1}^n IntM_{ij} P_{IntM_{ij}}$$

Subject to production function:

Eq. 5-26

$$Input_j = \text{Min} \left[\frac{VA_j}{\alpha_{VAj}}; \text{Min} \left(\frac{IntM_{1j}}{\alpha_{IntM_{1j}}}; \frac{IntM_{2j}}{\alpha_{IntM_{2j}}}; \dots; \frac{IntM_{ij}}{\alpha_{IntM_{ij}}} \right) \right]$$

where,

- $Input_j$: Total input goods of industry j
- VA_j, α_{VA_j} : Value added and its proportion in total composite input of industry j
- $IntM_{ij}, \alpha_{IntM_{ij}}$: intermediate-import composite good of industry i and its proportion in total composite input of industry j

The solution for the Leontief production function form will be:

$$Input_j = \frac{VA_j}{\alpha_{VA_j}} = \frac{IntM_{1j}}{\alpha_{IntM_{1j}}} = \frac{IntM_{2j}}{\alpha_{IntM_{2j}}} = \dots = \frac{IntM_{ij}}{\alpha_{IntM_{ij}}} \quad \text{Eq. 5-27}$$

And the price of composite input will be identified by the following equation:

$$P_{Input_j} = \alpha_{VA_j} P_{VA_j} + \sum_{i=1}^n \alpha_{IntM_{ij}} P_{IntM_{ij}} \quad \text{Eq. 5-28}$$

5.3.5 Market clearing

In Computable General Equilibrium Modelling, market clearing condition is an important step to make sure that the total demand and total supply of all industries, accounts meet each other in all markets. Generally, there are two basic condition. The first one is total input and total output are equal in term of quantity and value:

$$X_i = X_i^{hh-gov} + X_i^I + \sum_{i=1}^n x_{ij} \quad \text{Eq. 5-29}$$

where,

- X_i : Armington aggregate/or total supply of industry i
- X_i^{hh-gov} : Demand of households and government on good i
- X_i^I : Investment demand good i
- x_{ij} : Intermediate demand of good i

The second one is, the factor market clearing condition:

$$\sum_{i=1}^n l_j^S = \sum_{i=1}^n l_j^D$$

and

$$\sum_{i=1}^n k_j^S = \sum_{i=1}^n k_j^D$$

Eq. 5-30

where,

l_j^S, l_j^D : Labor endowment (supply) and demand for production of industry j

k_j^S, k_j^D : Capital supply and demand for production of industry j

5.4 The possibility of integrating transportation models into CGE models

This section discusses the possibility of integrating transportation accessibility factors into CGE models to assess their impacts on tourism. Integrating transportation accessibility factors into CGE models has been acknowledged in studies on the economic impacts of transportation by several researchers (Munk 2003; Kim, Hewings, and Hong 2004; Kweka 2004; Kawakami, Tiwari, and Doi 2004; Schäfer and Jacoby 2005; Munk 2006; Ando and Meng 2009; Kim and Hewings 2009; Kim, Kim, and Hewings, 2011). Transportation is not only a central factor linking the demand (market or origin) and supply (production or destination) sides of the tourism industry – in terms of traveling to and from destinations – but it is also an important factor for determining the attractiveness of the destination, and thereby affects demand.

On the supply side, transportation, as well as the attractions, services, information, and promotions available at the destination, are the driving forces behind the supply side of the tourism industry. Every element plays its own role, and harmonic interactions among these five supply side components may strengthen the “pull factor”. As a result of healthy supply side elements, a destination may see increases in the number of arrivals. The travel preference and all the purposes of tourism development will be gained (Gunn and Var, 2002). The role of transportation appears to open up new tourist destinations as well as makes them more accessible (Lohmann and Pearce, 2012). Transportation is therefore a key component in the Resort Development Spectrum (Prideaux, 2000b). Travelers benefit from better transportation accessibility because their trips become easier and more comfortable (Gunn and Var, 2002). Furthermore, a good transportation system to and at

destination can reduce travel costs, making the destination even more accessible due to overall cost savings (Masson and Petiot, 2009; Prideaux, 2000a).

The demand side, which is most often determined by the number of arrivals or overall tourist expenditures (Song et al., 2009), is greatly influenced by a number of determinants, such as: (1) supply side factors, which include attractions, services, transportation, information, and promotions that enhance a destination's attractiveness; (2) tourists' incomes; (3) prices of tourism packages, including travel costs and the cost of living for tourists at the destination; (4) exchange rates, which influence international tourism in the case that a country's currency is devalued, making travel cheaper and increasing demand; (5) trade volume, meaning that the higher trade volume between countries may encourage both business and leisure travel; (6) marketing activities that provide information about a destination; and (7) other factors, i.e. political disturbances, recessions, mega-events, language similarities between origins and destinations (Uysal, 1998). In his research on tourism forecasting, Sheldon (1993) stated that tourism arrivals and expenditures are correlated and, under specific circumstances, that tourism arrivals can be translated into tourism expenditures.

Based on this discussion, it is clear that there are strong links between transportation accessibility factors, which definitely effect to travel costs (in terms of money and time spent), and in tourism supply and demand. From an economic point of view, transportation and tourism products can be presented monetarily. These interactions are best illustrated by CGE models, as they describe the quantitative interdependencies among economic industries, households, and government entities in an area. They can also describe the inter-relations between individual regions and the rest of the world (Leontief, 1986). Integrating transportation accessibility factors into CGE models will help uncover the mechanisms and behaviors of tourism production under a variety of transportation accessibility policies outside of homogenized economic interactions.

In the literature, integrating transportation accessibility factors into CGE models has been utilized in some researches on the transportation-economy relationship. In these studies, the costs of transportation and travel time seem to be used more often than other factors (see in Table 2-1). Munk (2003, 2006) examined the economic impact of transportation policies reflected in taxation, road pricing, and the costs of optimizing road infrastructure.

These studies indicated that implementing these policies can help governments reduce their expenditure on road infrastructure, increase social welfare, and redistribute income from urban to rural households. Kweka (2004) studied the impacts of transportation on tourism and the economy by assuming that transportation infrastructure improvements would reduce the costs of travel, marketing, and distribution, thereby attracting more tourists to the destination. A 10% cost reduction scenario was used in the model to assess the impact of transportation improvements. Regional differentials in price, such as FOB/CIF (Free On Board/Cost, Insurance and Freight), were also studied by Ando and Meng (2009) using data from China. The total costs, including domestic transportation costs for services to the nearest export port and shipping costs, were integrated into the transportation demand calculation, which was then presented with factor inputs through intra- and extra-regional purchases. Schäfer and Jacoby (2005) also assessed the impact of transportation on the economy by examining fuel prices and taxes.

Kim and Hewings (2009), Kim, Kim, and Hewings (2011), and Kim, Hewings, and Hong (2004) incorporated transportation accessibility into their CGE model by using an accessibility index, which was calculated based on the population size and the distance from one region to another. From this index, the scale of transportation demand was estimated by the 'shortest route algorithm'. These authors showed that improvements in the accessibility index achieved through investment in the transportation network can reduce production costs. This action was then integrated into the CGE model.

The economic impact of technology in the context of transportation was also examined in the literature. Kawakami, Tiwari, and Doi (2004) examined ITS impacts in Japan by evaluating road pricing and the extent of information provision to drivers. ITS impacts on the economy were measured using a productivity scenario in which total factor productivity was increased by 20%.

5.5 Framework to integrate Transportation Model into CGE Model

The need to integrate transportation with economic activities

As discussed in the Chapter 1, the roles of transportation in the socio-economy are obvious. Its roles appear not only in the changing of nationwide socio-demographics, national income, national production, and consumption, but also in the changing of regional welfare redistribution, or economic equality. Even though its roles are important,

however, the link between transportation and economic development is one of the key unresolved questions in transportation geography (Preston, 2001). This may be because of the transmission mechanism links from transportation to the economic development are not comprehensively considered yet. Preston (2001), in his proposal for the new millennium researches, emphasized the critical use of CGE model as an appropriate tool to assess the impacts of transportation on household welfare, labor markets, economic factors, as well as production.

Tourism is a special industry in the economy that its activities strongly stick to transportation. For other regular industries, freight transportation is the main actor, but for tourism industry not only freight transportation remains as the main actor for tourism commodities/services demand, but also passenger transportation highly impacts on the travel demand. The integration of transportation into CGE model, therefore, need to consider the freight and passenger transportation roles to the tourism commodities/services and arrivals associates with the interactions with other industries, accounts/sectors in the economy. Considering the integration methods, there are two options: scenario based integration and modeling integration. In term of spatial modelling, there are also two methods to integrate transportation into Computable General Equilibrium Model, which are integrating transportation into regional (or single country) and inter-regional (or multi-country) CGE model.

Integrate transportation model into regional CGE Model

Integrating transportation into single country CGE model will convert the impacts of transport policies into general cost and time changes and see how much these changes impacts on the behavior of government and households in consumption, of firms in production of goods and services as well as interaction behavior between home country and RoW. For investment activities, the additional information on labor, capital, and other inputs are needed to simulate the temporary impacts.

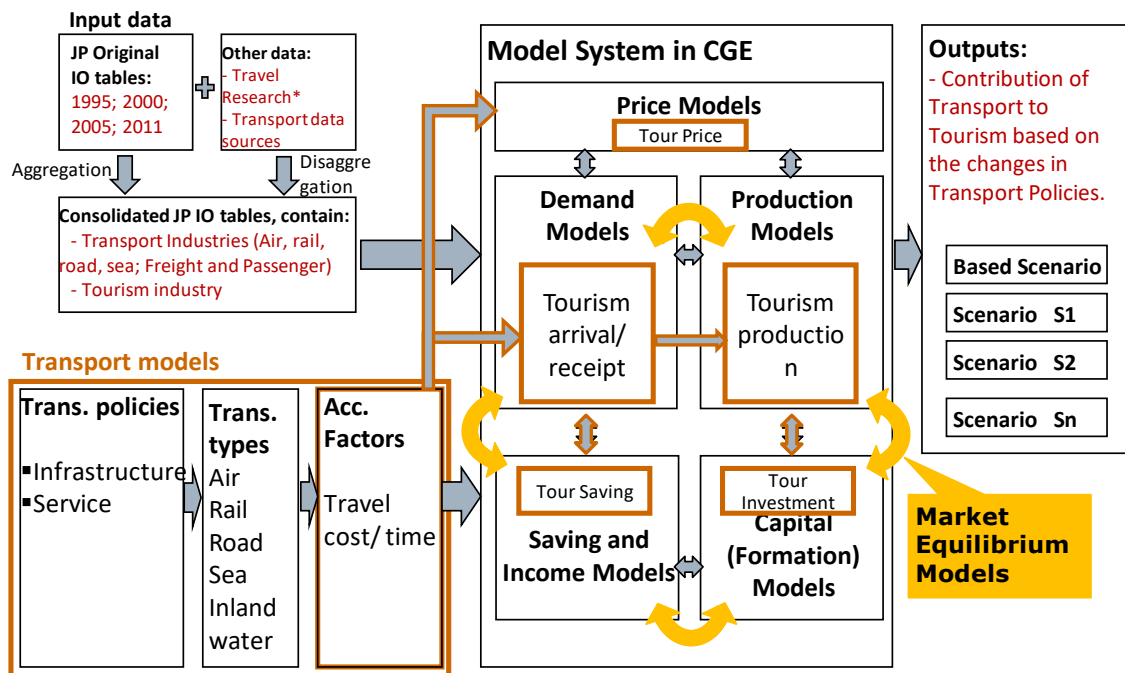


Figure 5-7. Analytical framework for transportation policy analysis for regional model

There are two databases need to be developed for the integration. One database is for CGE modeling, which is known as IO table or SAM; and another one supplies for transportation modeling, which contains transportation traveling data such as OD table and others. Depending on the requirement of the analysis purpose, the databases are designed appropriately. For example, databases the analysis aims at distinguishing the roles of various transportation modes with different types of tourism should contain the variety of transportation modes in both OD table and SAM.

The transportation model will do its duty in converting the transportation policies impacts into time and/or cost changes specified by transportation modes (road, rail, water, air), tourism types (domestic, inbound, outbound), or trip purpose (recreational, business). Since time is also considered as a type of cost, it will be converted into equivalent value in monetary term based on value of time for each type of travelers. The cost changes will be injected into the CGE model. Association with behavior parameters of households, government, and firms, the system of equations in the model will simultaneously simulate the responses of all the bodies in the economy. Once the system reaches to the new equilibrium statement with satisfying the constrain conditions, one can compare the economic criteria of the economy before and after the policy shocks.

Integrating transportation models into Inter-Regional CGE Model

Multi-country/multi-regional modelling not only describes the behavior of government, households, firms of every single region, but also illustrates the interactions among them. To describe this phenomenon the changes of time and costs in pairwise need to be determined. This task can be done by using transportation modeling.

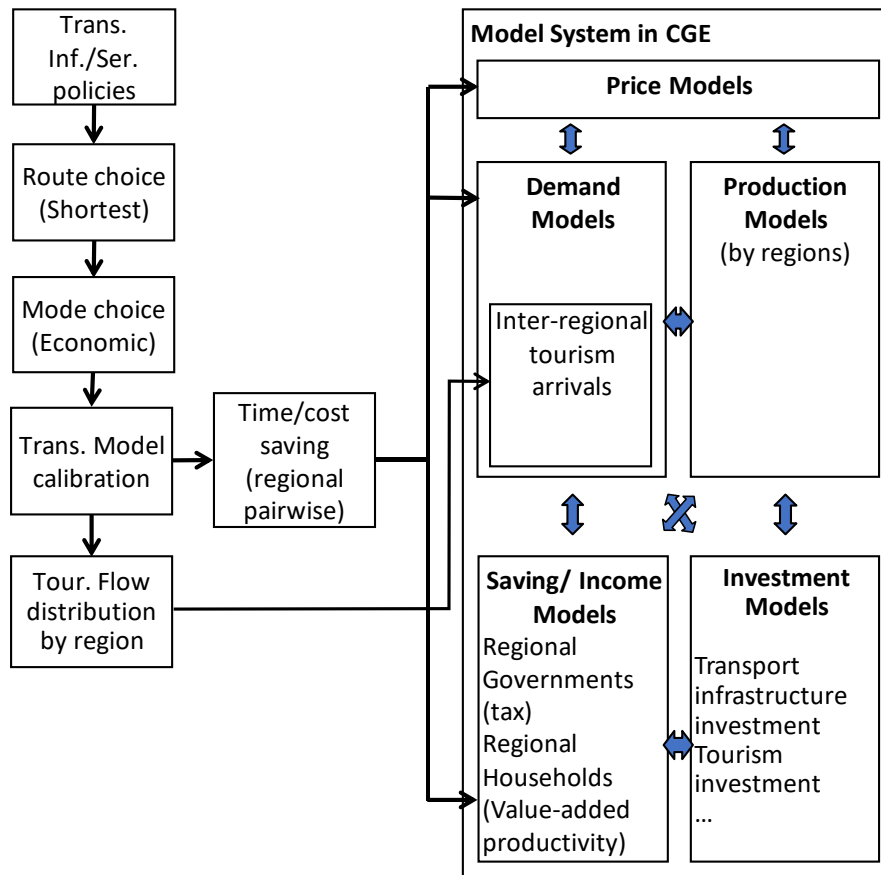


Figure 5-8. Integrating transportation models into interregional Computable General Equilibrium Model

5.6 Potential applications of integrating transportation accessibility factors in CGE models

Research on the impact of transportation policies on the economy has attracted the most attention in recent years (Munk 2003). However, empirical studies that integrate transportation accessibility factors into their CGE models are rare. Among 69 papers surveyed, there are only five integrating transportation accessibility factors into CGE models with functional linkages, 13 with cost saving scenarios based (see Table 2-1). Furthermore, studies that integrate transportation accessibility factors into CGE models to assess the effects of transportation on tourism are still rare. CGE models with integrated

transportation accessibility factors have the following scholarly applications.

First, understanding the underlying mechanisms of the relationship between transportation accessibility and tourism will allow for better illustration of tourism responses commensurate with changes in transportation, and will also allow for more accurate quantification of results. Infrastructure data supplied in monetary terms, which appears in economic IO tables, can lead to misleading interpretations pertaining to transportation investment (Rietveld and Bruinsma, 1998a); therefore, the use of an accessibility index variable integrating into CGE models is suitable to describe the effectiveness of transportation investment (Kim and Hewings 2009). As CGE models illustrate economic interactions among sectors at both the regional and the interregional level, transportation models provide a methodology to determine transportation accessibility effects under alternative transportation policies, and convert these effects into cost or time savings. According to Rietveld and Bruinsma (1998), such changes will affect productivity in firms, and lead to a change in value added, which will in turn lead to GDP growth either regionally or nationally. For the tourism industry, changes in transportation costs affect both the production side and the demand side. Furthermore, greater accessibility provides easier travel access and increases the attractiveness of the tourist destination.

Second, the impacts of different transportation policies on tourism are compared to find the most effective method for developing tourism. It is clear that each policy provides a set of transportation accessibility factors, which generate economic responses once they are integrated into CGE models. As long-haul travel continues to develop, enhanced connectivity among different modes of transportation (air, rail, road, and water) is necessary to provide cost and time savings, comfort, and ease to travelers as they access their desired destinations. The required level of infrastructure investment for all transportation sub-sectors combined (air, rail, road, and water transportation) or the infrastructure investment required to improve single transportation sector alone, is often unmet due to budget constraints. In this scenario, the infrastructure project that provides the strongest economic response in terms of tourism should be prioritized. Since CGE models can describe the economy as well as the interactions among its parts (Mary E. Burfisher, 2011), evaluating transportation policies using this method is appropriate not only for tourism, but also for other industries in the economy.

Third, transportation spillover impacts at sectoral, regional, and inter-regional levels can be high possibility with CGE models. Spillover impacts are defined as the inter-linkages between variables, sectors, or regions of interest (Antonakakis et al., 2015). Miller (1969) argued that the magnitude of inter-regional spillovers is much higher compared with the relatively modest regional feedback effects in the cases that there are strong economic linkages among them. These spillovers are usually lost in regional analyses. Thus, identifying spillovers is an important component when analyzing the relationships among transportation, tourism, and the economy. Economic specifications of different sectors are not unified; therefore, incorporating sectoral specifications, or transportation accessibility factors in this case, is an essential action to improve the accuracy of analyses.

Some studies in the literature utilize CGE models to identify spillovers, but spillovers related to transportation and tourism are rarely acknowledged. Parrado and De Cian (2014) employed a dynamic, multi-sectoral, multi-regional CGE model to assess trade-driven technology spillovers and analyze the interaction between climate and trade policies in the presence of such spillovers. Deng, Falvey, and Blake (2012) developed a static CGE model to evaluate how tax incentives can promote foreign direct investment (FDI) productivity spillovers in China. The results of that study suggest that tax incentives can lead to weaker FDI spillovers in the short term, but only for foreign firms. The surviving domestic firms become more productive and thus more capable of absorbing productivity spillovers. These studies demonstrate that the inter-sectoral, inter-regional redistribution effects can be significant under some circumstances.

Finally, CGE models with integrated transportation accessibility factors may be used as an aggregation tool for forecasting. Although CGE models have not yet become valuable forecasting tools, they could be used in aggregate forecasts to help “policy makers, investors, trade unions and households to form realistic expectations concerning: real wage growth; the costs of capital relative to labor; the industrial composition of economic activity; employment growth in different occupations and industries; and growth rates in different regions” in terms of the entire economy as well as the tourism industry under the impact of transportation policies and other exogenous variables (Dixon and Parmenter, 1996).

5.7 Capability of CGE model in evaluating impacts of transportation policies

Usually, each transportation policy has three types of impacts, the first type represents for the change in the cost, which recognized as the direct money that travelers or good owners (for freight transportation) have to pay for the moving, the second type represents for the change in term of time travelers/goods have to spend during the trips, and the last type includes satisfaction, comfort, preference... Particularly, infrastructure policies often have economic impacts during the construction period due to the utilization of labor, investment, materials ... among others, cost/time changes are known as long-term impacts and the impacts of construction period are short-term; the psychological impacts usually depend on the relative relationship between the physical characteristics along the route, such as landscape, atmosphere, design of route... and the perception of the users.

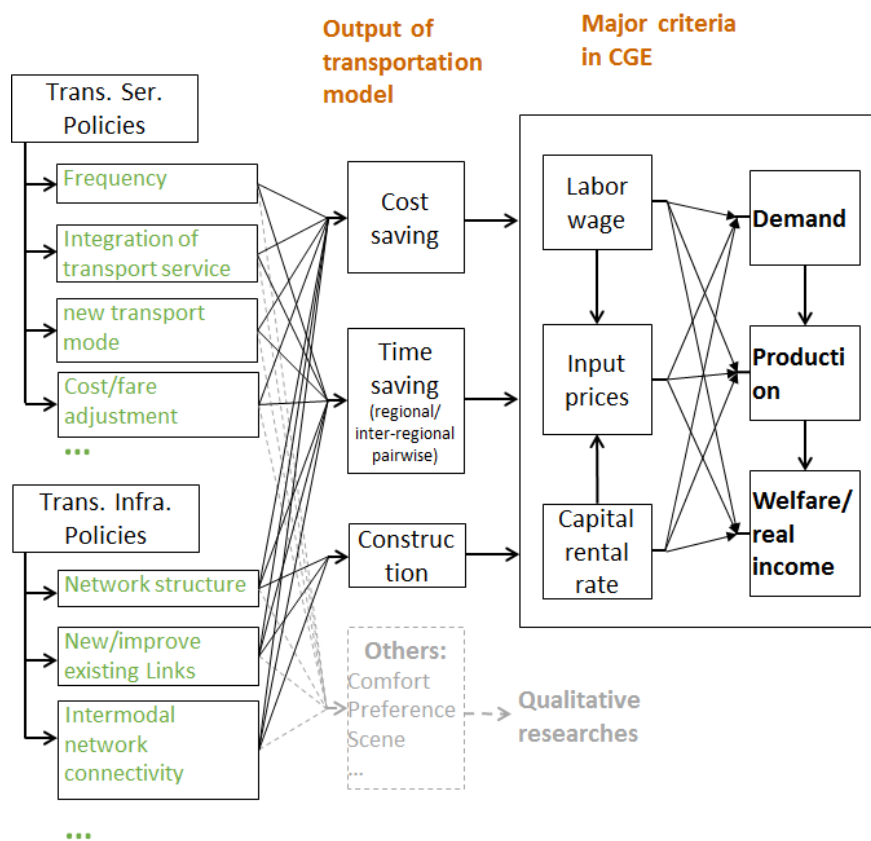


Figure 5-9. Capabilities of CGE model in observing the impacts of transportation policies

CGE model is well capable in observing the impacts of transportation policies in term of time/cost changes and the impacts on the short-term of the construction/investment period

(see Figure 5-9). The impacts as time changes can be converted into the monetary term in some conditions. Depending on the demographical characters of the travelers, the time may be converted into equivalent monetary term through their value of time. Depending on the types of the CGE modeling, for example regional or inter-regional, the time and cost change will be integrated appropriately.

5.8 Challenges to integrate Transportation Model into CGE Model

Although the importance of transportation is acknowledged in empirical studies, its integration into CGE models – to evaluate its wider economic impact, and its impact on tourism in particular – has not yet been achieved to any large extent. Despite the fact that transportation is integrated into CGE models, there are still challenges in incorporating transportation into spatial CGE (SCGE) models (Tavasszy et al., 2011). Researchers should keep the following complications in mind when developing CGE models for the transportation sector:

- SCGE models show spatial interactions between regions, based on a description of their production and consumption levels, but do not describe the choices made with respect to alternative services offered within the transportation system.
- There are inconsistencies between SCGE and transportation models. In transportation models, the production and attraction rates are elastic. The total volume entering or leaving a region shown in these models will differ. These elasticities are endogenous in SCGE models, which limit their transferability to transportation models. This problem can be solved by allowing the two models to reach convergence by feeding spatial patterns of transportation flows from the SCGE model back into the transportation model.
- Limitations in data availability exist.
- Differences in the linkages required between freight and passenger transportation need to be estimated.
- Choosing the correct specification for transportation costs can be challenging.
- Possible inconsistencies exist in trade pattern descriptions between SCGE and transportation models.
- Passenger and freight transportation are linked to overall transportation using different mechanisms.

Despite these challenges in integrating transportation accessibility factors into CGE models, the economic impacts of transportation have been examined in the literature. Two different methods are used. In the first method, scholars create scenarios assumption that transportation impacts with some scenarios of cost changes. This may be an easy way to check the effect of improvements or investments in transportation, but there are not any functional linkages between the improvement results and the scientific numbers. The second method is to estimate accessibility factors based on the real improvements, and then incorporate these changes into the CGE model. The production and demand quantities of industries in economy are functionally affected under the real changes of transportation. Although this method is certainly more complicated, it integrates real transportation activities and assesses changes implicitly, as opposed to the more rudimentary application of economic scenarios.

5.9 Conclusions

Transportation plays a very important role in the development of tourism and the economy as a whole. However, the studies only integrate transportation in a general sense by using cost fluctuation scenarios. Empirical studies on the transportation-economy relationship integrated transportation accessibility factors, but studies on transportation-tourism relationship did not incorporate these factors at all. Some general conclusions can be drawn from this chapter as follow.

First, the theoretical framework that supports the use of transportation accessibility factors in CGE models to estimate the impact of transportation on tourism was barely recognized. This would be a crucial task for researchers who may be interested in applying CGE models in this field of study.

Second, since the first empirical CGE model was formulated by Johansen (1960), CGE models have been applied in tourism-economy and transportation-economy studies, but not widely in transportation-tourism studies. Quantification of the role of transportation in tourism development has not been well developed either. Further development in this area will be necessary for future empirical analyses that wish to integrate transportation accessibility factors into CGE models.

Third, accessibility factors such as travel costs, infrastructure improvements, and information provision were partially considered in some works, while the other accessibility factors were not acknowledged at all. This may be due to the difficulty of measuring and integrating these factors; however, this matter should be addressed in future work.

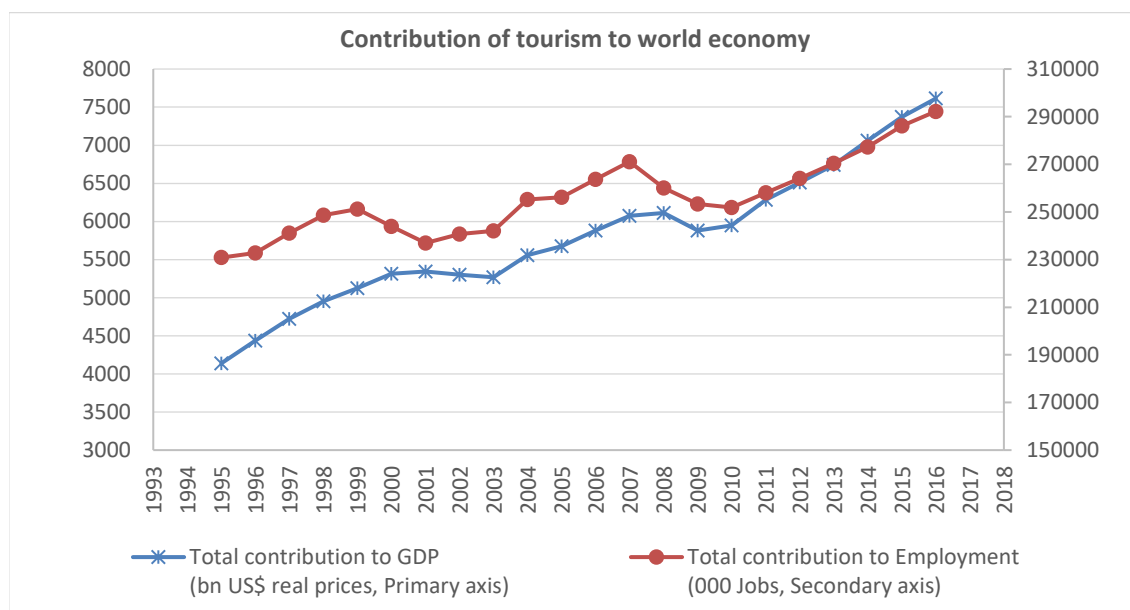
Finally, although many studies have stressed the role of transportation on tourism in a non-technical way, it is very important for decision makers and practitioners to have relevant empirical studies with quantitative data so they can develop transportation policies that effectively promote tourism industries. These studies can serve as excellent tools to evaluate the efficacy of transportation projects aimed at developing tourism.

In summary, this chapter shows that transportation plays an important role in tourism. However, a lack of understanding of the underlying mechanisms of this relationship requires development of new research methodologies and techniques that consider previously unincorporated variables, such as transportation accessibility factors.

6 Transportation policy based to promote tourism

6.1 Tourism situation in Japan

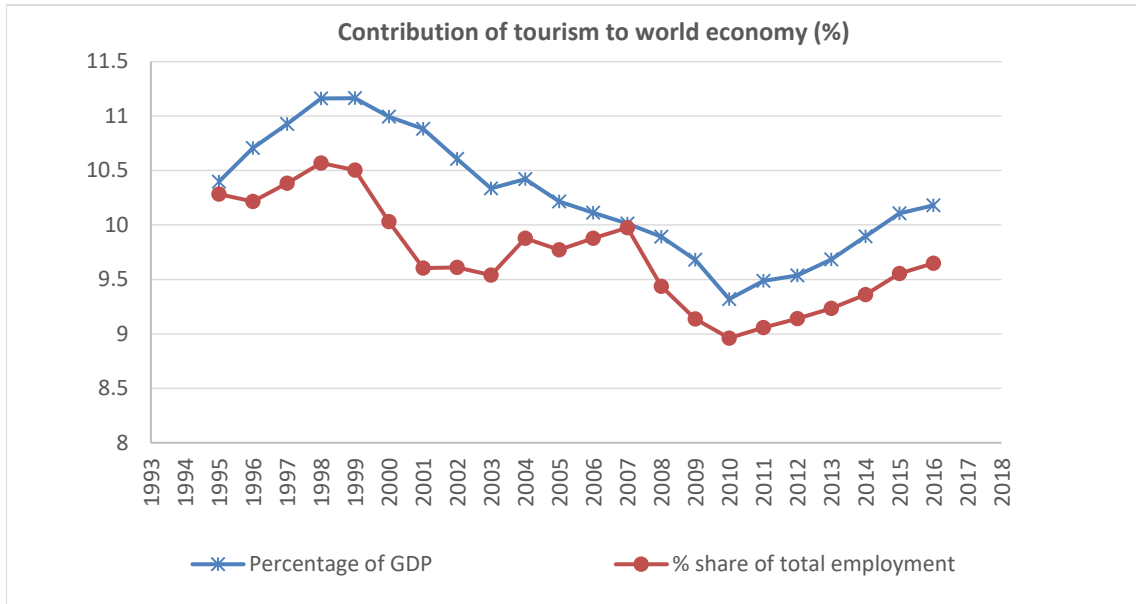
6.1.1 General situation



Source: (WTTC, 2016)

Figure 6-1. Total contribution of tourism to world economy in term of value

In the last decades, the world economy watches the increasingly development of the tourism industry. In 1995, travel and tourism totally contributed to the world economy more than US\$4,138 billion. This figure continuously increased to more than US\$5,674 billion after ten years, 2005. In this year, 2017, its contribution is predicted to increase to more than US\$7,884 billion, equals almost as twice as previous last two decades. In the next ten years, in 2027, its total contribution is projected to approximately US\$11,513 billion. Along with the increase of the contribution to GDP, tourism’s contribution to the world employment is also increasingly as the same manner with the GDP contribution. In 1995, tourism totally contributed 230,838 thousand jobs to the world employment. Every year, its contribution grows more than 1% comparison to the prior year. After ten years, in 2005, its contribution increases to 256,177 thousand jobs. This figure increases to 286,181 thousand jobs in 2015. It is predicted to increase to 381,700 thousand jobs in 2027, equals to 1.65 times in comparison to the last two decades.

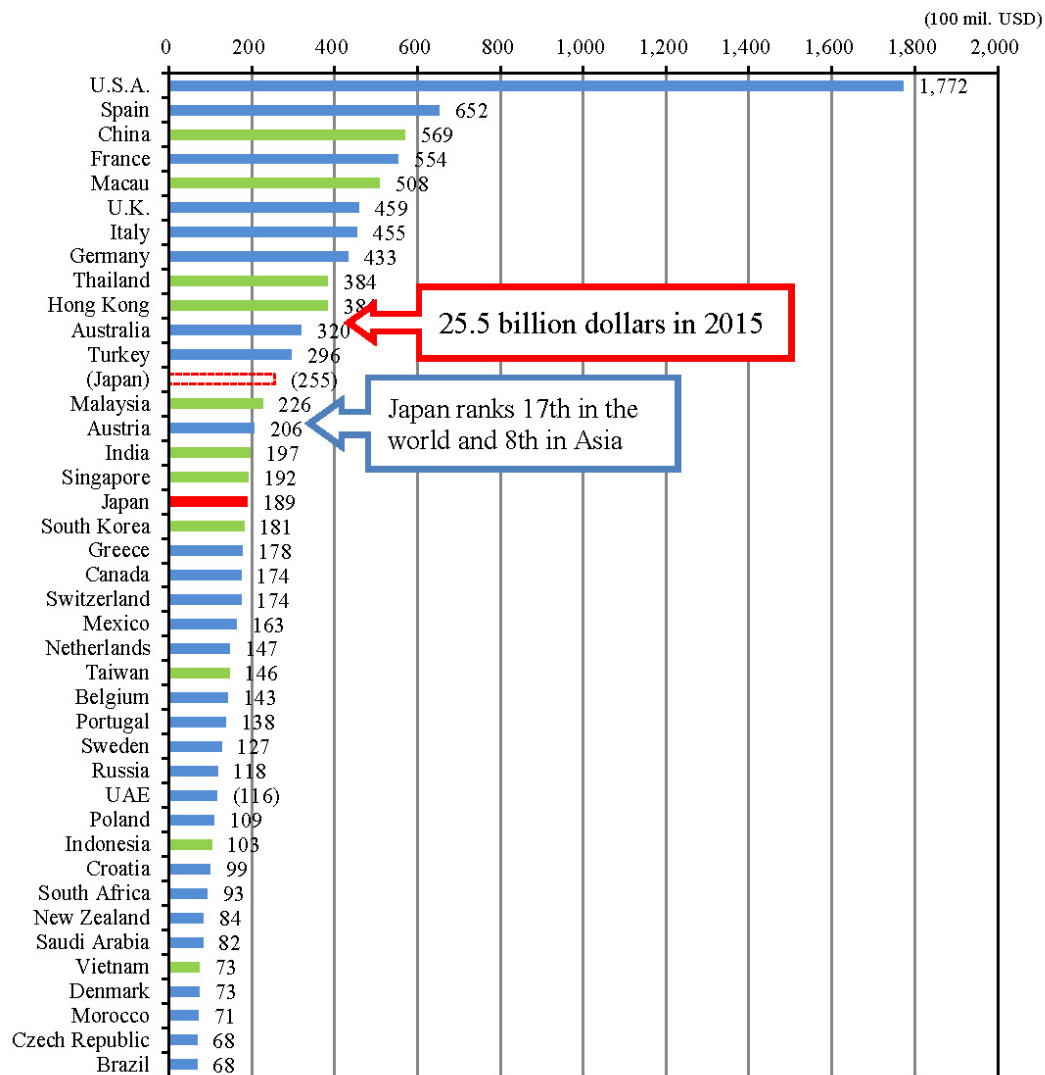


Source: (WTTC, 2016)

Figure 6-2. Total contribution of tourism to the world economy in term of share

In term of the world economy structure, the share of tourism to world economy in both GDP and employment fluctuates during last two decades due to many reasons, such as the economic crisis, climate changes, disasters, disease, ... or the shifts of other industries in the economy. In the late nineties of previous century, the total share of tourism in the world economy seemed reach to peak at the 11.16% of the world GDP. This time, the contribution of tourism to world employment was also reach to 10.57%, the highest proportion over the last two decades. After this peak, the share of tourism in the world economy in term of GDP and employment trended to reduce annually. In 2010, the contribution of tourism is at lowest peak for both GDP (9.32%) and employment (8.96%). After 2010, the contribution of tourism in term of world GDP and employment tend to increase continuously. GDP of tourism occupies from 9.32% in 2010 to 10.18% in 2016 and projected to 11.42% in 2027; employment also increases with the same fashion to GDP, it is from 8.96% in 2010 to 9.64% in 2016 and predicted to continue to increase to 11.13% in 2027.

6.1.2 Inbound tourism and its receipts ranking



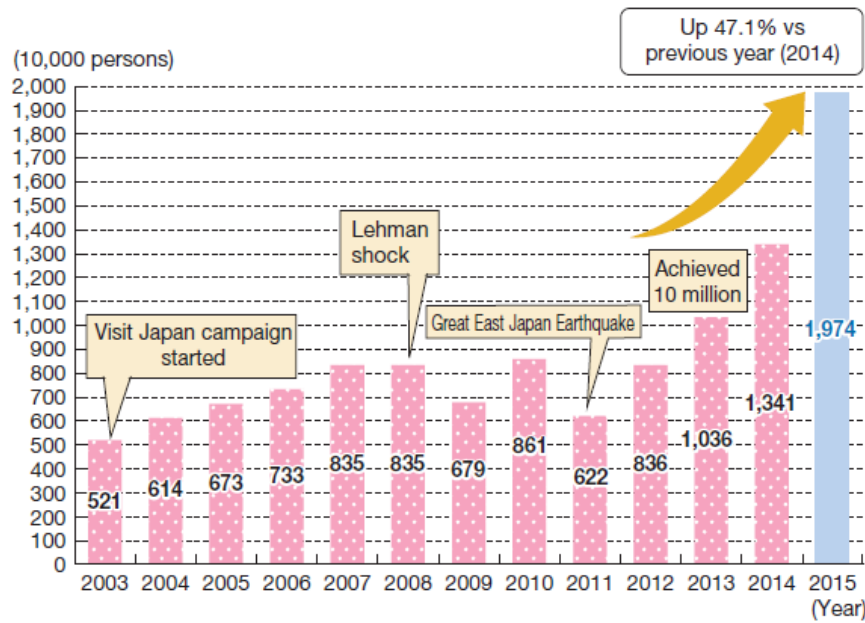
Source: A JNTO's document based on data of the UNWTO and National tourism offices.

Notes:

1. Numbers shown above are provisional values as of June 2015.
2. Values for 2013 were used for the UAE because values for 2014 are unknown.
3. International tourism receipts don't include international passenger fares.
4. Data on international tourism receipts may be updated or modified from time to time. Calculated values of international tourism receipts are affected by changes in the exchange rates of foreign currencies to the U.S. dollar. Thus, rankings are subject to change depending on the timing of data collection.

Figure 6-3. Ranking international tourism expenditure by country/region (US\$100 mil.)

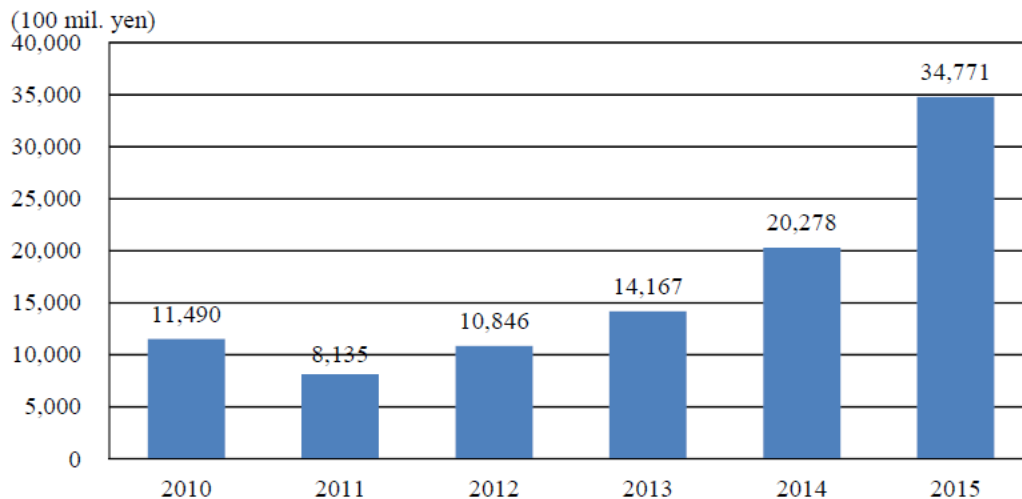
Comparing to other countries in the world, in term of tourism receipt, inbound tourism to Japan is ranked quite high in the world. The information in 2015 indicates that receipts from inbound tourism to Japan is ranked as 17th in the world and 8th among Asian economies. The total spending from foreigner tourists to Japan economy was approximately US\$ 25.5 bn.



Source: JNTO, extracted from White book of MLIT, 2015

Figure 6-4. Trend of inbound tourist to Japan

Figure 6-4 indicates how inbound tourism is effected by the international and domestic events. After the campaign applied to international tourists to Japan started in 2003, the visitors to Japan increases continuously for five years. On September 15th, 2008, the failure of Lehman brothers bank, one of the four biggest investment banks of United State. The effects of bankruptcy of Lehman had rippled throughout global financial markets and of course tourist arrivals to Japan and its receipts were not out of these impacts. A year later, 2009 watched the fall of the inbound arrivals from 8,350,000 to 6,790,000 tourists. Then in 2010, the inbound tourism seemed be recovered to equivalent to that in the year before Lehman’s shock. However, the inbound tourism demand fell down under upon impact of the Great Earthquake happened in 2011.



Source: (MLIT, JTA, 2016)

Note:

- (1) Since the survey was not conducted in the period from January to March in 2010, those values have been substituted for by the average of the values calculated from the period from April to December.
- (2) The value of inbound tourism consumption of 2011 presented in this figure differs to the value used for CGE analysis. The reason maybe because of the difference in the way of estimation. The value used for CGE analysis is estimated based on the average consumption per tourist obtained from the survey multiple with the total number of inbound visitors of the same calendar year.

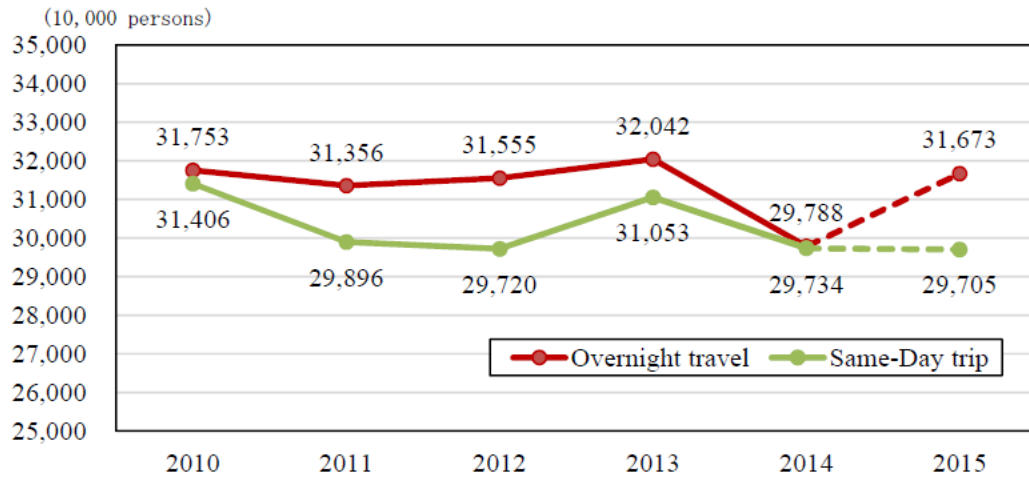
Figure 6-5. Consumption trend of inbound tourism

The same with the fluctuation of inbound tourist arrivals, the inbound tourist consumption in 2011 decreases from JPY 11,490 million to JPY 8,135 million due to the Great Japan Earthquake. After the disaster, the inbound tourist arrivals as well as the inbound tourist receipts rapidly increased. In 2015, after four years, the inbound tourist arrivals were approximately 20 million, equaled to as more than three times as that in 2011. The total receipts from inbound tourism was JPY 34,771,000 million, as more than four times as that in 2011.

6.1.3 Domestic tourism

The same as inbound tourism, domestic tourism in Japan is also effected by the global shocks, and especially the domestic shocks, for instant, Japan Great Earthquake. The Figure 6-6 and Figure 6-7 show the situation of domestic tourism of Japan in five years, from 2010 to 2015 in term of both number of travelers and tourism expenditure. In 2011, since the effect of the Japan Great Earthquake, the tourists fell down from 317.530 million overnight travelers and 314.060 million day-trips to 313.560 and 298.960 overnight and day-trip travelers respectively. Along with the fall down of traveler number, the domestic tourism receipts also decreased from JPY 20.4 to JPY19.7 trillion from 2010 to 2011. After this year, in 2013, the demand of domestic tourism and its expenditure seemed be recovered, to be 320.420 million overnights and 310.530 million day-trips; and domestic

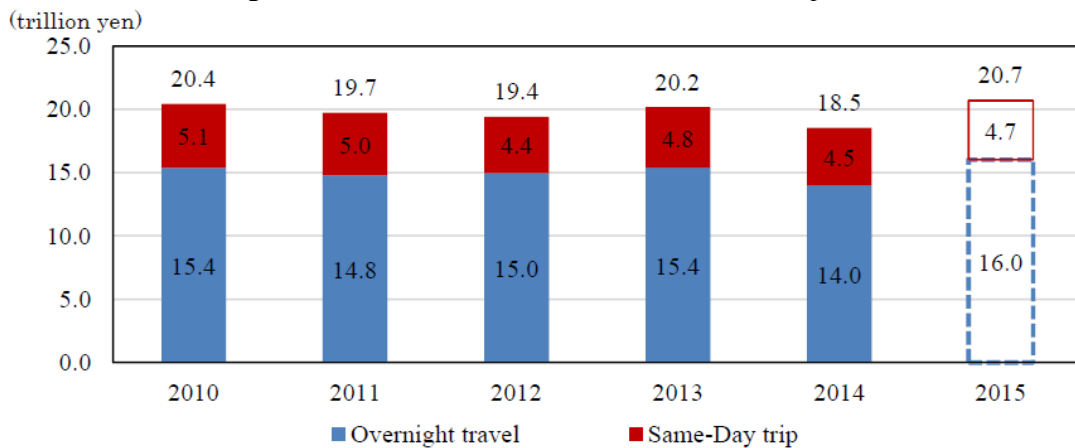
expenditure increased to 20.2 trillion in 2013.



Source: Survey of Trend in Travel and Tourism Consumption (JTA)

Note: Figures of 2015 are preliminary. Note that the preliminary figures in the Survey of Trend in Travel and Tourism Consumption are likely to be greater than the confirmed ones; therefore, the 2015 figures are only calculated for reference

Figure 6-6. Fluctuation of domestic travelers in Japan



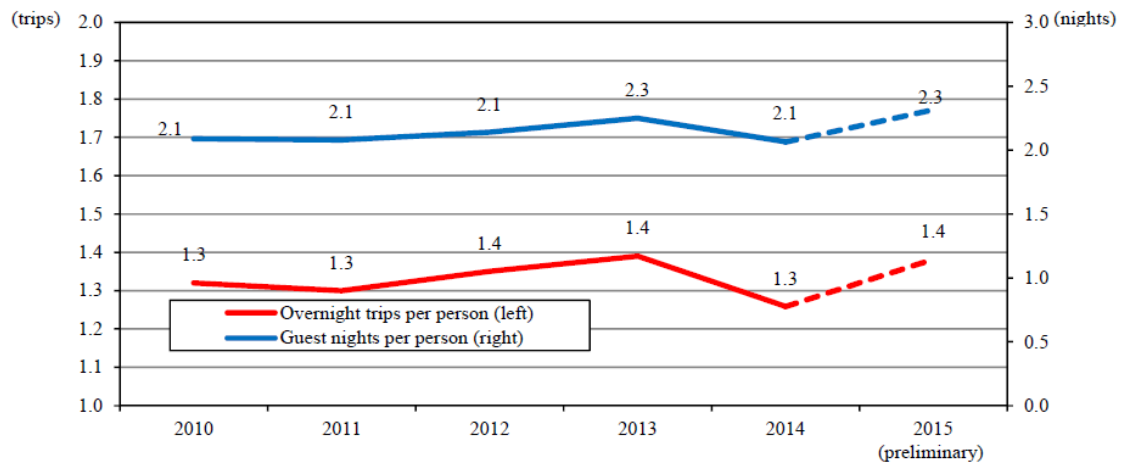
Source: Survey of Trend in Travel and Tourism Consumption (JTA)

Note: Figures of 2015 are preliminary, for reference only. The preliminary figures in the Survey of Trend in Travel and Tourism Consumption are likely to be greater than the confirmed ones;

Figure 6-7. Domestic travelers' expenditure, same-day trips and overnight trips

In 2014, maybe, the Government's decision on consumption tax policy of increasing from 5% to 8%. This decision led the Japanese economy grows negatively for two continuous quarters in 2014. This event is supposed as the main reason led domestic travelers decided to cut down their domestic traveling. During the period from 2013 to 2014, the domestic tourism fell from 320.420 to 297.880 million overnight travelers; from 310.530 to 297.340 million same day-trips. The expenditure also fell down from 20.2 trillion in 2013 to 18.5 trillion JPY in 2014. In the same period, the domestic travelers tend to reduce their

average length of stay. Each traveler reduced their average trip number from 2.3 overnight trips per person in 2013 to 2.1 in 2014.

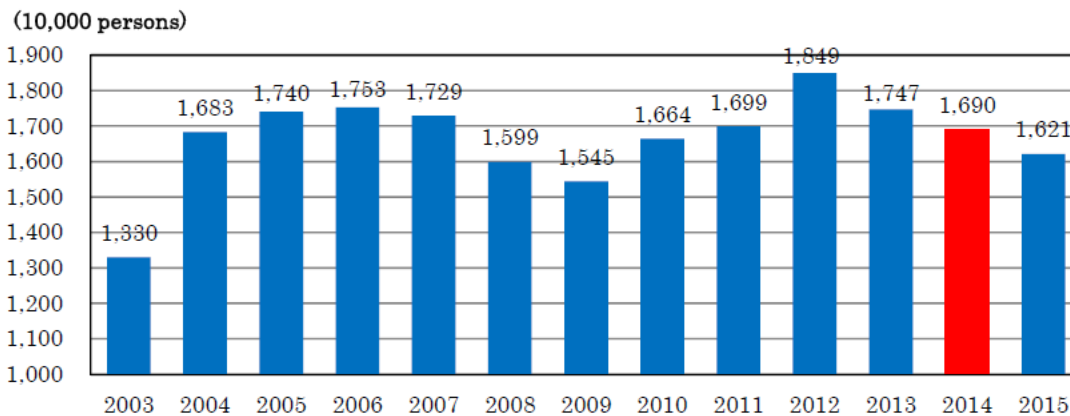


Source: Survey of Trend in Travel and Tourism Consumption (JTA)

Note: Figures of 2015 are preliminary, for reference only. The preliminary figures in the Survey of Trend in Travel and Tourism Consumption are likely to be greater than the confirmed ones;

Figure 6-8. Overnight trips per person and nights per person of domestic tourism

6.1.4 Outbound tourism

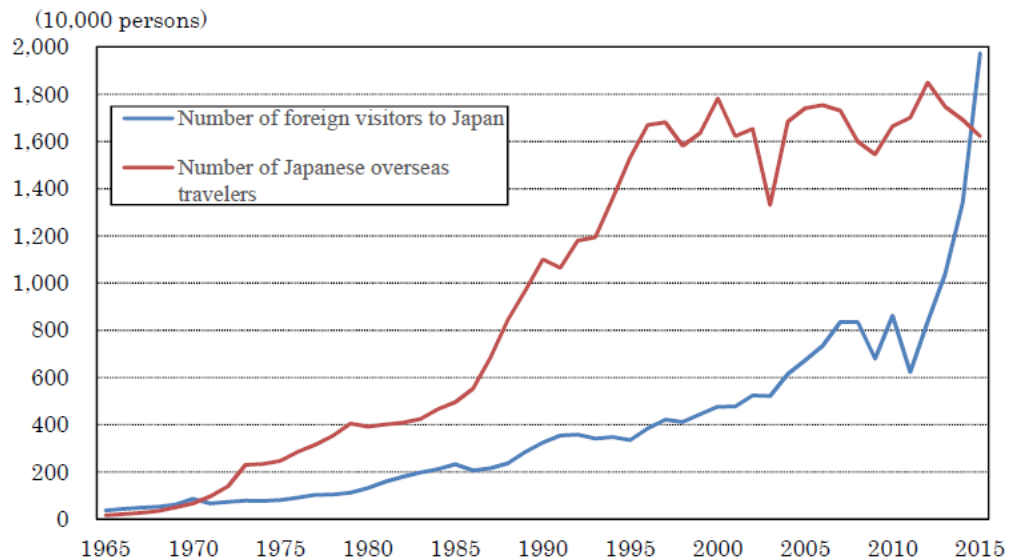


Source: Ministry of Justice, MLIT, JTA (2016)

Figure 6-9. Trend of overseas travel from Japan

Outbound tourism from Japan contains two categories, which are overseas tourists travelling for business and for recreational purposes. Being different to domestic and inbound tourism, outbound tourism has different trend. Since 2003, from 13.3 million overseas visitors, outbound tourism trend to increase continuously to 17.53 million in 2006. At this period, under the global economic crisis, the demand of overseas visitors tended to

go down. It sharply reduced 17.53 million travelers in 2006 to 15.45 million in 2009. Despite the Great Earthquake happened in 2011, it seemed not effect to the demand of the oversea traveling. The oversea demand in 2009 was 15.45 million, continuously increased and reached to peak as 18.49 million in 2012. From this year, the tourism demand trended to reduce every year to more than 16.21 million in 2015.



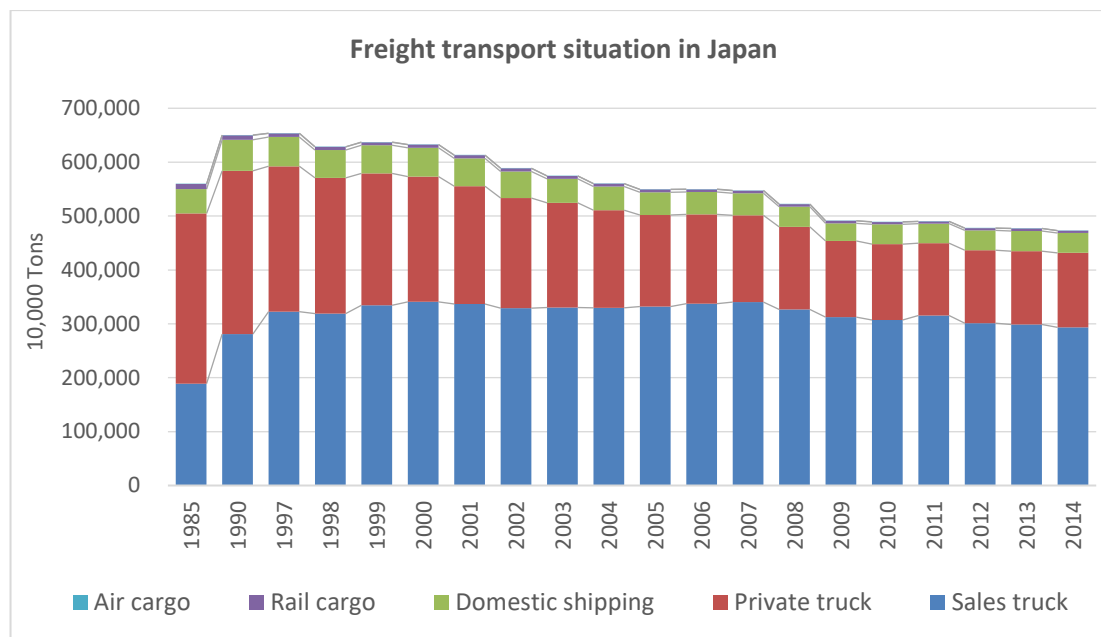
Source: Ministry of Justice, JNTO, MLIT, JTA (2016)

Figure 6-10. Trend of foreign visitors and Japanese oversea

Figure 6-10 illustrates the difference in the trends of inbound and outbound travelers. From 1960s to 2010s inbound tourism demand tended to increase. During late 2000s and early 2010s, under the impacts of global shocks, such as climate changes, economic crisis, and natural disaster, the inbound tourism to Japan fluctuated and then rapidly increased maybe because of inbound tourism campaign promotion. Differing to inbound, outbound tourism increased until 1995 then fluctuated during the time after that. After 2010s, in contrast to inbound tourism, oversea tourism tended to reduce the demand.

6.2 Transportation situation

6.2.1 Freight transportation



Source: Transport Policy White Book, (MLIT, 2016)

Figure 6-11. Freight transportation situation in Japan

Freight transportation in Japan contains four major modes, namely air, rail, domestic water way and road freight transportation. Since the late 1990s, the productivity of freight transportation tended to reduce from 6,536.13 million tons (in 1997) to 4,729.58 million tons (in 2014). The reduction is approximately 28% in one and half decades. Among four freight transportation modes, road freight transportation mode, which includes business and private truck is dominant. It occupies more than 90% among others. Domestic water freight transportation occupies from 7-8% productivity every year. Rail cargo only contributes around 1% of productivity annually. Air freight transportation is very minority to the freight transportation in Japan, it contributes only 0.1-0.2% productivity every year.

Table 6-1. Freight transportation situation in Japan

Unit: 10,000 tons

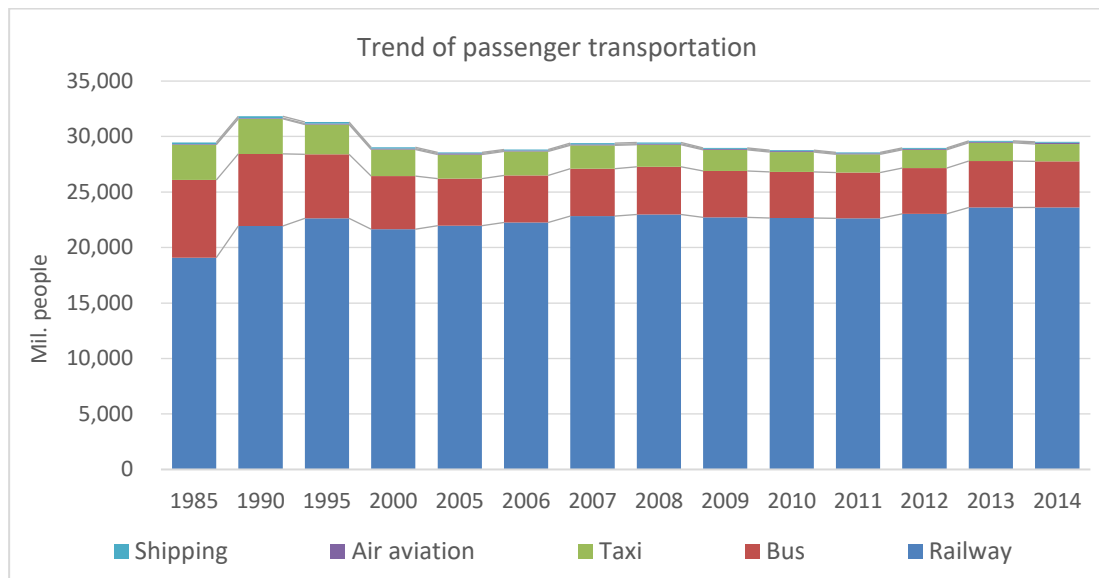
Year	Sales truck	Private truck	Domestic shipping	Rail cargo	Air cargo
1985	189,194	315,611	45,239	9,629	54
1990	280,841	302,991	57,520	8,662	87
1997	322,502	269,943	54,144	6,923	101
1998	319,253	251,631	51,665	6,037	102
1999	334,155	244,693	52,260	5,869	106
2000	340,689	232,251	53,702	5,927	110
2001	336,769	218,506	52,007	5,867	102

2002	329,006	204,216	49,725	5,659	100
2003	330,536	194,081	44,554	5,360	103
2004	329,450	181,312	44,025	5,222	106
2005	332,240	169,413	42,615	5,247	108
2006	337,327	165,516	41,664	5,187	113
2007	340,386	160,848	40,969	5,085	114
2008	326,641	153,103	37,871	4,623	107
2009	312,350	141,168	33,218	4,325	102
2010	306,942	141,078	36,673	4,363	100
2011	315,305	134,390	36,098	3,983	96
2012	301,184	135,409	36,599	4,234	98
2013	298,950	135,626	37,833	4,410	102
2014	293,436	138,148	36,930	4,342	102

Source: Transport Policy White Book, (MLIT, 2016)

Aggregated based on: Railway transport statistics, Car transport statistics, Domestic shipping transport statistics, Air transport statistics, Transport and Tourism General Policy Bureau

6.2.2 Passenger transportation



Source: Transport Policy White Book, (MLIT, 2016)

Aggregated based on: Railway transport statistics, Car transport statistics, Domestic shipping transport statistics, Air transport statistics, Transport and Tourism General Policy Bureau

Figure 6-12. Domestic passenger transportation trend in Japan

Passenger transportation is defined as including daily commuting, such as for work or for school, and traveling for tourism purposes. Figure 6-12 and Table 6-1 describe the contribution of road, rail, air, and water transportation for passenger travel demand. Road transportation includes taxi and bus service, but not include self-driving.

Table 6-2. Domestic passenger transportation trend in Japan

	Unit: Mil people				
Year	Railway	Bus	Taxi	Air aviation	Shipping
1985	19,085	6,998	3,192	44	154
1990	21,939	6,500	3,159	65	163
1995	22,630	5,756	2,703	78	149
2000	21,647	4,803	2,384	93	110
2005	21,963	4,244	2,173	94	103
2006	22,244	4,241	2,165	97	99
2007	22,841	4,264	2,095	95	101
2008	22,976	4,304	1,984	91	99
2009	22,724	4,178	1,909	84	92
2010	22,669	4,158	1,783	82	85
2011	22,632	4,118	1,660	79	84
2012	23,042	4,125	1,640	86	87
2013	23,606	4,176	1,648	92	88
2014	23,600	4,175	1,557	95	86

Source: Transport Policy White Book, (MLIT, 2016)

Aggregated based on: Railway transport statistics, Car transport statistics, Domestic shipping transport statistics, Air transport statistics, Transport and Tourism General Policy Bureau

For passenger transportation, the role of railway is majority and trend to increase since 1980s. In 1985, railway passenger satisfied approximately 65% demand of passenger. The role of this passenger transportation mode continuously increased years afterward. Recently, railway passenger transportation mode takes care approximately 80% of passenger demand. Along with the expanding of railway passenger transportation, road passenger transportation, which include buses and taxis have been narrowed up its market share from 34.6% in 1980s to 19.42% in present. Air and domestic shipping are minorities in the passenger transportation system. The contributions of them in term of trip number at this present time are just about 0.3% each.

It is clearly that for freight and passenger, the different modes appear different role. For freight transportation, road transportation mode is major mode and take care more than 90% in total freight transportation demand. On another side, railway transportation is the major mode for passenger travel demand.

6.3 Scenario design for analysis

6.3.1 Selection of Transportation policy for analysis

February 13, 2015 the Cabinet Office officially approved the Basic Plan on

Transportation Policy for Japan, period from 2014 – 2020 under the Law No. 92 of Dec. 4, 2013 (Transportation Policy Basic Plan, MLIT, 2015). The general transportation policy plan 2014 – 2020 covers aspects to encourage the Japanese economy, reduce environment affects, increase the integration to make traveler more comfortable...etc. The plan also considers carefully the development of transportation to promote inbound, strengthening the domestic tourism, as well as focusing on the Tokyo Olympic 2020 (White Book MLIT, 2015). The structure of the policy plan aims to three basic directions:

First, to realize user-friendly transport that contributes to the rich lives of the citizens, focusing on four points:

- To reconstruct the regional transport networks under local governments' initiatives, coordinating with town planning policies: To vitalize local public transport services under coordination with relevant measures to create active and unique communities, taking into account population decrease, super-aging, and reliance on automobiles.
- To encourage deployment of various transport services taking into account local circumstances: To provide new transport services with convenience, comfort, and efficiency responding to changing society with population decrease and super-aging.
- To make barrier-free transport more familiar: To realize the smooth transportation in the super-aging community and the society where all can participate in, considering Tokyo 2020 Olympic and Paralympic games.
- To further raise the service levels for passenger transport and logistics: To improve worldwide leading field in transporting people & goods to help realize the rich lives of the citizens.

Second, to build up the inter-regional / international passenger transport and logistics networks that create a foundation for growth and prosperity. This direction focuses on:

- To strengthen competitiveness of Japan international transport network: To develop foundation for aviation and maritime transport as a requirement to grow along with Asian and global growth.
- To boost regional flow of people and goods: To help vitalize the entire nation through promotion of the flow of people, including foreigners, and industrialization of and migration to rural areas, by increasing speed and utilizing regional networks.

- To enhance coordination with tourism policies toward receiving 20 million foreign visitors: To help and encourage foreign visitors and domestic tourists who visit all around Japan by improving convenience of transport means, in response to the Tokyo 2020 Olympic and Paralympic games and afterward. In addition, to ease overseas & domestic access to rich tourism assets to raise the value of these assets, and make transport itself into a tourism asset.
- To expand transport infrastructure & services worldwide using Japanese technology and know-how: To contribute to transport problem solving in various locations in the world as well as promoting economic growth and the transport industry of Japan through cutting edge transport technology & know-how.

Finally, to create a foundation of sustainable, secure and safe transport, which aims to:

- To take the most prudent course for large-scale disasters & deterioration of transport facilities: To implement the great natural disaster response plan for Tokyo or Nankai earthquake, etc. based on experience from the Great East Earthquake. Secure sustainable transport services with measures for aging vehicles and infrastructure.
- To enhance transport business foundation for stable & safe operation: Learning from Kan-etsu Highway tour bus accident (2012), JR Hokkaido issue (2013) and Korean ferryboat accident (2014), check service quality, enhance business base, and build good management ethics.
- To secure and foster human resources in the transport sector: To secure, train and develop workforce by encouraging women to join in order to counter labor shortages and decline in technical skills in the transport sector. To ensure the environment for transport network with quality service and create local jobs.
- To proceed with further low carbonization & energy conservation: As 20% of Japan's CO₂ emissions are from transport, improve transport energy conservation toward the low-carbon society, in view of the vulnerability of Japan's energy supply after the Great East Earthquake. Also to work for responses to air pollution, noise and a balanced ecosystem.

Although the basic plan of Japan has action program to promote tourism, it is hard to estimate how much in term of time and cost changes due to the limitation of the detailed information. This section tends to propose some typical scenarios of change the

transportation cost as the results of transportation cost deregulation, then simply inject into the CGE framework to illustrate how transportation cost impacts on tourism industry in macroeconomic view point. The selection of transportation policy scenario is shown in the red frame of Figure 6-13.

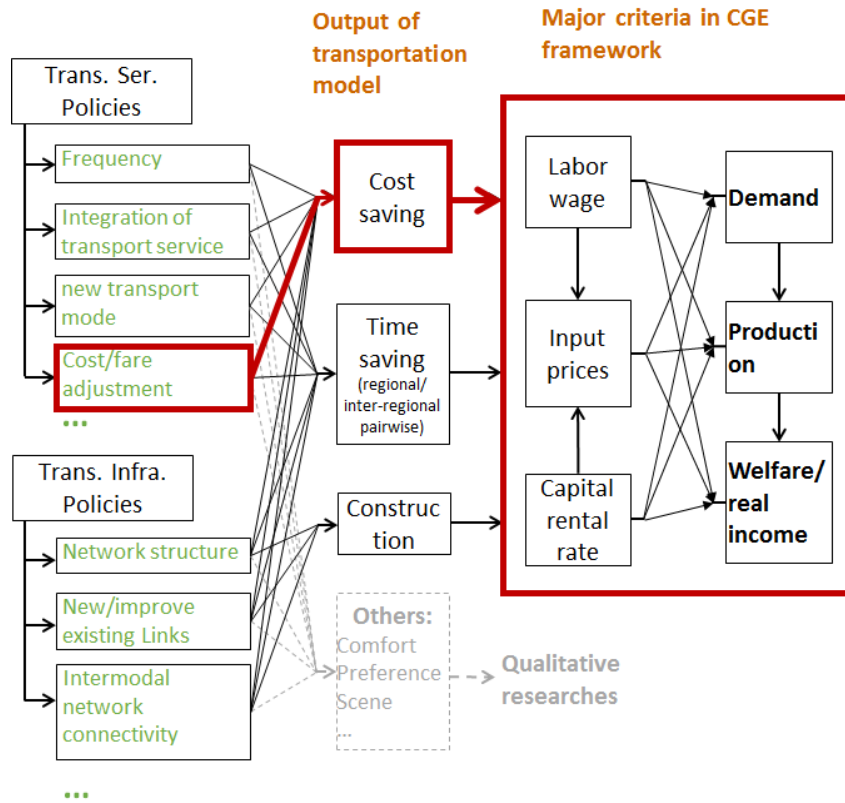


Figure 6-13. Selection of scenario for policy analysis

6.3.2 Scenario design for analysis

As mentioned in previous sections, each tourist has to pay two kinds of costs: the first cost is for the tourism services and commodities, such as food, beverage, accommodation, and recreational services...etc. This cost is directly related to the freight transportation. The second cost is direct money the tourists pay for the transportation services to take them from their origins to tourism destinations, or between and/or within tourism destinations. This second cost is dependent on the passenger transportation. Each transportation type (passenger or freight) includes four typical transportation modes: air, road, water, and rail transportation.

The deregulation of transportation cost is imposed for each type of transportation mode to illustrate its impacts on tourism in term of gross output, demand, welfare,...Each

scenario presents the change of transportation cost of both freight and passenger of corresponding transportation modes, for instance, Scenario 1 illustrates for the change of air transportation cost; Scenario 2 is for the change of road transportation cost; Scenario 3 is for the change of waterway transportation cost; Scenario 4 is for the change of railway transportation cost; and Scenario 5 describes the case that all transportation sectors can reduce their cost (see Figure 6-14).

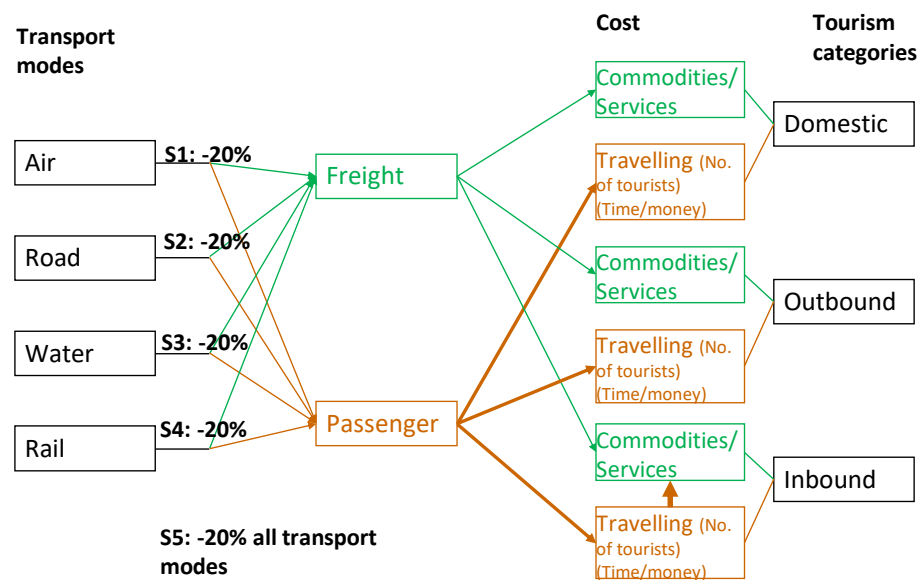


Figure 6-14. Scenario design for transportation policy analysis

For tourism, if we assume that each tourist spends amount of money in average for their needs of services and commodities. The increase of tourism arrivals may then stimulate some expenditure in tourism services and commodities. In this scene, the change in passenger transportation cost impacts not only on number of tourism arrivals but also on the spending in tourism services and commodities. In other word, the tourism commodities and services demand are effected by both freight transportation margin and passenger transportation cost through the changes of tourism arrivals.

6.3.3 Transportation modal share of tourism

Transportation modal share used for transportation - tourism analysis should include freight and passenger transportation. Freight transportation effects on commodities' prices of both non-tourism and tourism industries. Passenger transportation also effects on non-tourism travel, for example, daily commuting to school, to work, and tourism travel. Since daily commuting (to work and/or school) demand does not change much upon on the changes of transportation cost (reduction), this study assumes that the

changes in transportation cost may not affect (much) to the demand of daily commuting but only effects to the travel demand in tourism.

From this scene, the freight transportation modal share is obtained to represent the general share of both non-tourism and tourism industries. Passenger transportation modal shares focus on tourism only and distinguished in three tourism categories, namely air, road, water, and rail transportation (Table 6-3).

Table 6-3. Transportation modal share for freight and tourism passenger

	Air	Road	Waterway	Railway
Freight¹	0.02%	91.80%	7.37%	0.81%
Passenger				
Dom Tour ²	5.21%	63.54%	1.89%	29.36%
Out Tour ³	95.73%	-	4.27%	-
In Tour ³	95.67%	-	4.33%	-

Note:

¹: Traffic policy white paper, MLIT, 2016 (based on the quantity of good)

²: Domestic tourism consumption trend survey, MLIT, 2011 (based on the number of travelers)

³: Domestic/foreign tourism consumption trend survey, MLIT, 2011 (based on the number of travelers)

Freight transportation modal share is in transport quantity term (ton), extracted from Transportation Policy White Book (MLIT, 2016, Table 1-19, P14). For passenger transportation, the modal shares are dependent on the type of tourism. Domestic tourists may include residents who use local transportation modes for their traveling and travelers from other regions who use both inter-regional and local transportation modes for their mobilities. The total consumption of domestic tourism depends on resident tourists and inter-regional tourists. Then the passenger modal share of domestic tourism should represent for both local and inter-regional transportation modes. For this reason, passenger transportation modal share is extracted from tourism consumption trend survey based on the number of travelers use each type of transportation modes in general.

Different to domestic tourists, inbound and outbound tourists utilize international transportation modes (air and water) to move from origins to destination countries, then utilize local transportation at destination for their purposes. During the trip at the destinations, tourists may purchase some services and commodities for their uses. In this situation, if we assume that each tourist spends a specific amount in average for the services and commodities, then the total consumption of these types of tourisms depends

on the number of arrivals to the destinations, which are effected by international transportation. For inbound and outbound tourism, international transportation modal shares will be used as input for the analysis. The modal share information of outbound tourism is extracted from tourism consumption trend survey based on the proportion of number of person utilized the longest transportation modes in their travels. For inbound tourism, passenger transportation modal share is resulted from the aggregation of foreign tourism consumption trend survey with cruise ship statistic. The results are consistency for calendar year 2011.

6.4 Analytical framework and treatment of transportation cost changes in CGE model

6.4.1 Analytical framework

CGE framework contains five major blocks of models: demand, supply/production, saving, and investment models which links each other and links to the prices. Standard CGE model deals with the relative prices between factors and goods, then links the relative changes in prices to the demand, production, saving/investment model. These models behave with the changes of cost simultaneously until equilibrium statement is reached. The explanations and forms of demand, production, saving and investment are in the section 5.3.

In the analytical framework, the transportation margins are determined based on the proposed scenarios and the shares of transportation modes.

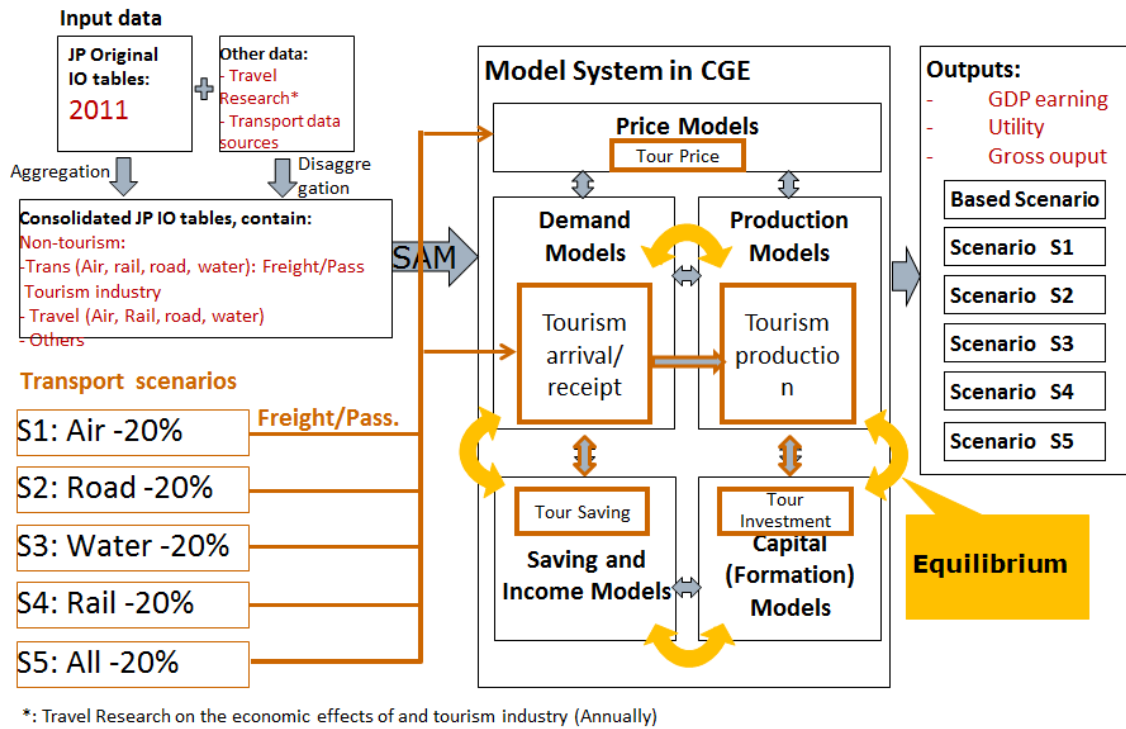


Figure 6-15. Analytical framework for transportation policy analysis

6.4.2 Treatment of freight transportation cost changes in CGE model

In the section 5.3 - CGE Model structure, Tr_i denotes for the transportation margin that industry j , and final demand accounts (government and households) pays for freight transportation sector when purchasing the goods/commodities of industry i . If we set α_{air}^f , α_{road}^f , α_{water}^f , α_{rail}^f respectively denotes for modal share of freight air, road, water, and rail transportation in total gross output X_i . The corresponding transportation margin of each mode will be identified as follow:

$$t_{air\ i}^f = \frac{T_{air\ i}^f}{X_i \alpha_{air}^f} \quad \text{Eq. 6-1}$$

$$t_{road\ i}^f = \frac{T_{road\ i}^f}{X_i \alpha_{road}^f} \quad \text{Eq. 6-2}$$

$$t_{water\ i}^f = \frac{T_{water\ i}^f}{X_i \alpha_{water}^f} \quad \text{Eq. 6-3}$$

$$t_{rail\ i}^f = \frac{T_{rail\ i}^f}{X_i \alpha_{rail}^f} \quad \text{Eq. 6-4}$$

where,

$t_{air\ i}^f, t_{road\ i}^f, t_{water\ i}^f, t_{rail\ i}^f$: Margin of air, road, water, rail freight transportation respectively

$T_{air\ i}^f, T_{road\ i}^f, T_{water\ i}^f, T_{rail\ i}^f$: the total cost industry j and households, government and RoW accounts pay for air, road, water, rail freight transportation sectors respectively when purchase good of industry i

X_i : gross output of industry i

The cost for transportation contains the cost for storage and freight forwarding, denoted by $T_{sf\ i}^f$, the general transportation margin will be then calculated as following:

$$Tr_i^f = \frac{T_{air\ i}^f + T_{road\ i}^f + T_{water\ i}^f + T_{rail\ i}^f + T_{sf\ i}^f}{X_i} \quad \text{Eq. 6-5}$$

From Eq. 6-1, Eq. 6-2, Eq. 6-3, Eq. 6-4, and Eq. 6-5 we can write the general transportation margin as:

$$Tr_i^f = t_{air\ i}^f \alpha_{air}^f + t_{road\ i}^f \alpha_{road}^f + t_{water\ i}^f \alpha_{water}^f + t_{rail\ i}^f \alpha_{rail}^f + t_{sf\ i}^f \quad \text{Eq. 6-6}$$

where,

$t_{sf\ i}^f$: Margin of storage and freight forwarding of transportation that industry j and households, government and RoW accounts pay for air, road, water, rail freight transportation sectors respectively when purchase good of industry i

In this research, policy shocks are applied for the transportation services to bring goods place to place rather than the storage and forwarding. So, the margin of storage and freight forwarding will be kept unchanged during the modelling and it is also not distinguished as in the modal share.

When a shock of margin change Δt (%) in transportation mode(s), the Eq. 6-6 with considering shocks is written as:

$$Tr_i^f = t_{air\ i}^f(1 + \Delta t_{air})\alpha_{air}^f + t_{road\ i}^f(1 + \Delta t_{road})\alpha_{road}^f + t_{water\ i}^f(1 + \Delta t_{water})\alpha_{water}^f + t_{rail\ i}^f(1 + \Delta t_{rail})\alpha_{rail}^f + t_{sf\ i}^f \quad \text{Eq. 6-7}$$

where,

$\Delta t_{air}, \Delta t_{road}, \Delta t_{water}, \Delta t_{rail}$: shock in air, road, water, and rail transportation modes respectively

6.4.3 Treatment of passenger transportation cost changes in CGE model

In SAM 2011 for transportation and tourism analysis, expenditure for passenger transportation services is disaggregated as separated industries in domestic, outbound and inbound tourism. That means 100% of spending of these industries are for traveling services. Then the margins of passenger transportation with shocks are presented as:

$$Tr_{air\ i}^P = (1 + \Delta t_{air}) \quad \text{Eq. 6-8}$$

$$Tr_{road\ i}^P = (1 + \Delta t_{road}) \quad \text{Eq. 6-9}$$

$$Tr_{water\ i}^P = (1 + \Delta t_{water}) \quad \text{Eq. 6-10}$$

$$Tr_{rail\ i}^P = (1 + \Delta t_{rail}) \quad \text{Eq. 6-11}$$

where,

$\Delta t_{air}, \Delta t_{road}, \Delta t_{water}, \Delta t_{rail}$: shocks in air, road, water, and rail transportation modes respectively

$Tr_{air\ i}^P, Tr_{road\ i}^P, Tr_{water\ i}^P, Tr_{rail\ i}^P$: margins of air, road, water, and rail transportation modes respectively after the shocks

6.5 Domestic tourism demand and multiple impact of transportation cost on inbound tourism

6.5.1 Domestic tourism demand

Domestic tourism demand is obtained by maximization of the utility function with subject to the domestic budget constrain of households. Cobb – Douglas (see Eq. 5-10 to Eq.

5-13 for the form and the solution of C-D) constant (unity) elasticity² of demand preference is used to describe this behavior of domestic households. The unitary elasticity of Cobb – Douglas means that if the price of one good, for example tourism souvenir is relative increased 1% compares with daily food, then the demand of quantity of tourism souvenir reduce by 1% compares with the demand of daily food. The Cobb – Douglas unitary elasticity preference also implies that the budget share for each type of good is fixed as its relative price changes. That means, if the budget of households increases by some amount, for example 1%, then the demand of households for every good in their consumption basket positively offsets 1%.

6.5.2 Multiple impact of transportation cost on inbound tourism

The demand of international tourism responses to the individual good/service price can be observed by the notation below:

$$Arr_{Exp}^p = Arr_{Exp}^b \left(\frac{P_{Exp}^p}{P_{Exp}^b} \right)^\xi \quad \text{Eq. 6-12}$$

where,

Arr_{Exp}^p : demand of inbound tourism (arrivals), responses to the policy denoted by abbreviation “p”. In this case, change the policy is the transportation cost deregulation.

Arr_{Exp}^b : demand of inbound tourism at benchmark scenario “b”.

P_{Exp}^b, P_{Exp}^p : price of travel at benchmark and policy applied scenario respectively.

ξ : price elasticity of inbound tourism demand. In the model, it is assigned as -0.6482 under the research of GTAP (Hertel et al., 2014)

Based on the assumption that the consumption demand is stimulated by the relative changes of the tourism arrivals. The inbound tourism demand for tourism goods/services will be multiple of the changes of good/service prices and the demand of arrivals:

² The Elasticity of Substitution is the percentage change in the quantity ratio of good X to Y relative to the change in the price ratio of good Y to X

$$q_{Exp\ i}^p = \left[q_{Exp\ i}^b \left(\frac{P_{Exp\ i}^p}{P_{Exp\ i}^b} \right)^{\xi} \right] \frac{Arr_{Exp}^p}{Arr_{Exp}^b} \quad \text{Eq. 6-13}$$

where,

$q_{Exp\ i}^p$: demand of inbound tourism for the domestic good i , responses to the policy denoted by abbreviation “ p ”. In this case, change the policy is the transportation cost deregulation.

$q_{Exp\ i}^b$: demand of inbound tourism for the domestic good i at benchmark scenario.

6.6 Model closure and procedure

6.6.1 Model closure

Assuming that in the short time, the labor force and the capital of the nation are unchanged. When the transportation shocks are exogenously imposed to the model, the national labor wage and capital rental rate adjust until all the labors are employed and all capitals are used. The labor and capital demand will be then endogenously estimated based on the wage and rental rate until it is equaled to supply.

Dealing with an open economy model, this study firstly identifies the final domestic demand for consumption based on total national income ($Lw+Kr$) and savings (S_{HG}). The demands for investment (I) are estimated as fixed coefficients between domestic final demand for consumption and investment, which calibrated in the baseline SAM. The demands for export goods is determined as a proportion of gross output via export coefficients calculated in CET of domestic and export. Demands of import goods for intermediate inputs are obtained from CES production function between domestic and import intermediate goods. In turn, the capital transfer from RoW (S_{RoW}) is determined as the difference between total import demand and the total export in term of value. In the modelling, the domestic saving (S_{HG}) is assigned an initial value, the investment, export, import is endogenously adjusted to maintain the identity that total savings and total investment are equaled.

6.6.2 Modelling procedure

Relying on the model closure and macro closure, the modelling procedure is described in

the Figure 6-16. The database of the modelling (SAM) is constructed in Chapter 3, behavior parameters are obtained from Global Trade Analysis Project - GTAP (Hertel et al., 2014), the modelling applied in this research follow these steps:

Step 1: Estimation of calibrated parameters (refer section 6.7)

Step 2: Assign to the labor and capital an initial value of wage, rental rate; and domestic saving is also assigned an initial value. To help model faster convergent, the values of labor wage, capital rental rate should be initially assigned as unity; the initial value of domestic saving of households and government is assigned as equaled baseline value (SHG^0).

Shocks of transportation cost/fare deregulation are set.

Step 3: Calculate the industrial good prices P_i following these:

$$[P_1 P_2 \dots P_J] = [B_1 B_2 \dots B_J] \{ [I] - [1 + Tr + Td][A] \}^{-1} \quad \text{Eq. 6-14}$$

$$B_j = a_{0j}(wD_{lj} + rD_{kj}) + a_{mj}P_{mj}$$

where,

- P_j : good price of industry j ($j \in J, j=i$)
- $[A]$: technical coefficient matrix
- a_{0j}, a_{mj} : ratio of value added and import in one unit of input
- D_{lj}, D_{kj} : Demand of labor and capital in one unit of value add composite input
- w, r, P_{mj} : wage, rental rate, and price of labor, capital, and import good respectively
- $[I+Tr+Td]$: diagonal matrix of transportation and trade margin. This matrix form is shown below:

$$[I+Tr+Td] = \begin{bmatrix} 1 + Tr_1 + Td_1 & \dots & 0 & \dots & 0 \\ \vdots & & \vdots & & \vdots \\ 0 & \dots & 1 + Tr_i + Td_i & \dots & 0 \\ \vdots & & \vdots & & \vdots \\ 0 & \dots & 0 & \dots & 1 + Tr_l + Td_l \end{bmatrix} \quad \text{Eq. 6-15}$$

Tr is transportation margin with consideration of shocks, calculated as equation from Eq. 6-7 to Eq. 6-11. Trade margin is determined in the same manner with transportation margin.

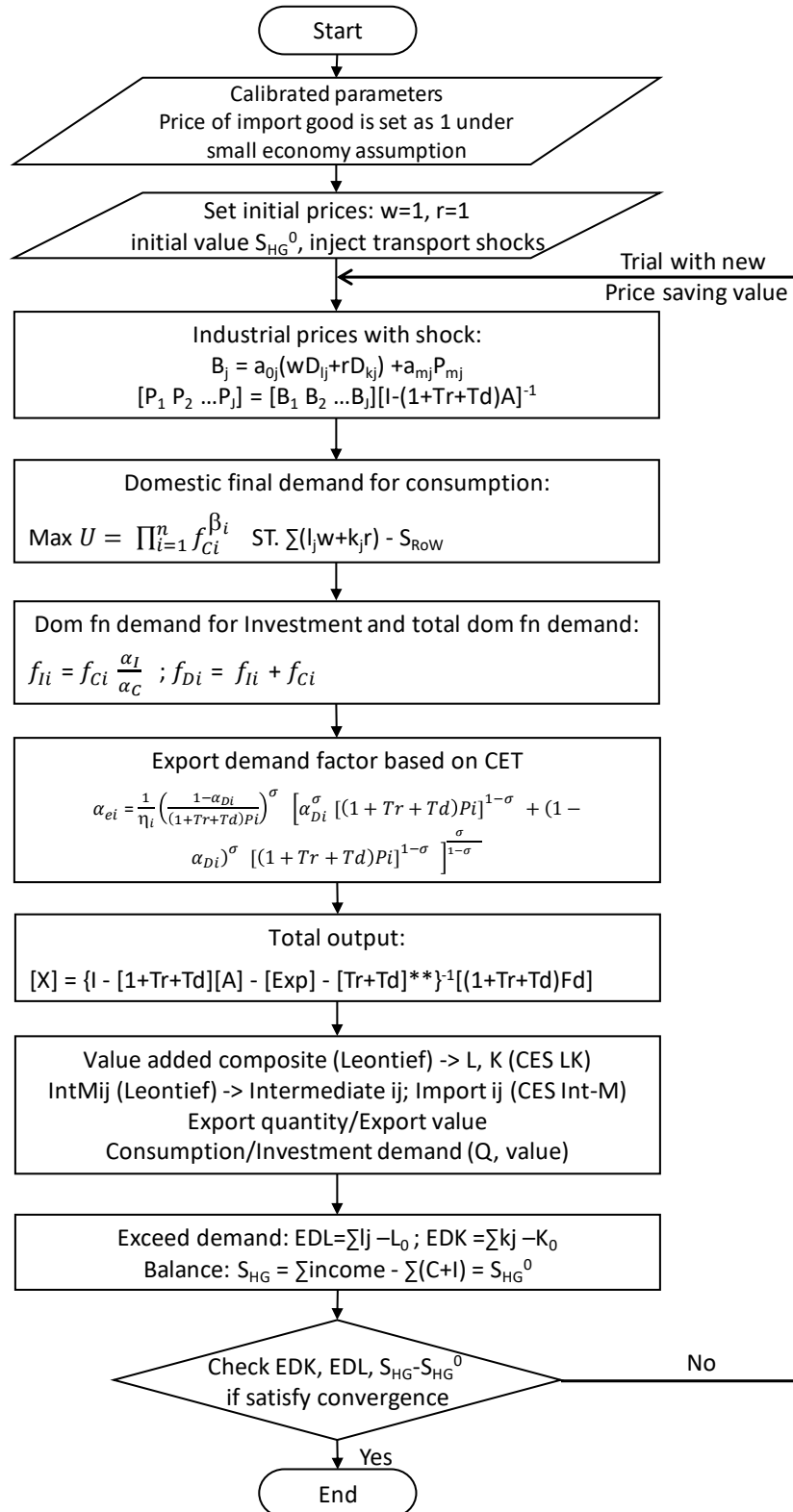


Figure 6-16. CGE Modelling procedure

Step 4: Determine the domestic final demand for consumption based on the Cobb – Douglas utility function explained as in Eq. 5-10 and Eq. 5-11.

Step 5: Determine the demand of investment and total domestic final demand. Since applying one-price principle, the investment demand f_{Ii} will be determined relying on the demand for consumption f_{Ci} , total domestic final demand will be then calculated as summation of demand for investment and consumption, as below:

$$f_{Ii} = f_{Ci} \frac{\alpha_{Ii}}{\alpha_{Ci}} \quad \text{Eq. 6-16}$$

$$f_{Di} = f_{Ci} + f_{Ii} \quad \text{Eq. 6-17}$$

where,

α_{Ii}, α_{Ci} : share of investment and consumption goods in industry i , calibrated from baseline SAM

Step 6: Estimate export ratio in total output based on CET transformation between domestic and export good. From Eq. 5-19, export good of industry i is determined as a ratio (Exp_i) of total output:

$$Exp_i = \frac{1}{\eta_i} \left(\frac{1 - \alpha_{Di}}{(1 + Tr_i + Td_i) P_i} \right)^\sigma \left[\alpha_{Di}^\sigma [(1 + Tr_i + Td_i) P_i]^{1 - \sigma} + (1 - \alpha_{Di})^\sigma [(1 + Tr_i + Td_i) P_i]^{1 - \sigma} \right]^{\frac{\sigma}{1 - \sigma}} \quad \text{Eq. 6-18}$$

Step 7: Determine total output (X_i) of industries

$$[X] = \{ [I] - [I + Tr + Td][A] - [Exp] - [Tr + Td]** \}^{-1} [(1 + Tr + Td)Fd] \quad \text{Eq. 6-19}$$

where,

$[Exp]$: diagonal matrix made from export ratio
 $[Tr + Td]$: matrix made from transportation and trade margin to convert transportation and trade margin into quantity flow
 $[I]$: identity matrix

If we assume that the industry 4 is freight transportation service industry, industry 5 is passenger service, and industry 6 is trade industry, the matrix $[Tr + Td]**$ is then in the

form as bellow:

$$[Tr+Td]** = \begin{bmatrix} t_1 & 0 & 0 & 0 & 0 & 0 & 0 & \dots & 0 \\ 0 & t_2 & 0 & 0 & 0 & 0 & 0 & \dots & 0 \\ 0 & 0 & t_3 & 0 & 0 & 0 & 0 & \dots & 0 \\ -\frac{P_1}{P_4}Tr_1^f & -\frac{P_2}{P_4}Tr_2^f & -\frac{P_3}{P_4}Tr_3^f & -\frac{P_4}{P_4}Tr_4^f & -\frac{P_5}{P_4}Tr_5^f & -\frac{P_6}{P_4}Tr_6^f & -\frac{P_7}{P_4}Tr_7^f & \dots & -\frac{P_n}{P_4}Tr_n^f \\ -\frac{P_1}{P_5}Tr_1^p & -\frac{P_2}{P_5}Tr_2^p & -\frac{P_3}{P_5}Tr_3^p & -\frac{P_4}{P_5}Tr_4^p & -\frac{P_5}{P_5}Tr_5^p & -\frac{P_6}{P_5}Tr_6^p & -\frac{P_7}{P_5}Tr_7^p & \dots & -\frac{P_n}{P_5}Tr_n^p \\ -\frac{P_1}{P_6}Td_1 & -\frac{P_2}{P_6}Td_2 & -\frac{P_3}{P_6}Td_3 & -\frac{P_4}{P_6}Td_4 & -\frac{P_5}{P_6}Td_5 & 0 & -\frac{P_6}{P_6}Td_6 & -\frac{P_7}{P_6}Td_7 & \dots & -\frac{P_n}{P_6}Td_n \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & t_7 & \dots & 0 \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \dots & t_n \end{bmatrix} \quad \text{Eq. 6-20}$$

where,

$t_i = Tr_i^f + Td_i$: Transportation and trade margin if i is freight industry, and
 $t_i = Tr_i^p$: Passenger transportation cost if i is passenger service industry

Step 8: Based on the value of gross output, value added composite and domestic-import intermediate composite are calculated via Leontief (see Eq. 5-26). The demand of factors input, demand of domestic and import intermediate good are determined with CES production preference (see Eq. 5-15, Eq. 5-16, and Eq. 5-22).

Step 9: Determine total demand of labor $L_D = \sum l_j$ and capital $K_D = \sum k_j$ and compare to the national endowment of labor $L_S = L_0$ and capital $K_S = K_0$ to get exceed demand of labor $EDL = L_S - L_D$ and exceed demand of capital $EDK = K_D - K_S$. The households and government savings ($S_{HG} = \sum Income - \sum Domestic\ consumption$) is also compared with the initial value of saving (S_{HG}^0) assigned at the Step 2.

Step 10: Check the convergent condition of EDL , EDK , and $S_{HG} - S_{HG}^0$. If the convergent condition is satisfied, the calculation process will be completed. If not, the wage, rental rate, and the value of households and government savings need to be adjusted for the next trial. The loop will be completed until the convergent is satisfied.

This study applies the convergent condition of EDL^2 , EDK^2 , and $(S_{HG} - S_{HG}^0)^2 \leq 10^{-6}$.

6.7 Model calibration and validation

6.7.1 Concept of calibration

In CGE modelling, there are unknown parameters that represent for the technology and

efficiency of the economy exogenously effect to the results of the model. Modelers cannot operate the CGE without these parameters in hands. To estimate these parameters, the standard econometric methods are not sufficient due to the limitation of the number of observation in comparison with the number of parameters need to be estimate. To solve this problem, we use the technique called “calibration”.

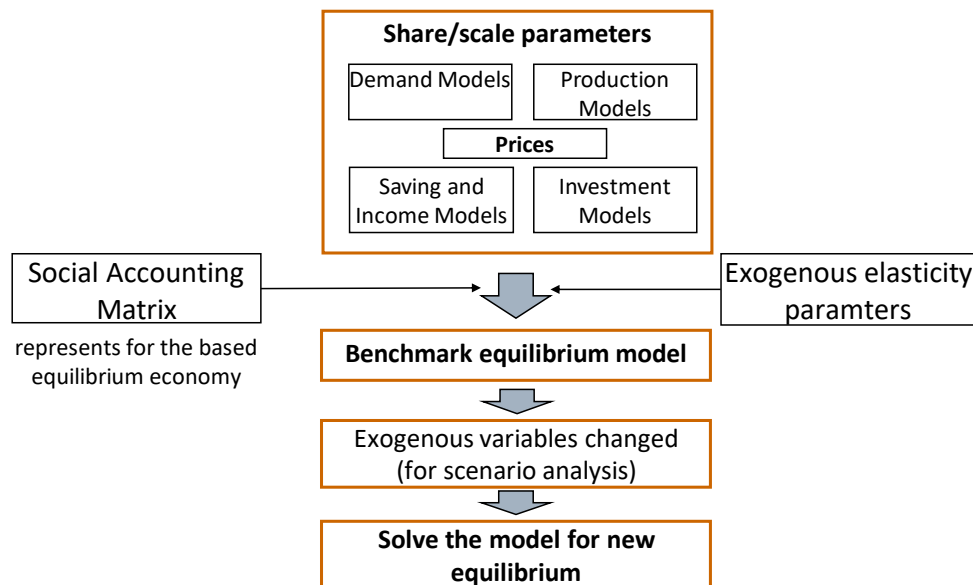


Figure 6-17. CGE model calibration procedure

The Social Accounting Matrix (SAM) database developed for CGE modelling describes all the transactions of the baseline equilibrium economy. This database provides quite comprehensive information but still not enough. There are parameters (elasticity) that illustrate the behavior of firms, households, and government absent. Modelers have several ways to get these. The first way is based on the available data of the research areas (region, nation, worldwide). This approach requires time consuming and great effort for data development. The second way is taking over the existing parameters, which have introduced by valid researches. This study refers the elasticity of Global Trade Analysis Project - GTAP (Hertel et al., 2014). The values of these parameters are presented in the Appendix.

The calibration in CGE model is the procedure to determine the unknown parameters which are representatives for the technology and the efficiency of the economy, so called share and scale (some documents refer as shift) parameters of production, demand, utility... models so that the solutions to the equations (models) replicate the initial

equilibrium as illustrated in the base data (or baseline model shown as SAM). The procedure of the calibration is illustrated in Figure 6-17, the detail functions of the calibration shown in the following sections.

6.7.2 Calibration of CES of factor input L, K

With the form of CES shown in Eq. 5-22, the share parameters of Labor and Capital are calibrated as:

$$\alpha_{lj} = \frac{w_0 \cdot l_j^{1/\sigma_{VA}}}{w_0 \cdot l_j^{1/\sigma_{VA}} + r_0 \cdot k_j^{1/\sigma_{VA}}} \quad \text{Eq. 6-21}$$

$$\alpha_{kj} = \frac{r_0 \cdot k_j^{1/\sigma_{VA}}}{w_0 \cdot l_j^{1/\sigma_{VA}} + r_0 \cdot k_j^{1/\sigma_{VA}}} = 1 - \alpha_{lj} \quad \text{Eq. 6-22}$$

$$\eta_j = \frac{w_0 l_{0j} + r_0 k_{0j}}{\left[\alpha_{lj} l_j^{\frac{\sigma_{VA}-1}{\sigma_{VA}}} + (1 - \alpha_{lj}) k_j^{\frac{\sigma_{VA}-1}{\sigma_{VA}}} \right]^{\frac{\sigma_{VA}}{\sigma_{VA}-1}}} \quad \text{Eq. 6-23}$$

where,

- α_{lj}, α_{kj} : calibrated share parameter of labor and capital input among value added composite good of industry j
- η_j : calibrated scale parameter of industry j in CES LK production function
- l_j, k_j, w_0, r_0 : labor, capital factors and their wage and rental rate at equilibrium condition (based line model) respectively
- σ_{VA} : substitution parameter between labor and capital

6.7.3 Calibration of CES of intermediate and import good

Corresponding to the Eq. 5-14, the calibration of share and scale parameters of CES production of domestic intermediate and import goods is shown in the following functions:

$$\alpha_{intij} = \frac{(1 + Tr_{i0} + Td_{i0})P_{i0}Int_{ij0}^{1/\sigma_M}}{(1 + Tr_{i0} + Td_{i0})P_{i0}Int_{ij0}^{1/\sigma_M} + P_{Mj0} \cdot M_{ij0}^{1/\sigma_M}} \quad \text{Eq. 6-24}$$

$$\alpha_{Mij} = \frac{P_{Mj0} \cdot M_{ij}^{1/\sigma_M}}{(1 + Tr_{i0} + Td_{i0})P_{i0}Int_{ij0}^{1/\sigma_M} + P_{Mj0} \cdot M_{ij0}^{1/\sigma_M}} = 1 - \alpha_{intij} \quad \text{Eq. 6-25}$$

$$\eta_{intMij} = \frac{P_{i0}Int_{ij0} + P_{Mj0}M_{ij0}}{\left[\alpha_{intij}Int_{ij0}^{\frac{\sigma_M-1}{\sigma_M}} + (1 - \alpha_{intij})M_{ij0}^{\frac{\sigma_M-1}{\sigma_M}} \right]^{\frac{\sigma_M}{\sigma_M-1}}} \quad \text{Eq. 6-26}$$

where,

- η_{intMij} : calibrated scale parameter
- $\alpha_{intij}, \alpha_{Mij}$: calibrated share parameter of domestic intermediate and import intermediate input among the composite
- $P_{i0}; Int_{ij0}$: Price and the demand of domestic intermediate good to produce the composite $IntM_{ij}$, these are identified in based line model
- $P_{mj0}; M_{ij0}$: Price and demand of import intermediate good to produce the composite $IntM_{ij}$, these values are also obtained in the base line model
- σ_M : substitution parameter between domestic intermediate good and import good under assumption of Armington (1969)

6.7.4 Calibration of Leontief of value added composite and intermediate-import composite good

Different to CES, Leontief production function contains only share parameters need to calibrate. The share of value added composite good and domestic-import intermediate composite good of Leontief production function (Eq. 5-26) are calibrated as in the Eq. 6-27 below:

$$\alpha_{VAj} = \frac{VA_{j0}}{X_{j0}} \quad \text{Eq. 6-27}$$

$$\alpha_{IntMij} = \frac{IntM_{ij0}}{X_{j0}}$$

where,

- α_{VAj} : Calibrated proportion of value added composite good in total composite input of industry j

- $\alpha_{IntM_{ij}}$: Calibrated proportion of intermediate-import composite good of industry i and its proportion in total composite input of industry j
- X_{j0} : Total input goods of industry j in baseline model, $X_j=X_i (i=j)$
- VA_{j0} : Value added composite input of industry j
- $IntM_{ij}$: intermediate-import composite good of industry i in total composite input of industry j

6.7.5 Calibration of CET of domestic and export goods

As the same as previous function forms, the calibration of CET of domestic and export goods also relies on the baseline model. Apply one-price principle for industrial good i , the share and scale parameters of CET for industry i are presented as:

$$\alpha_{Di} = \frac{D_{i0}^{1/\sigma}}{D_{i0}^{1/\sigma} + E_{i0}^{1/\sigma}} \quad \text{Eq. 6-28}$$

$$\alpha_{Ei} = \frac{E_{i0}^{1/\sigma}}{D_{i0}^{1/\sigma} + E_{i0}^{1/\sigma}} \quad \text{Eq. 6-29}$$

$$\eta_{CETi} = \frac{P_{i0}X_{i0}}{\left[\alpha_{Di}D_{i0}^{\frac{\sigma-1}{\sigma}} + (1-\alpha_{Di})E_{i0}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}} \quad \text{Eq. 6-30}$$

where,

- α_{Di}, α_{Ei} : Calibrated share parameter of domestic and export demand of industry i
- η_{CETi} : Calibrated scale parameter of transformation of industry i
- X_{i0} : Gross domestic output of industry i in the baseline model
- D_{i0} : Domestic supply of i -th industry in the baseline model
- E_{i0} : Export good of industry i in the baseline model
- P_{i0} : Price of good of industry i , this study does not consider exchange rate so the world price and domestic price of good are the same $P_{i0}^E = P_{i0}^D = P_{i0}$

σ : Elasticity of transformation between domestic and export of i -th good

6.7.6 Calibration of Cobb – Douglas utility function

The calibration of share parameters of Cobb – Douglas utility function (Eq. 5-10 and Eq. 5-11) are simply shown as below:

$$\beta_i = \frac{(1 + Tr_{i0} + Td_{i0})P_{i0}f_{ci0}}{\sum(1 + Tr_{i0} + Td_{i0})P_{i0}f_{ci0}} \quad \text{Eq. 6-31}$$

where,

f_{ci0} : consumption of good i in based line model
 β_i : calibrated share parameter of good i in utility function ($0 \leq \beta_i \leq 1$ and $\sum\beta_i=1$)
 Tr_{i0}, Td_{i0} : transport and trade margin of industry i determined in based line model

6.8 Impacts of transportation cost deregulation on nationwide economy

6.8.1 General impacts on nationwide economy

The model which is static and short-run assesses the economic impacts of transportation cost deregulation on cross-industries, and three categories of tourism, such as domestic, outbound, and inbound tourism in term of demand (consumption, investment, and export), gross output, welfare (in actual price, MIC, Japan, 2016, P38). Since the model does not deal with the international trade and taxation, the households and government are combined into one account. In the model, this account illustrates the unique behavior of consumption and investment with the shocks in transportation cost. The gross output is measured in term of value, the demand is measured in term of good quantity. The experiments with five scenarios of transportation cost deregulation shocks are performed. The results of the short-run effects are shown in the Table 6-4, including the real income, which is converted from that in benchmark in cooperation with the change in demand; the utility value got from C-D preference; Equivalent Variance ($EV = \frac{U_1 - U_0}{U_0} Y_0$, where Y_0 is benchmark value of income); and export demand of tourism and non-tourism industries.

Table 6-4. Impacts of transportation cost changes on national economy

Scenarios	S0	S1	S2	S3	S4	S5
	Benchmark	Air -20%	Road -20%	Water -20%	Rail -20%	All -20%
Real National GDP (Mil. JPY)	476,904,203	476,942,319	479,205,886	477,278,708	477,437,756	480,154,109
		0.0080%	0.4826%	0.0785%	0.1119%	0.6815%
Utility	362,460,382	362,489,350	364,209,724	362,745,016	362,865,897	364,930,400
		0.0080%	0.4826%	0.0785%	0.1119%	0.6815%
Increase of Welfare (EV)	-	38,116	2,301,683	374,505	533,553	3,249,906
Gross output (Mil. JPY)	1,022,971,615	1,023,046,498	1,030,157,397	1,024,209,229	1,023,370,779	1,031,879,922
		0.0073%	0.7024%	0.1210%	0.0390%	0.8708%
Export demand (Q)	60,876,184	61,045,524	61,249,190	60,882,225	60,884,716	61,433,296
		0.2782%	0.6127%	0.0099%	0.0140%	0.9152%
Non-tourism export (Q)	59,760,162	59,755,696	60,132,940	59,768,721	59,768,721	60,143,006
		-0.0075%	0.6238%	0.0143%	0.0143%	0.6406%
Tourism export (Q)	1,116,021	1,289,828	1,116,250	1,116,221	1,115,995	1,290,290
		15.5738%	0.0205%	0.0179%	-0.0023%	15.6152%

The results indicate that, in general, the reduction of transportation cost positively impacts to the nation economy. 20% reduction of air transportation cost stimulates 0.008% real income of nationwide; that of road transportation rises 0.4826%; water and rail transportation increase 0.0758% and 0.1119% respectively. In the case, all transportation sectors together reduce the cost of 20%, the impact is slightly higher than the summation of individual's impact, increases 0.6815% of national income in comparison with the benchmark value. The gross output also has the same trend impacts with the real income. The reduction of cost of air, road, water, and rail transportation respectively encourages 0.0073%, 0.7024%, 0.1210%, and 0.0390% of total output. The impact of scenario 5, 0.8708% also shows that the policy applied in all transportation sectors does the light higher impact than the summation of all individual impact of four scenarios.

The results prove the importance of transportation mode to the national economy based on the output of impact. It is easy to understand that, in term of total output, road transportation is the most important to the national economy since it is dominant for freight transportation. Water transportation is the second most important. These two

transportation modes are majorities for manufacturing industries in Japan since it is in-charge for approximately 99% of national cargo transportation. However, in term of welfare, railway transportation brings more real income as well as utility. This phenomenon is maybe because water transportation is the second most majority for freight, but railway is second most majority for passenger travelling service.

6.8.2 Different responses between tourism and non-tourism industries

To distinguish the differences of the impacts of various transportation modes on the non-tourism and tourism industries; and among different tourism industries, the Table 6-5 is prepared. The table indicates that road transportation strongly impacts on the non-tourism industries of the economy in term of both gross output (0.90%) and demand (0.48%). Water transportation is the second-best impacts on non-tourism industries, its importance, in term of economic is stimulating 0.16% of gross output, equals to more than one sixth of road transportation; and 0.08% of demand. Air and rail transportation are minorities for non-tourism industries in term of gross output. The reduction of 20% of cost in air and rail stimulate only 0.01% and 0.06% gross output. In term of demand, the cost reduction of air transportation slightly reduces that (-0.03%) of non-tourism industries. The reduction of air transportation cost makes the wage and rental rate of labor and capital slightly increased, this leads the reduction of demand in some industries.

Table 6-5. Changes in gross output and final demand under the transportation cost changes

No	Industry	Benchmark (Mil. JPY)	S1 Air - 20%	S2 Road - 20%	S3 Water - 20%	S4 Rail - 20%	S5 All - 20%
Gross output							
1	Non-tourism industries	971,622,955	0.01%	0.90%	0.16%	0.06%	1.12%
2	Domestic tourism	19,747,544	0.67%	1.13%	0.22%	1.74%	3.78%
3	Outbound tourism	2,504,652	3.31%	0.42%	0.05%	0.03%	3.85%
4	Inbound tourism	1,116,021	15.59%	0.50%	0.12%	0.04%	16.35%
Final demand (C,I,E)							
1	Non-tourism industries	483,322,886	-0.03%	0.48%	0.08%	0.03%	0.56%
2	Domestic tourism	13,097,565	0.87%	1.07%	0.22%	2.56%	4.73%
3	Outbound tourism	1,240,026	6.32%	0.40%	0.07%	0.03%	6.87%
4	Inbound tourism	1,116,021	15.57%	0.02%	0.02%	0.00%	15.62%

Note: C, I, E denotes for Consumption, Investment, and Export

In contrast to non-tourism industries, tourism industries more sensitively response to the reduction of transportation cost. With the same degree of transportation cost reduction, for example, air transportation stimulates dozens or hundreds of times the gross output of

domestic, outbound and inbound tourism. If road and water are dominant in encouraging non-tourism industries, road and railway are dominant to domestic tourism; and air transportation is strong effecting to outbound and inbound tourism while it is weak effecting to non-tourism industries.

6.8.3 The changes in demand and output of transportation service industries

If the reduction of transportation cost reduces the expenditure industries and households/government pay for their inputs and demand so that positively effects to gross output, welfare of national economy as well as tourism industries; the results shown in the Table 6-6 are the evidences of conversed impacts on output to the transportation service industries.

Table 6-6. Impacts on demand and gross output of transportation service industries under the shocks

No.	Industry	Benchmark (Mil. JPY)	S1 Air - 20%	S2 Road - 20%	S3 Water - 20%	S4 Rail - 20%	S5 All - 20%
I	Gross output						
1	Railway transport (passengers)	4,104,880	0.01%	0.96%	0.18%	-11.64%	-10.62%
2	Railway transport (freight)	121,192	0.03%	-0.68%	0.13%	-16.61%	-17.29%
3	Road transport service (bus, taxi)	2,989,485	0.01%	-2.22%	0.18%	0.08%	-1.96%
4	Road freight transport (except self-transport)	11,994,942	0.03%	-14.50%	0.15%	0.06%	-14.30%
5	International shipping	4,289,454	0.03%	-0.15%	-0.58%	0.03%	-0.66%
6	Coastal and inland water transport (passengers)	124,029	-0.01%	0.80%	-17.33%	0.06%	-16.64%
7	Coastal and inland water transport (freight)	705,911	0.03%	-0.18%	-16.10%	0.04%	-16.29%
8	Harbor transport service	1,961,848	0.04%	0.51%	-10.75%	0.04%	-10.23%
9	International air transport	1,114,879	-17.85%	0.73%	0.14%	0.06%	-17.09%
10	Domestic air transport (passengers)	501,021	-43.18%	0.78%	0.12%	0.07%	-42.66%
11	Domestic air transport (freight)	72,801	-9.22%	0.53%	0.14%	0.06%	-8.62%
II	Final demand (C,I,E)						
1	Railway transport (passengers)	2,631,278	-0.05%	0.13%	0.03%	-0.02%	0.09%
2	Railway transport (freight)	304	-0.05%	0.26%	0.06%	0.03%	0.30%
3	Road transport service (bus, taxi)	1,969,117	-0.05%	0.19%	0.05%	0.01%	0.20%
4	Road freight transport (except self-transport)	1,427,669	-0.05%	0.13%	0.05%	0.02%	0.14%
5	International shipping	2,964,279	0.02%	-0.39%	-0.59%	0.02%	-0.93%
6	Coastal and inland water transport (passengers)	99,443	-0.01%	0.92%	0.15%	0.07%	1.13%
7	Coastal and inland water transport (freight)	4,475	-0.04%	0.42%	0.13%	0.04%	0.54%
8	Harbor transport service	331,916	0.01%	-0.09%	-10.86%	0.02%	-10.93%
9	International air transport	791,149	-0.62%	0.88%	0.19%	0.07%	0.52%

10	Domestic air transport (passengers)	249,985	-0.20%	0.54%	0.16%	0.04%	0.53%
11	Domestic air transport (freight)	11,230	0.00%	0.46%	0.15%	0.03%	0.64%

In the inter-industrial economy, since all activities are strong linked each other's, the payment of an industry will be considered as the incomes of some relevant industries. The reduction of transportation cost means the less payment of industries and households/government account for transportation services. As the result, the incomes of transportation service industries are negatively affected.

With respect to the scenario of experiment, the reduction in the gross output of a transportation service industry is corresponding to the shock in cost of its. For instant, air transportation cost reduction of 20% decreases 17.85%, 43.18%, and 9.22% of the gross output of International passenger air transport, Domestic air transport (passengers), and Domestic air transport (freight) respectively. Domestic passenger air transportation is the most affected by this deregulation. The reduction of road (S2) transportation cost makes gross output of road passenger and freight transportation falling down 2.22%, 14.50%. In the same manner with air and road transportation, the scenario 3 (S3) indicates that the gross output of International shipping, Coastal and inland water transport (passengers), Coastal and inland water transport (freight), and Harbor transport service loss respectively 0.58%, 17.33%, 16.10%, and 10.75% due to the deregulation of water transportation. Railway transport (passengers), Railway transport (freight) loss 11.64%, 16.61% of gross production under the fall 20% of rail transportation cost.

6.9 Impacts of transportation policies on tourism

The economic impacts of transportation cost reduction on the tourism industries are presented in these following sections. The changes in the gross output and demand of tourism industries upon the changes in the transportation cost will be explained in cooperation with the transportation modal share. The impacts are results of both freight and passenger transportation shocks imposed on the tourism commodities/services.

6.9.1 Impacts on domestic tourism

The Figure 6-18 and Table 6-7 visually show the increases in gross output and demand of domestic tourism under five scenarios of transportation cost changes. The transportation modal share data in Japan indicates the significant role (91.80%) of road

transportation on cargo; although covered with water in four-side, water transportation only occupies a modest proportion (7.37%). Railway is developed system, but aims to serve the demand of travelers rather than for cargo, the railway slightly (0.81%) contributes to cargo transportation while air transportation contributes very small amount of freight of the economy.

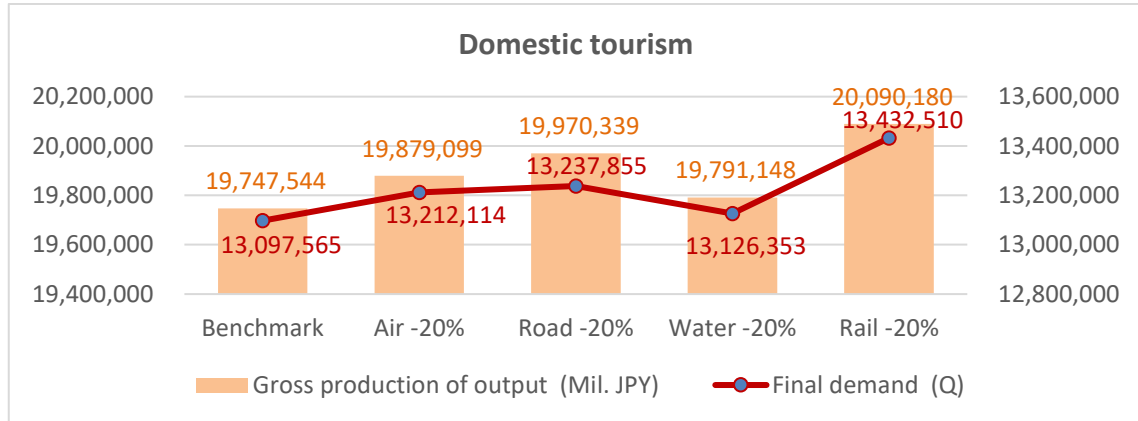


Figure 6-18. Impacts of transport cost reduction on domestic tourism

The road is not only dominant in freight but also significant in passenger transportation for domestic tourism in term of traveler number. Nevertheless, number of travelers is half of road passenger transportation, the expenditure that domestic tourists pay for railway passenger transportation is as four times as road. The results in Figure 6-18 and Table 6-7 show that road and rail transportation strongly impact on domestic tourism in comparison with air and water transportation. Link the results with the modal share we realize that although railway serves less than half of number of tourists comparing with road, but due to the large receipt of rail passenger transportation from tourists, then the impacts of rail transportation cost reduction 20% on gross output and demand is much higher than those of road transportation.

Table 6-7. Impacts of transport cost reduction on domestic tourism

	S0	S1	S2	S3	S4	S5
	Benchmark	Air -20%	Road -20%	Water -20%	Rail -20%	All -20%
Gross output (Mil. JPY)	19,747,544	19,879,099	19,970,339	19,791,148	20,090,180	20,494,105
% change		0.6662%	1.1282%	0.2208%	1.7351%	3.7805%

Final demand (Q)	3,097,565	13,212,114	13,237,855	13,126,353	13,432,510	13,717,303
% change		0.8746%	1.0711%	0.2198%	2.5573%	4.7317%

Taking a look at air transportation we will see the same phenomenon, it contributes only 0.02% in the total cargo demand of Japan in 2011 and serves only 5.21% the domestic tourists, but the reduction of 20% of its cost can encourage 0.6662% of domestic gross output, equals to half of road transportation, one-third of railway and encourages 0.8746% of domestic tourism demand, a little lower than the road transportation (1.0711%), approximately equals to one-third of the impact of rail on the final demand.

6.9.2 Impacts on outbound tourism

Easier than domestic tourism, the impacts of transportation on outbound tourism is easy to distinguish between transportation modes. For outbound tourism, air transportation seems to be the choice of almost tourists (95.73%), some others choose ocean transportation for their overseas trips. Road, railway, and even domestic air transportation are used in domestic trip segments.

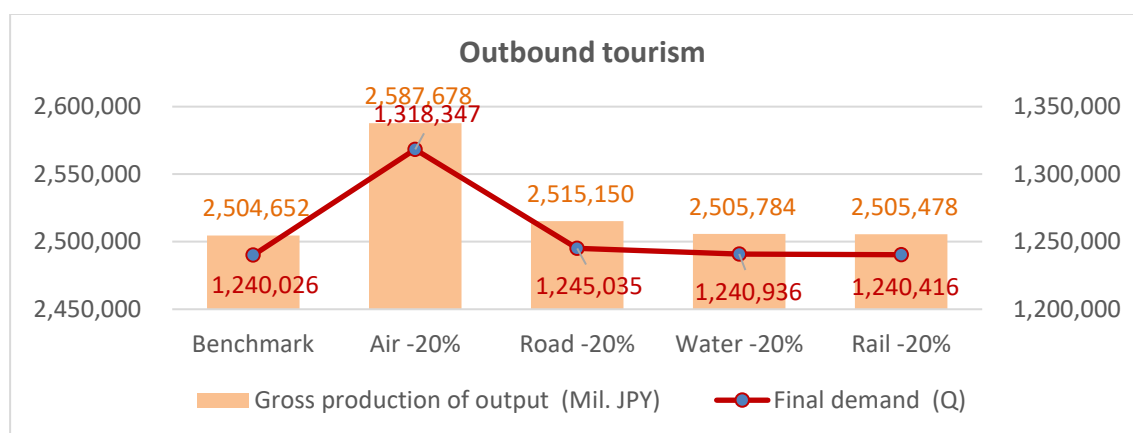


Figure 6-19. Impacts of transportation cost reduction on outbound tourism

For overseas tourism trips, the expenditure is divided into two parts, the domestic spending amounts and the spending amounts of Japanese that take place in other countries, which is considered as tourism commodities/services imported. Some spending items contain overseas spending larger than those in domestic, as the results total spending become negative showing the leakage to the economy of the outbound tourism. For Input-Output analysis, both amounts are presented explicitly to study on the interactions between industries in the economy. Anyway, in CGE modelling, the overseas spending is

aggregated into other import items.

Table 6-8. Impacts of transportation cost reduction on outbound tourism

	S0	S1	S2	S3	S4	S5
	Benchmark	Air -20%	Road -20%	Water -20%	Rail -20%	All -20%
Gross output (Mil. JPY)	2,504,652	2,587,678	2,515,150	2,505,784	2,505,478	2,601,129
% change		3.3149%	0.4192%	0.0452%	0.0330%	3.8519%
Final demand (Q)	1,240,026	1,318,347	1,245,035	1,240,936	1,240,416	1,325,157
% change		6.3160%	0.4039%	0.0734%	0.0315%	6.8653%

The reduction of air transportation cost sharply stimulates the gross output (3.3149%) and demand (6.3160%) of overseas tourism industry since it appears as the major mode to bring tourists to the international destinations. The air transportation policies directly effect to the traveling demand of tourists. In contrast, the road, water, and rail transportation cost reduction may stimulate only the demand of consumption/investment for tourism commodities and services through the reduction of the prices of domestic industrial goods. Road, rail do not encourage the travel demand of outbound tourism. The transportation cost deregulation of 20% rise 0.4192% gross output, 0.4039% demand (for road); 0.0452% gross output, 0.0734% demand (for water); and 0.0330% gross output, and 0.0315% demand (for railway). If all transportation modes apply the shocks in the same time, the outbound tourism would get 3.8519% higher in gross output and 6.8653% higher in demand.

6.9.3 Impacts on inbound tourism

Inbound tourism industries are special cases of the economy. The firms hire labor and capital from households/government and buy intermediate input from other domestic industries for the production. After this process, all the goods/services are produced to satisfied the demand of inbound travelers, no good/service is sold for domestic industries/sectors as intermediate or final demand. In Input-Output table and SAM inbound tourism industries are disaggregated separately with other industries to indicate this characteristic.

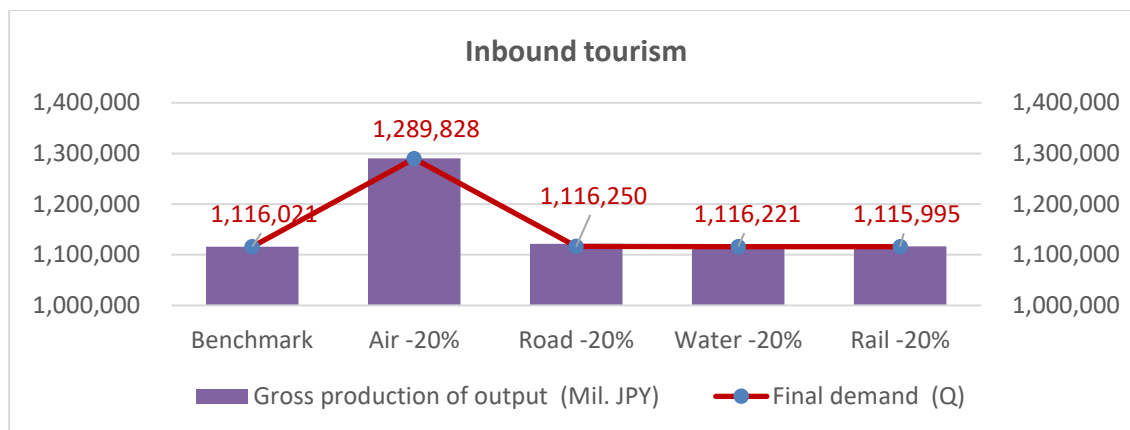


Figure 6-20. Impacts of transportation cost reduction on inbound tourism

As the same as outbound tourism in term of transportation mode, most of inbound tourists (95.67%) choose air transportation to come to Japan, other small amount (4.33%) choose to come to Japan by international shipping. Gross output and demand of inbound tourism are effected multiply by both number of arrivals of foreigners and the changes of tourism commodities and services (see more detail of multiple impact explanation in section 6.5, P133).

Table 6-9. Impacts of transportation cost reduction on inbound tourism

	S0	S1	S2	S3	S4	S5
	Benchmark	Air -20%	Road -20%	Water -20%	Rail -20%	All -20%
Gross output (Mil. JPY)	1,116,021	1,290,022	1,121,551	1,117,361	1,116,427	1,298,443
% change		15.5912%	0.4955%	0.1200%	0.0364%	16.3457%
Final demand (Q)	1,116,021	1,289,828	1,116,250	1,116,221	1,115,995	1,290,290
% change		15.5738%	0.0205%	0.0179%	-0.0023%	15.6152%

The Figure 6-20 and Table 6-9 show the results of multiple impact of arrivals and industrial good prices on the gross output and demand of inbound tourism as the result of air transportation cost changes. The deregulation of 20% of air transportation cost sharply stimulates gross output (15.5912%) and demand (15.5738%) of inbound tourism. Road and rail as well as coastal water way stimulate the consumption of tourism commodities and services through reducing the prices. The degree of the growth depends on the role of the transportation mode to the economy in term of modal share. The reduction of road transportation cost (20%) contributes to gross output 0.4955%, to demand 0.0205%;

water transportation contributes less than road transportation, 0.12% to gross output and 0.0179% to demand. The reduction of rail transportation cost slightly raises the total output of production while a little reduces its demand. The phenomenon is given by the increase of the input prices such as labor and capital, then makes the domestic industrial prices a little higher than those in the baseline model. Finally, the reduction cost shock in rail transportation a little reduce the final demand. Nonetheless, this reduction of demand in inbound tourism is too small and can be neglectable in comparison with positive impacts on the nationwide economy.

6.10 Sensitivity analysis

6.10.1 Concept and scenarios for sensitivity test

In CGE modeling, there are two kinds of parameters are exogenously imposed to operate the model: share and scale parameters and behavior parameters. The CGE model in this study contains the behavior parameters of constant elasticity of substitution (CES) parameter between domestic and import goods, CES parameter transformation between domestic and export goods, CES parameter between labor and capital, and demand elasticity of tourism export. Share and scale parameters can be obtained by calibration method based on every single period data, such as SAM. However, calibration method only allows to quantify the accuracy of the calibrated scale and share parameters, it does not get involved in the checking the validity of the behavior parameters. Sensitivity tests are proposed to address to this problem and to objectively check the robustness of CGE modeling. Sensitivity tests are for two objectives. The first one is to determine the robustness of the CGE modeling with respect to the proposed behavior parameters. Another objective is to identify the “confidence interval” of the modeling results (Hosoe et al., 2010).

To check the robustness of the modeling by sensitivity test, the most relevant parameters of the model need to be selected appropriate with the analysis purpose. For example, in this study, the constant elasticity of substitution of factors, of Armington import and domestic intermediate goods, of Armington domestic and export goods, and of the tourism export demand are selected. Varying the values of behavior parameters and repeat the modeling with respect to each. The output results of model obtained with each value of parameter will be recorded and compared to the results of the model with the selected

value of behavior parameter. The robustness of the modeling results is evaluated based on two conditions: (1) whether the sectoral response with respect to each value of parameter differs with that of the model with selected parameter; and (2) whether the ordering of the sectoral outputs is maintained with various value of parameter. If both conditions are satisfied, one can conclude confidently that the results of the modeling are robust.

Table 6-10. Sensitivity test scenario design

Parameter test	Based Scenario	Sensitive test T0	Sensitive test T1 (Central)	Sensitive test T2	Sensitive test T3	Sensitive test T4
Armington CET parameter σ_{CET}	Based line SAM outputs	$0.5\sigma_{CET}^S$	σ_{CET}^S	$4\sigma_{CET}^S$	$6\sigma_{CET}^S$	$10\sigma_{CET}^S$
Armington CES of dom. and import σ_D	SAA	$0.5\sigma_D^S$	σ_D^S	$4\sigma_D^S$	$6\sigma_D^S$	$10\sigma_D^S$
Price elasticity of tourism export demand σ_P	SAA	$0.5\sigma_P^S$	σ_P^S	$4\sigma_P^S$	$6\sigma_P^S$	$10\sigma_P^S$
Factor of production elasticity σ_{VA}	SAA	$0.5\sigma_{VA}^S$	σ_{VA}^S	$4\sigma_{VA}^S$	$6\sigma_{VA}^S$	$10\sigma_{VA}^S$

Note:

- SAA: Same as above.
- “*Central scenario*”: is defined as the modeling scenario with selected parameters of substitution.
- Abbreviation “*S*” in $\sigma_{CET}^S, \sigma_D^S, \sigma_P^S, \sigma_{VA}^S$ denotes for the “*Selected value*” of respective elasticity parameters at central scenario.

For sensitivity test, “*Central scenario*” is defined as the test scenario (T1) with the selected behavior parameters of Armington transformation (CET), Armington of CES between domestic and import goods, factors of CES production function (VA), and the elasticity of tourism export demand with domestic price. In the central scenario, the cost of all transportation modes is deregulated 20%. The central test scenario, the all parameters are defined as the same as those in the scenario 5 (S5) of the CGE analysis. Based line scenario is the “do no-thing” scenario, all the outputs of the model are from the SAM. The difference between the outputs of test T1 and those of based scenario is as the same as the difference between the outputs of the scenario 5 and those of based scenario. It illustrates for the economic impacts of the deregulation of transportation cost in all transportation modes.

The test scenarios from T0 to T4 represent for the varying value of parameters from very less elastic (or almost inelastic, T0) to very elastic (T4). With the 20% reduction in cost of all transportation modes, the modeling is repeatedly operating with the test from T0 to T4. The results are aggregated and compared to check the robustness of the model.

6.10.2 Sensitive test results

There are nine aggregated variables chosen to be illustrated for sensitivity test, which are national GDP, utility, welfare, gross output, demand for import, demand for export non-tourism products, demand for export tourism products, domestic final demand, and ratio of national GDP by total final demand.

Table 6-11. Sensitive test of Constant Elasticity of Transformation σ_{CET} with 20% cost reduction of all transportation modes

	Benchmark	T0($\sigma_{CET}^S*0.5$)	T1(σ_{CET}^S*1)	T2(σ_{CET}^S*4)	T3(σ_{CET}^S*6)	T4(σ_{CET}^S*10)
		All modes -20%	All modes -20%	All modes -20%	All modes -20%	All modes -20%
Real National GDP (Mil. JPY)	476,904,203	480,154,317 0.6815%	480,154,109 0.6815%	480,154,109 0.6815%	480,154,109 0.6815%	480,154,109 0.6815%
Utility	362,460,382	364,930,558 0.6815%	364,930,400 0.6815%	364,930,400 0.6815%	364,930,400 0.6815%	364,930,400 0.6815%
Increase of Welfare (EV)	-	3,250,114	3,249,906	3,249,906	3,249,906	3,249,906
Gross production of output (Mil. JPY)	1,022,971,615	1,031,879,974 0.8708%	1,031,879,922 0.8708%	1,031,879,922 0.8708%	1,031,879,922 0.8708%	1,031,879,922 0.8708%
Export demand (Q)	60,876,184	61,433,097 0.9148%	61,433,296 0.9152%	61,433,296 0.9152%	61,433,296 0.9152%	61,433,296 0.9152%
Non-tourism export	59,760,162	60,142,806 0.6403%	60,143,006 0.6406%	60,143,006 0.6406%	60,143,006 0.6406%	60,143,006 0.6406%
Tourism export	1,116,021	1,290,290 15.6152%	1,290,290 15.6152%	1,290,290 15.6152%	1,290,290 15.6152%	1,290,290 15.6152%
Import demand	83,296,759	83,570,107 0.3282%	83,570,091 0.3281%	83,570,091 0.3281%	83,570,091 0.3281%	83,570,091 0.3281%
Domestic fn Demand	448,381,160	451,382,939 0.6695%	451,382,743 0.6694%	451,382,743 0.6694%	451,382,743 0.6694%	451,382,743 0.6694%
Ratio Real GDP/Final demand	0.93647	0.93631	0.93631	0.93631	0.93631	0.93631

Table 6-11 illustrates the sensitivity of the model with constant elasticity of transformation, all the variables seem not change much while the CET value varies from half to ten times of the selected value. Specifically, GDP, utility, EV, and total gross output remain stable; there are little changes in variables of non-tourism export demand, import, and domestic final demand when CET value reduces 50% (T0) from the selected value (T1). All the values of each variables with respect to the variation of CET from T1

to T4 are the same.

Table 6-12. Sensitive test of CES Domestic/Import good σ_D with 20% cost reduction of all transportation modes

	Benchmark	T0($\sigma_D^{S*0.5}$) All modes -20%	T1(σ_D^{S*1}) All modes -20%	T2(σ_D^{S*4}) All modes -20%	T3(σ_D^{S*6}) All modes -20%	T4(σ_D^{S*10}) All modes -20%
Real National GDP (Mil. JPY)	476,904,203	480,156,649 0.6820%	480,154,109 0.6815%	480,140,737 0.6787%	480,134,584 0.6774%	480,125,742 0.6755%
Utility	362,460,382	364,932,331 0.6820%	364,930,400 0.6815%	364,920,237 0.6787%	364,915,560 0.6774%	364,908,840 0.6755%
Increase of Welfare (EV)	-	3,252,446	3,249,906	3,236,534	3,230,381	3,221,539
Gross production of output (Mil. JPY)	1,022,971,615	1,031,942,547 0.8769%	1,031,879,922 0.8708%	1,031,550,379 0.8386%	1,031,398,818 0.8238%	1,031,181,089 0.8025%
Export demand (Q)	60,876,184	61,433,946 0.9162%	61,433,296 0.9152%	61,429,877 0.9095%	61,428,304 0.9070%	61,426,043 0.9032%
Non-tourism export	59,760,162	60,143,659 0.6417%	60,143,006 0.6406%	60,139,567 0.6349%	60,135,712 0.6284%	60,135,712 0.6284%
Tourism export	1,116,021	1,290,287 15.6149%	1,290,290 15.6152%	1,290,310 15.6169%	1,290,318 15.6177%	1,290,331 15.6189%
Import demand	83,296,759	83,571,306 0.3296%	83,570,091 0.3281%	83,563,693 0.3205%	83,560,749 0.3169%	83,556,520 0.3119%
Domestic fn Demand	448,381,160	451,384,822 0.6699%	451,382,743 0.6694%	451,371,795 0.6670%	451,366,759 0.6659%	451,359,521 0.6642%
Ratio Real GDP/Final demand	0.93647	0.93631	0.93631	0.93631	0.93631	0.93631

Comparison to CET, the model is a little more sensitive to CES between domestic and import intermediate goods. Applying the shock of reduction 20% of transportation margin, the GDP, utility, and EV change from +0.0005% to -0.0059% as CES σ_D varying from 50% to 10 times of selected value. With the same range of σ_D variation, the gross output varies from +0.0061% to -0.0683%; non-tourism export good does from +0.0011% to -0.0122%; tourism export is from -0.0003% to 0.0037%; import demand is from 0.0015% to -0.0163%; and domestic final demand is from 0.0005% to -0.0052% respectively comparing to the selected value of CES between domestic and import intermediate goods.

Table 6-13. Sensitive test of factor elasticity of substitution σ_{VA} with 20% cost reduction of all transportation modes

	Benchmark	T0($\sigma_{VA}^{S*0.5}$) All modes -20%	T1(σ_{VA}^{S*1}) All modes -20%	T2(σ_{VA}^{S*4}) All modes -20%	T3(σ_{VA}^{S*6}) All modes -20%	T4(σ_{VA}^{S*10}) All modes -20%
Real National GDP (Mil. JPY)	476,904,203	480,143,202 0.6792%	480,154,109 0.6815%	480,163,949 0.6835%	480,165,149 0.6838%	480,166,126 0.6840%
Utility	362,460,382	364,922,110 0.6792%	364,930,400 0.6815%	364,937,879 0.6835%	364,938,791 0.6838%	364,939,533 0.6840%
Increase of Welfare (EV)	-	3,238,999	3,249,906	3,259,746	3,260,946	3,261,923
Gross production of output (Mil. JPY)	1,022,971,615	1,031,904,154 0.8732%	1,031,879,922 0.8708%	1,031,858,058 0.8687%	1,031,855,392 0.8684%	1,031,853,221 0.8682%
Export demand (Q)	60,876,184	61,435,371 0.9186%	61,433,296 0.9152%	61,431,425 0.9121%	61,431,196 0.9117%	61,431,011 0.9114%
Non-tourism export	59,760,162	60,145,091 0.6441%	60,143,006 0.6406%	60,141,125 0.6375%	60,140,709 0.6368%	60,140,709 0.6368%
Tourism export	1,116,021	1,290,280 15.6143%	1,290,290 15.6152%	1,290,299 15.6160%	1,290,301 15.6161%	1,290,301 15.6162%
Import demand	83,296,759	83,571,541 0.3299%	83,570,091 0.3281%	83,568,782 0.3266%	83,568,623 0.3264%	83,568,493 0.3262%
Domestic fn Demand	448,381,160	451,379,268 0.6687%	451,382,743 0.6694%	451,385,883 0.6701%	451,386,266 0.6702%	451,386,579 0.6703%
Ratio real GDP/Final demand	0.93647	0.93629	0.93631	0.93633	0.93633	0.93633

The results of sensitivity test with factor of substitution (as shown in Table 6-13) are the same manner with those with CES between domestic and import intermediate and substitution of transformation. The test with half value of σ_{VA} reduces approximately 11,000 Mil JPY (-0.0023%) and test with four times of σ_{VA} increase approximately 9,000 mil JPY (+0.0021%) in comparison with that of the central value. The gross output increases 0.0024% in the test T0 if reduces the σ_{VA} as half as the central value (T1); four times of that will reduce the total output -0.0021% (T2); the result of gross output reduces 0.0026% in compare with the central value T1 in the case of increasing σ_{VA} to ten times as it in central value. The test results appear as the same trend as that with non-tourism export, tourism export, import demand and domestic final demand.

Table 6-14. Sensitive test of price elasticity of demand of tourism export σ_P with 20% cost reduction of all transportation modes

	Benchmark	T0($\sigma_P^{S*0.5}$) All modes -20%	T1(σ_P^{S*1}) All modes -20%	T2(σ_P^{S*4}) All modes -20%	T3(σ_P^{S*6}) All modes -20%	T4(σ_P^{S*10}) All modes -20%
Real National GDP (Mil. JPY)	476,904,203	480,240,185 0.6995%	480,154,109 0.6815%	479,490,870 0.5424%	478,867,581 0.4117%	476,957,942 0.0113%
Utility	362,460,382	364,995,820 0.6995%	364,930,400 0.6815%	364,426,320 0.5424%	363,952,603 0.4117%	362,501,224 0.0113%
Increase of Welfare (EV)	-	3,335,982	3,249,906	2,586,667	1,963,378	53,739
Gross production of output (Mil. JPY)	1,022,971,615	1,031,851,237 0.8680%	1,031,879,922 0.8708%	1,032,101,878 0.8925%	1,032,311,603 0.9130%	1,032,958,623 0.9763%
Export demand (Q)	60,876,184	61,347,366 0.7740%	61,433,296 0.9152%	62,095,484 2.0029%	62,717,873 3.0253%	64,625,107 6.1583%
Non-tourism export	59,760,162	60,143,585 0.6416%	60,143,006 0.6406%	60,138,703 0.6334%	60,123,869 0.6086%	60,123,869 0.6086%
Tourism export	1,116,021	1,203,781 7.8636%	1,290,290 15.6152%	1,956,781 75.3355%	2,583,014 131.4485%	4,501,238 303.3291%
Import demand	83,296,759	83,575,345 0.3345%	83,570,091 0.3281%	83,529,606 0.2795%	83,491,561 0.2339%	83,375,004 0.0939%
Domestic fn Demand	448,381,160	451,463,722 0.6875%	451,382,743 0.6694%	450,758,771 0.5303%	450,172,389 0.3995%	448,375,835 -0.0012%
Ratio Real GDP/Dom Final demand	1.06361	1.06374	1.06374	1.06374	1.06374	1.06375

The test explicitly indicates that tourism export demand is very sensitive with the value of price elasticity of demand. The value of tourism export demand varies in a wide range, from 7.86% to 303.33% when price elasticity changes from half (T0) to ten times (T4) of central value (T1). Along with the increase of tourism export demand, the EV, domestic final demand and import demand decrease as increase of price elasticity of tourism export. The tourism export demand increase stimulates the national gross output. Nevertheless, the ratio of real income and domestic final demand, which indicates for the average of real income per unit of domestic final demand seems remain as constant or change very small.

To summary, the sensitivity tests indicate that to extent to which the model variables are sensitive depends on the substitution parameter. The demand of tourism export is very sensitive with the changes of the price elasticity of demand. The increase of price elasticity of tourism export leads to the increase of the tourism export demand. Along with this increase, the domestic final demand tends to reduce when value of price elasticity increases. The overall result shows that the income per unit of final demand is unchanged. The tests with the substitution values of production factors, domestic-import intermediate goods, and substitution of CET appear as robust when sectoral gross outputs and sectoral GDPs of cross economy are not much different as the substitution values

vary in wide range from half to ten times of central values.

6.11 Conclusions

The works in the Chapter 6 are the results of application of integration of transportation into regional CGE framework in simple cases of transportation policies introduced in the Chapter 5, which are scenario bases of transportation cost deregulation. The integration is simply injection of transportation cost changes into the price models, demand/production models rather than applying the transportation model in a more comprehensive way. Although the method is easier but the results are good enough to illustrate the impacts of freight/passenger transportation distinguishing into four basic transportation modes, namely, air, road, water, and railway. The conclusions of this chapter can be expressed as below:

Generally, transportation cost reduction positively impacts on national economy as well as tourism industries. The deregulation of transportation cost of 20% in all modes positively increases 0.6815% in national welfare and 0.8708% national gross output. With the same shock, tourism industries, including domestic, outbound, and inbound grows 5.6889% in demand and 4.3883% in gross output.

The distinguishing the various transportation modes help to understand their different roles to the economy as well as tourism industries. The deregulation of 20% cost in air transportation positively increase 0.0080% national real income; the same policy in road, water and rail transportation stimulates national real income respectively 0.4826%, 0.0785%, and 0.1119%. In term of gross output (mil. JPY), the reduction of cost in air, road, water, and railway transportation encourages 0.0073%, 0.7024%, 0.1210%, and 0.0390%. For three categories of tourism industries in general, the shock in air transportation stimulate 1.6629% gross output and 2.3728% demand. Those shocks in road, water, and rail transportation contribute to the growth of tourism (three categories) respectively 1.0220%, 0.1972%, 1.4715% gross output; and 0.9417%, 0.1935%, 2.1698% demand.

Road transportation is the most effective for non-tourism industries in comparison with other transportation modes. The cost shock in road encourages 0.9% the gross output of non-tourism, equals to as 5.7 times as water, 16 times as rail, and 85 times as air

transportation; regarding on the demand, it promotes 0.48% demand of non-tourism industries, as 6.1 times as water, 14.2 times as rail transportation. In contrast, tourism (all domestic, outbound, and inbound) is much effected by air transportation. The shock in air transportation cost stimulates 2.37% demand of tourism in Japan; 1.1 times as rail, 2.52 times as road, and 12.3 times as water transportation. The same manner to demand, air transportation promotes 1.66% tourism gross output; as 1.13 as rail, 1.62 times as road, and 8.4 times as water transportation.

More detail in tourism industries, transportation modes play different roles to different tourism types:

- Rail transportation get the most effective responses from domestic tourism (+2.56% demand and +1.74% production output); the second most is road transportation (+1.07% demand and +1.13% production output); air transportation is the third contributes to domestic tourism (+0.87% demand, +0.67% production output); and water transportation is the last, it promotes +0.22% domestic tourism demand and production output.
- Outbound tourism is the most sensitive with air transportation cost shock. The 20% of air transportation cost deregulation can promote 6.32% demand and 3.31% gross production of outbound tourism. The impact of air transportation on outbound tourism demand equals to 15.63 times as road, 86.06 times as water, and 200 times as railway transportation. In term of production output, impact of air transportation is as 7.91 times as road, as 73.35 times as water, and 100.47 times as railway transportation.
- As the same fashion with outbound, inbound tourism is the most effectively promoted by the air transportation cost deregulation. The results indicate that with the same amount of cost deregulation shock, air transportation even promotes inbound more than outbound tourism (2.46 times higher in demand, 4.70 times higher in production output).

Although the deregulation of transportation cost positively stimulates the national economy (+0.6815% national welfare) and strongly promotes tourism (+4.3883% gross production and +5.6889% demand), the deregulation of the transportation cost creates the lost in transportation service industries. The deregulation of the transportation cost in all

transportation service sectors reduces sharply production of air transportation, such as -42.66% production of domestic air passenger transportation, -17.09% production of international air passenger transportation, and -8.62% production of air freight transportation. Other transportation lost their production from 1% to more than 14% depends on their roles to the economy and tourism industries. This fact raises the need of considering the policies that less negative impact on the transportation service industries. Some of the policies for the consideration might be the cost optimization, reduction of the time cost, ...etc.

Conclusions and recommendations

Research conclusions

The research has step by step found the answers for the research questions and satisfy the research objectives. The discussions on the roles of transportation on the economy in general and on the tourism development in particular are reviewed to provide the theoretical background for the study. Later, study review most up to date empirical inter-industry studies which focus on the transportation-tourism interactions using CGE models. The literature review is widened into the studies on the economic impacts of transportation and economic impacts of tourism. These widened areas aim to understand how tourism and transportation are treated in the studies. The review result proves that the studies on the economic impacts of transportation on tourism is critical. The Input-Output table and SAM as database is developed for the experiments with Input-Output and CGE modeling. Based on the work's outcomes, there are some key conclusions are drawn out:

Conclusion 1: The roles of transportation to tourism promotion are widely acknowledged in the literature by many researchers. The developments of the tourism industries are always marked by the contribution of transportation. The improvement of accessibility to the destinations in term of mobility, cost saving, or/and time saving, comfortability, convenience, ...etc. stimulates the number of arrivals and maybe the tourism receipt. There are three transportation policy group can improve the tourism destinations accessibility:

- The first group includes policies of infrastructure development. These includes activities of re-structure the network; construction of new links or facilities, such as new links of roads, railway, or new airport...; improvement of existing ones; or improve the connectivity of a part or entire network by investing/improve infrastructure...etc.
- The second category is service policies. It may contain the strategies of improvement of travel speed/time for passenger transportation, such as reduce the waiting time, increase frequency; improvement of public transport connectivity, i.e. reduce the transfer time; public transport subsidy, or discount for student...;

applying road pricing; taxes of fuel; or introduction of new transportation modes which provide faster traveling, more comfortable, more convenient...

- The final one is regulation policies, for example, the regulation of the emission standard, or restriction of driving may also effect to the accessibility of tourism destination.

The application of the first group policy, such as development of transportation network, the introduction of transportation modes helps tourists explore the new tourism destinations. These policies can impact on both widen the tourism supplies and then stimulate the tourism demand (arrivals/receipt). The second and third group policy can improve/reduce the accessibility via changes of travel cost/time or changes of the affordability as well as convenience and comfortability. These policies can only impact on the tourism demand (arrival/receipt) rather than the tourism supply.

Conclusion 2: Although transportation plays important roles to the development of tourism, the quantitative experiment employing inter-sectoral frameworks, for instance Input-Output and CGE model is rarely recognized in literature. Since the tourism becomes more and more significant to economies, the investigation in the literature recognizes many studies on the economic impacts of tourism on economy using both Input-Output and CGE model. Nevertheless, the investigation rarely acknowledges the emperical studies deal with the question if tourism is such important to the economy, then what are the factors support for this significance, which can be answered by using Input-Output model. Regarding on the application of CGE model to assess the economic impacts of transportation policies on tourism, the investigation acknowledges one studies for Tanzania (Kweka, 2004). In his own work, he argues that the improvement of transportation infrastructure effeciency can promote tourism in two ways. The first is encouraging the tourists by improving the access to the attractions. The second is improving the infrastructure effeciency may cut down the cost of the trip as well as marketing and distribution of goods. This work does not distinguish the impacts of transportation modes on different types of tourism.

Conclusion 3: The crucial need of the identification of the linkage between transportation and tourism industries, and the experiments on the transportation policies on the tourism promotion rises the critical demand for the develop the database which is Input-Output table or SAM for the research. This research is based on the original Input-Output table

of Japan (2011) in cooperating with the data of consumption trend survey and some other data, such as transportation for the database development. The output of this task is the Input-Output table contains 58 non-tourism industries and 3 tourism industry groups, for example, domestic, outbound, and inbound tourism. Each group includes 21 tourism industries representing for 21 spending items of tourists. This Input-Output table is then converted into SAM form for CGE modelling.

Conclusion 4: The Input-Output modelling proves that tourism is significant to Japanese economy. It contributes totally to national economy 3.3% GDP, equals to 15,726,354 Mil. JPY, in which there is 2.26% (10,781,522 Mil. JPY) from the direct contribution. In term of multiplier, each 100 JPY spent by tourism, the economy will get 151 JPY in total production; 49.8% of the spending come into the direct GDP; 72.7% of the spending come into the total GDP. Among three types of tourisms, inbound tourism the most contributes to the economy since its output and income multiplier are relative high (output multiplier: 2.008; income multiplier: 0.817). Domestic tourism is leveraged as the medium contribution to the economy (output multiplier: 1.673; and income multiplier: 0.741). Outbound tourism is important to the economy since its leakage made by the oversea spending of Japanese tourists. The more spending, the more economy lost. Even if the oversea spending is larger than the domestic one, the multiplier of outbound tourism may become negative.

Conclusion 5: There are strong links between transportation and tourism industries. As a consumer, transportation service is the most important industry for all domestic, inbound and outbound tourism; on the other side, as a supplier, it is the top fifth or sixth of tourism industries. There have been many theoretical studies conclude on the importance of transportation on the tourism; by input/output coefficients, this analysis once again confirms by empirical figures that transportation is a vital for tourism.

Conclusion 6: Since tourism is special industry, traveling is the major activity of tourist that sticks tightly with transportation. So the integration of transportation model into CGE model is critical task to understand in deep and more precisely the mechanism of its economic impacts on tourism in term of macroeconomic view point. This research introduces the framework to integrate transportation model into CGE at both regional and inter-regional scale. The integration at regional scale focuses on the finding the regional

time/cost saving in general while inter-regional scale finds the time/cost saving between regions in pairwise.

However the application of these framework in this study is still limited to the injection of cost change scenarios into price/demand/production models rather than employing the transportation model. This task should be taken into consideration in the next stage.

Conclusion 7: Transportation cost reduction positively impacts on national economy as well as tourism industries. The deregulation of transportation cost of 20% in all modes positively increases 0.6815% in national welfare and 0.8708% national gross output. With the same shock, tourism industries, including domestic, outbound, and inbound grows 5.6889% in demand and 4.3883% in gross output.

Enhancing the conclusion 6, the result of CGE modelling proves that tourism industry is more sensitive than non-tourism. The deregulation of transportation cost of 20% in all modes stimulates 0.5645% demand and 1.1206% production output of non-tourism only while the shock stimulates 5.6889% in demand (10 times higher demand of non-tourism) and 4.3883% in gross output (4 times higher non-tourism output) of tourism (all domestic, outbound and inbound).

Conclusion 8: Different transportation modes play different roles to different tourism types:

- Rail transportation get the most effective responses from domestic tourism (+2.56% demand and +1.74% production output); the second most is road transportation (+1.07% demand and +1.13% production output); air transportation is the third contributes to domestic tourism (+0.87% demand, +0.67% production output); and water transportation is the last, it promotes +0.22% domestic tourism demand and production output.
- Outbound tourism are the most sensitive with air transportation cost shock. The 20% of air transportation cost deregulation can promote 6.32% demand and 3.31% gross production of outbound tourism. The impact of air transportation on outbound tourism demand equals to 15.63 times as road, 86.06 times as water, and 200 times as railway transportation. In term of production output, impact of air transportation is as 7.91 times as road, as 73.35 times as water, and 100.47 times as railway transportation.

- As the same fashion with outbound, inbound tourism is the most effectively promoted by the air transportation cost deregulation. The results indicate that with the same amount of cost deregulation shock, air transportation even promotes inbound more than outbound tourism (2.46 times higher in demand, 4.70 times higher in production output).

Conclusion 9: Although the deregulation of transportation cost positively stimulates the national economy (+0.6815% national welfare) and strongly promotes tourism (+4.3883% gross production and +5.6889% demand), the deregulation of the transportation cost creates the lost in transportation service industries. The deregulation of the transportation cost in all transportation service sectors reduces sharply production of air transportation, such as -42.66% production of domestic air passenger transportation, -17.09% production of international air passenger transportation, and -8.62% production of air freight transportation. Other transportation lost their production from 1% to more than 14% depends on their roles to the economy and tourism industries. This fact raises the need of considering the policies can balance between the positive impacts on the economy and negative impact on the transportation service industries.

Conclusion 10: The use of Input-Output and Computable General Equilibrium Model combined can answer the both questions, the first one is (1) how strong is linkage between transportation and tourism, or in other word, which factors contribute to the development of the tourism industry. The research presents explicitly that transportation service is top one as consumer and top 5 or 6 as supplier. Move one more step forward, the research answers the second question on (2) how transportation policies impact on tourism promotion. the answer for this question is explained through the experiment to find the responds of three types of tourism with respect to the shocks of transportation cost in four basic transportation modes. Although there are still some limitations (will be presented in the section below), but the research has answered comprehensively the research questions on what factors stimulate tourism industry and how transportation impacts on tourism.

Research contributions

The research firstly conduct a survey aims to the most updated (until 2015) empirical studies using CGE model to analysis the interaction between transportation and tourism.

The results of the survey are aggregated and presents the situation of the studies in the field. This may provide researchers, who interested in transportation-tourism interindustry analysis some good information on the new research directions.

The Input-Output model is used to confirm by scientific figures about the strong linkage between tourism and transportation. For the first time, the research employs the CGE model to distinguish the different roles of different transportation modes to the various types of tourism.

Table 6-15. Research contributions and future considerations

Analysis method	Causation	Transport cost				Multiple impacts of passenger → commodity/ service	Trans. Modes	Tour. type	Tour. behavior	Notes
		Freight		Passenger						
		Time	Money	Time	Money					
Scenario based	Trans infra → Tour		⊙						Kweka, Tanzania 2004	
	Trans service → Tour		●	●	●	●	●	▲		
Trans. Model integration	Trans infra → Tour	▲	▲	▲	▲	▲	▲	▲		
	Trans service → Tour	▲	▲	▲	▲	▲	▲	▲		
Scenario based	Tour → Trans. Infra	■	■	■	■	■	■	■		
	Tour → Trans. service	■	■	■	■	■	■	■		
Trans. Model integration	Tour → Trans. Infra	■	■	■	■	■	■	■		
	Tour → Trans. service	■	■	■	■	■	■	■		

 Research contribution
 Future critical consideration
 Previous study's contribution
 Future potential study areas

Also, for the first time, the role of passenger transportation is taken into account to the impacts on economy, especially on tourism industry. The passenger transportation is also seen under for basic modes. This consideration brings a comprehensive view point on the impacts of transportation on tourism since tourism sticks not only to freight transportation, which directly impacts on the prices of tourism commodities/services, but also to passenger transportation, which directly effects on the arrivals of tourism demand.

In reality, the number of arrivals may be representative for the demand of tourism commodities/services. If we consider each tourist spends a specific amount for their need on the tourism commodities and services, then if the numbers of arrivals increase, the

demand for the tourism commodities/services may increase at the same rate. The consideration of this point for inbound tourism in this study brings the model closer with the reality. This may be regarded as a contribution.

Research difficulties and limitations

As mentioned in the Chapter 3, the database for this research is developed relying on the 518 Rows x 397 Columns-original IO table and the tourism consumption trend survey on both domestic and outbound travelers. In the target IO table or/and SAM the tourism industries need to be disaggregated as detail as possible to acquire the analysis requirement. For example, there are 3 tourism categories, namely domestic, inbound and outbound in both supply and demand side. Each category should include spending for transportation services and tourism commodities/services. In final demand sectors, it is necessary to distinguish the tourism domestic final demand and tourism import as well as tourism export. Meaning that, the domestic expenditure and oversea expenditure for each of domestic and foreign travelers need to be recognized. For example, inbound tourists have two options to travel to Japan, the first one is utilizing international air transportation, the second one is international shipping. However, each type of international transportation contains two types of operators, namely, domestic operators (the Japanese air operators), who run business to contribute to the domestic economy; another one is foreign operators, who contribute to foreign economies. The same phenomenon to the outbound tourists, the expenditure for foreign operators is considered as import, that for domestic operators is regarded as domestic demand. For developing the database, the information about the proportion of outbound/inbound tourists specified by domestic operators and foreign operators for each transportation mode. The difficulty of the research comes from the lacking statistical data on the number of foreign tourists by each types of operators in both air and water transportation.

Limitation of the research is the consequence of such data limitation. Usually, the statistical data is more precisely than the survey data, consequently the results get from statistical data is more reliable than that from the survey data. Since the lack of the statistical data on the inbound tourist specified by the types of operators, such as domestic and oversea, this research assumes the proportion of tourists' consumption utilized domestic and oversea air transportation operators based on the tourism consumption trend survey. The proportion of inbound tourists' consumption for international air shipping

specified by types of operators is also assumed in the same way.

Future research directions

The research raises some research areas that are critical to address as follow:

- The integration of transportation model with CGE is critical to understand precisely the impacts of transportation on tourism. This integration need to consider some sub-area in single or combination serveral factors, such as:
 - The infrastructure policies: the impacts during construction period and afterward;
 - Transportation service policies with varous types of aspects: fare, road pricing,...
- The behaviors of variety of tourism types, for example recreational trips, business trips need to be distinguished, especialy the behaviors respond to the transportation service policies;
- In Japan, the development of transportation infrastructure has, let's say, completed previously. The transportation infrastructure construction mostly focuses on the maintenance and repair. The effect of transportation infrastructure development on tourism should be results of the construction activities that happened in long period from long time ago. The impacts of its on tourism can be observed with long-run, dynamic experiment.
- This research takes the multiple impacts of passenger transportation cost deregulation into account to estimate the demand of tourism commodities and services. Nevertheless, the multiple impacts are considered for inbound tourism explicitly. The demands of tourism commodities and services impacted by the changes of arrivals for domestic and outbound tourism are also crucial for the future research.
- Conversely, if the policy makers decide a specific level of development in tourism industry, then what is the maximum contribution that transportation industry can satisfy the need of tourism development. The researches to support this point are also one of the considerations.

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Appendices

Appendix 1. CGE empirical studies on relationship among economic, tourism and transport

Authors, Public Year	Country/ region	Data Period	Sectors	Causality	Tour	Trans	Acc.
(Chen and Haynes, 2015)	USA	1997-2011	13 Sec	Trans → Eco	x	o	No
(Fernando et al., 2015)	Sri Lankan	2006	64 Ind	Tour → Eco	o	o	No
(Pratt, 2015)	(1) American Samoa	(1) 2002	(1) 15 Ind	Tour → Eco	o	o	No
	(2) Aruba	(2) 1999	(2) 15 Ind				
	(3) Fiji	(3) 2002	(3) 35 Ind				
	(4) Jamaica	(4) 2007	(4) 53 Ind				
	(5) Maldives	(5) 2003	(5) 34 Ind				
	(6) Mauritius	(6) 2007	(6) 26 Ind				
	(7) Seychelles	(7) 1999	(7) 16 Ind				
(Pratt, 2014)	Fiji	2002	14 Sec	Currency devaluation → Tourism	o	o	No
(X. Meng, 2014)	Singapore	2000	34 Sec	Eco → Tour	o	o	No
(S. Meng, 2014)	Singapore	2005	35 Sec	Tour → Eco	o	o	No
(Becken and Lennox, 2012)	New Zealand in relation with other countries	2004	50 Com	Oil price → Trans cost → Tour	o	o	No
(Lennox, 2012)	New Zealand (in relation with 9 countries and 3 regions)	2004	50 Ind	Oil price → Trans cost/Eco → Tour	o	o	No
(Sakamoto and others, 2011)	Northern Kyushu, Japan (in relation with other countries)	2000	18 Sec	Trans (logistics cost) → Eco	x	o	Yes ⁽⁰⁾
(Li et al., 2011)	China	2002	122 Ind	Tour → Eco	o	o	No
(Konan, 2011)	Hawaii	1997	131 Sec	Visitor expenditure, labor migration → Eco	o	o	No
(Kim et al., 2011)	Korea	1995	4 Sec	Trans (Highway financing) → Eco	x	o	Yes ⁽¹⁾
(Li et al., 2010)	China and RoW	1995-2008	122 Ind	Eco → Tour	o	o	No
(Bröcker et al., 2010)	European Union	2001	2 Ind	Trans → Eco	x	o	Yes ⁽⁰⁾
(Kim and Hewings, 2009)	Korea	1995	4 Sec	Trans (network) → Eco	x	o	Yes ⁽¹⁾
(Blake, 2009)	United Kingdom	2002	26 Sec	Tour (demand) → Eco	o	o	No
(Ando and Meng, 2009)	China (SCGE with 29 regions)	1987	7 Sec	Trans → Eco	x	o	Yes ⁽⁰⁾
(Pratt and Blake, 2009)	Hawaii	2002	26 Sec	Tour (Cruise) → Eco	o	o	No
(Ihalanayake, 2008)	Australia	1996-1997	37 Sec	Taxation → Tour	o	o	No
(Zaouali, 2007)	China	2000	2 Sec	Oil price → Trans → Eco	x	o	No

Authors, Public Year	Country/ region	Data Period	Sectors	Causality	Tour	Trans	Acc.
(Narayan and Prasad, 2007)	Fiji	1990	35 Sec	Coup → Eco (Tour)	o	o	No
(Yeoman et al., 2007)	Scotland	2005	82 Ind	Oil → Trans → Tour	o	o	No
(Dixon et al., 2007)	United State of America (51 regions)	2002	500 Ind	Tariff, quotas → Eco (Tour, Trans)	o	o	No
(Hertel et al., 2007)	Argentina, Brazil, Chile, Paraguay, USA, Uruguay, and New Zealand	1994, see Hummels (1999)	40 Sec	Policy → Eco	x	o	No
(Blake et al., 2006a)	Scotland	1979-2003	82 Ind	Tour → Eco	o	x	No
(Berritella et al., 2006)	International CGE 207 countries	1997	17 Ind	Climate change → Tour	o	x	No
(Munk, 2006)	Denmark	Stylized	2 Sec	Trans (pricing) → Env, Con, Gov budget	x	o	Yes ⁽⁰⁾
(Liu, 2006)	Taiwan	1999	14 Sec	Industrial park → Eco	x	o	No
(Wattanakuljarus, 2006)	Thailand	2001	80 Ind	Tour → Env/ Eco	o	o	No
(Gago et al., 2006)	Spain	1995	17 Ind	Tour (taxation) → Eco	o	o	No
(Blake, 2005)	United Kingdom	2002	123 Ind	Olympic (Tour) → Eco	o	o	No
(Chan et al., 2005)	Viet Nam	1997	17 Sec	Labor → Eco	o	o	No
(Schäfer and Jacoby, 2005)	12 regions/nation (US, Japan, Brazil, China, India, others)	1995	22 Sec	Trans → Eco	x	o	Yes ⁽⁰⁾
(Gooroochurn and Thea Sinclair, 2005)	Mauritius	1997	17 Sec	Tour (taxation) → Eco	o	o	No
(Gooroochurn and Blake, 2005)	Mauritius	1997	17 Sec	Tour → Eco	o	o	No
(Dwyer et al., 2005)	Australia	2000-2001	56 Ind	Tour (events) → Eco	o	o	No
(Ueda et al., 2005)	Japan	1995	7 Sec	Trans (Airport) → Eco	o	o	No
(Ishiguro and Inamura, 2005)	Japan (in relation with U.S.A., EU, and Asia)	1990	1 Sec	Trans (Maritime Cost) → Eco	o	o	No
(Kawakami et al., 2004)	Japan	1995	20 Sec	Trans (ITS) → Eco	x	o	Yes ⁽⁰⁾
(Kim et al., 2004)	Korea	1990-1995	4 Sec	Trans (network) → Eco	x	o	Yes ⁽¹⁾
(Narayan, 2004)	Jiji	1990	35 Sec	Tour (international) → Eco	o	o	No
(Kweka, 2004)	Tanzania	1992	23 Sec	Trans → Tour → Eco	o	o	Yes ⁽⁰⁾
(Konan and Kim, 2003)	Hawaii	1997	23 Sec	Tour → Trans, Eco	o	o	No
(Narayan, 2003)	Jiji	1990	35 Sec	Tour (events) → Eco	o	o	No
(Sugiyarto et al., 2003)	Indonesia	1993	18 Sec	Tour → Eco	x	o	No
(A. Blake et al., 2003)	Malta	1998	31 Sec	Tour → Eco	o	o	No

Authors, Public Year	Country/ region	Data Period	Sectors	Causality	Tour	Trans	Acc.
(Munk, 2003)	Denmark	Stylized	2 Sec	Trans (pricing) → Env, Con, Gov budget	x	o	Yes ⁽⁰⁾
(Adam Blake et al., 2003)	United Kingdom	1990	115 Sec	Disease (FMD) → Tour	o	o	No
(Dwyer et al., 2003a)	Australia	2000-2001	56 Ind	Tour → Eco	o	o	No
(Dwyer et al., 2003b)	New South Wales, Australia	2000-2001	56 Ind	Tour → Eco	o	o	No
(Oosterhaven and Knaap, 2003)	Netherlands	1992	14 Sec	Trans → Eco	x	o	Yes ⁽¹⁾
(Lofgren and Robinson, 2002)	Mozambique	Stylized	5 Sec	Trans (cost), world prices → Eco	x	o	Yes ⁽⁰⁾
(Conrad and Heng, 2002)	Germany	1991	18 Ind	Fuel tax (Trans) → Capital (Trans)	x	o	No
(Mabugu, 2002)	Zimbabwe	1980	8 Sec	Policy → Eco, Tour	o	o	No
(Doi et al., 2001)	Japan	1995	20 Sec	Sea port → Trans cost, Eco	x	o	No
(Dwyer et al., 2001)	New South Wales, Australia	2000-2001	56 Ind	Tour → Eco	o	o	No
(A. Blake, 2000) and (Adam Blake, 2000)	Spain	1992	49 Sec	Tour → Eco	o	o	No
(Dixon and Rimmer, 1999)	Australia	1994	12 Ind	Tax → Tour	o	o	No
(Kim, 1998)	Korea	1990	19 Sec	Trans (Investment) → Eco	x	o	No
(Haddad and Hewings, 1998)	Brazil	1985	40 Sec	Trans (Cost) → Eco	x	o	Yes ⁽⁰⁾
(Bröcker, 1998)	Europe (in relation with other regions)	1996	2 Sec	Trans (cost) → Eco	x	o	Yes ⁽¹⁾
(Zhou et al., 1997)	Hawaii	1982	14 Sec	Tour → Eco	o	o	No
(Treasury, 1997)	Australia	1994	12 Ind	Tour (events) → Eco	o	o	No
(Naqvi and Peter, 1996)	Australia	1990-1991	13 Ind	Trans (Infrastructure) → Eco	x	o	No
(Miyagi, 1996)	Japan	1985	7 Ind	Trans (Infrastructure) → Eco	x	o	Yes ⁽⁰⁾
(Adams and Parmenter, 1995)	Queensland, Australia	1989	108 Ind	Tour → Eco	o	o	No
(Buckley, 1992)	United State of America (3 regions)	1977	5 Sec	Trans → Eco	x	o	Yes ⁽⁰⁾
(Liew and Liew, 1991)	USA	1977	26 Sec	Trans (cost) → Eco	x	o	Yes ⁽⁰⁾
(Jones and Whalley, 1989)	Canada	1979	13 Ind	Policy → Eco	x	o	No

Note:

Tour = Tourism; Trans = Transport; Eco = Economic; Acc. = Accessibility factors; Sec = Sector; Ind = Industry; Gov = Government; Env = Environment; Con = Congestion; FMD = Foot and Mouth Disease; ITS = Intelligent Transport System;

Yes⁽⁰⁾ = Accessibility factor is considered in the CGE model as cost scenario; Yes⁽¹⁾ = Accessibility factor is considered in the CGE model with transport model integration; No = Accessibility factor is not considered in the CGE model;

“x” = the factor is not considered in the CGE model; “o” = the factor is considered in the CGE model

Appendix 2. IO table sector and Tourism Satellite Account classification

Input-Output Table sector *	Travel and tourism satellite accounts commodity classification
001 crop farming	A200-01 agricultural products
002 Livestock / 003 agricultural services / 004 forestry	B000-01 other agricultural and forestry
005 fishing	A200-02 marine products
02 mining	B000-02 mining
1111 slaughter / 1112 Livestock grocery / 1116 agricultural save grocery	A200-03 agricultural foodstuffs
1113 Fisheries grocery	A200-04 fisheries grocery
1115-03 confectionery	A200-05 confectionery
1115-01 noodles / 1115-02 bread / 1114 TadashiKoku-milling / 1117 sugar, fats and oils and seasonings such / 1119 Other grocery / 010 Beverages / 011 feed and organic fertilizer (except otherwise classified) / 012 cigarette	A200-06 other food products
04 textile products	A200-07 fiber products
05 pulp, paper and wood products	A200-08 pulp, paper and wood products
06 chemical products	A200-09 photosensitive material A200-10 pharmaceuticals, cosmetics, and toothpaste B000-03 other chemical products
07 petroleum and coal products	A200-11 gasoline and diesel B000-04 other petroleum and coal products
2319-01 rubber footwear / 2319-02 plastic footwear / 032 Leather, fur and related products	A200-16 footwear and leather products
08 ceramic, stone and clay products	A200-12 ceramics, etc. B000-05 other of ceramic, stone and clay products
09 iron and steel	B000-06 steel
10 non-ferrous metal	B000-07 non-ferrous metal
11 metal products	B000-08 metal products
12 general machinery	B000-09 general machinery
13 electrical machinery	B000-10 industrial electrical equipment
14 information and communication equipment	A200-13 electrical products
15 electronic components	
16 transport machinery	A200-14 car B000-11 other transport equipment
17 precision machinery	A200-15 camera glasses & Watch B000-12 other

Input-Output Table sector *	Travel and tourism satellite accounts commodity classification
	precision machinery
019 printing and prepress and bookbinding / 030 plastic products / 063 other manufacturing industrial products / 064 recyclable resources collection and processing / 2311 tires and tubes / 2319-09 other rubber products	A200-17 movement supplies A200-18 other manufacturing industrial products
19 Construction	B000-13 construction
20 power, gas and heat supply	B000-14 power, gas and heat supply
21 water supply and waste treatment	B000-15 water and waste treatment
6111 Wholesale	B000-16 Wholesale
6112 retail	B000-17 retail
23 finance and insurance	A171-00 casualty insurance B000-18 other financial and insurance
075 real estate brokerage and rental / 076 housing rent	B000-19 real estate brokerage and housing rent
077 housing rent (imputed rent)	A112-00 imputed rent
7111 railway passenger transport	A131-01 Shinkansen A131-02 (except for the bullet train) inter-city rail passenger transport A200-19 urban railway passenger transport
7112 rail freight transport	B000-20 rail freight transport
7121 road passenger transport	A132-00 road passenger transport
7122 road freight transport (excluding private transport)	B000-21 road freight transport
081 water transportation	A133-01 open ocean passenger transport A133-02 in the coastal-water passenger transport B000-22 waterway freight transport
082 air transport	A134-01 international air passenger transport A134-02 domestic air passenger transport B000-23 air cargo transport
7189-01 road transport facility provided	A200-20 road management
7189-09 travel and other transportation related services	A135-00 transportation ancillary services A141-00 travel industry A143-00 tourist information and tourist information
7181 packing / 7189-02 water transport facility management ★★ / 7189-03 other water transportation ancillary services / 7189-04 aviation	

Input-Output Table sector *	Travel and tourism satellite accounts commodity classification
facility management (country public) ★★ / 7189-	
05 aviation facility management (industry) / 7189-	
06 Other airlines servicing	
083 Freight Forwarding / 084 warehouse	B000-24 Other transport
086 communication / 087 broadcasting	B000-25 postal, telegraph and telephone B000-26 broadcasting
7351-02 newspaper / 7351-03 Publication	A200-21 publishing and printing
088 Information Services / 089 Internet-related services / 7351-04 news feeds, credit bureaus / 7351-01 video information production and distribution industry	B000-27 other information communication industry
27 public service	
8213 social education and other education	A152-00 museum and other cultural services
8211 school education / 093 Research	B000-28 other educational and research
29 medical, health and social security and long-term care	A200-22 massage
097 other public services	A173-02 exhibition
8512 goods leasing (excluding car rental industry)	A172-00 sports and hobby goods rental B000-29 other goods rental
8513 car rental industry	A136-00 transportation equipment rental
098 Advertising / 100 automobile and machinery repair / 101 other business services	Maintenance and repair services of A137-00 transportation equipment B000-30 other business services
8611-05 sports provide industry, parks, amusement park	A161-00 sports recreation sports services A162-00 amusement park and other recreation B000-31 other sports provide industry
8611-01 theater / 8611-02 box office park (except otherwise classified), the box office Orchestra / 8611-03 play area / 8611-04 such as bicycle race-horse racetrack, the competition Orchestra / 8611-09 other entertainment	A151-00 Performing Arts B000-32 other entertainment
103 eateries	A120-00 food
104 lodging industry	A111-00 inn and other accommodation
8614-02 barber Industry / 8614-03 beauty business	B000-33 Barber & Beauty Salon
8619-01 photo industry	A200-23 photography

Input-Output Table sector *				Travel and tourism satellite accounts commodity classification		
8614-01	washing	Industry	/	A173-03	hot	spring
8614-04	bath	services	/			
8614-09	other laundry, barber, beauty and bath services			A173-04		guide
/				A173-05	tourist services not elsewhere classified	
8619-02	ceremonial	Industry	/			
8619-03	various repair industry (except otherwise classified)			A200-24	photographic development and baking	
/				B000-34		cleaning
8619-04	individual professor industry/					
8619-09	other personal services			B000-35	other laundry, barber, beauty and bath services	
				B000-36	other personal services	
33	office supplies					
34	classification Unknown					

(Source: (MLIT, 2011a, 2011b) *Tourism Consumption Trend survey, MLIT, Japan 2011*)

Appendix 3. Travel consumption items and Tourism Satellite Account classification

TSA commodity classification	Travel and tourism consumption trends survey item		
	(Domestic tourism consumption)	(Outbound tourism consumption)	(Inbound tourism consumption)
A1 tourism-specific products			
A11 accommodation			
A111 inn and other accommodation	Accommodation expenses	Accommodation expenses	hotel fee
A112 belonging rent			
A12 Food	Food costs	Food costs	Food costs
A13 passenger transport			
A131 intercity rail passenger transport			
01 Shinkansen	Bullet train		
02 inter-city railway passenger transport (excluding the Shinkansen)	Railways (except for bullet train), ski lift fee	Railroad	Rail and monorail, ski lifts
A132 road passenger transport	Bus, taxi Hire	Bus, taxi Hire	Bus taxi
A133 waterway passenger transport			
01 ocean-going passenger transport			
02 In the coastal-water passenger transport	Ships (coastal)	Ship (local)	
A134 air passenger transport			
01 international air passenger transport			
02 domestic air passenger transport	Airplane (domestic)	Airplane (local)	Airlines (Japan movement)
A135 transportation incidental services	Parking-toll		

TSA commodity classification	Travel and tourism consumption trends survey item		
	(Domestic tourism consumption)	(Outbound tourism consumption)	(Inbound tourism consumption)
A136 transportation equipment rental	Car rental fee		Other transportation expenses
A137 maintenance and repair of transport equipment			
A14 travel industry and tourism guide			
A141 travel industry	Entry fee		Local tour and Tourism Guide
A143 tourist information and tourist information			
A15 cultural services			
A151 for the Performing Arts	Sports and arts appreciation	Cultural services	Art appreciation, sports
A152 museum, other cultural services	Museums, Zoo and Botanical Garden and aquariums, passport application fee	Visa application fee	Visa application fee Museums, Zoos and aquariums
A16 recreation and other entertainment services			
A161 sports recreation Sports	Sport facilities, camping		
A162 amusement park and other recreation	Amusement & Expo	Sports and entertainment	Golf and theme park
A17 Other tourism services			
A171 damage insurance	Travel insurance and credit card admission fee		
A172 sports and entertainment equipment rental	Rental charge		Rental charge
A173 Other tourism			

TSA commodity classification	Travel and tourism consumption trends survey item		
	(Domestic tourism consumption)	(Outbound tourism consumption)	(Inbound tourism consumption)
services			
02 exhibition	Exhibition Convention participation fee		
03 Hot Springs	Hot spring spa facilities Este stop-off		
04 guide	Leisure fishing boat, guide fee		
05 other non classified tourism services	Other	Other	Other entertainment services expenses, other
A2 tourism-related commodity, goods are			
01 to 18 and 21 service			
19,20,22 to 24			
01 agricultural products	Agricultural products		
02 marine products	Marine products		
03 agricultural food products	Processed agricultural goods		
04 Fisheries grocery	Processed marine products		
05 confectionery	Confectionery		Confectionery
06 other grocery	Other food products	Grocery	Other food, beverages, alcohol and tobacco
07 textile products	Fiber product	Fiber product	Kimono (kimono), folk crafts
08 pulp, paper and wood products	Wood and paper products		
09 photographic light-sensitive material	the film		
10 pharmaceuticals, cosmetics, and toothpaste	Drug, and Cosmetic	Drug, and Cosmetic	Cosmetics, pharmaceuticals, toiletries
11 gasoline and diesel fuel	gasoline cost		

TSA commodity classification	Travel and tourism consumption trends survey item		
	(Domestic tourism consumption)	(Outbound tourism consumption)	(Inbound tourism consumption)
12 ceramics, etc.	Ceramics and glass products		
13 electrical products	Electric appliances and related products	Electric appliances and related products	Electric appliances
14 car			
15 camera-glasses & Watch	Camera Glasses & Watch		Camera & Video Camera Watches
16 footwear and leather products	Shoes, bags such	Shoes, bags such	Clothes (except kimono), bag, shoes
17 exercise supplies	Sports equipment · C D · Stationery		
18 other manufacturing industrial products	Other manufactured goods		Manga · DVD · anime-related products, other shopping bill
19 cities in the railway passenger transport			
20 road management			
21 publishing and printing	Publication		
22 massage	Massage		
23 photography	Photography fee		
24 photographic development and baking	Photos of developing print		
B non-tourism products goods is 01 to 12,27,30 service from 13 to 26,28,29,31 to 36			
01 other agricultural and forestry	Tourist Farm		
02 mining			
03 other chemical products			
04 other petroleum and coal products			

TSA commodity classification	Travel and tourism consumption trends survey item		
	(Domestic tourism consumption)	(Outbound tourism consumption)	(Inbound tourism consumption)
05 other ceramic, stone and clay products			
06 iron and steel			
07 non-ferrous metal			
08 metal products			
09 general machinery			
10 industrial electrical equipment			
11 transport machinery			
12 other precision machinery			
13 Construction			
14 power, gas and heat supply			
15 water supply and waste treatment			
16 wholesale			
17 retail			
18 other financial and insurance			
19 real estate brokerage and housing rent			
20 rail freight transport			
21 road freight transport	home delivery	home delivery	
22 water transportation cargo transport			
23 air cargo transport			
24 Other transport			
25 mail, telegraph and telephone	Postal and telecommunications charges	Postal and telecommunications charges	
26 broadcast			
27 other information communication			

TSA commodity classification	Travel and tourism consumption trends survey item		
	(Domestic tourism consumption)	(Outbound tourism consumption)	(Inbound tourism consumption)
industry			
28 other educational and research			
29 other goods rental			
30 other business services			
31 other sports provide industry			
32 Other entertainment			
33 Barber & Beauty Salon	Beauty salons - Barber		
34 cleaning	cleaning		
35 other laundry, barber, beauty and bath services			
36 other personal services			

(Source: (MLIT, 2011a, 2011b) *Tourism Consumption Trend survey, MLIT, Japan 2011*)

Appendix 4a. Domestic tourism consumption amount specified by spending items

No.	Spending items	Domestic tourism spending amount Unit: Mil. Yen
	Total spending	19,736,938
1	Entry fee, Parking, Toll road fee, expressway toll	3,716,429
2	Transportation cost	-
2.1	Airplane (domestic/Local)	959,757
2.2	Airplane (international)	-
2.3	Railway (bullet train, railway, ski lift)	2,066,195
2.4	Bus, taxi hire	398,757
2.5	Water transport (coastal)	89,980
2.6	Water transport (ocean)	-
2.7	Car rental and other transportation expense	181,433
2.8	Gasoline cost	1,203,175
3	Accommodation	2,115,682
4	Food costs	2,070,466
5	Agricultural products	157,398
6	Processed agricultural goods	104,706
7	Marine products	191,421
8	Processed marine products	171,803
9	Confectionery	1,357,426
10	Other food products	1,022,762
11	Fiber product	1,026,477
12	Shoes, bags such	382,964
13	Ceramics and glass products	58,755
14	Publication	92,354
15	Wood and paper products	44,872
16	Drug, cosmetic, and film	139,138
17	Camera Glasses & Watch; Electric appliances and related products	458,572
18	Hot spring spa facilities Este stop-off	527,645
19	Amusement, Expo, and Sport Facilities, Camping	360,663
20	Museums, Zoo and aquariums, visa and passport application fee	115,460
21	Sports and arts appreciation	85,988
22	Exhibition Convention participation fee	24,306
23	Tourist Farm	11,104
24	Rental charge	38,260
25	Massage	45,900

No.	Spending items	Domestic tourism spending amount Unit: Mil. Yen
26	Photography fee	23,276
27	Postal and telecommunications charges	22,984
28	home delivery	105,702
29	Sport equipment, CD, Stationery	97,769
30	Travel insurance and credit card admission fee	20,601
31	Beauty salons - Barber	246,757

Appendix 4b. Outbound tourism consumption amount specified by spending items

No.	Spending items	Outbound tourism Unit: Mil. Yen	
		Domestic spending	Oversea spending
	Total spending	2,504,268	1,717,916
1	Entry fee, Parking, Toll road fee, expressway toll	1,468,929	-
2	Transportation cost	-	-
2.1	Airplane (domestic/Local)	23,213	58,527
2.2	Airplane (international)	448,055	333,937
2.3	Railway (bullet train, railway, ski lift)	32,743	25,384
2.4	Bus, taxi hire	25,612	53,227
2.5	Water transport (coastal)	1,020	62,691
2.6	Water transport (ocean)	212	8,123
2.7	Car rental and other transportation expense	-	-
2.8	Gasoline cost	8,056	-
3	Accommodation	24,382	405,388
4	Food costs	28,554	244,593
5	Agricultural products	-	-
6	Processed agricultural goods	-	-
7	Marine products	-	-
8	Processed marine products	-	-
9	Confectionery	34,446	-
10	Other food products	30,038	131,185
11	Fiber product	75,078	93,519
12	Shoes, bags such	78,737	125,247
13	Ceramics and glass products	-	-
14	Publication	11,642	-
15	Wood and paper products	-	-
16	Drug, cosmetic, and film	21,350	38,224
17	Camera Glasses & Watch; Electric appliances and related products	47,357	3,919
18	Hot spring spa facilities Este stop-off	35,398	61,427
19	Amusement, Expo, and Sport Facilities, Camping	-	35,477
20	Museums, Zoo and aquariums, visa and passport application fee	47,828	-
21	Sports and arts appreciation	-	25,943
22	Exhibition Convention participation fee	-	-

No.	Spending items	Outbound tourism Unit: Mil. Yen	
		Domestic spending	Oversea spending
23	Tourist Farm	-	-
24	Rental charge	1,397	-
25	Massage	-	-
26	Photography fee	-	-
27	Postal and telecommunications charges	2,226	7,114
28	home delivery	6,038	3,990
29	Sport equipment, CD, Stationery	3,537	-
30	Travel insurance and credit card admission fee	34,004	-
31	Beauty salons - Barber	14,415	-

Appendix 4c. Inbound tourism consumption amount specified by spending items

No.	Spending items	Inbound tourism spending amount Unit: Mil. Yen
	Total spending	1,116,021
1	Entry fee, Parking, Toll road fee, expressway toll	4,304
2	Transportation cost	-
2.1	Airplane (domestic/Local)	5,843
2.2	Airplane (international)	384,775
2.3	Railway (bullet train, railway, ski lift)	45,673
2.4	Bus, taxi hire	16,267
2.5	Water transport (coastal)	-
2.6	Water transport (ocean)	-
2.7	Car rental and other transportation expense	6,055
2.8	Gasoline cost	-
3	Accommodation	237,527
4	Food costs	145,495
5	Agricultural products	-
6	Processed agricultural goods	-
7	Marine products	-
8	Processed marine products	-
9	Confectionery	25,532
10	Other food products	31,954
11	Fiber product	12,097
12	Shoes, bags such	59,590
13	Ceramics and glass products	-
14	Publication	-
15	Wood and paper products	-
16	Drug, cosmetic, and film	40,136
17	Camera Glasses & Watch; Electric appliances and related products	81,291
18	Hot spring spa facilities Este stop-off	10,381
19	Amusement, Expo, and Sport Facilities, Camping	3,008
20	Museums, Zoo and aquariums, visa and passport application fee	3,049
21	Sports and arts appreciation	1,766
22	Exhibition Convention participation fee	-

No.	Spending items	Inbound tourism spending amount Unit: Mil. Yen
23	Tourist Farm	-
24	Rental charge	1,279
25	Massage	-
26	Photography fee	-
27	Postal and telecommunications charges	-
28	home delivery	-
29	Sport equipment, CD, Stationery	-
30	Travel insurance and credit card admission fee	-
31	Beauty salons - Barber	-

Appendix 5. Input-Output table for transportation-tourism analysis Japan 2011 (Producer's Price)

Input-Output table mapping

Input-Output table mapping	P16	P32
	P15	P31
	P14	P30
	P13	P29
	P12	P28
	P11	P27
	P10	P26
	P9	P25
	P8	P24
	P7	P23
	P6	P22
	P5	P21
	P4	P20
	P3	P19
	P2	P18
	P1	P17

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P1)

Unit: Mil JPY		Intermediate Demand									
CODE	01	06	11	15	16	191	20	21	221		
Inputs	01	1,411,009	75	6,555,318	23,914	295,660	-	28,863	-	-	
	06	185	1,467	2,178	22	57,636	-	127,182	12,335,843	26	
	11	1,078,954	-	5,429,299	4,997	17,531	-	153,400	57	166	
	15	35,179	2,138	21,954	389,501	39,030	2,655	15,811	320	6,154	
	16	243,278	1,702	466,459	16,297	3,253,981	743,234	355,013	268	74,022	
	191	1,535	381	224,179	6,321	56,789	297,261	67,238	364	3,654	
	20	652,348	9,068	316,057	262,833	410,138	184,272	9,527,503	30,270	2,174,144	
	21	210,502	20,415	153,609	19,546	63,208	7,875	2,105,249	1,112,001	14,558	
	221	102,765	617	624,329	18,667	212,595	257,099	458,394	1,811	2,349,477	
	222, 231	11,614	3,285	5,460	8,583	8,045	2,531	15,667	462	5,454	
	25	28,017	441	84,487	1,427	56,742	128	150,971	5,450	49,074	
	26	794	2,533	-	324	104,241	-	968	-9	16,132	
	27	-	712	52,141	19	30,076	12,801	131,949	175	26,027	
	28	13,744	16,964	459,220	5,534	129,874	3,732	230,599	8,986	17,868	
	29	6	1,915	-	-	12,877	-	535	-	4,515	
	30	45	1,217	-	-	858	-	-	197	31,087	
	31	3,003	-	10	-	-	-	24	-	-	
	32	6	21	42	2	122	3,346	101	7	8	
	33	2,059	287	16	-	1,322	88	90	-	335	
	34, 3911, 3919	15,513	1,431	45,484	24,206	73,713	397	32,496	45,994	143,954	
	35	62,169	31	-	-	-	-	-	-	-	
	41	68,886	6,089	40,651	12,443	95,432	18,781	198,258	14,249	75,612	
	46	114,409	27,078	399,317	57,272	421,535	68,979	667,424	110,199	217,115	
	47	12,057	2,440	82,745	3,201	26,527	2,780	72,702	9,150	13,724	
	48	2,891	1,233	15,457	337	6,077	2,383	45,050	377	358	
	5111011	418,117	15,798	2,435,841	221,660	1,114,331	461,441	1,314,771	148,801	815,580	
	5112011	218,846	3,430	114,007	26,652	25,528	4,834	30,201	1,718	6,162	
	53	67,835	26,866	161,567	41,203	98,805	42,479	171,129	50,990	25,712	
	55	25,145	7,520	79,203	8,446	27,276	23,851	71,866	4,982	37,103	
	5711011	1,287	2,212	9,409	2,702	6,948	10,531	33,596	2,898	16,913	
	5712011	1,510	43	10,114	223	4,916	2,856	5,361	508	826	
	5721	961	5,410	8,661	2,266	5,263	1,758	22,009	1,051	8,693	
	5722011	195,706	2,614	568,182	22,513	238,634	70,323	293,081	68,644	88,866	
P	5731011	47,400	12,508	133,347	11,102	42,061	31,018	51,459	3,879	9,587	
P	5732011	275,672	165,222	45,330	7,252	25,330	4,929	13,564	1,343	2,460	
	5741011	-	4	-	8	544	55	1	96	29	
	5742011	4	14	10	15	17	8	84	8	20	
	5742012	13,946	295	15,089	573	6,744	961	37,340	75,284	2,374	
	5743011	20,793	86	27,992	297	22,198	3,273	19,457	107,063	2,559	
	5751011	279	585	1,251	900	1,609	2,233	6,585	324	1,932	
	5751012	325	441	822	647	1,076	756	8,117	287	1,118	
	5751013	86	3	103	32	41	283	211	23	75	
	5751014	386	-	-	-	-	-	-	-	-	
	5761011	11,615	179	39,038	1,282	15,708	6,072	21,869	11,939	5,031	
	5771011	26,831	284	150,550	4,270	32,406	10,722	44,596	122,425	17,471	
	2,03,04,05,06,09	320	41	2,263	192	2,268	988	3,492	76	2,480	
	5791011	1,816	967	4,131	1,790	2,597	1,197	9,982	548	4,322	
	59	38,893	7,757	162,758	15,458	64,101	36,911	336,426	12,700	53,102	
	61	-	-	-	-	-	-	-	-	-	
	63	10,268	6,456	207,414	36,524	77,998	30,798	2,185,045	36,948	223,305	
	64	3,553	-	-	-	20	96	398	-	10	
	65	9,207	2,459	31,444	3,048	8,547	3,687	50,881	2,850	4,501	
	66	279,528	42,671	1,069,929	65,829	260,636	219,221	1,191,760	83,845	364,868	
	671	-	-	-	-	-	-	-	-	-	
	672	-	-	80,639	-	-	-	-	-	-	
	Others 67	2,784	147	6,270	374	1,090	673	2,872	263	787	
P	68	6,428	657	20,548	2,598	8,038	4,758	14,740	414	1,121	
	69	156,126	5,797	89,701	5,244	25,364	8,591	37,956	10,919	12,416	
Dome:Fr	01	21,377	-	219,741	581	763	-	775	-	-	
	Fr 11	48,502	-	232,731	108	699	-	5,997	3	7	
	Fr 15,16,21	20,146	1,827	14,081	179,771	33,616	4,885	14,057	315	4,956	
	Fr 20	3,304	46	1,601	1,331	2,077	933	48,251	153	11,011	
	Fr 34.39 ar	1,152	78	5,710	1,184	4,403	2,475	3,798	1,997	16,628	
	Fr 591.592	196	30	898	149	313	271	957	51	146	
	Fr 53	44	17	104	26	64	27	110	33	17	
	Fr 571101:	647	1,112	4,730	1,358	3,492	5,293	16,887	1,457	8,501	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P2)

Unit: Mil JPY										
CODE	222, 231	25	26	27	28	29	30	31	32	
Inputs	01	288,448	1,853	2	719	-	-	-	-	-
	06	1,146	375,120	1,924,511	1,204,876	1,910	433	709	255	856
	11	10,897	2,849	22	-	-	-	-	-	-
	15	28,204	14,293	6,353	6,056	7,988	6,921	12,555	5,180	37,646
	16	12,661	141,241	8,663	22,873	38,389	15,576	16,076	30,665	88,102
	191	1,926	13,010	3,847	5,268	26,830	12,707	18,978	25,333	63,522
	20	511,214	216,699	90,245	95,222	87,041	39,353	59,663	111,645	248,147
	21	12,930	178,242	1,167,667	36,837	33,016	15,242	18,687	7,399	26,672
	221	95,205	49,034	1,093	57,142	32,360	48,588	96,751	185,769	240,047
	222, 231	97,042	6,036	13,826	909	12,252	52,296	189,843	58,313	27,459
	25	1,955	559,764	134,091	56,657	40,508	73,950	62,163	144,344	685,345
	26	9,867	50,417	17,202,952	13,871	2,633,672	1,277,794	1,508,915	156,145	82,771
	27	5,559	60,507	206,868	3,679,672	703,668	386,447	285,314	242,391	746,412
	28	63,644	70,366	19,682	14,830	706,667	333,471	472,940	254,352	271,174
	29	-	13,250	3,265	153	9,584	1,326,318	582,125	103,365	29,567
	30	-	5,402	3,103	772	4,913	34,633	1,902,955	11,173	38,552
	31	-	-	-	-	179	25,026	80,247	539,588	3,050
	32	3	7	22	1,652	32,824	72,292	119,058	913,970	3,460,967
	33	-	299	-	262	8,695	245,125	334,022	124,388	253,804
	34, 3911, 3919	6,457	65,870	387,069	203,318	1,751	7,203	20,184	10,380	15,187
	35	-	-	-	-	-	-	9,424	-	-
	41	10,005	81,536	251,445	65,730	85,795	38,398	56,236	18,165	101,221
	46	55,220	307,368	871,459	240,177	187,483	109,769	128,560	55,760	375,765
	47	2,039	8,835	29,110	8,825	7,328	6,461	9,664	4,568	26,380
	48	548	12,454	2,538	1,414	627	2,055	300	2,329	6,962
	5111011	242,874	299,790	954,853	473,557	695,959	537,388	666,912	370,156	661,886
	5112011	9,387	15,644	17,467	8,638	12,446	20,507	60,650	21,664	31,241
	53	12,759	63,463	106,736	66,258	103,048	58,178	91,212	61,142	76,404
	55	5,906	19,925	34,310	9,130	39,036	27,836	41,696	13,370	22,901
	5711011	2,681	10,604	8,732	4,693	12,202	9,750	18,077	10,801	30,339
	5712011	239	1,627	1,382	955	326	491	672	340	589
	5721	3,054	5,928	4,498	2,512	11,543	12,305	17,097	7,409	28,244
	5722011	23,002	141,404	272,486	100,142	115,411	80,247	101,073	54,366	102,844
P	5731011	4,792	17,207	59,886	18,065	59,028	31,738	44,333	28,714	19,736
P	5732011	1,162	64,805	24,615	9,058	26,497	12,878	21,472	15,223	6,359
	5741011	27	-	12	43	42	-	-	-	1
	5742011	8	13	6	4	21	8	31	9	65
	5742012	912	22,620	35,219	2,507	6,421	3,845	5,155	1,963	4,169
	5743011	2,323	12,432	93,027	70,330	20,443	10,908	13,512	3,084	5,271
	5751011	979	1,321	1,050	364	3,012	2,936	4,645	1,466	1,868
	5751012	355	564	1,129	420	1,142	1,096	2,134	908	1,166
	5751013	34	65	46	52	40	189	226	364	578
	5751014	-	-	-	-	-	-	-	-	-
	5761011	1,343	10,421	17,781	5,770	6,306	4,675	6,033	3,265	6,114
	5771011	4,119	22,514	36,538	39,768	17,582	12,098	14,967	9,946	16,047
	2,03,04,05,06,09	338	2,280	6,395	1,351	713	1,078	823	348	1,205
	5791011	468	1,188	1,534	1,119	4,321	1,600	3,389	1,611	1,119
	59	25,575	45,191	68,251	34,542	65,325	71,737	150,584	51,826	133,094
	61	-	-	-	-	-	-	-	-	-
	63	78,672	128,679	198,936	147,294	89,135	247,687	512,235	418,921	925,890
	64	1	-	46	-	-	-	-	-	-
	65	3,166	7,904	21,737	3,456	9,113	20,813	26,760	10,145	10,951
	66	98,561	330,555	315,414	157,445	292,637	387,399	535,668	208,834	619,817
	671	-	-	-	-	-	-	-	-	-
	672	-	-	-	-	-	-	-	-	-
	Others 67	291	406	1,959	930	892	1,093	2,392	818	2,539
P	68	1,277	7,284	3,849	3,452	4,027	7,692	13,765	4,878	11,163
	69	17,274	56,939	70,444	39,420	26,419	93,597	110,822	27,547	18,204
Dome:Fr 01		7,624	49		19					
Fr 11		216	125	1						
Fr 15,16,21		37,804	13,790	7,710	3,608	7,311	17,305	29,878	18,670	30,865
Fr 20		2,589	1,097	457	482	441	199	302	565	1,257
Fr 34,39 and		1,056	3,135	16,810	9,059	399	852	2,312	1,673	2,128
Fr 591,592		135	143	96	129	382	237	399	233	540
Fr 53		8	41	69	43	66	37	59	39	49
Fr 5711011		1,347	5,330	4,389	2,359	6,134	4,901	9,086	5,429	15,250

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P3)

Unit: Mil JPY										
CODE	33	34, 3911, 39	35	41	46	47	48	511101	511201	
Inputs	01	-	42,627	5	55,489	-	-	-	-	8,531
	06	543	6,591	3,505	326,076	6,905,061	-	-	-	-
	11	-	6,909	-	534	-	-	-	7,625	4,746
	15	26,200	24,301	49,946	93,892	2,275	2,134	5,058	125,360	115,432
	16	109,105	202,204	66,003	2,297,838	34,193	8,713	13,523	457,044	272,406
	191	46,961	75,643	44,852	33,368	49,702	10,936	14,029	234,861	328,290
	20	207,408	218,755	476,542	275,436	21,355	58,702	61,489	338	490
	21	18,128	18,155	105,007	725,321	1,539,930	71,948	51,556	76,782	125,372
	221	474,990	490,735	984,043	602,947	-	141,824	6,988	67,120	358,322
	222, 231	65,182	49,854	527,074	50,860	8,419	2,884	25,344	4,907	5,795
	25	140,133	62,567	345,880	2,827,046	1,075	18,003	2,046	7,089	11,365
	26	756,547	111,258	2,959,243	1,345,032	-	1,794	-	-	-
	27	1,006,262	403,763	1,070,621	565,608	12,274	1,419	22	978	431
	28	402,461	256,147	478,789	4,455,395	12,594	4,593	602	227,765	75,761
	29	195,889	24,880	385,086	314,591	-	23,554	-	211	182
	30	30,429	7,764	43,468	3,068	125	689	-	221	101
	31	12,121	8,528	18,963	8,414	-	352	129	107,176	12,255
	32	1,939,750	2,399,115	261,738	14,135	120	57	-	693	1,417
	33	1,662,369	182,253	1,414,607	396,831	70	479	-	16,661	7,254
	34, 3911, 3919	13,831	340,148	329,961	237,993	129,913	1,709	2,736	45,926	26,407
	35	-	-	19,825,403	-	-	-	-	-	-
	41	60,851	30,498	70,554	74,068	881,975	297,566	25,955	322,843	321,970
	46	136,064	94,807	491,558	237,790	2,238,845	181,441	159,895	248,700	1,630,756
	47	9,669	6,839	16,374	41,429	19,059	427,785	40,922	39,516	185,811
	48	2,718	989	13,389	73,509	304,493	6,637	-	60,155	57,776
	5111011	887,900	642,971	2,047,625	3,513,646	297,766	85,541	44,602	1,292,640	349,407
	5112011	33,105	91,433	64,287	193,951	7,166	8,436	14,936	154,767	129,036
	53	72,380	110,660	208,741	704,339	397,998	17,144	33,287	1,034,189	558,874
	55	40,777	25,508	43,659	243,659	167,181	7,977	9,504	2,300,404	916,974
	5711011	20,249	26,952	13,182	44,899	9,092	3,527	30,955	304,784	60,685
	5712011	678	2,030	2,951	3,567	975	219	667	447	1,189
	5721	14,352	9,574	13,634	39,180	6,221	1,308	11,768	154,600	40,993
	5722011	122,871	502,380	421,026	968,343	289,186	23,255	66,778	97,483	99,808
P	5731011	28,433	65,291	30,281	584,740	71,837	18,089	19,008	1,316,525	651,180
P	5732011	9,051	52,274	13,968	334,580	18,580	10,175	59,339	799,317	549,050
	5741011	3	77	82	-	54	-	-	-	-
	5742011	38	42	6	64	29	4	22	337	102
	5742012	4,039	40,620	21,251	35,672	63,794	1,890	1,225	2,742	3,633
	5743011	9,869	96,580	78,651	38,959	88,445	393	145	1,782	2,787
	5751011	4,022	1,588	3,566	432	1,040	512	5,946	88,084	6,106
	5751012	2,984	1,099	2,138	2,699	484	433	1,453	51,523	11,473
	5751013	565	712	1,765	609	12	32	21	203	343
	5751014	-	-	-	-	3,685	-	-	-	-
	5761011	7,001	6,900	27,387	46,696	21,489	910	444	4,126	5,239
	5771011	24,669	44,490	51,258	65,863	211,906	1,751	542	9,200	13,896
	2,03,04,05,06,09	5,250	1,293	4,848	43	-	-	-	51,681	3,212
	5791011	2,980	2,407	3,991	26,964	29,560	7,820	3,706	73,263	66,945
	59	190,436	193,413	136,987	470,735	261,532	189,441	37,133	2,000,343	1,751,120
	61	-	-	-	-	-	-	-	-	-
	63	858,300	654,521	1,826,738	93,400	148,123	813	838	187,080	118,464
	64	-	-	-	70	892	1,195	-	985	1,061
	65	9,596	9,988	12,578	57,278	36,626	44,867	8,057	20,671	31,835
	66	620,190	478,032	1,169,169	5,239,606	1,946,472	628,390	207,828	3,121,076	3,567,610
	671	-	-	-	-	-	-	-	-	-
	672	-	-	-	-	-	-	-	-	-
	Others 67	2,270	4,572	4,261	12,944	1,741	1,273	201	54,879	28,809
P	68	14,750	11,540	15,181	45,986	1,101	3,590	12,730	99,783	104,199
	69	65,067	28,071	75,738	783,322	68,124	41,639	4,386	328,722	344,077
Dome:Fr 01	-	-	4,838	-	1,451	-	-	-	-	228
Fr 11	-	-	139	-	24	-	-	-	336	209
Fr 15,16,2!	30,386	25,256	103,383	91,212	3,345	1,913	8,877	60,309	55,301	
Fr 20	1,050	1,108	2,413	1,395	108	297	311	2	2	
Fr 34.39 ar	3,264	16,431	20,119	12,921	5,827	763	210	3,178	4,115	
Fr 591.592	533	547	508	2,636	89	59	121	3,546	2,771	
Fr 53	47	71	134	453	256	11	21	665	359	
Fr 571101:	10,178	13,548	6,626	22,569	4,570	1,773	15,560	153,201	30,504	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P4)

Unit: Mil JPY										
	CODE	53	55	571101	571201	5721	572201	P 573101	P 573201	574101
Inputs	01	-	171	-	-	-	-	-	-	-
	06	-	-	24	-	-	-	-	-	-
	11	-	-	-	-	-	-	-	-	-
	15	34,046	1,623	4,449	99	3,027	9,705	669	1,395	1,722
	16	133,221	29,015	2,513	37	1,241	15,033	-	-	1,573
	191	552,159	3,644	6,959	190	2,048	23,632	-	-	80
	20	842	1,939	335	10	766	5,908	127	755	522
	21	16,670	48,274	16,680	2,106	236,452	888,761	1,757,575	1,136,157	409,006
	221	90,637	42,569	-	-	11	5,535	-	240	108
	222, 231	2,458	10	540	15	246	17,754	2,657	58,982	598
	25	386	5,144	22	1	42	480	-	-	222
	26	-	-	-	-	-	-	-	-	3
	27	-	-	-	-	-	-	-	-	222
	28	3,222	23,431	1,159	67	1,102	19,022	-	-	68
	29	-	-	480	15	39	27	-	-	21
	30	-	-	65	1	27	183	-	-	-
	31	466	-	-	-	-	109	-	-	10
	32	1,056	-	27	1	-	1	-	-	10
	33	105	1,004	900	24	947	-	728	1,232	8
	34, 3911, 3919	13,112	6,207	439	14	1,817	5,722	27	74	337
	35	-	-	250,559	18,358	-	-	671	966	4,485
	41	188,101	3,155,658	141,448	2,528	6,725	27,948	76,050	97,115	818
	46	129,697	380,924	129,445	6,041	10,789	70,331	5,562	6,828	351
	47	50,992	39,826	23,695	474	7,118	16,657	66,743	33,691	449
	48	71,853	1,125	49,409	3,189	3,181	21,857	-	-	1,913
	5111011	156,255	56,862	8,223	320	29,903	93,804	199,660	108,938	31,283
	5112011	60,100	57,020	5,992	233	13,376	75,310	413,025	149,768	633
	53	2,005,417	5,373,896	190,984	5,523	14,605	150,246	230,220	87,175	32,764
	55	630,404	1,561,970	9,043	635	22,277	152,320	108,010	7,840	1,812
	5711011	207,103	3,822	360	91	770	9,454	-	-	575
	5712011	378	631	1,329	313	133	12,554	1,447	1,188	352
	5721	150,030	3,373	381	28	3,344	8,288	-	-	697
	5722011	76,744	16,907	3,073	112	9,533	31,022	13,571	13,874	3,539
P	5731011	222,121	119,359	6,358	140	6,670	10,460	-	-	3,997
P	5732011	10,299	3,423	3,309	29	2,073	6,657	-	-	1,107
	5741011	-	-	3	-	-	331	-	-	1,323,924
	5742011	381	6	-	-	4	14	-	-	2
	5742012	673	1,569	256	15	6,123	36,747	44,675	10,622	6,884
	5743011	808	1,283	243	5	106	634	670	506	663,143
	5751011	6,758	341	23	2	88	1,234	-	-	255
	5751012	5,135	785	24	3	103	505	-	-	151
	5751013	370	168	36	1	12	1,806	5	15	1
	5751014	-	-	-	-	-	-	-	-	-
	5761011	2,703	1,456	277	2,922	822	9,842	2,803	2,028	1,183
	5771011	7,442	4,767	981	22	381	2,406	5,181	1,892	451
2,03,04,05,06,09		9	-	13,554	5	9,942	45,157	107,693	23,507	15,302
	5791011	241,684	13,222	2,723	340	908	5,462	-	-	175
	59	1,895,918	286,213	27,547	1,652	28,377	133,959	-	-	10,439
	61	-	-	-	-	-	-	-	-	-
	63	24,069	119	37,439	1,084	5,282	20,232	403	2,725	3,053
	64	3,837	480	230	1	-	6	-	-	-
	65	87,406	23,681	1,627	50	8,292	19,109	-	-	2,591
	66	3,437,826	2,096,872	128,582	2,277	178,153	729,335	1,734,800	1,215,129	24,385
	671	-	-	-	-	-	-	-	-	-
	672	-	-	-	-	-	-	-	-	-
Others	67	7,004	43,603	12,812	45	2,664	3,943	36	51	267
P	68	117,971	27,832	6,317	221	5,272	17,612	3,006	2,078	953
	69	126,058	344,572	77,216	1,815	5,789	94,459	-	-	2,247
Dome	Fr 01	-	5	-	-	-	-	-	-	-
	Fr 11	-	-	-	-	-	-	-	-	-
	Fr 15,16,21	16,691	908	2,176	49	1,448	9,040	308	650	947
	Fr 20	4	10	2	-	4	30	1	4	3
	Fr 34,39 and 40	3,366	444	49	1	87	459	13	265	18
	Fr 591,592	2,328	711	214	7	319	958	-	-	14
	Fr 53	1,289	3,455	123	4	9	97	148	56	21
	Fr 571101:	104,102	1,921	181	46	387	4,752	-	-	289

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P5)

Unit: Mil JPY

CODE	5742011	5742012	574301	5751011	5751012	5751013	5751014	5761011	5771011
01	-	-	-	-	-	-	-	-	-
06	-	-	-	-	-	-	-	78	-
11	-	-	-	-	-	-	-	-	-
15	554	5,743	6,032	594	618	95	44	592	1,258
16	366	3,794	2,375	581	604	93	43	3,707	21,805
191	171	1,768	2,090	303	315	48	22	2,964	1,986
20	34	349	18	104	108	17	8	80	1,687
21	10,800	111,923	24,084	85,826	89,319	13,675	6,361	19,374	2,981
221	49	504	132	336	350	54	25	1,267	6,517
222, 231	271	2,806	2,643	1	1	-	-	428	774
25	33	343	13	16	17	3	1	8	2
26	1	11	-	-	-	-	-	-	-
27	22	230	1	-	-	-	-	-	-
28	483	5,009	3,785	37	39	6	3	377	4,556
29	-	-	10	36	38	6	3	12	228
30	29	296	168	21	21	3	2	206	123
31	3	31	33	8	9	1	1	95	189
32	-	-	-	1	1	-	-	-	2
33	52	538	119	17	17	3	1	15	77
34, 3911, 3919	76	784	615	38	40	6	3	301	122
35	3,047	31,574	35,605	47,530	49,464	7,573	3,523	-	-
41	698	7,236	12,258	65	68	10	5	6,711	49,775
46	277	2,874	2,590	1,566	1,630	250	116	2,725	86,704
47	165	1,715	274	108	112	17	8	792	3,581
48	181	1,878	1,423	252	262	40	19	1,908	1,950
5111011	1,796	18,611	9,412	2,337	2,432	372	173	3,764	14,542
5112011	286	2,964	3,653	577	601	92	43	2,946	3,836
53	2,696	27,944	32,008	4,625	4,814	737	343	12,420	9,463
55	232	2,407	274,940	2,631	2,739	419	195	67,235	135,032
5711011	64	661	4,302	114	119	18	8	555	1,707
5712011	11	117	52	139	145	22	10	3,472	62
5721	178	1,845	1,521	15	15	2	1	504	744
5722011	199	2,059	1,991	1,553	1,616	247	115	1,135	3,156
P 5731011	402	4,169	3,745	490	510	78	36	1,474	2,413
P 5732011	198	2,048	879	119	123	19	9	306	1,310
5741011	2	18	-	12	12	2	1	1	-
5742011	-	1	7	-	-	-	-	1	3
5742012	497	5,152	298	640	666	102	47	91	114
5743011	1,118	11,588	74	112	117	18	8	37	153
5751011	4	41	45	733	762	117	54	588	90
5751012	10	107	139	219	228	35	16	166	110
5751013	1	5	9	4	4	1	-	3	12
5751014	-	-	-	133	139	21	10	-	-
5761011	39	407	141	249	259	40	18	1,870	191
5771011	25	260	315	399	416	64	30	160	506
2,03,04,05,06,09	1,116	11,570	1,349	15,935	16,584	2,539	1,181	3,254	2,197
5791011	77	794	2,306	312	324	50	23	963	1,558
59	2,202	22,820	40,414	5,153	5,363	821	382	9,130	29,390
61	-	-	-	-	-	-	-	-	-
63	181	1,878	2,786	445	463	71	33	1,829	6,712
64	106	1,103	-	-	-	-	-	-	36,632
65	97	1,008	2,498	48	50	8	4	1,019	9,362
66	1,813	18,791	25,884	70,992	73,882	11,311	5,262	48,371	212,189
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	37	388	439	173	180	28	13	222	458
P 68	562	5,823	3,176	671	699	107	50	3,952	3,194
69	244	2,525	17,381	8,120	8,450	1,294	602	4,717	23,725
Dome: Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,21	324	3,355	3,436	273	284	44	20	395	860
Fr 20	-	2	-	1	1	-	-	-	9
Fr 34.39 and	6	60	50	4	5	1	-	33	46
Fr 591.592	4	38	88	11	11	2	1	68	146
Fr 53	2	18	21	3	3	-	-	8	6
Fr 5711011:	32	332	2,162	57	60	9	4	279	858

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P6)

Unit: Mil JPY										
CODE	,04,05,06,09	5791011	59	61	63	64	65	66	671	
inputs	01	280	-	-	1,693	26,601	129,071	8,567	778	70,304
	06	-	-	-	288	1,478	-	-	12	-142
	11	1,176	-	11	13,063	44,224	391,012	5,808	437	262,704
	15	1,416	1,754	31,588	95,131	11,686	123,325	73,940	97,968	15,222
	16	24,393	966	701,667	52,778	205,367	322,561	82,889	219,481	13,703
	191	4,818	10,961	826,061	335,613	486,926	205,997	196,636	422,675	1,475
	20	1,159	1,074	72,005	39,387	205,131	7,754,048	10,976	281,425	8,468
	21	2,418	8,377	48,032	400,588	199,511	193,932	24,897	176,045	10,210
	221	3,700	-	161,642	30,930	129,000	55,336	11,710	160,106	4,927
	222, 231	89	826	35,740	40,029	8,980	49,428	20,813	498,479	3,194
	25	6	-	486	7,868	63,653	46,178	1,855	72,875	5,510
	26	1,812	-	-	1,057	-	178	23	9,846	73
	27	28	-	2,868	8,677	2,175	89,791	1,025	36,277	1,980
	28	3,768	36	16,610	201,562	4,853	20,088	11,408	82,313	2,223
	29	258	73	276	13,073	-	12	-	501,075	-
	30	101	48	94	646	-	-	-	748,552	-
	31	86	90	7,094	431,858	-	548,573	-	420,318	81
	32	18	6	42,442	90,280	35,173	220	-	833,039	2
	33	487	-	10,169	73,332	17,229	8,265	44	476,559	316
	34, 3911, 3919	168	13	187,269	137,904	162,916	57,182	21,436	315,617	4,367
	35	1,046	-	-	439,222	2,113	-	-	1,861,967	-
	41	24,232	3,844	322,347	810,258	463,717	312,567	17,787	191,541	11,774
	46	8,114	9,788	303,672	390,848	607,358	624,377	19,360	424,431	119,220
	47	4,653	1,159	94,662	147,622	322,971	326,850	12,961	57,165	33,796
	48	4,043	1,443	114,594	850,445	117,163	161,592	132	15,837	91,037
	5111011	10,819	4,200	531,195	311,024	374,544	2,777,857	132,950	1,150,003	127,997
	5112011	1,498	6,970	135,913	196,138	230,144	250,904	82,444	303,639	60,434
	53	9,201	1,973	218,897	1,626,440	70,243	347,735	317,495	737,507	44,484
	55	25,723	21,941	1,213,803	61,246	284,310	1,134,825	101,904	543,965	35,759
	5711011	766	744	49,339	154,634	114,378	57,462	14,538	56,584	1,720
	5712011	31	1,200	2,559	662	1,414	6,052	193	1,871	261
	5721	1,180	1,364	54,140	159,062	51,592	18,829	19,879	50,025	369
	5722011	3,065	88,155	190,138	112,088	100,288	351,128	29,474	195,083	19,282
P	5731011	2,798	2,389	324,629	293,230	218,659	216,050	34,590	306,478	49,625
P	5732011	737	7,639	86,819	113,653	48,805	67,057	8,338	112,421	5,026
	5741011	-	1,175	21	-	211	24	16	1,224	-
	5742011	2	2	226	71	188	31	46	140	3
	5742012	80	700	2,069	4,343	4,063	5,591	418	6,065	437
	5743011	116	10	4,418	1,209	2,730	6,601	365	11,884	357
	5751011	38	5,008	26,550	6,201	15,297	4,494	732	13,419	270
	5751012	95	115	30,285	7,574	23,284	8,197	5,083	24,664	401
	5751013	5	16,093	3,754	251	287	1,264	102	6,515	245
	5751014	17	-	17,442	1,746	-	-	-	7,040	-
	5761011	159	9,711	9,478	4,569	5,525	22,400	1,399	14,454	1,242
	5771011	395	187	28,515	201,769	15,111	28,902	3,016	20,911	2,436
	2,03,04,05,06,09	910	-	1,653	667	38	-	-	2,901	16,525
	5791011	804	-	184,185	165,746	90,719	70,305	30,296	52,006	2,804
	59	22,024	23,301	7,006,835	1,037,525	811,543	822,679	316,068	4,716,171	52,478
	61	-	-	-	-	-	-	-	-	-
	63	1,230	507	846,034	8,669	92,082	192,007	-	185,469	965
	64	313	47	21,514	896	719	1,867,833	56	863	8
	65	1,822	29	64,126	133	53,614	70,965	-	144,488	3,865
	66	110,659	12,005	6,689,621	2,979,711	2,004,614	3,041,290	375,710	7,873,268	65,069
	671	-	-	-	-	-	-	-	-	-
	672	-	-	-	-	-	462,069	-	-	25,895
	Others 67	305	713	493,624	20,811	41,066	644,926	12,975	100,797	34,596
P	68	2,025	5,057	76,975	112,304	132,723	127,638	22,867	100,212	5,986
	69	7,794	536	302,852	33,894	358,436	212,762	19,958	566,923	3,616
Dome:Fr 01	10	-	-	-	67	115	5,978	229	21	3,326
Fr 11	77	-	1	-	823	1,944	22,162	1,004	19	14,232
Fr 15,16,20	767	1,015	26,419	53,068	9,050	70,610	39,384	65,465	7,862	
Fr 20	6	5	365	199	1,039	39,270	56	1,425	43	
Fr 34.39 ar	45	49	12,322	7,354	9,730	3,819	1,940	18,065	219	
Fr 591.592	39	295	6,508	7,165	7,856	4,777	2,716	23,968	195	
Fr 53	6	1	141	1,046	45	224	204	474	29	
Fr 571101:	385	374	24,800	77,728	57,493	28,884	7,308	28,442	865	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P7)

Unit: Mil JPY		P					Domestic				
CODE	672	Others 67	68	69		Fr 01	Fr 11	Fr 15,16,25,Fr 20	Fr 34,39 and		
Inputs	01	848,447	86,413	-	-	23,075	285,723	27,468	146	3,170	
	06	-731	682	-	455		483	3,778	644	291	
	11	5,173,050	62,799	-	5,905	19,500	540,365	4,972	777	301	
	15	9,549	80,977	14,278	2,178	2,781	1,123	176,016	80	1,172	
	16	144,940	112,973	563,526	10,877	5,774	49,251	24,442	1,798	12,231	
	191	12,793	141,406	-	464	113	28,426	3,494	341	4,371	
	20	57,107	259,753	20,781	63,812	17,079	34,045	162,110	48,255	21,981	
	21	120,084	197,837	-	146,844	17,608	9,907	12,147	10,663	926	
	221	17,547	67,712	53,338	37,465	4,978	38,857	31,782	2,322	31,976	
	222, 231	2,345	25,845	9,616	6,806	390	270	24,643	79	2,379	
	25	36,752	18,083	7,096	38,204	576	3,987	6,427	765	2,841	
	26	726	885	38	54,716	66	-	3,210	5	4,583	
	27	8,902	6,949	1,260	41,718	-	9,653	1,232	668	16,325	
	28	64,232	59,298	474	20,903	573	25,924	15,262	1,168	10,734	
	29	-	414	-	-	-	-	174	3	990	
	30	-	479	-	-	-	-	53	-	441	
	31	-	35,043	33,474	-	10	-	-	-	337	
	32	-	529	38,024	-	1	3	2	1	93,349	
	33	1,090	6,960	-	6,849	252	1	8	-	7,105	
	34, 3911, 3919	49,428	123,433	183,939	2,006	1,265	2,802	12,642	165	14,348	
	35	-	2,331	-	-	9,573	-	-	-	-	
	41	69,393	171,638	-	-	1,673	2,763	8,301	1,004	1,698	
	46	615,698	598,196	-	48,646	2,435	30,212	35,745	3,380	5,445	
	47	253,918	185,213	-	16,277	126	5,302	1,973	368	369	
	48	261,219	196,599	-	18,547	9	3,455	329	228	54	
	5111011	1,848,657	400,087	243,172	75,343	16,096	202,482	133,779	6,659	32,877	
	5112011	935,608	247,837	70,249	798	6,135	6,465	13,792	153	3,850	
	53	114,383	123,903	-	24,097	2,623	10,663	20,712	867	4,971	
	55	281,356	482,055	-	195,260	307	5,857	5,090	364	1,308	
	5711011	26,228	29,954	-	13,210	119	958	1,766	170	1,197	
	5712011	3,564	647	779	201	49	932	166	27	104	
	5721	7,667	23,795	-	3,963	81	1,072	1,626	111	443	
	5722011	295,902	143,652	50,396	221,009	3,584	47,403	15,621	1,484	22,371	
P	5731011	31,077	276,185	-	3,830	2,205	14,651	6,121	261	2,993	
P	5732011	1,620	122,611	-	54,033	8,231	4,260	4,103	69	2,291	
	5741011	-	15	-	674	-	-	13	-	4	
	5742011	87	132	-	16	-	2	8	-	2	
	5742012	5,722	2,812	1,087	2,299	488	994	625	189	1,779	
	5743011	4,857	1,456	2,836	841	432	1,606	520	99	4,223	
	5751011	-	6,586	-	4,172	14	98	507	33	86	
	5751012	2,034	7,538	-	6,859	10	93	341	41	54	
	5751013	2,811	294	114	804	3	7	21	1	30	
	5751014	-	-	-	338	1	-	-	-	-	
	5761011	18,833	3,299	3,201	12,237	278	3,097	921	111	339	
	5771011	40,414	5,405	4,737	1,486	689	9,123	2,782	226	2,032	
2,03,04,05,06,09	5791011	10,347	3,595	-	5,545	47	214	192	18	70	
	5791011	30,335	30,801	-	1,599	77	696	872	51	126	
	59	421,608	486,601	-	212,004	1,757	17,030	10,616	1,704	8,133	
	61	-	-	-	1,136,566	-	-	-	-	-	
	63	7,950	19,664	-	125,481	463	16,193	26,695	11,067	27,374	
	64	1,713	650	-	16,035	9	-	-	2	-	
	65	35,903	130,837	-	10,097	1,285	2,890	1,643	258	458	
	66	651,305	926,016	-	261,060	6,494	113,803	49,694	6,036	22,388	
	671	-	-	-	-	-	-	-	-	-	
	672	114,246	-	-	1,640	-	3,536	-	-	-	
	Others 67	84,702	389,008	-	12,696	205	586	210	15	201	
P	68	19,788	59,752	-	891	282	948	1,452	75	500	
	69	43,564	55,045	709	-	5,377	3,983	6,131	192	1,285	
Dome:	Fr 01	42,598	2,361	-	-	1,150	12,792	658	4	246	
	Fr 11	280,642	3,342	-	260	1,015	38,753	104	30	6	
	Fr 15,16,20	5,881	43,971	11,331	3,133	1,396	818	86,685	71	1,220	
	Fr 20	289	1,316	105	323	86	172	821	244	111	
	Fr 34,39 and	2,233	6,271	8,233	261	77	418	783	19	753	
	Fr 591,592	1,073	2,104	-	184	6	111	92	5	25	
	Fr 53	74	80	-	15	2	7	13	1	3	
	Fr 571101:	13,183	15,057	-	6,640	60	481	888	86	602	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P8)

Unit: Mil JPY									
CODE	Fr 591.592,5	Fr 53	Fr 5711011	Fr 5721	Fr 5722011	Fr 5741011	Fr 5742011	Fr 5751011	Fr 5751012
01	-	-	-	-	-	-	-	-	-
06	-	-	12	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-
15	52	22	2,247	407	86	-	732	-	1,247
16	12,600	86	1,270	167	133	-	484	-	1,220
191	15,135	355	3,515	275	208	-	225	-	637
20	1,048	1	169	103	52	-	44	-	218
21	116	11	8,426	31,761	7,838	-	14,267	-	180,278
221	107	58	-	2	49	-	64	-	706
222, 231	38	2	273	33	157	-	358	-	2
25	1	-	11	6	4	-	44	-	34
26	-	-	-	-	-	-	1	-	-
27	72	-	-	-	-	-	29	-	-
28	49	2	585	148	168	-	638	-	79
29	-	-	242	5	-	-	-	-	76
30	-	-	33	4	2	-	38	-	43
31	-	-	-	-	1	-	4	-	17
32	13	1	14	-	-	-	-	-	2
33	3	-	455	127	-	-	69	-	35
34, 3911, 3919	48	8	222	244	50	-	100	-	81
35	-	-	126,570	-	-	-	4,025	-	99,837
41	447	121	71,453	903	246	-	922	-	137
46	534	83	65,389	1,449	620	-	366	-	3,290
47	168	33	11,970	956	147	-	219	-	227
48	131	46	24,959	427	193	-	239	-	530
5111011	6,476	100	4,154	4,017	827	-	2,372	-	4,908
5112011	176	39	3,027	1,797	664	-	378	-	1,213
53	407	1,289	96,475	1,962	1,325	-	3,562	-	9,716
55	831	405	4,568	2,992	1,343	-	307	-	5,527
5711011	166	133	182	103	83	-	84	-	240
5712011	46	-	671	18	111	-	15	-	293
5721	121	96	192	449	73	-	235	-	31
5722011	1,721	49	1,552	1,281	274	-	262	-	3,262
P 5731011	905	143	3,212	896	92	-	531	-	1,030
P 5732011	145	7	1,672	278	59	-	261	-	249
5741011	-	-	2	-	3	-	2	-	24
5742011	-	-	-	1	-	-	-	-	-
5742012	15	-	129	822	324	-	657	-	1,344
5743011	55	1	123	14	6	-	1,477	-	236
5751011	226	4	11	12	11	-	5	-	1,539
5751012	265	3	12	14	4	-	14	-	460
5751013	-	-	18	2	16	-	1	-	7
5751014	102	-	-	-	-	-	-	-	280
5761011	103	2	140	110	87	-	52	-	523
5771011	212	5	495	51	21	-	33	-	839
2,03,04,05,06,09	48	-	6,847	1,335	398	-	1,475	-	33,472
5791011	938	155	1,376	122	48	-	101	-	655
59	9,049	1,219	13,915	3,812	1,181	-	2,909	-	10,824
61	-	-	-	-	-	-	-	-	-
63	1,616	15	18,912	709	178	-	239	-	935
64	21	2	116	-	-	-	141	-	-
65	244	56	822	1,114	169	-	128	-	100
66	10,655	2,210	64,953	23,930	6,432	-	2,395	-	149,121
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	842	5	6,472	358	35	-	49	-	363
P 68	199	76	3,191	708	155	-	742	-	1,410
69	337	81	39,005	778	833	-	322	-	17,056
Dome: Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2!	85	11	1,099	194	80	-	428	-	574
Fr 20	5	-	1	1	-	-	-	-	1
Fr 34.39 ai	69	2	25	12	4	-	8	-	9
Fr 591.592	9	1	108	43	8	-	5	-	23
Fr 53	-	1	62	1	1	-	2	-	6
Fr 571101:	83	67	91	52	42	-	42	-	121

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P9)

Unit: Mil JPY										
CODE	Fr 2111-01	Fr 6612011	Fr 578	Fr 64	Fr 6711011	Fr 6821011	Fr 6312, 659	Fr 01	Fr 11	Outbound
inputs	01	-	-	1,279	98	57,004	75,535	3,699	-	-14,874
	06	803,860	-	-	-	-115	-65	27	-	4
	11	4	-	5,371	298	213,006	460,545	3,173	-	-9,137
	15	7	16	6,466	94	12,342	850	5,353	-	-62
	16	5	160	111,382	246	11,111	12,904	8,162	-	-582
	191	12	34	22,001	157	1,196	1,139	12,253	-	-50
	20	1,238	44	5,293	5,909	6,866	5,084	15,456	-	-404
	21	64,130	1,617	11,039	148	8,278	10,691	14,993	-	-451
	221	131	26	16,897	42	3,995	1,562	4,312	-	-1,865
	222, 231		12	407	38	2,590	209	1,264	-	-14
	25	15		27	35	4,468	3,272	1,318	-	-315
	26	-	-	8,275		59	65	44	-	-
	27	13	-	127	68	1,605	793	497	-	25
	28	421	440	17,204	15	1,803	5,718	3,800	-	-1,480
	29	-	-	1,176		-	-	21	-	-
	30	12	75	459	-	-	-	24	-	-
	31	-	-	394	418	66	-	3,304	-	-
	32	-	-	80		1	-	30	-	-
	33	-	29	2,222	6	256	97	275	-	-
	34, 3911, 3919	84	22	768	44	3,541	4,400	8,619	-	-163
	35	-	-	4,776	-	-	-	177	-	-
	41	476	349	110,647	238	9,547	6,178	12,734	-	-66
	46	6,120	1,932	37,052	476	96,666	54,814	39,151	-	-942
	47	285	198	21,245	249	27,403	22,606	13,823	-	-201
	48	-	256	18,462	123	73,815	23,256	10,970	-	55
	5111011	7,182	681	49,401	2,117	103,782	164,582	26,091	-	-4,011
	5112011	59	458	6,841	191	49,001	83,295	16,766	-	-413
	53	3,148	10,777	42,011	265	36,068	10,183	11,245	-	-427
	55	250	4,702	117,457	865	28,994	25,048	30,693	-	-141
	5711011	145	125	3,498	44	1,395	2,335	2,523	-	-6
	5712011	21	7	141	5	211	317	48	-	-24
	5721	58	34	5,387	14	299	683	1,584	-	-2
	5722011	2,992	141	13,995	268	15,634	26,343	8,359	-	-1,147
P	5731011	247	1,023	12,776	165	40,237	2,767	16,573	-	-94
P	5732011	73	747	3,367	51	4,075	144	7,783	-	-65
	5741011	7	-	-	-	-	-	2	-	-
	5742011			8		3	8	7	-	-
	5742012	5,145	15	364	4	355	509	218	-	-45
	5743011	3,377	10	530	5	290	432	89	-	-96
	5751011	18	12	174	3	219	-	441	-	-2
	5751012	12	8	434	6	325	181	596	-	-
	5751013	1	1	25	1	199	250	19	-	-
	5751014	-	-	77	-	-	-	-	-	-
	5761011	739	12	724	17	1,007	1,677	231	-	-82
	5771011	8,586	40	1,802	22	1,976	3,598	405	-	-478
2,03,04,05,06,09			433	4,157	-	13,399	921	64	-	-2
	5791011	26	135	3,672	54	2,274	2,701	2,415	-	4
	59	699	1,430	100,565	627	42,550	37,535	28,758	-	-185
	61	-	-	-	-	-	-	-	-	-
	63	2,411	172	5,616	146	783	708	1,507	-	-372
	64	-	-	1,430	1,423	6	153	48	-	-
	65	132	1,001	8,321	54	3,134	3,196	9,020	-	-45
	66	3,337	12,588	505,291	2,318	52,759	57,984	74,162	-	-1,527
	671	-	-	-	-	-	-	-	-	-
	672	-	-	-	352	20,996	10,171	-	-	-350
	Others 67	10	317	1,392	491	28,051	7,541	15,540	-	-5
P	68	13	337	9,247	97	4,854	1,762	3,862	-	-56
	69	248	2,990	35,587	162	2,932	3,878	4,941	-	-195
Dome: Fr 01		-	-	44	5	2,696	3,792	101	-	-404
	Fr 11		-	353	17	11,540	24,985	172	-	54
	Fr 15,16,21	3	11	3,504	54	6,375	524	2,801	-	-37
	Fr 20	6		27	30	35	26	78	-	-2
	Fr 34.39 ar	4	1	204	3	177	199	444	-	-15
	Fr 591.592	2	4	176	4	158	96	228	-	-
	Fr 53	2	7	27		23	7	7	-	-
	Fr 571101:	73	63	1,758	22	701	1,174	1,268	-	-3

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P10)

Unit: Mil JPY										
CODE	Fr 15,16,25,26	Fr 20	Fr 34.39 and Fr 53	Fr 591.592,5	Fr 53	Fr 5711011	Fr 5721	Fr 5722011	Fr 5741011	
Inputs	01	-2,099	-18	212	-	-	-	-	-	-
	06	-10	-78	25	-	-	-	-	-	-
	11	-365	-94	27	-	-	-	-	-	-
	15	-3,615	-10	98	4	36	8	-28	2	-5
	16	-460	-218	902	1,568	141	5	-12	3	-4
	191	-94	-41	330	1,855	586	13	-19	4	-
	20	-7,281	-5,852	1,293	131	1	1	-7	1	-1
	21	-355	-1,293	75	7	18	30	-2,200	152	-1,087
	221	-2,850	-282	2,272	12	96	-	-	1	-
	222, 231	-2,591	-10	199	-7	3	1	-2	3	-2
	25	-62	-93	245	-	-	-	-	-	-1
	26	-267	-1	419	-	-	-	-	-	-
	27	-66	-81	1,509	9	-	-	-	-	-1
	28	-1,459	-142	971	2	3	2	-10	3	-
	29	-	-	92	-	-	1	-	-	-
	30	-	-	34	-	-	-	-	-	-
	31	-	-	32	-	-	-	-	-	-
	32	-	-	8,831	-2	1	-	-	-	-
	33	-	-	671	-1	-	2	-9	-	-
	34, 3911, 3919	-324	-20	1,292	-4	14	1	-17	1	-1
	35	-	-	-	-	-	451	-	-	-12
	41	-303	-122	131	-30	200	254	-63	5	-2
	46	-1,183	-410	413	-16	138	233	-100	12	-1
	47	-71	-45	29	-9	54	43	-66	3	-1
	48	-8	-28	4	-22	76	89	-30	4	-5
	5111011	-5,273	-808	2,651	788	166	15	-278	16	-83
	5112011	-432	-19	347	10	64	11	-124	13	-2
	53	-520	-105	431	-	2,128	344	-136	26	-87
	55	-198	-44	105	26	669	16	-207	26	-5
	5711011	-76	-21	105	9	220	1	-7	2	-2
	5712011	-6	-3	8	6	6	2	-1	2	-1
	5721	-85	-14	38	3	159	1	-31	1	-2
	5722011	-596	-180	1,951	195	81	6	-89	5	-9
P	5731011	-198	-32	257	79	236	11	-62	2	-11
P	5732011	-83	-8	202	7	11	6	-19	1	-3
	5741011	-1	-	-	-	-	-	-	-	-3,518
	5742011	-	-	-	-	-	-	-	-	-
	5742012	-21	-23	157	2	1	-	-57	6	-18
	5743011	-25	-12	372	7	1	-	-1	-	-1,762
	5751011	-18	-4	7	25	7	-	-1	-	-1
	5751012	-11	-5	4	33	5	-	-1	-	-
	5751013	-1	-	3	-	-	-	-	-	-
	5751014	-	-	-	10	-	-	-	-	-
	5761011	-34	-13	28	13	3	-	-8	2	-3
	5771011	-102	-27	175	25	8	-	-4	-	-1
	2,03,04,05,06,09	-11	-2	5	6	-	24	-92	8	-41
	5791011	-22	-6	10	69	257	5	-8	1	-
	59	-504	-207	734	-710	2,012	50	-264	23	-28
	61	-	-	-	-	-	-	-	-	-
	63	-1,397	-1,342	2,478	56	26	67	-49	3	-8
	64	-	-	-	-4	4	-	-	-	-
	65	-48	-31	39	20	93	3	-77	3	-7
	66	-2,541	-732	1,897	396	3,649	231	-1,657	125	-65
	671	-	-	-	-	-	-	-	-	-
	672	-	-	-	-	-	-	-	-	-
	Others 67	-8	-2	18	27	7	23	-25	1	-1
P	68	-46	-9	44	8	125	11	-49	3	-3
	69	-430	-23	110	-20	134	139	-54	16	-6
Dome	Fr 01	-53	-	20	-	-	-	-	-	-
	Fr 11	-7	-4	1	-	-	-	-	-	-
	Fr 15,16,21	-2,314	-9	102	6	18	4	-13	2	-3
	Fr 20	-37	-30	7	1	-	-	-	-	-
	Fr 34.39 and Fr 53	-35	-2	65	8	4	-	-1	-	-
	Fr 591.592	-4	-1	2	-	2	-	-3	-	-
	Fr 53	-	-	-	-	1	-	-	-	-
	Fr 5711011	-38	-10	53	5	110	-	-4	1	-1

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P11)

Unit: Mil JPY

CODE	Fr 5742011	Fr 5751011	Fr 5751012	Fr 2111-01	Fr 6612011	Fr 578	Fr 64	Fr 6711011	Fr 6821011
inputs									
01	-	-	-	-	-	505	-	-10,266	-7,882
06	-	-	-	5,382	-	-	-	21	7
11	-	-	-	-	-	2,123	-	-38,360	-48,055
15	-502	148	-46	-	-	2,556	-	-2,223	-89
16	-331	145	-45	-	-	44,024	-	-2,001	-1,346
191	-154	76	-23	-	-	8,696	-	-215	-119
20	-30	26	-8	8	-	2,092	-	-1,236	-530
21	-9,778	21,436	-6,633	429	-	4,363	-	-1,491	-1,116
221	-44	84	-26	1	-	6,678	-	-719	-163
222, 231	-245	-	-	-	-	161	-	-466	-22
25	-30	4	-1	-	-	11	-	-805	-341
26	-1	-	-	-	-	3,271	-	-11	-7
27	-20	-	-	-	-	50	-	-289	-83
28	-438	9	-3	3	-	6,800	-	-325	-597
29	-	9	-3	-	-	465	-	-	-
30	-26	5	-2	-	-	182	-	-	-
31	-3	2	-1	-	-	156	-	-12	-
32	-	-	-	-	-	32	-	-	-
33	-47	4	-1	-	-	878	-	-46	-10
34, 3911, 3919	-68	10	-3	1	-	303	-	-638	-459
35	-2,758	11,871	-3,673	-	-	1,888	-	-	-
41	-632	16	-5	3	-	43,733	-	-1,719	-645
46	-251	391	-121	41	-	14,645	-	-17,408	-5,719
47	-150	27	-8	2	-	8,397	-	-4,935	-2,359
48	-164	63	-19	-	-	7,297	-	-13,293	-2,427
5111011	-1,626	584	-181	48	-	19,526	-	-18,690	-17,173
5112011	-259	144	-45	-	-	2,704	-	-8,824	-8,691
53	-2,441	1,155	-357	21	-	16,605	-	-6,495	-1,063
55	-210	657	-203	2	-	46,425	-	-5,221	-2,614
5711011	-58	29	-9	1	-	1,383	-	-251	-244
5712011	-10	35	-11	-	-	56	-	-38	-33
5721	-161	4	-1	-	-	2,129	-	-54	-71
5722011	-180	388	-120	20	-	5,532	-	-2,815	-2,749
P 5731011	-364	122	-38	2	-	5,050	-	-7,246	-289
P 5732011	-179	30	-9	-	-	1,331	-	-734	-15
5741011	-2	3	-1	-	-	-	-	-	-
5742011	-	-	-	-	-	3	-	-	-1
5742012	-450	160	-49	34	-	144	-	-64	-53
5743011	-1,012	28	-9	23	-	209	-	-52	-45
5751011	-4	183	-57	-	-	69	-	-39	-
5751012	-9	55	-17	-	-	172	-	-59	-19
5751013	-	1	-	-	-	10	-	-36	-26
5751014	-	33	-10	-	-	30	-	-	-
5761011	-36	62	-19	5	-	286	-	-181	-175
5771011	-23	100	-31	57	-	712	-	-356	-375
2,03,04,05,06,09	-1,011	3,980	-1,232	-	-	1,643	-	-2,413	-96
5791011	-69	78	-24	-	-	1,451	-	-409	-282
59	-1,994	1,287	-398	5	-	39,748	-	-7,663	-3,917
61	-	-	-	-	-	-	-	-	-
63	-164	111	-34	16	-	2,220	-	-141	-74
64	-96	-	-	-	-	565	-	-1	-16
65	-88	12	-4	1	-	3,289	-	-564	-334
66	-1,642	17,731	-5,487	22	-	199,718	-	-9,501	-6,050
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-3,781	-1,061
Others 67	-34	43	-13	-	-	550	-	-5,052	-787
P 68	-509	168	-52	-	-	3,655	-	-874	-184
69	-221	2,028	-628	2	-	14,066	-	-528	-405
Dome: Fr 01	-	-	-	-	-	18	-	-486	-396
Fr 11	-	-	-	-	-	140	-	-2,078	-2,607
Fr 15,16,21	-293	68	-21	-	-	1,385	-	-1,148	-55
Fr 20	-	-	-	-	-	11	-	-6	-3
Fr 34.39 and	-5	1	-	-	-	81	-	-32	-21
Fr 591.592	-3	3	-1	-	-	70	-	-28	-10
Fr 53	-2	1	-	-	-	11	-	-4	-1
Fr 5711011	-29	14	-4	-	-	695	-	-126	-122

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P12)

Unit: Mil JPY		Inbound						
CODE	Fr 6312, 659	Fr 01	Fr 11	Fr 15,16,25,26	Fr 20	Fr 34.39 and Fr 591.592,5	Fr 53	Fr 5711011
Inputs	01	-126	-	5,665	2,572	42	293	-
	06	-2	-	10	13	186	45	-
	11	-83	-	11,782	442	224	48	-
	15	-308	-	26	2,707	23	167	50
	16	-278	-	1,030	509	519	1,392	28
	191	-241	-	570	89	98	521	78
	20	-328	-	720	8,030	13,920	1,506	4
	21	132	-	237	358	3,076	125	186
	221	-392	-	909	3,560	670	3,378	-
	222, 231	-61	-	6	3,278	23	343	6
	25	-11	-	111	72	221	431	-
	26	-2	-	-	341	1	766	-
	27	7	-	201	85	193	2,779	-
	28	-28	-	647	1,842	337	1,763	13
	29	-1	-	-	-	1	171	5
	30	-1	-	-	-	-	53	1
	31	-290	-	-	-	-	59	-
	32	-1	-	-	-	-	16,514	-
	33	-32	-	-	-	-	1,255	10
	34, 3911, 3919	-217	-	74	295	47	2,341	5
	35	20	-	-	-	-	-	2,798
	41	697	-	56	327	290	210	1,579
	46	-667	-	674	1,232	975	653	1,445
	47	360	-	116	75	106	47	265
	48	-701	-	65	8	66	7	552
	5111011	-733	-	4,041	5,661	1,921	4,426	92
	5112011	-225	-	173	422	44	629	67
	53	-442	-	247	463	250	762	2,133
	55	-602	-	123	212	105	176	101
	5711011	262	-	19	84	49	186	4
	5712011	1	-	22	6	8	14	15
	5721	14	-	22	98	32	66	4
	5722011	-273	-	1,029	653	428	3,458	34
P	5731011	-805	-	287	199	75	449	71
P	5732011	-325	-	89	71	20	360	37
	5741011	-	-	-	1	-	1	-
	5742011	-	-	-	-	-	-	-
	5742012	2	-	24	24	55	280	3
	5743011	-1	-	42	30	28	665	3
	5751011	2	-	2	19	10	11	-
	5751012	37	-	2	11	12	8	-
	5751013	-	-	-	1	-	5	-
	5751014	-	-	-	-	-	-	-
	5761011	-2	-	66	37	32	47	3
	5771011	1	-	220	110	65	306	11
	2,03,04,05,06,09	-19	-	4	13	5	9	151
	5791011	154	-	14	19	15	17	30
	59	-982	-	349	569	492	1,331	308
	61	-	-	-	-	-	-	-
	63	-7	-	349	1,610	3,192	4,505	418
	64	7	-	-	-	1	-	3
	65	-873	-	60	46	74	69	18
	66	2,214	-	2,442	2,930	1,741	3,290	1,436
	671	-	-	-	-	-	-	-
	672	-	-	110	-	-	-	-
	Others 67	-1,421	-	12	8	4	31	143
P	68	49	-	21	46	22	79	71
	69	415	-	85	525	55	193	862
Dome:	Fr 01	-6	-	151	65	1	33	-
	Fr 11	-5	-	793	9	9	1	-
	Fr 15,16,20	-157	-	19	2,077	21	174	24
	Fr 20	-2	-	4	41	70	8	-
	Fr 34.39 and Fr 591.592	-12	-	10	40	6	113	1
	Fr 53	14	-	2	5	1	4	2
	Fr 5711011	-	-	-	-	-	-	1
	Fr 5711011	131	-	10	42	25	93	2

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P13)

Unit: Mil JPY										
CODE	Fr 5721	Fr 5722011	Fr 5741011	Fr 5742011	Fr 5751011	Fr 5751012	Fr 2111-01	Fr 6612011	Fr 578	
inputs	01	-	-	-	-	-	-	-	-	1
	06	-	-	-	-	-	-	-	-	-
	11	-	-	-	-	-	-	-	-	6
	15	17	-	-	-	500	8	-	1	7
	16	7	-	-	-	489	7	-	5	129
	191	11	-	-	-	255	4	-	1	25
	20	4	-	-	-	87	1	-	1	6
	21	1,296	-	-	-	72,275	1,097	-	54	13
	221	-	-	-	-	283	4	-	1	20
	222, 231	1	-	-	-	1	-	-	-	-
	25	-	-	-	-	13	-	-	-	-
	26	-	-	-	-	-	-	-	-	10
	27	-	-	-	-	-	-	-	-	-
	28	6	-	-	-	31	-	-	15	20
	29	-	-	-	-	30	-	-	-	1
	30	-	-	-	-	17	-	-	2	1
	31	-	-	-	-	7	-	-	-	-
	32	-	-	-	-	1	-	-	-	-
	33	5	-	-	-	14	-	-	1	3
	34, 3911, 3919	10	-	-	-	32	-	-	1	1
	35	-	-	-	-	40,025	608	-	-	6
	41	37	-	-	-	55	1	-	12	128
	46	59	-	-	-	1,319	20	-	64	43
	47	39	-	-	-	91	1	-	7	25
	48	17	-	-	-	212	3	-	9	21
	5111011	164	-	-	-	1,968	30	-	23	57
	5112011	73	-	-	-	486	7	-	15	8
	53	80	-	-	-	3,895	59	-	360	49
	55	122	-	-	-	2,216	34	-	157	136
	5711011	4	-	-	-	96	1	-	4	4
	5712011	1	-	-	-	117	2	-	-	-
	5721	18	-	-	-	13	-	-	1	6
	5722011	52	-	-	-	1,308	20	-	5	16
P	5731011	37	-	-	-	413	6	-	34	15
P	5732011	11	-	-	-	100	2	-	25	4
	5741011	-	-	-	-	10	-	-	-	-
	5742011	-	-	-	-	-	-	-	-	-
	5742012	34	-	-	-	539	8	-	1	-
	5743011	1	-	-	-	95	1	-	-	1
	5751011	-	-	-	-	617	9	-	-	-
	5751012	1	-	-	-	184	3	-	-	1
	5751013	-	-	-	-	3	-	-	-	-
	5751014	-	-	-	-	112	2	-	-	-
	5761011	5	-	-	-	210	3	-	-	1
	5771011	2	-	-	-	336	5	-	1	2
	2,03,04,05,06,09	54	-	-	-	13,419	204	-	14	5
	5791011	5	-	-	-	263	4	-	4	4
	59	156	-	-	-	4,340	66	-	48	116
	61	-	-	-	-	-	-	-	-	-
	63	29	-	-	-	375	6	-	6	7
	64	-	-	-	-	-	-	-	-	2
	65	45	-	-	-	40	1	-	33	10
	66	976	-	-	-	59,784	908	-	420	585
	671	-	-	-	-	-	-	-	-	-
	672	-	-	-	-	-	-	-	-	-
	Others 67	15	-	-	-	146	2	-	11	2
P	68	29	-	-	-	565	9	-	11	11
	69	32	-	-	-	6,838	104	-	100	41
Dome:	Fr 01	-	-	-	-	-	-	-	-	-
	Fr 11	-	-	-	-	-	-	-	-	-
	Fr 15,16,21	8	-	-	-	230	3	-	-	4
	Fr 20	-	-	-	-	-	-	-	-	-
	Fr 34.39 and	-	-	-	-	4	-	-	-	-
	Fr 591.592	2	-	-	-	9	-	-	-	-
	Fr 53	-	-	-	-	3	-	-	-	-
	Fr 571101:	2	-	-	-	48	1	-	2	2

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P14)

Unit: Mil JPY						Final demand sectors			
CODE	Fr 64	Fr 6711011	Fr 6821011	Fr 6312, 659	700000	Consumption			
						71	72	73	
Inputs	01	-	6,400	5,308	75	10,347,847	60,382	3,284,731	-
	06	-	-13	-5	1	24,092,776	-5,385	-6,104	-
	11	-	23,914	32,363	64	13,901,388	762,889	23,628,940	224,986
	15	-	1,386	60	64	1,925,887	69,520	2,421,334	-
	16	-	1,247	907	107	11,962,959	67,882	341,046	2,015
	191	-	134	80	144	5,018,495	19,434	53,178	-
	20	-	771	357	187	25,473,575	165,312	2,523,741	-
	21	-	929	751	199	14,828,327	23,664	5,781,390	-
	221	-	449	110	52	8,990,564	17,103	310,753	4,849
	222, 231	-	291	15	20	2,085,847	27,757	961,449	-
	25	-	502	230	19	5,880,047	14,711	147,455	-
	26	-	7	5	1	28,325,469	-	-43,608	-
	27	-	180	56	4	9,869,880	1,375	182,595	-
	28	-	202	402	46	9,651,258	30,578	288,136	625
	29	-	-	-	-	3,551,422	-	13,219	-
	30	-	-	-	-	2,873,283	-	9,477	-
	31	-	7	-	34	2,301,181	2,557	202,047	166
	32	-	-	-	-	10,381,180	1,008	136,765	-
	33	-	29	7	4	5,272,078	53,061	2,911,212	-
	34, 3911, 3919	-	398	309	116	3,557,437	251,829	5,635,467	17
	35	-	-	-	4	22,953,244	-	5,302,658	-
	41	-	1,072	434	211	9,773,227	-	-	-
	46	-	10,853	3,852	581	14,839,139	5,143	6,317,707	-
	47	-	3,077	1,589	187	2,933,964	2,749	1,884,207	-261,415
	48	-	8,287	1,634	164	2,775,568	-	218,643	768,044
	5111011	-	11,652	11,565	334	30,523,802	455,979	12,985,876	4,688
	5112011	-	5,501	5,853	218	4,831,229	1,096,414	30,611,343	5,070
	53	-	4,049	716	160	16,575,762	170	15,531,685	-
	55	-	3,255	1,760	362	11,901,584	-	59,204,489	61,313
	5711011	-	157	164	46	1,475,403	11,801	2,613,547	-
	5712011	-	24	22	1	90,887	945	21,602	25
	5721	-	34	48	27	1,018,012	69,669	1,891,629	-
	5722011	-	1,755	1,851	140	7,288,141	256,424	2,956,086	2,587
P	5731011	-	4,517	194	248	5,663,199	-	-	-
P	5732011	-	457	10	98	3,269,468	-	-	-
	5741011	-	-	-	-	1,325,292	-	1,900	-
	5742011	-	-	1	-	2,400	11	9,668	-
	5742012	-	40	36	3	575,889	838	69,568	3
	5743011	-	33	30	1	1,483,040	1,292	44,333	5
	5751011	-	25	-	7	242,819	2,556	570,439	-
	5751012	-	36	13	10	223,992	2,337	219,665	-
	5751013	-	22	18	-	42,306	374	25,478	9
	5751014	-	-	-	-	31,594	-	2,272	-
	5761011	-	113	118	3	439,047	4,446	149,400	114
	5771011	-	222	253	5	1,419,852	8,201	188,459	375
	2,03,04,05,06,09	-	1,504	65	1	485,341	448	275,617	-7,678
	5791011	-	255	190	41	1,210,421	10,693	186,307	-
	59	-	4,777	2,638	361	25,370,860	159,753	12,683,731	34,664
	61	-	-	-	-	1,136,566	-	1,115,155	37,153,473
	63	-	88	50	22	11,167,133	-	7,464,537	16,088,916
	64	-	1	11	1	1,965,198	594,489	13,087,227	44,585,660
	65	-	352	225	95	1,171,373	-	4,004,368	-
	66	-	5,923	4,075	1,260	59,958,272	70,004	4,015,441	-
	671	-	-	-	-	-	792,893	1,767,461	-
	672	-	2,357	715	-	717,536	5,904,263	16,729,228	-
	Others 67	-	3,149	530	268	2,106,437	1,170,091	18,451,572	-
P	68	-	545	124	51	1,325,036	-	-	-
	69	-	329	273	76	5,027,255	-	18,864	-
Dome:	Fr 01	-	303	266	2	333,159	3,037	104,322	-
	Fr 11	-	1,296	1,756	3	689,937	71,323	2,150,908	9,909
	Fr 15,16,21	-	716	37	34	1,306,556	39,208	1,351,464	8
	Fr 20	-	4	2	1	129,009	837	12,781	-
	Fr 34,39 and	-	20	14	6	220,582	10,617	225,672	22
	Fr 591,592	-	18	7	3	79,111	1,480	35,120	1,005
	Fr 53	-	3	-	-	10,658	-	9,987	-
	Fr 5711011	-	79	82	23	741,620	5,932	1,313,715	-

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P15)

Unit: Mil JPY	Investment							Exports	
CODE	74	75	76	77	780000	790000	810000	820000	
Inputs	01	-	166,958	245,429	2,141	3,759,640	14,107,488	43,977	3,803,618
	06	-	-6,977	-42,044	1,735	-58,775	24,034,001	35,575	-23,200
	11	-	-	175,259	10,340	24,802,413	38,703,802	241,081	25,043,495
	15	455	164,183	-99,416	13,769	2,569,846	4,495,733	310,135	2,879,982
	16	12,839	256,313	-66,029	13,971	628,036	12,590,995	354,036	982,071
	191	-	-	10,725	2,029	85,366	5,103,860	41,047	126,413
	20	-	-	116,906	140,478	2,946,438	28,420,013	4,724,036	7,670,474
	21	-	-	102,250	25,076	5,932,379	20,760,706	1,407,146	7,339,526
	221	-	-658	68,103	35,626	435,776	9,426,340	1,229,126	1,664,901
	222, 231	-	-	-25,800	16,127	979,533	3,065,380	699,149	1,678,682
	25	-	-	13,502	26,893	202,561	6,082,608	849,959	1,052,520
	26	-35,365	-212,421	168,974	61,564	-60,856	28,264,613	3,342,282	3,281,426
	27	-	303,515	1,121	93,994	582,600	10,452,480	2,197,452	2,780,052
	28	2,837	268,330	23,279	24,090	637,875	10,289,133	617,071	1,254,946
	29	121,223	3,543,662	79,137	86,146	3,843,387	7,394,809	3,018,179	6,861,566
	30	79,989	6,300,090	155,458	174,423	6,719,437	9,592,720	6,024,954	12,744,391
	31	186,865	3,728,250	31,029	49,887	4,200,801	6,501,982	1,377,353	5,578,154
	32	-	-	195,019	154,406	487,198	10,868,378	5,612,056	6,099,254
	33	445,360	4,305,128	186,274	166,083	8,067,118	13,339,196	4,677,019	12,744,137
	34, 3911, 3919	926,665	4,949,936	-128,593	88,453	11,723,775	15,281,211	2,533,807	14,257,582
	35	224,530	5,118,701	-368,320	357,260	10,634,829	33,588,073	14,420,592	25,055,421
	41	16,528,740	26,212,518	-	-	42,741,258	52,514,485	-	42,741,258
	46	-	-	-	-	6,322,850	21,161,989	26,304	6,349,154
	47	-	-	-	-	1,625,541	4,559,505	9,004	1,634,545
	48	-	-	-	-	986,687	3,762,255	3,083	989,770
	5111011	347,610	4,494,065	148,331	-	18,436,549	48,960,351	7,537,855	25,974,404
	5112011	96,088	1,450,388	2,321	-	33,261,624	38,092,853	53,654	33,315,278
	53	-	-	-	-	15,531,855	32,107,617	836,796	16,368,651
	55	-	-	-	-	59,265,802	71,167,386	21,813	59,287,615
	5711011	-	-	-	-	2,625,348	4,100,751	-9,391	2,615,957
	5712011	66	649	272	-	23,559	114,446	6,746	30,305
	5721	-	-	-	-	1,961,298	2,979,310	809	1,962,107
	5722011	29,109	529,261	24,789	-	3,798,255	11,086,396	902,596	4,700,851
P	5731011	-	-	-	-	-	5,663,199	-	-
P	5732011	-	-	-	-	-	3,269,468	-	-
	5741011	-	-	-	-	1,900	1,327,192	2,962,167	2,964,067
	5742011	-	-	-	-	9,679	12,079	16	9,695
	5742012	303	5,823	2,509	-	79,044	654,933	50,978	130,022
	5743011	1,023	22,707	2,122	-	71,482	1,554,522	407,326	478,808
	5751011	-	-	-	-	572,995	815,814	-165,908	407,087
	5751012	-	-	-	-	222,002	445,994	-3,731	218,271
	5751013	115	1,058	45	-	27,079	69,385	3,416	30,495
	5751014	-	-	-	-	2,272	33,866	-	2,272
	5761011	1,573	27,583	1,738	-	184,854	623,901	58,063	242,917
	5771011	2,004	34,749	6,184	-	239,972	1,659,824	107,157	347,129
2,03,04,05,06,09	5791011	-	-	-	-	268,386	753,727	96,697	365,083
	59	1,194,574	7,022,434	-11,421	706	197,000	1,407,421	17,650	214,650
	61	-	-	-	-	21,084,440	46,455,301	289,180	21,373,621
	63	-	-	-	-	38,268,628	39,405,194	-	38,268,628
	64	-	-	-	-	23,553,453	34,720,586	81,495	23,634,948
	65	-	-	-	-	58,267,376	60,232,574	234	58,267,610
	66	194,023	1,994,767	-	-	4,004,368	5,175,741	21,460	4,025,827
	671	-	-	-	-	6,274,234	66,232,506	1,219,047	7,493,281
	672	-	-	-	-	2,560,354	2,560,354	-82,598	2,477,756
	Others 67	-	-	-	1,233	22,633,490	23,351,026	19,946	22,653,436
P	68	-	-	-	-	19,622,897	21,729,334	54,126	19,677,023
	69	-	-	-	-	-	1,325,036	-	-
Dome:	Fr 01	-	1,302	1,381	192	18,864	5,046,119	3,693	22,557
	Fr 11	-	-	11,372	958	110,235	443,393	3,913	114,147
	Fr 15,16,21	260	75,860	-51,029	8,170	2,244,470	2,934,407	31,777	2,276,247
	Fr 20	-	-	592	711	1,423,941	2,730,497	206,171	1,630,112
	Fr 34.39 and 591.592	36,168	194,914	-4,581	3,704	14,922	143,931	24,128	39,050
	Fr 53	-	-	-344	16	466,517	687,100	111,657	578,174
	Fr 5711011	-	-	-	-	37,276	116,387	486	37,763
		-	-	-	-	9,987	20,644	538	10,525
		-	-	-	-	1,319,647	2,061,267	18,237	1,337,884

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P16)

Unit: Mil JPY		Imports			
CODE	830000	870000	880000	970000	
Inputs	01	14,151,465	-2,475,427	1,328,191	11,676,038
	06	24,069,576	-23,309,596	-23,332,796	759,980
	11	38,944,883	-6,051,456	18,992,038	32,893,427
	15	4,805,868	-2,471,859	408,122	2,334,009
	16	12,945,030	-1,921,434	-939,362	11,023,597
	191	5,144,908	-54,810	71,602	5,090,097
	20	33,144,049	-5,672,534	1,997,940	27,471,515
	21	22,167,853	-3,521,877	3,817,648	18,645,975
	221	10,655,466	-717,027	947,874	9,938,439
	222, 231	3,764,529	-918,840	759,841	2,845,689
	25	6,932,567	-551,840	500,681	6,380,728
	26	31,606,895	-1,119,679	2,161,747	30,487,216
	27	12,649,932	-3,588,041	-807,989	9,061,891
	28	10,906,204	-774,944	480,002	10,131,260
	29	10,412,988	-988,187	5,873,379	9,424,801
	30	15,617,674	-1,258,552	11,485,839	14,359,122
	31	7,879,335	-1,445,575	4,132,579	6,433,760
	32	16,480,434	-3,072,053	3,027,201	13,408,381
	33	18,016,215	-2,973,562	9,770,575	15,042,653
	34, 3911, 3919	17,815,018	-6,005,136	8,252,446	11,809,883
	35	48,008,665	-2,437,163	22,618,258	45,571,502
	41	52,514,485	-	42,741,258	52,514,485
	46	21,188,293	-1,015	6,348,139	21,187,278
	47	4,568,509	-1,114	1,633,431	4,567,395
	48	3,765,338	-214	989,556	3,765,124
	5111011	56,498,206	-988,900	24,985,504	55,509,306
	5112011	38,146,507	-	33,315,278	38,146,507
	53	32,944,412	-905,104	15,463,546	32,039,308
	55	71,189,199	-1,666	59,285,949	71,187,533
	5711011	4,091,359	-1,094	2,614,863	4,090,265
	5712011	121,192	-	30,305	121,192
	5721	2,980,119	-11,474	1,950,633	2,968,645
	5722011	11,988,992	-3,708	4,697,143	11,985,284
P	5731011	5,663,199	-	-	5,663,199
P	5732011	3,269,468	-	-	3,269,468
	5741011	4,289,359	-1,312,282	1,651,785	2,977,077
	5742011	12,095	56,020	65,715	68,115
	5742012	705,911	-	130,022	705,911
	5743011	1,961,848	-537,579	-58,771	1,424,269
	5751011	649,906	-192,990	214,096	456,916
	5751012	442,263	33,251	251,522	475,514
	5751013	72,801	-	30,495	72,801
	5751014	33,866	-	2,272	33,866
	5761011	681,964	-	242,917	681,964
	5771011	1,766,981	-	347,129	1,766,981
	2,03,04,05,06,09	850,424	-36,521	328,562	813,903
	5791011	1,425,071	-20,032	194,618	1,405,039
	59	46,744,481	-706,315	20,667,305	46,038,165
	61	39,405,194	-	38,268,628	39,405,194
	63	34,802,081	-131,313	23,503,635	34,670,768
	64	60,232,808	-3,617	58,263,993	60,229,191
	65	5,197,201	-55,909	3,969,919	5,141,292
	66	67,451,553	-1,518,785	5,974,496	65,932,768
	671	2,477,756	131,555	2,609,312	2,609,312
	672	23,370,972	-114,539	22,538,897	23,256,433
	Others 67	21,783,460	-53,656	19,623,367	21,729,803
P	68	1,325,036	-	-	1,325,036
	69	5,049,812	-39,537	-16,980	5,010,275
Dome: Fr	01	447,306	-87,382	26,765	359,924
	Fr 11	2,966,184	-309,486	1,966,761	2,656,698
	Fr 15,16,20	2,936,668	-1,423,600	206,513	1,513,069
	Fr 20	168,059	-28,922	10,128	139,138
	Fr 34.39 and	798,756	-242,416	335,758	556,341
	Fr 591.592	116,873	-1,536	36,227	115,338
	Fr 53	21,183	-582	9,943	20,601
	Fr 5711011	2,079,505	-13,310	1,324,575	2,066,195

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P17)

Unit: Mil JPY	Intermediate Demand									
CODE	01	06	11	15	16	191	20	21	221	
Fr 5721	131	736	1,178	308	716	239	2,994	143	1,182	
Fr 572201:	1,727	23	5,013	199	2,105	620	2,586	606	784	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	73	234	172	244	288	139	1,392	130	333	
Fr 575101:	-	-	-	-	-	-	-	-	-	
Fr 575101	738	1,002	1,865	1,469	2,443	1,716	18,425	651	2,538	
Fr 2111-01	15,284	1,465	11,126	1,419	4,565	572	151,219	74,883	1,012	
Fr 661201:	-	-	-	-	-	-	-	-	-	
Fr 578	1,456	187	10,280	870	10,303	4,485	15,860	344	11,264	
Fr 64	3	-	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	-	-	7,210	-	-	-	-	-	-	
Fr 6312, 6:	474	108	1,336	81	441	336	1,198	103	269	
Outbo Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	1,335	-	5,257	1	19	-	158	-	-	
Fr 15,16,2:	1,762	244	1,020	13,434	1,725	222	1,353	35	493	
Fr 20	507	7	246	204	319	143	7,404	24	1,690	
Fr 34.39 ar	82	7	324	106	350	91	222	191	974	
Fr 591.592	24	4	112	19	39	34	117	6	18	
Fr 53	72	29	171	44	105	45	182	54	27	
Fr 571101:	10	18	75	22	55	84	268	23	135	
Fr 5721	8	47	76	20	46	15	192	9	76	
Fr 572201:	99	1	286	11	120	35	148	35	45	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	1	3	2	3	3	2	16	1	4	
Fr 575101:	246	516	1,104	794	1,420	1,970	5,811	286	1,705	
Fr 575101	18	24	45	36	59	42	446	16	61	
Fr 2111-01	102	10	74	10	31	4	1,013	501	7	
Fr 661201:	-	-	-	-	-	-	-	-	-	
Fr 578	575	74	4,063	344	4,072	1,773	6,269	136	4,452	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	-	-	99	-	-	-	-	-	-	
Fr 6312, 6:	25	10	171	3	53	14	239	6	13	
Inbou Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	-	-	
Fr 15,16,2:	-	-	-	-	-	-	-	-	-	
Fr 20	-	-	-	-	-	-	-	-	-	
Fr 34.39 ar	-	-	-	-	-	-	-	-	-	
Fr 591.592	-	-	-	-	-	-	-	-	-	
Fr 53	-	-	-	-	-	-	-	-	-	
Fr 571101:	-	-	-	-	-	-	-	-	-	
Fr 5721	-	-	-	-	-	-	-	-	-	
Fr 572201:	-	-	-	-	-	-	-	-	-	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	-	-	-	-	-	-	-	-	-	
Fr 575101:	-	-	-	-	-	-	-	-	-	
Fr 575101	-	-	-	-	-	-	-	-	-	
Fr 2111-01	-	-	-	-	-	-	-	-	-	
Fr 661201:	-	-	-	-	-	-	-	-	-	
Fr 578	-	-	-	-	-	-	-	-	-	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	-	-	-	-	-	-	-	-	-	
Fr 6312, 6:	-	-	-	-	-	-	-	-	-	
7000000	6,026,753	419,864	20,984,928	1,542,698	7,568,804	2,620,113	20,672,679	14,509,189	7,001,240	
ectors 7111001	21,961	6,676	102,570	6,717	65,476	24,455	116,860	15,843	12,006	
7111002	7,444	8,219	76,688	6,360	32,486	34,408	62,250	5,253	47,892	
7111003	39,932	21,614	158,547	21,859	76,223	48,935	169,685	16,882	111,730	
9111000	1,168,435	121,641	3,636,098	622,248	1,654,372	1,226,143	1,946,563	168,729	1,691,736	
9112000	80,229	15,314	463,190	81,462	215,985	160,410	253,810	21,922	221,210	
9113000	54,542	6,599	231,314	37,595	132,019	84,015	201,932	24,657	125,469	
9211000	2,782,101	44,464	2,830,608	-297,564	387,215	304,393	1,451,129	-152,756	-272,633	
9311000	1,667,985	74,240	1,393,754	217,757	568,990	442,357	2,061,893	407,063	708,237	
9321000	-	-	7,821	-	-	-	-	-	-	
9411000	506,383	42,295	3,135,738	94,987	322,282	145,013	534,976	3,675,517	291,706	
9511000	-679,727	-946	-127,830	-111	-254	-143	-261	-46,322	-155	
9600000	5,649,286	340,116	11,908,499	791,311	3,454,793	2,469,985	6,798,836	4,136,787	2,937,198	
9700000	11,676,038	759,980	32,893,427	2,334,009	11,023,597	5,090,097	27,471,515	18,645,975	9,938,439	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P18)

Unit: Mil JPY											
CODE	222, 231	25	26	27	28	29	30	31	32		
Fr 5721	415		806	612	342	1,570	1,674	2,325	1,008	3,842	
Fr 572201:	203		1,247	2,404	883	1,018	708	892	480	907	
Fr 574101:	-		-	-	-	-	-	-	-	-	
Fr 574201:	140		224	98	63	350	137	510	152	1,070	
Fr 575101:	-		-	-	-	-	-	-	-	-	
Fr 575101	807		1,279	2,563	953	2,593	2,488	4,843	2,062	2,647	
Fr 2111-01	939		11,547	6,595	2,181	2,357	1,089	1,331	520	1,908	
Fr 661201:	-		-	-	-	-	-	-	-	-	
Fr 578	1,537		10,356	29,046	6,138	3,241	4,897	3,738	1,579	5,472	
Fr 64	-		-	-	-	-	-	-	-	-	
Fr 671101:	-		-	-	-	-	-	-	-	-	
Fr 682101:	-		-	-	-	-	-	-	-	-	
Fr 6312, 6!	160		394	511	206	573	823	1,498	337	1,944	
OutboFr 01	-		-	-	-	-	-	-	-	-	
Fr 11	-		4	-	-	-	-	-	-	-	
Fr 15,16,2!	6,056		795	941	250	912	2,987	5,254	3,227	2,702	
Fr 20	397		168	70	74	68	31	46	87	193	
Fr 34.39 ar	55		284	1,610	854	19	49	136	87	116	
Fr 591.592	17		18	12	16	48	30	50	29	68	
Fr 53	14		67	113	70	109	62	97	65	81	
Fr 571101:	21		84	70	37	97	78	144	86	242	
Fr 5721	27		52	39	22	101	107	149	65	247	
Fr 572201:	12		71	137	50	58	40	51	27	52	
Fr 574101:	-		-	-	-	-	-	-	-	-	
Fr 574201:	2		3	1	1	4	2	6	2	12	
Fr 575101:	864		1,165	927	322	2,658	2,590	4,098	1,293	1,648	
Fr 575101	20		31	62	23	63	60	117	50	64	
Fr 2111-01	6		77	44	15	16	7	9	3	13	
Fr 661201:	-		-	-	-	-	-	-	-	-	
Fr 578	608		4,093	11,481	2,426	1,281	1,935	1,478	624	2,163	
Fr 64	-		-	-	-	-	-	-	-	-	
Fr 671101:	-		-	-	-	-	-	-	-	-	
Fr 682101:	-		-	-	-	-	-	-	-	-	
Fr 6312, 6!	28		77	45	24	137	166	259	64	516	
InbouFr 01	-		-	-	-	-	-	-	-	-	
Fr 11	-		-	-	-	-	-	-	-	-	
Fr 15,16,2!	-		-	-	-	-	-	-	-	-	
Fr 20	-		-	-	-	-	-	-	-	-	
Fr 34.39 ar	-		-	-	-	-	-	-	-	-	
Fr 591.592	-		-	-	-	-	-	-	-	-	
Fr 53	-		-	-	-	-	-	-	-	-	
Fr 571101:	-		-	-	-	-	-	-	-	-	
Fr 5721	-		-	-	-	-	-	-	-	-	
Fr 572201:	-		-	-	-	-	-	-	-	-	
Fr 574101:	-		-	-	-	-	-	-	-	-	
Fr 574201:	-		-	-	-	-	-	-	-	-	
Fr 575101:	-		-	-	-	-	-	-	-	-	
Fr 575101	-		-	-	-	-	-	-	-	-	
Fr 2111-01	-		-	-	-	-	-	-	-	-	
Fr 661201:	-		-	-	-	-	-	-	-	-	
Fr 578	-		-	-	-	-	-	-	-	-	
Fr 64	-		-	-	-	-	-	-	-	-	
Fr 671101:	-		-	-	-	-	-	-	-	-	
Fr 682101:	-		-	-	-	-	-	-	-	-	
Fr 6312, 6!	-		-	-	-	-	-	-	-	-	
7000000	1,819,653		3,581,780	24,773,081	6,949,161	6,318,573	5,833,318	8,520,772	4,373,050	9,645,406	
ectors 7111001	9,858		37,906	44,647	45,247	46,014	55,054	71,941	35,822	78,198	
7111002	8,356		20,095	36,176	6,858	33,493	14,044	18,012	18,286	20,949	
7111003	21,189		51,038	102,168	36,194	90,121	76,269	119,319	60,056	109,894	
9111000	542,363		1,133,333	1,258,203	719,322	2,520,920	1,763,249	2,962,729	1,051,750	2,303,522	
9112000	70,999		148,153	164,119	93,681	329,979	230,429	387,350	137,238	300,437	
9113000	33,408		87,467	126,049	85,446	157,281	141,936	224,196	102,440	236,521	
9211000	-25,194		576,113	2,313,304	674,807	-329,862	647,335	1,105,552	74,676	-914,978	
9311000	285,563		562,653	1,270,122	349,797	684,243	570,001	819,616	486,312	1,449,558	
9321000	-		-	-	-	-	-	-	-	-	
9411000	79,625		182,335	399,623	101,476	280,810	93,355	129,962	94,269	179,159	
9511000	-133		-145	-276	-98	-312	-189	-327	-139	-285	
9600000	1,026,035		2,798,948	5,714,135	2,112,730	3,812,687	3,591,483	5,838,350	2,060,710	3,762,975	
9700000	2,845,689		6,380,728	30,487,216	9,061,891	10,131,260	9,424,801	14,359,122	6,433,760	13,408,381	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P19)

Unit: Mil JPY

CODE	33	34, 3911, 39 35	41	46	47	48	511101	511201	
Fr 5721	1,952	1,302	1,854	5,329	846	178	1,601	21,028	5,576
Fr 572201:	1,084	4,432	3,714	8,543	2,551	205	589	860	881
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	622	700	96	1,060	486	74	359	5,588	1,686
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	6,773	2,494	4,853	6,125	1,099	982	3,297	116,949	26,041
Fr 2111-01	1,310	1,296	7,301	20,193	81,596	5,224	3,682	5,584	9,123
Fr 661201:	-	-	-	197	-	-	-	-	-
Fr 578	23,847	5,872	22,022	194	-	-	-	234,746	14,588
Fr 64	-	-	-	-	1	1	-	1	1
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	2,103	1,314	2,049	8,475	1,794	364	190	6,302	4,507
Outbo Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	1	-	-	-	10	6
Fr 15,16,2:	4,309	3,438	17,531	5,811	520	223	1,505	4,437	4,153
Fr 20	161	170	370	214	17	46	48	-	-
Fr 34.39 ar	154	1,475	1,582	1,083	547	32	15	234	217
Fr 591.592	66	69	63	323	11	6	15	416	331
Fr 53	77	117	222	748	422	18	35	1,098	593
Fr 571101:	161	215	105	358	72	28	247	2,428	483
Fr 5721	125	84	119	342	54	11	103	1,351	358
Fr 572201:	62	253	212	488	146	12	34	49	50
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	7	8	1	12	6	1	4	63	19
Fr 575101:	3,550	1,401	3,147	381	918	452	5,246	77,727	5,388
Fr 575101	164	60	117	148	27	24	80	2,829	630
Fr 2111-01	9	9	49	135	546	35	25	37	61
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	9,426	2,321	8,704	77	-	-	-	92,784	5,766
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	503	252	323	507	399	20	20	454	417
Inbou Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2:	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 ar	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	-	-	-	-	-	-	-	-	-
7000000	10,471,361	8,259,568	36,485,180	28,802,317	16,418,844	2,376,596	1,028,008	16,399,819	13,143,342
ectors 7111001	59,154	54,442	67,973	195,637	122,572	20,186	21,697	445,420	59,213
7111002	18,934	32,145	35,897	471,196	42,081	2,173	17,358	403,022	294,731
7111003	141,125	104,197	258,294	302,342	82,205	35,773	52,193	594,497	314,361
9111000	2,432,042	1,909,391	5,339,087	15,919,582	1,511,648	417,406	1,595,109	16,156,858	15,806,780
9112000	317,258	244,917	685,287	1,752,478	217,020	84,765	191,617	1,878,585	1,697,975
9113000	244,800	152,757	395,623	737,733	185,058	82,261	33,350	980,807	496,807
9211000	-317,291	-197,320	-172,700	1,031,445	-2,942,564	556,485	191,890	12,834,869	2,207,648
9311000	1,559,402	1,063,456	2,526,311	1,654,461	4,609,296	980,005	265,501	3,716,480	2,796,411
9321000	-	-	-	-	-	80,596	142,093	-	-
9411000	116,117	186,602	-48,255	1,947,017	967,717	172,817	226,384	2,146,035	1,334,071
9511000	-249	-273	-1,195	-299,723	-26,599	-241,668	-76	-47,086	-4,832
9600000	4,571,292	3,550,315	9,086,322	23,712,168	4,768,434	2,190,799	2,737,116	39,109,487	25,003,165
9700000	15,042,653	11,809,883	45,571,502	52,514,485	21,187,278	4,567,395	3,765,124	55,509,306	38,146,507

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P20)

Unit: Mil JPY										
CODE	53	55	571101	571201	5721	572201	P	P	574101	
							573101	573201		
Fr 5721	20,407	459	52	4	455	1,127	-	-	-	95
Fr 572201:	677	149	27	1	84	274	120	122	-	31
Fr 574101:	-	-	-	-	-	-	-	-	-	-
Fr 574201:	6,328	99	3	2	65	240	-	-	-	36
Fr 575101:	-	-	-	-	-	-	-	-	-	-
Fr 575101	11,655	1,781	54	8	233	1,146	-	-	-	343
Fr 2111-01	1,210	3,505	1,205	153	17,168	64,532	127,615	82,495	-	29,697
Fr 661201:	-	112	-	-	207	4,531	75,320	71,245	-	-
Fr 578	41	-	61,567	25	45,157	205,108	489,161	106,771	-	69,505
Fr 64	3	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	2,457	2,569	1,718	48	269	659	20	126	-	74
Outbo Fr 01	-	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-	-
Fr 15,16,2:	1,264	55	177	4	114	1,259	23	49	-	89
Fr 20	1	2	-	-	1	5	-	1	-	-
Fr 34.39 ar	156	32	3	-	8	31	1	10	-	2
Fr 591.592	279	86	26	1	40	120	-	-	-	2
Fr 53	2,128	5,703	203	6	16	159	244	93	-	35
Fr 571101:	1,650	30	3	1	6	75	-	-	-	5
Fr 5721	1,311	29	3	-	29	72	-	-	-	6
Fr 572201:	39	9	2	-	5	16	7	7	-	2
Fr 574101:	-	-	-	-	-	-	-	-	-	95
Fr 574201:	72	1	-	-	1	3	-	-	-	-
Fr 575101:	5,964	301	20	1	78	1,089	-	-	-	225
Fr 575101	282	43	1	-	6	28	-	-	-	8
Fr 2111-01	8	23	8	1	115	432	854	552	-	199
Fr 661201:	-	-	-	-	-	-	-	-	-	-
Fr 578	16	-	24,334	10	17,848	81,070	193,342	42,201	-	27,472
Fr 64	-	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	271	158	464	19	37	67	8	51	-	3
Inbou Fr 01	-	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-	-
Fr 15,16,2:	-	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-	-
Fr 34.39 ar	-	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	-	-	-	-	-	-	-	-	-	-
7000000	10,957,925	13,807,397	1,260,704	51,445	714,776	3,178,952	5,663,199	3,269,468	2,683,906	
ectors 7111001	287,296	23,045	8,516	1,991	6,030	32,468	-	-	-	1,270
7111002	107,460	174,414	433	168	34,428	6,244	-	-	-	421
7111003	555,819	74,652	62,388	202	79,454	133,543	-	-	-	7,108
9111000	7,257,534	3,603,827	670,769	31,791	1,651,781	5,494,924	-	-	-	43,274
9112000	1,096,371	255,675	75,413	3,263	180,528	648,069	-	-	-	3,130
9113000	1,465,419	88,351	155,645	5,188	68,114	188,906	-	-	-	3,752
9211000	7,125,940	29,708,221	158,683	-1,261	65,939	382,414	-	-	-	60,015
9311000	3,487,692	19,495,249	1,552,275	22,324	148,170	988,843	-	-	-	145,334
9321000	-	-	-	-	-	-	-	-	-	-
9411000	544,245	3,998,108	178,333	6,163	80,086	931,592	-	-	-	29,268
9511000	-846,394	-41,406	-32,895	-82	-60,662	-670	-	-	-	-402
9600000	21,081,383	57,380,136	2,829,561	69,747	2,253,868	8,806,332	-	-	-	293,171
9700000	32,039,308	71,187,533	4,090,265	121,192	2,968,645	11,985,284	5,663,199	3,269,468	2,977,077	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P21)

Unit: Mil JPY

CODE	5742011	5742012	574301	5751011	5751012	5751013	5751014	5761011	5771011
Fr 5721	24	251	207	2	2			69	101
Fr 572201:	2	18	18	14	14	2	1	10	28
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	2	23	117	2	3			10	49
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	23	243	315	497	517	79	37	377	250
Fr 2111-01	784	8,127	1,749	6,232	6,485	993	462	1,407	216
Fr 661201:	-	-	-	-	-	-	-	599	-
Fr 578	5,071	52,555	6,128	72,379	75,326	11,532	5,365	14,778	9,978
Fr 64		1	-	-	-	-	-	-	28
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6!	3	30	92	265	276	42	20	59	144
OutboFr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2!	33	339	340	20	21	3	1	42	83
Fr 20									1
Fr 34.39 a!		4	3					2	2
Fr 591.592		4	10	1	1			8	18
Fr 53	3	30	34	5	5	1		13	10
Fr 571101:	1	5	34	1	1			4	14
Fr 5721	2	16	13					4	7
Fr 572201:		1	1	1	1			1	2
Fr 574101:									-
Fr 574201:			1						1
Fr 575101:	3	36	40	646	673	103	48	518	79
Fr 575101	1	6	8	12	13	2	1	9	6
Fr 2111-01	5	54	12	42	43	7	3	9	1
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	2,004	20,772	2,422	28,608	29,773	4,558	2,120	5,841	3,944
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6!		1	11	11	11	2	1	11	13
InboFr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2!	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 a!	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6!	-	-	-	-	-	-	-	-	-
7000000	39,835	412,830	541,345	363,479	378,274	57,914	26,941	236,381	700,077
ectors 7111001	149	1,545	11,536	2,495	2,597	398	185	2,353	1,631
7111002	53	553	15,036	369	384	59	27	398	2,936
7111003	667	6,910	45,560	1,950	2,029	311	145	22,054	27,274
9111000	9,713	100,657	405,999	37,419	38,942	5,962	2,773	185,105	333,321
9112000	712	7,374	44,362	4,636	4,825	739	344	23,413	32,148
9113000	1,115	11,553	24,078	3,977	4,139	634	295	14,305	29,599
9211000	2,195	22,745	90,700	1,931	2,010	308	143	50,760	80,900
9311000	11,609	120,315	207,841	61,140	63,629	9,742	4,532	93,313	311,698
9321000	-	-	-	-	-	-	-	-	-
9411000	3,377	34,998	40,641	-20,472	-21,305	-3,262	-1,517	53,917	247,496
9511000	-1,309	-13,569	-2,829	-9	-9	-1	-1	-35	-99
9600000	28,280	293,081	882,924	93,437	97,240	14,887	6,925	445,583	1,066,904
9700000	68,115	705,911	1,424,269	456,916	475,514	72,801	33,866	681,964	1,766,981

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P22)

Unit: Mil JPY										
CODE	.04,05,06,09	5791011	59	61	63	64	65	66	671	
Fr 5721	160	185	7,364	21,635	7,017	2,561	2,704	6,804	50	
Fr 572201:	27	778	1,677	989	885	3,098	260	1,721	170	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	30	33	3,754	1,171	3,121	522	771	2,330	55	
Fr 575101:	-	-	-	-	-	-	-	-	-	
Fr 575101	216	260	68,743	17,191	52,850	18,605	11,537	55,982	909	
Fr 2111-01	176	608	3,479	29,086	14,486	14,054	1,727	12,756	741	
Fr 661201:	170	-	1,260	-	-	11	-	2,822	1,257	
Fr 578	4,135	-	7,509	3,028	175	-	-	13,175	75,061	
Fr 64	-	-	16	1	1	1,423	-	1	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	-	-	-	-	-	41,313	-	-	2,315	
Fr 6312, 6:	64	61	26,599	3,745	3,188	36,734	877	12,209	1,794	
Outbo Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	2	-	-	18	57	447	26	1	303	
Fr 15,16,2:	52	102	2,937	5,110	863	6,716	3,562	7,225	676	
Fr 20	1	1	56	31	159	6,026	9	219	7	
Fr 34.39 ar	2	2	930	623	774	286	126	1,470	19	
Fr 591.592	5	37	702	894	984	595	340	2,952	24	
Fr 53	10	2	232	1,726	75	369	337	783	47	
Fr 571101:	6	6	393	1,232	911	458	116	451	14	
Fr 5721	10	12	473	1,390	451	164	174	437	3	
Fr 572201:	2	44	96	56	51	177	15	98	10	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	-	-	43	13	35	6	9	26	1	
Fr 575101:	34	4,420	23,428	5,471	13,499	3,966	646	11,841	238	
Fr 575101	5	6	1,663	416	1,278	450	279	1,354	22	
Fr 2111-01	1	4	23	195	97	94	12	85	5	
Fr 661201:	-	-	-	-	-	-	-	-	-	
Fr 578	1,634	-	2,968	1,197	69	-	-	5,207	29,668	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	-	-	-	-	-	570	-	-	32	
Fr 6312, 6:	8	12	4,913	198	104	2,467	36	1,714	107	
Inbou Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	-	-	
Fr 15,16,2:	-	-	-	-	-	-	-	-	-	
Fr 20	-	-	-	-	-	-	-	-	-	
Fr 34.39 ar	-	-	-	-	-	-	-	-	-	
Fr 591.592	-	-	-	-	-	-	-	-	-	
Fr 53	-	-	-	-	-	-	-	-	-	
Fr 571101:	-	-	-	-	-	-	-	-	-	
Fr 5721	-	-	-	-	-	-	-	-	-	
Fr 572201:	-	-	-	-	-	-	-	-	-	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	-	-	-	-	-	-	-	-	-	
Fr 575101:	-	-	-	-	-	-	-	-	-	
Fr 575101	-	-	-	-	-	-	-	-	-	
Fr 2111-01	-	-	-	-	-	-	-	-	-	
Fr 661201:	-	-	-	-	-	-	-	-	-	
Fr 578	-	-	-	-	-	-	-	-	-	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	-	-	-	-	-	-	-	-	-	
Fr 6312, 6:	-	-	-	-	-	-	-	-	-	
7000000	300,964	260,540	21,826,753	12,473,282	8,453,253	24,555,298	2,129,583	25,491,349	1,362,897	
ectors 7111001	3,687	5,776	395,186	320,404	178,850	216,220	80,879	485,970	13,121	
7111002	2,146	-	151,872	61,364	18,807	79,986	48,651	264,473	7,666	
7111003	19,290	38,852	310,757	15,294	139,970	333,630	30,620	381,538	41,572	
9111000	183,977	844,732	8,990,413	10,818,128	17,619,463	24,642,703	2,340,229	19,921,971	619,717	
9112000	21,473	107,594	1,078,510	2,180,221	2,775,607	2,855,909	163,450	2,186,109	74,652	
9113000	13,198	62,147	551,655	1,503,030	1,468,429	907,601	84,211	648,100	20,372	
9211000	167,043	-22,118	7,873,276	-	116,217	2,037,243	-36,249	6,192,183	80,297	
9311000	65,249	74,685	3,974,401	-	1,799,461	4,329,117	292,174	8,111,337	314,139	
9321000	453	-	-	-11,910,957	1,707,843	155,061	-	-	-	
9411000	48,221	32,831	887,490	122,514	431,547	927,280	122,065	2,262,607	74,998	
9511000	-11,798	-	-2,147	-	-38,679	-810,857	-114,322	-12,870	-118	
9600000	512,939	1,144,499	24,211,412	26,931,912	26,217,514	35,673,893	3,011,709	40,441,419	1,246,414	
9700000	813,903	1,405,039	46,038,165	39,405,194	34,670,768	60,229,191	5,141,292	65,932,768	2,609,312	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P23)

Unit: Mil JPY					Domestic					
CODE	672	Others 67	P 68	69	Fr 01	Fr 11	Fr 15,16,25,26,Fr 20	Fr 34.39 and		
Fr 5721	1,043	3,236	-	539	11	146	221	15	60	
Fr 572201:	2,611	1,267	445	1,950	32	418	138	13	197	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	1,441	2,188	-	272	8	27	128	7	30	
Fr 575101:	-	-	-	-	-	-	-	-	-	
Fr 575101	4,617	17,111	-	15,570	24	212	774	93	123	
Fr 2111-01	7,628	14,306	-	10,657	1,278	718	869	766	66	
Fr 661201:	-	1,129	-	2,919	-	-	-	-	-	
Fr 578	46,997	16,328	-	25,186	212	974	874	80	316	
Fr 64	1	-	-	12	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	10,215	-	-	147	-	316	-	-	-	
Fr 6312, 6:	4,933	16,967	-	742	21	127	71	6	57	
Outbo Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	6,181	73	-	8	16	966	-	1	-	
Fr 15,16,25,26,Fr 20	442	4,024	983	431	113	52	7,166	7	164	
Fr 20	44	202	16	50	13	26	126	37	17	
Fr 34.39 and	209	546	774	15	6	22	61	1	64	
Fr 591.592	125	261	-	18	1	14	12	1	3	
Fr 53	121	132	-	26	3	11	22	1	5	
Fr 571101:	209	239	-	105	1	8	14	1	10	
Fr 5721	67	208	-	35	1	9	14	1	4	
Fr 572201:	149	72	25	111	2	24	8	1	11	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	16	25	-	3	-	-	1	-	-	
Fr 575101:	-	5,811	-	3,682	13	87	448	29	76	
Fr 575101	112	414	-	377	1	5	19	2	3	
Fr 2111-01	51	96	-	71	9	5	6	5	-	
Fr 661201:	-	-	-	-	-	-	-	-	-	
Fr 578	18,576	6,454	-	9,955	84	385	345	32	125	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	141	-	-	2	-	4	-	-	-	
Fr 6312, 6:	421	1,020	-	75	1	24	9	1	10	
Inbo Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	-	-	
Fr 15,16,25,26,Fr 20	-	-	-	-	-	-	-	-	-	
Fr 20	-	-	-	-	-	-	-	-	-	
Fr 34.39 and	-	-	-	-	-	-	-	-	-	
Fr 591.592	-	-	-	-	-	-	-	-	-	
Fr 53	-	-	-	-	-	-	-	-	-	
Fr 571101:	-	-	-	-	-	-	-	-	-	
Fr 5721	-	-	-	-	-	-	-	-	-	
Fr 572201:	-	-	-	-	-	-	-	-	-	
Fr 574101:	-	-	-	-	-	-	-	-	-	
Fr 574201:	-	-	-	-	-	-	-	-	-	
Fr 575101:	-	-	-	-	-	-	-	-	-	
Fr 575101	-	-	-	-	-	-	-	-	-	
Fr 2111-01	-	-	-	-	-	-	-	-	-	
Fr 661201:	-	-	-	-	-	-	-	-	-	
Fr 578	-	-	-	-	-	-	-	-	-	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	-	-	-	-	
Fr 682101:	-	-	-	-	-	-	-	-	-	
Fr 6312, 6:	-	-	-	-	-	-	-	-	-	
700000	13,241,093	6,589,290	1,325,036	3,011,528	170,838	1,600,326	963,603	104,703	383,216	
sectors 7111001	53,847	188,937	-	4,873	2,614	9,457	5,237	592	2,392	
7111002	88,955	128,246	-	3,273	357	4,529	4,754	315	1,715	
7111003	233,161	268,392	-	8,203	3,285	13,636	14,321	859	5,012	
9111000	6,339,022	5,212,717	-	160,868	44,384	343,436	385,991	9,859	93,375	
9112000	444,986	562,760	-	13,379	2,873	44,125	50,532	1,285	12,005	
9113000	93,704	132,210	-	4,489	1,845	21,287	23,326	1,023	7,254	
9211000	749,568	4,125,927	-	1,482,179	75,800	339,416	-128,327	7,350	-7,648	
9311000	1,382,526	2,686,359	-	275,048	55,092	127,550	133,197	10,443	48,874	
9321000	-	-	-	-	-	343	-	-	-	
9411000	629,745	1,835,607	-	46,459	18,315	156,107	60,513	2,710	10,160	
9511000	-175	-642	-	-24	-15,479	-3,513	-79	-1	-13	
960000	10,015,340	15,140,513	-	1,998,747	189,085	1,056,372	549,465	34,435	173,125	
970000	23,256,433	21,729,803	1,325,036	5,010,275	359,924	2,656,698	1,513,069	139,138	556,341	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P24)

Unit: Mil JPY									
CODE	Fr 591.592,5	Fr 53	Fr 5711011	Fr 5721	Fr 5722011	Fr 5741011	Fr 5742011	Fr 5751011	Fr 5751012
Fr 5721	16	13	26	61	10	-	32	-	4
Fr 572201:	15	-	14	11	2	-	2	-	29
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	6	4	2	9	2	-	3	-	5
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	601	7	27	31	10	-	31	-	1,044
Fr 2111-01	8	1	609	2,306	569	-	1,036	-	13,090
Fr 661201:	1	-	-	28	40	-	-	-	-
Fr 578	218	-	31,100	6,066	1,809	-	6,699	-	152,034
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	48	2	868	36	6	-	4	-	556
Outbo Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2:	4	1	89	15	11	-	43	-	42
Fr 20	1	-	-	-	-	-	-	-	-
Fr 34.39 a:	3	-	1	1	-	-	1	-	1
Fr 591.592	1	-	13	5	1	-	1	-	3
Fr 53	-	1	102	2	1	-	4	-	10
Fr 571101:	1	1	1	1	1	-	1	-	2
Fr 5721	1	1	2	4	1	-	2	-	-
Fr 572201:	1	-	1	1	-	-	-	-	2
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-
Fr 575101:	199	4	10	10	10	-	5	-	1,358
Fr 575101	15	-	1	1	-	-	1	-	25
Fr 2111-01	-	-	4	15	4	-	7	-	88
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	86	-	12,293	2,397	715	-	2,648	-	60,092
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	5	-	234	5	1	-	-	-	22
Inbou Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2:	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 a:	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6:	-	-	-	-	-	-	-	-	-
7000000	67,965	7,046	636,844	96,011	28,036	-	52,622	-	763,492
ectors 7111001	1,228	185	4,302	810	286	-	197	-	5,242
7111002	405	69	219	4,624	55	-	70	-	775
7111003	1,663	357	31,515	10,673	1,178	-	881	-	4,095
9111000	20,957	4,666	338,839	221,872	48,461	-	12,830	-	78,599
9112000	2,368	705	38,095	24,249	5,716	-	940	-	9,738
9113000	1,840	942	78,624	9,149	1,666	-	1,473	-	8,353
9211000	12,484	4,582	80,159	8,857	3,373	-	2,899	-	4,057
9311000	4,535	2,243	784,131	19,903	8,721	-	15,336	-	128,426
9321000	-	-	-	-	-	-	-	-	-
9411000	1,897	350	90,085	10,757	8,216	-	4,461	-	-43,001
9511000	-3	-544	-16,617	-8,148	-6	-	-1,730	-	-19
9600000	47,373	13,555	1,429,351	302,746	77,666	-	37,358	-	196,265
9700000	115,338	20,601	2,066,195	398,757	105,702	-	89,980	-	959,757

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P25)

Unit: Mil JPY									Outbound	
CODE	Fr 2111-01	Fr 6612011	Fr 578	Fr 64	Fr 6711011	Fr 6821011	Fr 6312, 659	Fr 01	Fr 11	
Fr 5721	8	5	733	2	41	93	215	-	-	-
Fr 572201:	26	1	123	2	138	232	74	-	-	-10
Fr 574101:	-	-	-	-	-	-	-	-	-	-
Fr 574201:	5	2	136	-	45	128	117	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-	-
Fr 575101	28	19	986	14	737	411	1,352	-	-	-1
Fr 2111-01	4,656	117	802	11	601	679	1,085	-	-	-33
Fr 661201:	-	-	777	-	1,019	-	57	-	-	-
Fr 578	2	1,965	18,881	-	60,861	4,184	290	-	-	-10
Fr 64	-	-	1	1	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	31	1,877	909	-	-	-	-31
Fr 6312, 659	2	29	293	28	1,455	439	840	-	-	-2
Outbo Fr 01	-	-	-	-	-	-	-	-	-	-
Fr 11	-	-	9	-	246	550	4	-	-	2
Fr 15,16,20	-	1	237	5	548	39	243	-	-	-3
Fr 20	1	-	4	5	5	4	12	-	-	-
Fr 34.39 ar	-	-	9	-	16	19	38	-	-	-1
Fr 591.592	-	1	21	-	19	11	28	-	-	-
Fr 53	3	11	45	-	38	11	12	-	-	-
Fr 571101:	1	1	28	-	11	19	20	-	-	-
Fr 5721	1	-	47	-	3	6	14	-	-	-
Fr 572201:	2	-	7	-	8	13	4	-	-	-1
Fr 574101:	-	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	2	-	1	1	1	-	-	-
Fr 575101:	16	11	154	3	193	-	389	-	-	-1
Fr 575101	1	-	24	-	18	10	33	-	-	-
Fr 2111-01	31	1	5	-	4	5	7	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-	-
Fr 578	1	777	7,463	-	24,056	1,654	115	-	-	-4
Fr 64	-	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	26	13	-	-	-	-
Fr 6312, 659	-	3	35	2	87	37	58	-	-	-
Inbou Fr 01	-	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-	-
Fr 15,16,20	-	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-	-
Fr 34.39 ar	-	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-	-
Fr 6312, 659	-	-	-	-	-	-	-	-	-	-
7000000	920,626	46,438	1,374,254	18,713	1,105,065	1,178,824	437,582	-	-	-40,792
ectors 7111001	881	115	16,837	165	10,639	4,794	11,335	-	-	-192
7111002	165	282	9,801	61	6,216	7,919	8,539	-	-	-123
7111003	924	531	88,083	254	33,708	20,758	18,023	-	-	-232
9111000	8,693	22,154	840,070	18,780	502,479	564,348	350,807	-	-	-5,892
9112000	1,128	2,641	98,048	2,176	60,529	39,616	33,753	-	-	-730
9113000	1,406	748	60,266	692	16,518	8,342	8,587	-	-	-412
9211000	-13,071	29,019	762,748	1,553	65,106	66,732	283,700	-	-	-3,209
9311000	19,809	69,441	297,940	3,299	254,710	123,083	178,851	-	-	-2,560
9321000	-	-	2,067	118	-	-	6,871	-	-	-34
9411000	265,978	10,067	220,188	707	60,810	56,065	84,894	-	-	-12,702
9511000	-3,363	-2	-53,872	-618	-96	-16	-586	-	-	178
9600000	282,549	134,995	2,342,175	27,187	1,010,618	891,642	984,773	-	-	-25,909
9700000	1,203,175	181,433	3,716,429	45,900	2,115,682	2,070,466	1,422,355	-	-	-66,700

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P26)

Unit: Mil JPY										
CODE	Fr 15,16,25,2	Fr 20	Fr 34.39	and Fr 591.592,5	Fr 53	Fr 5711011	Fr 5721	Fr 5722011	Fr 5741011	
Fr 5721	-12	-2	5		22			-4		
Fr 572201:	-5	-2	17	2	1			-1		
Fr 574101:	-	-	-	-	-			-		
Fr 574201:	-4	-1	3	1	7			-1		
Fr 575101:	-	-	-	-	-			-		
Fr 575101	-25	-11	10	74	12			-2		-1
Fr 2111-01	-26	-93	5	1	1	2		-160	11	-79
Fr 661201:	-	-	-	-	-	-		-2	1	
Fr 578	-50	-10	25	27		111		-420	35	-185
Fr 64	-	-	-	-	-	-		-	-	-
Fr 671101:	-	-	-	-	-	-		-	-	-
Fr 682101:	-	-	-	-	-	-		-	-	-
Fr 6312, 6!	-4	-1	5	1	3	3		-3		
OutboFr 01	-	-	-	-	-	-		-	-	-
Fr 11	-	-	-	-	-	-		-	-	-
Fr 15,16,2!	-257	-1	14	-	1			-1		
Fr 20	-6	-5	1					-		
Fr 34.39 a!	-2	-	6					-		
Fr 591.592	-1	-	-					-		
Fr 53	-1	-	-		2			-		
Fr 571101:	-1	-	1		2			-		
Fr 5721	-1	-	-		1			-		
Fr 572201:	-	-	1					-		
Fr 574101:	-	-	-		-			-		
Fr 574201:	-	-	-		-			-		
Fr 575101:	-16	-4	6	22	6			-1		-1
Fr 575101	-1	-	-	2				-		
Fr 2111-01	-	-1	-					-1		-1
Fr 661201:	-	-	-	-	-	-		-		-
Fr 578	-20	-4	10	11		44		-166	14	-73
Fr 64	-	-	-	-	-	-		-	-	-
Fr 671101:	-	-	-	-	-	-		-	-	-
Fr 682101:	-	-	-	-	-	-		-	-	-
Fr 6312, 6!	-1	-	1	-	-	1		-	-	-
InbouFr 01	-	-	-	-	-	-		-	-	-
Fr 11	-	-	-	-	-	-		-	-	-
Fr 15,16,2!	-	-	-	-	-	-		-	-	-
Fr 20	-	-	-	-	-	-		-	-	-
Fr 34.39 a!	-	-	-	-	-	-		-	-	-
Fr 591.592	-	-	-	-	-	-		-	-	-
Fr 53	-	-	-	-	-	-		-	-	-
Fr 571101:	-	-	-	-	-	-		-	-	-
Fr 5721	-	-	-	-	-	-		-	-	-
Fr 572201:	-	-	-	-	-	-		-	-	-
Fr 574101:	-	-	-	-	-	-		-	-	-
Fr 574201:	-	-	-	-	-	-		-	-	-
Fr 575101:	-	-	-	-	-	-		-	-	-
Fr 575101	-	-	-	-	-	-		-	-	-
Fr 2111-01	-	-	-	-	-	-		-	-	-
Fr 661201:	-	-	-	-	-	-		-	-	-
Fr 578	-	-	-	-	-	-		-	-	-
Fr 64	-	-	-	-	-	-		-	-	-
Fr 671101:	-	-	-	-	-	-		-	-	-
Fr 682101:	-	-	-	-	-	-		-	-	-
Fr 6312, 6!	-	-	-	-	-	-		-	-	-
7000000	-39,071	-12,698	32,641	4,742	11,630	2,268	-6,649	543	-7,132	
sectors 7111001	-256	-72	210	122	305	15		-56	6	-3
7111002	-249	-38	135	49	114	1		-320	1	-1
7111003	-650	-104	418	175	590	112		-739	23	-19
9111000	-16,473	-1,196	7,719	1,893	7,703	1,207		-15,365	939	-115
9112000	-2,157	-156	991	203	1,164	136		-1,679	111	-8
9113000	-959	-124	610	161	1,555	280		-634	32	-10
9211000	2,878	-891	-725	-325	7,563	285		-613	65	-159
9311000	-5,356	-1,267	4,186	-359	3,702	2,793		-1,378	169	-386
9321000	-	-	-	-	-	-		-	-	-
9411000	-2,663	-329	792	93	578	321		-745	159	-78
9511000	4	-	-1	-	-898	-59		564	-	1
9600000	-25,880	-4,176	14,334	2,012	22,374	5,090	-20,966	1,505	-779	
9700000	-64,951	-16,874	46,975	6,754	34,004	7,358	-27,615	2,048	-7,911	

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P27)

Unit: Mil JPY									
CODE	Fr 5742011	Fr 5751011	Fr 5751012	Fr 2111-01	Fr 6612011	Fr 578	Fr 64	Fr 6711011	Fr 6821011
Fr 5721	-22	1	-	-	-	290	-	-7	-10
Fr 572201:	-2	3	-1	-	-	49	-	-25	-24
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-2	1	-	-	-	54	-	-8	-13
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	-21	124	-38	-	-	390	-	-133	-43
Fr 2111-01	-710	1,556	-482	31	-	317	-	-108	-71
Fr 661201:	-	-	-	-	-	307	-	-183	-
Fr 578	-4,591	18,077	-5,594	-	-	7,463	-	-10,960	-437
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-338	-95
Fr 6312, 64	-3	66	-20	-	-	116	-	-262	-46
Outbo Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	4	-	-44	-57
Fr 15,16,21	-30	5	-2	-	-	94	-	-99	-4
Fr 20	-	-	-	-	-	2	-	-1	-
Fr 34.39 ar	-	-	-	-	-	4	-	-3	-2
Fr 591.592	-	-	-	-	-	8	-	-4	-1
Fr 53	-3	1	-	-	-	18	-	-7	-1
Fr 571101:	-	-	-	-	-	11	-	-2	-2
Fr 5721	-1	-	-	-	-	19	-	-	-1
Fr 572201:	-	-	-	-	-	3	-	-1	-1
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	1	-	-	-
Fr 575101:	-3	161	-50	-	-	61	-	-35	-
Fr 575101	-1	3	-1	-	-	9	-	-3	-1
Fr 2111-01	-5	10	-3	-	-	2	-	-1	-
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	-1,815	7,145	-2,211	-	-	2,950	-	-4,332	-173
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-5	-1
Fr 6312, 64	-	3	-1	-	-	14	-	-16	-4
Inbou Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,21	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 ar	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 64	-	-	-	-	-	-	-	-	-
7000000	-36,066	90,782	-28,092	6,164	-	543,178	-	-199,007	-123,003
sectors 7111001	-135	623	-193	6	-	6,655	-	-1,916	-500
7111002	-48	92	-28	1	-	3,874	-	-1,119	-826
7111003	-604	487	-151	6	-	34,815	-	-6,070	-2,166
9111000	-8,794	9,346	-2,892	58	-	332,040	-	-90,490	-58,886
9112000	-644	1,158	-358	8	-	38,754	-	-10,900	-4,134
9113000	-1,009	993	-307	9	-	23,820	-	-2,975	-870
9211000	-1,987	482	-149	-88	-	301,478	-	-11,725	-6,963
9311000	-10,511	15,270	-4,725	133	-	117,762	-	-45,870	-12,843
9321000	-	-	-	-	-	817	-	-	-
9411000	-3,058	-5,113	1,582	1,781	-	87,030	-	-10,951	-5,850
9511000	1,185	-2	1	-23	-	-21,293	-	17	2
9600000	-25,605	23,337	-7,221	1,892	-	925,751	-	-181,999	-93,037
9700000	-61,671	114,118	-35,314	8,056	-	1,468,929	-	-381,006	-216,040

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P28)

Unit: Mil JPY		Inbound						
CODE	Fr 6312, 659 Fr 01	Fr 11	Fr 15,16,25,;Fr 20	Fr 34.39 andFr 591.592,5 Fr 53	Fr 5711011			
Fr 5721	2	-	3	13	4	9	-	1
Fr 572201:	-2	-	9	6	4	31	-	-
Fr 574101:	-	-	-	-	-	-	-	-
Fr 574201:	-3	-	1	4	2	5	-	-
Fr 575101:	-	-	-	-	-	-	-	-
Fr 575101	84	-	4	24	27	17	-	1
Fr 2111-01	10	-	17	26	221	9	-	13
Fr 661201:	-3	-	-	-	-	-	-	-
Fr 578	-87	-	20	60	23	40	-	687
Fr 64	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-
Fr 682101:	-	-	10	-	-	-	-	-
Fr 6312, 659 Fr 01	-51	-	3	5	2	9	-	19
OutboFr 01	-	-	-	-	-	-	-	-
Fr 11	-	-	20	-	-	-	-	-
Fr 15,16,25,;Fr 20	-13	-	1	263	2	24	-	2
Fr 20	-	-	1	6	11	1	-	-
Fr 34.39 andFr 591.592,5 Fr 53	-1	-	1	2	-	10	-	-
Fr 591.592	2	-	-	1	-	-	-	-
Fr 53	-	-	-	-	-	1	-	2
Fr 571101:	2	-	-	1	-	1	-	-
Fr 5721	-	-	-	1	-	1	-	-
Fr 572201:	-	-	1	-	-	2	-	-
Fr 574101:	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-
Fr 575101:	2	-	2	17	8	10	-	-
Fr 575101	2	-	-	1	1	-	-	-
Fr 2111-01	-	-	-	-	1	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-
Fr 578	-35	-	8	24	9	16	-	272
Fr 64	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-
Fr 6312, 659 Fr 01	-2	-	-	1	-	2	-	5
InbouFr 01	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-
Fr 15,16,25,;Fr 20	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-
Fr 34.39 andFr 591.592,5 Fr 53	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-
Fr 6312, 659 Fr 01	-	-	-	-	-	-	-	-
7000000	-6,241	-	33,844	42,438	30,203	56,853	-	14,077
sectors								
7111001	-560	-	200	294	171	375	-	95
7111002	-357	-	67	288	91	221	-	5
7111003	-53	-	281	724	248	717	-	697
9111000	4,311	-	7,244	18,032	2,844	13,143	-	7,490
9112000	-261	-	927	2,361	371	1,686	-	842
9113000	126	-	458	1,043	295	1,051	-	1,738
9211000	-13,331	-	7,161	-2,218	2,120	-1,358	-	1,772
9311000	-6,016	-	2,803	5,786	3,012	7,320	-	17,333
9321000	2,846	-	11	-	-	-	-	-
9411000	-4,271	-	4,548	2,943	782	1,284	-	1,991
9511000	-2	-	-57	-5	-	-2	-	-367
9600000	-17,568	-	23,642	29,249	9,933	24,438	-	31,596
9700000	-23,809	-	57,486	71,687	40,136	81,291	-	45,673

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P29)

Unit: Mil JPY

CODE	Fr 5721	Fr 5722011	Fr 5741011	Fr 5742011	Fr 5751011	Fr 5751012	Fr 2111-01	Fr 6612011	Fr 578
Fr 5721	2	-	-	-	-	2	-	-	1
Fr 572201:	-	-	-	-	12	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	2	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	1	-	-	-	418	6	-	1	1
Fr 2111-01	94	-	-	-	5,248	80	-	4	1
Fr 661201:	1	-	-	-	-	-	-	-	1
Fr 578	247	-	-	-	60,952	926	-	66	22
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6!	1	-	-	-	223	3	-	1	-
Outbo Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2!	1	-	-	-	17	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 a!	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	1	-	-	-	-
Fr 53	-	-	-	-	4	-	-	-	-
Fr 571101:	-	-	-	-	1	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	1	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	544	8	-	-	-
Fr 575101	-	-	-	-	10	-	-	-	-
Fr 2111-01	1	-	-	-	35	1	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	98	-	-	-	24,091	366	-	26	9
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6!	-	-	-	-	9	-	-	-	-
Inbou Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,2!	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 a!	-	-	-	-	-	-	-	-	-
Fr 591.592	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 571101:	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 572201:	-	-	-	-	-	-	-	-	-
Fr 574101:	-	-	-	-	-	-	-	-	-
Fr 574201:	-	-	-	-	-	-	-	-	-
Fr 575101:	-	-	-	-	-	-	-	-	-
Fr 575101	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 661201:	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 671101:	-	-	-	-	-	-	-	-	-
Fr 682101:	-	-	-	-	-	-	-	-	-
Fr 6312, 6!	-	-	-	-	-	-	-	-	-
7000000	3,917	-	-	-	306,091	4,648	-	1,550	1,592
ectors 7111001	33	-	-	-	2,101	32	-	4	20
7111002	189	-	-	-	311	5	-	9	11
7111003	435	-	-	-	1,642	25	-	18	102
9111000	9,051	-	-	-	31,511	478	-	739	973
9112000	989	-	-	-	3,904	59	-	88	114
9113000	373	-	-	-	3,349	51	-	25	70
9211000	361	-	-	-	1,627	25	-	968	883
9311000	812	-	-	-	51,487	782	-	2,317	345
9321000	-	-	-	-	-	-	-	-	2
9411000	439	-	-	-	-17,240	-262	-	336	255
9511000	-332	-	-	-	-7	-	-	-	-62
9600000	12,351	-	-	-	78,684	1,195	-	4,505	2,713
9700000	16,267	-	-	-	384,775	5,843	-	6,055	4,304

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P30)

Unit: Mil JPY	CODE	Fr 64	Fr 6711011	Fr 6821011	Fr 6312, 659	700000	Final demand sectors			
							Consumption			Investment
						71	72	73	74	
	Fr 5721	-	5	7	4	138,466	9,476	257,292	-	-
	Fr 572201:	-	15	16	1	64,298	2,262	26,079	23	257
	Fr 574101:	-	-	-	-	-	-	-	-	-
	Fr 574201:	-	5	9	2	39,817	179	160,398	-	-
	Fr 575101:	-	-	-	-	-	-	-	-	-
	Fr 575101	-	83	29	22	508,425	5,305	498,604	-	-
	Fr 2111-01	-	67	48	14	924,345	1,702	419,846	-	-
	Fr 661201:	-	114	-	1	163,939	-	16,524	-	-
	Fr 578	-	6,833	294	6	2,204,495	2,034	1,251,895	-34,877	-
	Fr 64	-	-	-	-	1,498	453	9,974	33,978	-
	Fr 671101:	-	-	-	-	-	687,095	1,531,625	-	-
	Fr 682101:	-	211	64	-	64,154	527,892	1,495,738	-	-
	Fr 6312, 659	-	163	31	14	159,839	52,347	1,165,359	50,383	-
Outbou	Fr 01	-	-	-	-	-	-	-	-	-
	Fr 11	-	28	39	-	15,690	1,797	51,041	291	-
	Fr 15,16,20	-	62	3	3	131,238	3,780	131,145	-	15
	Fr 20	-	1	-	-	19,796	128	1,961	-	-
	Fr 34.39 ar	-	2	1	1	17,188	1,036	22,750	1	3,707
	Fr 591.592	-	2	1	-	9,641	184	4,089	127	-
	Fr 53	-	4	1	-	17,592	-	16,484	-	-
	Fr 571101:	-	1	1	-	11,752	94	20,818	-	-
	Fr 5721	-	-	-	-	8,893	609	16,526	-	-
	Fr 572201:	-	1	1	-	3,673	129	1,490	1	15
	Fr 574101:	-	-	-	-	95	-	-	-	-
	Fr 574201:	-	-	-	-	451	2	1,819	-	-
	Fr 575101:	-	22	-	6	214,270	2,255	503,370	-	-
	Fr 575101	-	2	1	1	12,297	128	12,059	-	-
	Fr 2111-01	-	-	-	-	6,189	11	2,811	-	-
	Fr 661201:	-	-	-	-	-	-	-	-	-
	Fr 578	-	2,701	116	2	871,333	804	494,815	-13,785	-
	Fr 64	-	-	-	-	-	-	-	-	-
	Fr 671101:	-	-	-	-	-	7,918	17,651	-	-
	Fr 682101:	-	3	1	-	885	7,280	20,628	-	-
	Fr 6312, 659	-	10	3	1	17,521	301	61,302	20,871	-
Inbou	Fr 01	-	-	-	-	-	-	-	-	-
	Fr 11	-	-	-	-	-	-	-	-	-
	Fr 15,16,20	-	-	-	-	-	-	-	-	-
	Fr 20	-	-	-	-	-	-	-	-	-
	Fr 34.39 ar	-	-	-	-	-	-	-	-	-
	Fr 591.592	-	-	-	-	-	-	-	-	-
	Fr 53	-	-	-	-	-	-	-	-	-
	Fr 571101:	-	-	-	-	-	-	-	-	-
	Fr 5721	-	-	-	-	-	-	-	-	-
	Fr 572201:	-	-	-	-	-	-	-	-	-
	Fr 574101:	-	-	-	-	-	-	-	-	-
	Fr 574201:	-	-	-	-	-	-	-	-	-
	Fr 575101:	-	-	-	-	-	-	-	-	-
	Fr 575101	-	-	-	-	-	-	-	-	-
	Fr 2111-01	-	-	-	-	-	-	-	-	-
	Fr 661201:	-	-	-	-	-	-	-	-	-
	Fr 578	-	-	-	-	-	-	-	-	-
	Fr 64	-	-	-	-	-	-	-	-	-
	Fr 671101:	-	-	-	-	-	-	-	-	-
	Fr 682101:	-	-	-	-	-	-	-	-	-
	Fr 6312, 659	-	-	-	-	-	-	-	-	-
	700000	-	124,065	82,838	6,275	462,769,600	13,633,296	282,821,445	98,736,467	20,401,047
ectors	7111001	-	1,194	337	153	4,261,177	-	-	-	-
	7111002	-	698	557	94	3,028,198	-	-	-	-
	7111003	-	3,784	1,459	210	6,343,921	-	-	-	-
	9111000	-	56,413	39,658	4,836	209,415,116	-	-	-	-
	9112000	-	6,796	2,784	542	25,764,948	-	-	-	-
	9113000	-	1,854	586	143	13,240,959	-	-	-	-
	9211000	-	7,309	4,689	3,006	86,806,105	-	-	-	-
	9311000	-	28,596	8,649	2,678	85,689,911	-	-	-	-
	9321000	-	-	-	181	14,018,046	-	-	-	-
	9411000	-	6,827	3,940	1,364	31,934,109	-	-	-	-
	9511000	-	-11	-1	-1	-3,597,234	-	-	-	-
	9600000	-	113,462	62,657	13,207	476,905,256	-	-	-	-
	9700000	-	237,527	145,495	19,482	939,674,856	-	-	-	-

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P31)

Unit: Mil JPY					Exports			
CODE	75	76	77	780000	790000	810000	820000	
Fr 5721	-	-	-	266,769	405,235	2,323	269,091	
Fr 572201:	4,669	219	-	33,509	97,807	7,963	41,472	
Fr 574101:	-	-	-	-	-	-	-	
Fr 574201:	-	-	-	160,577	200,394	266	160,843	
Fr 575101:	-	-	-	-	-	-	-	
Fr 575101	-	-	-	503,909	1,012,334	4,793	508,702	
Fr 2111-01	-	7,633	1,739	430,921	1,355,265	100,002	530,923	
Fr 661201:	-	-	-	16,524	180,463	978	17,502	
Fr 578	-	-	-	1,219,052	3,423,548	458,766	1,677,818	
Fr 64	-	-	-	44,405	45,903	-	44,405	
Fr 671101:	-	-	-	2,218,720	2,218,720	134,257	2,352,976	
Fr 682101:	-	-	-	2,023,630	2,087,784	14,792	2,038,422	
Fr 6312, 6!	-	-	101	1,268,190	1,428,029	5,864	1,274,055	
Outbo Fr 01	-	-	-	-	-	-	-	
Fr 11	-	278	17	53,423	69,113	669	54,092	
Fr 15,16,2!	5,472	-4,461	786	136,738	267,976	21,034	157,772	
Fr 20	-	91	109	2,290	22,086	3,702	5,992	
Fr 34.39 a!	19,863	-499	363	47,221	64,409	10,808	58,029	
Fr 591.592	-	-43	2	4,358	13,999	59	4,418	
Fr 53	-	-	-	16,484	34,077	888	17,373	
Fr 571101:	-	-	-	20,912	32,665	289	21,201	
Fr 5721	-	-	-	17,134	26,028	149	17,283	
Fr 572201:	267	12	-	1,914	5,587	455	2,369	
Fr 574101:	-	-	-	-	95	212	212	
Fr 574201:	-	-	-	1,821	2,272	3	1,824	
Fr 575101:	-	-	-	505,625	719,895	193,133	698,758	
Fr 575101	-	-	-	12,188	24,485	116	12,304	
Fr 2111-01	-	51	12	2,885	9,074	670	3,555	
Fr 661201:	-	-	-	-	-	-	-	
Fr 578	-	-	-	481,834	1,353,167	181,328	663,162	
Fr 64	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	25,569	25,569	1,547	27,116	
Fr 682101:	-	-	-	27,908	28,793	204	28,112	
Fr 6312, 6!	-	-	-	82,473	99,994	666	83,140	
Inbou Fr 01	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	57,486	57,486	
Fr 15,16,2!	-	-	-	-	-	71,687	71,687	
Fr 20	-	-	-	-	-	40,136	40,136	
Fr 34.39 a!	-	-	-	-	-	81,291	81,291	
Fr 591.592	-	-	-	-	-	-	-	
Fr 53	-	-	-	-	-	-	-	
Fr 571101:	-	-	-	-	-	45,673	45,673	
Fr 5721	-	-	-	-	-	16,267	16,267	
Fr 572201:	-	-	-	-	-	-	-	
Fr 574101:	-	-	-	-	-	-	-	
Fr 574201:	-	-	-	-	-	-	-	
Fr 575101:	-	-	-	-	-	384,775	384,775	
Fr 575101	-	-	-	-	-	5,843	5,843	
Fr 2111-01	-	-	-	-	-	-	-	
Fr 661201:	-	-	-	-	-	6,055	6,055	
Fr 578	-	-	-	-	-	4,304	4,304	
Fr 64	-	-	-	-	-	-	-	
Fr 671101:	-	-	-	-	-	237,527	237,527	
Fr 682101:	-	-	-	-	-	145,495	145,495	
Fr 6312, 6!	-	-	-	-	-	19,482	19,482	
7000000	70,983,359	979,826	1,563,313	489,118,753	951,888,353	70,944,580	560,063,333	
sectors								
7111001								
7111002								
7111003								
9111000								
9112000								
9113000								
9211000								
9311000								
9321000								
9411000								
9511000								
9600000								
9700000								

IO table for Transportation – Tourism analysis, Producer price, Japan 2011 (P32)

Unit: Mil JPY		Imports			
CODE	830000	870000	880000	970000	
Fr 5721	407,558	-8,800	260,291	398,757	
Fr 572201	105,770	-68	41,404	105,702	
Fr 574101	-	-	-	-	
Fr 574201	200,660	-110,680	50,164	89,980	
Fr 575101	-	-	-	-	
Fr 575101	1,017,128	-57,371	451,331	959,757	
Fr 2111-01	1,455,267	-252,092	278,831	1,203,175	
Fr 661201	181,441	-8	17,494	181,433	
Fr 578	3,882,314	-165,885	1,511,934	3,716,429	
Fr 64	45,903	-3	44,402	45,900	
Fr 671101	2,352,976	-237,294	2,115,682	2,115,682	
Fr 682101	2,102,576	-32,110	2,006,312	2,070,466	
Fr 6312, 6	1,433,893	-11,538	1,262,516	1,422,355	
Outbc Fr 01	-	-	-	-	
Fr 11	69,782	-136,482	-82,390	-66,700	
Fr 15,16,2	289,009	-353,960	-196,188	-64,951	
Fr 20	25,788	-42,662	-36,670	-16,874	
Fr 34.39 a	75,217	-28,242	29,787	46,975	
Fr 591.592	14,059	-7,305	-2,887	6,754	
Fr 53	34,965	-961	16,412	34,004	
Fr 571101	32,954	-25,595	-4,394	7,358	
Fr 5721	26,177	-53,792	-36,509	-27,615	
Fr 572201	6,042	-3,994	-1,625	2,048	
Fr 574101	307	-8,218	-8,006	-7,911	
Fr 574201	2,275	-63,946	-62,122	-61,671	
Fr 575101	913,028	-798,910	-100,152	114,118	
Fr 575101	24,601	-59,914	-47,611	-35,314	
Fr 2111-01	9,744	-1,688	1,867	8,056	
Fr 661201	-	-	-	-	
Fr 578	1,534,495	-65,566	597,596	1,468,929	
Fr 64	-	-	-	-	
Fr 671101	27,116	-408,122	-381,006	-381,006	
Fr 682101	28,997	-245,036	-216,924	-216,040	
Fr 6312, 6	100,660	-124,469	-41,330	-23,809	
Inbou Fr 01	-	-	-	-	
Fr 11	57,486	-	57,486	57,486	
Fr 15,16,2	71,687	-	71,687	71,687	
Fr 20	40,136	-	40,136	40,136	
Fr 34.39 a	81,291	-	81,291	81,291	
Fr 591.592	-	-	-	-	
Fr 53	-	-	-	-	
Fr 571101	45,673	-	45,673	45,673	
Fr 5721	16,267	-	16,267	16,267	
Fr 572201	-	-	-	-	
Fr 574101	-	-	-	-	
Fr 574201	-	-	-	-	
Fr 575101	384,775	-	384,775	384,775	
Fr 575101	5,843	-	5,843	5,843	
Fr 2111-01	-	-	-	-	
Fr 661201	6,055	-	6,055	6,055	
Fr 578	4,304	-	4,304	4,304	
Fr 64	-	-	-	-	
Fr 671101	237,527	-	237,527	237,527	
Fr 682101	145,495	-	145,495	145,495	
Fr 6312, 6	19,482	-	19,482	19,482	
7000000	1,022,832,933	-83,158,077	476,905,256	939,674,856	
ectors 7111001	-	-	-	-	
7111002	-	-	-	-	
7111003	-	-	-	-	
9111000	-	-	-	-	
9112000	-	-	-	-	
9113000	-	-	-	-	
9211000	-	-	-	-	
9311000	-	-	-	-	
9321000	-	-	-	-	
9411000	-	-	-	-	
9511000	-	-	-	-	
9600000	-	-	-	-	
9700000	-	-	-	-	

Appendix 6. Social Accounting Matrix (SAM) for Transportation – Tourism analysis, case of Japan 2011

SAM mapping

	P16		P32
	P15		P31
	P14		P30
	P13		P29
	P12		P28
	P11		P27
	P10		P26
	P9		P25
	P8		P24
	P7		P23
	P6		P22
	P5		P21
	P4		P20
	P3		P19
	P2		P18
	P1		P17

SAM mapping

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P1)

SAM for Transportation - Tourism analysis, Purchaser price, Japan 2011			Intermediate Demand		
Unit: Mil JPY			01	06	
CODE	Name		Agriculture, forestry and fishery	Mining	
Intermediate inputs	01	Agriculture, forestry and fishery	1,520,626	97	
	06	Mining	329	2,103	
	11	Beverages and Foods	1,347,436	-	
	15	Textile product	69,420	4,116	
	16	Pulp, paper and wooden products	310,235	2,857	
	191	Printing, plate making and book binding	1,684	417	
	20	Chemical products	926,600	11,306	
	21	Petroleum and coal products	251,902	23,941	
	221	Plastic products	157,402	841	
	222, 231	Rubber products; Leather, fur skins and miscellaneous	18,430	4,585	
	25	Ceramic, stone and clay products	36,563	625	
	26	Iron and steel	942	3,075	
	27	Non-ferrous metals	-	771	
	28	Metal products	22,621	25,309	
	29	General-purpose machinery	6	2,182	
	30	Production machinery	66	1,420	
	31	Business oriented machinery	4,030	-	
	32	Electronic components	7	23	
	33	Electrical machinery	2,589	329	
	34, 3911, 3919	Information and communication electronics equipmen	23,449	2,555	
	35	Transportation equipment	62,169	31	
	41	Construction	68,886	6,089	
	46	Electricity, gas and heat supply	114,409	27,078	
	47	Water supply	12,057	2,440	
	48	Waste management services	2,891	1,233	
	5111011	Wholesale trade	-	-	
	5112011	Retail trade	-	-	
	53	Finance and insurance	67,835	26,866	
	55	Real estate	25,145	7,520	
	5711011	Railway transport (passengers)	1,286	2,209	
	5712011	Railway transport (freight)	-	-	
	5721	Road transport service (bus, taxi)	963	5,422	
	5722011	Road freight transport (except self-transport)	8,065	379	
	P	5731011	Self-transport (passengers)	47,400	12,508
	P	5732011	Self-transport (freight)	275,672	165,222
		5741011	International shipping	-	4
		5742011	Coastal and inland water transport (passengers)	45	145
		5742012	Coastal and inland water transport (freight)	-	-
		5743011	Harbor transport service	-	-
		5751011	International air transport	372	780
		5751012	Domestic air transport (passengers)	364	495
		5751013	Domestic air transport (freight)	-	-
		5751014	Aircraft service except air transport	386	-
		5761011	Consigned freight forwarding	-	-
		5771011	Storage facility service	-	-
	578=5781-01;578901,02,03,04,05,06,09	Services relating to transport	147	19	
		5791011	Postal services and mail delivery	1,816	967
	59	Information and communications	43,544	8,273	
	61	Public administration	-	-	
	63	Education and research	10,269	6,457	
	64	Medical, health care and welfare	3,553	-	
	65	Miscellaneous non-profit services	9,208	2,459	
	66	Business services	279,520	42,669	
	671	Hotels	-	-	
	672	Eating and drinking services	-	-	
	Others 67	Personal services (Except Eating, Drinking)	2,782	147	
P	68	Office supplies	6,428	657	
	69	Activities not elsewhere classified	164,274	6,019	
Domestic	Fr 01	Agriculture, forestry and fishery	19,624	-	
	Fr 11	Food and beverage	53,182	-	
	Fr 15,16,25,2229.2311.231	Fiber, wood, paper, ceramic, glass products; Shoes and	17,121	1,494	
	Fr 20	Drug, cosmetic, and film	4,594	56	
	Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and spor	1,546	109	
	Fr 591.592,595102.03	Information and communication	282	43	

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P2)

CODE	11	15	16	191	20	21	221	222, 231	25
	Beverages and Foods	Textile product	Pulp, paper and wooden	Printing, plate making and	Chemical products	Petroleum and coal products	Plastic and rubber products	Rubber products; Leather, fur clav	Ceramic, stone and
01	7,851,977	32,033	383,555	-	44,300	-	-	349,447	2,280
06	2,500	22	64,691	-	144,276	12,748,803	28	1,321	509,028
11	6,847,337	6,284	22,721	-	191,213	70	218	12,145	3,667
15	41,491	563,926	66,862	4,675	27,888	616	10,745	44,152	26,269
16	604,191	21,735	4,277,113	1,101,619	480,209	468	102,804	17,238	188,418
191	245,374	6,665	62,366	324,404	73,734	401	4,012	1,986	14,286
20	399,410	332,075	517,217	223,900	10,714,410	39,097	2,664,255	600,316	273,083
21	178,494	22,139	76,212	9,947	2,184,545	1,219,492	17,158	14,789	214,526
221	743,331	25,370	300,496	371,885	593,686	2,367	2,715,999	114,730	69,102
222, 231	7,898	12,237	11,378	3,561	21,582	651	7,507	116,520	8,492
25	103,303	1,753	69,027	168	186,566	6,782	62,140	2,285	704,278
26	-	379	119,908	-	1,090	-	19,681	11,144	61,837
27	63,336	22	37,885	16,220	156,738	230	33,234	7,012	76,318
28	525,871	8,618	160,493	5,185	269,640	10,851	21,200	78,178	89,889
29	-	-	14,671	-	609	-	5,164	-	15,102
30	-	-	999	-	-	230	36,286	-	6,303
31	14	-	-	-	38	-	-	-	-
32	53	3	131	4,284	127	8	10	4	9
33	20	-	1,628	122	121	-	409	-	409
34, 3911, 3919	57,966	50,032	90,538	639	36,934	46,573	146,393	11,087	75,693
35	-	-	-	-	-	-	-	-	-
41	40,522	11,944	95,432	18,781	197,982	14,249	75,612	9,452	81,536
46	397,634	54,977	421,535	68,979	666,496	110,199	217,115	53,254	307,368
47	82,419	3,073	26,527	2,780	72,601	9,150	13,724	1,916	8,835
48	15,427	323	6,077	2,383	44,987	377	358	534	12,454
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	160,876	39,552	98,805	42,479	170,891	50,990	25,712	12,234	63,464
55	78,924	8,108	27,276	23,851	71,766	4,982	37,103	5,552	19,925
5711011	9,368	2,591	6,939	10,518	33,508	2,895	16,892	2,530	10,591
5712011	-	-	-	-	-	-	-	-	-
5721	8,653	2,180	5,275	1,762	22,029	1,053	8,713	2,880	5,942
5722011	7,418	893	918	1,229	7,344	745	2,253	1,362	4,274
5731011	132,909	10,657	42,061	31,018	51,387	3,879	9,587	4,495	17,207
5732011	45,163	6,961	25,330	4,929	13,545	1,343	2,460	1,092	64,805
5741011	-	8	544	55	1	96	29	25	-
5742011	106	145	178	86	858	80	205	83	138
5742012	-	-	-	-	-	-	-	-	-
5743011	-	-	-	-	-	-	-	-	-
5751011	1,662	1,152	2,146	2,977	8,767	432	2,576	1,265	1,761
5751012	918	696	1,206	847	9,085	322	1,253	381	632
5751013	-	-	-	279	-	-	-	-	-
5751014	-	-	-	-	-	-	-	-	-
5761011	-	-	-	497	-	-	-	-	-
5771011	16	-	678	1,204	2,537	1,396	8	1	379
1,02,03,04,05,06,09	1,033	84	1,038	452	1,596	35	1,135	143	1,044
5791011	4,118	1,719	2,597	1,197	9,968	548	4,322	448	1,188
59	180,131	17,716	70,403	41,640	352,921	13,858	56,650	27,372	48,416
61	-	-	-	-	-	-	-	-	-
63	206,655	35,060	78,000	30,798	2,182,020	36,949	223,306	75,688	128,684
64	-	-	20	96	398	-	10	1	-
65	31,331	2,926	8,547	3,687	50,812	2,850	4,501	3,102	7,904
66	1,065,527	63,190	260,628	219,213	1,190,093	83,842	364,862	93,118	330,550
671	-	-	-	-	-	-	-	-	-
672	80,245	-	-	-	-	-	-	-	-
Others 67	6,246	358	1,088	673	2,864	262	786	278	405
68	20,471	2,494	8,038	4,758	14,719	414	1,121	1,209	7,284
69	93,402	5,253	26,663	8,675	39,834	11,950	12,882	17,335	60,470
Fr 01	235,373	574	950	-	907	-	-	6,763	45
Fr 11	247,695	103	799	-	6,512	3	9	177	144
Fr 15,16,25,2229.23	12,079	105,977	30,082	5,360	12,053	283	4,130	26,371	13,718
Fr 20	1,973	1,642	2,554	1,104	52,700	193	13,145	2,960	1,349
Fr 34.39 and Sport	6,367	1,920	4,762	3,109	4,309	1,611	17,058	1,259	2,994
Fr 591.592,595102.1	1,351	219	467	401	1,367	81	232	201	219

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P3)

CODE	26	27	28	29	30	31	32	33	34, 3911, 39
	Iron and steel	Non-ferrous metals	Metal products	General-purpose machinery	Production machinery	Business oriented machinery	Electronic component	Electrical machinery	Information and communication
01	3	885	-	-	-	-	-	-	62,947
06	2,062,953	1,323,552	2,220	501	868	327	972	616	8,173
11	27	-	-	-	-	-	-	-	8,934
15	12,155	10,815	14,892	13,179	22,662	9,843	69,552	48,282	44,198
16	13,825	31,246	50,732	21,595	23,217	41,092	122,920	147,256	286,507
191	4,224	5,786	29,464	13,954	20,843	27,821	69,761	51,570	83,043
20	122,441	118,909	115,833	51,565	80,443	141,636	314,753	264,110	283,943
21	1,219,686	47,079	41,451	18,759	22,448	9,301	32,947	22,902	22,746
221	1,475	74,767	43,004	62,674	131,909	239,876	317,705	592,016	633,962
222, 231	18,880	1,256	16,728	70,978	229,229	80,241	37,601	88,558	69,329
25	165,775	69,470	50,742	97,801	80,955	165,216	783,784	166,769	75,857
26	18,275,122	17,160	3,142,934	1,494,943	1,763,607	182,371	98,993	896,778	131,147
27	252,823	4,161,410	862,406	466,270	335,490	296,938	903,332	1,193,505	470,763
28	26,823	21,462	810,244	406,123	586,401	288,689	319,068	488,571	305,068
29	3,722	174	10,916	1,457,711	673,736	118,002	33,481	223,520	28,043
30	3,622	901	5,733	40,205	1,982,059	13,016	44,990	35,496	9,054
31	-	-	282	39,515	124,845	612,161	3,503	18,704	10,629
32	27	1,776	35,498	77,872	127,856	986,865	3,672,935	2,070,788	2,543,580
33	-	298	10,021	286,465	384,291	144,089	281,752	1,840,653	220,450
34, 3911, 3919	411,394	209,427	2,661	8,407	38,324	18,444	23,401	23,650	453,764
35	-	-	-	-	10,736	-	-	-	-
41	251,445	65,730	85,795	38,398	56,236	18,165	101,221	60,851	30,488
46	871,459	240,177	187,483	109,769	128,560	55,760	375,765	136,064	94,775
47	29,110	8,825	7,328	6,461	9,664	4,568	26,380	9,669	6,837
48	2,538	1,414	627	2,055	300	2,329	6,962	2,718	989
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	106,736	66,258	103,049	58,178	91,212	61,142	76,404	72,380	110,624
55	34,310	9,130	39,036	27,836	41,696	13,370	22,901	40,777	25,500
5711011	8,722	4,688	12,187	9,738	18,055	10,788	30,301	20,225	26,911
5712011	-	-	-	-	-	-	-	-	1,359
5721	4,508	2,518	11,570	12,333	17,137	7,427	28,309	14,386	9,593
5722011	4,261	1,671	2,685	3,879	3,794	4,489	5,664	9,764	418,090
5731011	59,886	18,065	59,028	31,738	44,333	28,714	19,736	28,433	65,270
5732011	24,615	9,058	26,497	12,878	21,472	15,223	6,359	9,051	52,256
5741011	12	43	42	-	-	-	-	1	3
5742011	61	39	216	85	315	94	661	384	432
5742012	-	-	-	-	-	-	-	-	38,378
5743011	-	-	-	-	-	-	-	-	92,772
5751011	1,400	486	4,016	3,914	6,192	1,954	2,490	5,363	2,116
5751012	1,265	471	1,280	1,229	2,391	1,018	1,307	3,344	1,231
5751013	-	-	-	-	-	-	-	-	-
5751014	-	-	-	-	-	-	-	-	-
5761011	-	-	-	-	-	-	-	-	1,326
5771011	17	1	772	106	231	1,656	208	4,030	30,654
1,02,03,04,05,06,09	2,928	619	327	494	377	159	552	2,404	592
5791011	1,534	1,119	4,321	1,600	3,389	1,611	1,119	2,980	2,406
59	70,895	37,556	72,592	76,827	159,031	56,629	144,199	201,613	213,948
61	-	-	-	-	-	-	-	-	-
63	198,938	147,295	89,143	247,697	512,250	418,925	925,923	858,331	654,319
64	46	-	-	-	-	-	-	-	-
65	21,738	3,456	9,113	20,813	26,761	10,145	10,952	9,596	9,985
66	315,407	157,442	292,632	387,390	535,647	208,831	619,800	620,165	477,855
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	1,956	929	890	1,092	2,390	816	2,536	2,268	4,569
68	3,849	3,452	4,027	7,692	13,765	4,878	11,163	14,750	11,537
69	73,998	43,066	27,758	102,574	123,274	32,750	20,932	69,948	31,652
Fr 01	-	17	-	-	-	-	-	-	6,350
Fr 11	1	-	-	-	-	-	-	-	132
Fr 15,16,25,2229.23	6,856	2,984	6,039	14,529	24,496	16,004	26,783	24,882	20,749
Fr 20	606	587	573	255	398	700	1,555	1,305	1,404
Fr 34.39 and Sport	14,245	7,546	489	964	3,082	2,183	2,684	4,108	18,058
Fr 591.592,595102.1	145	200	581	356	592	357	834	809	841

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P4)

CODE	35 Transporta tion equipment	41 Constructio n	46 Electricity, gas and heat	47 Water supply	48 Waste managem ent services	511101 Wholesale trade	511201 Retail trade	53 Finance and insurance	55 Real estate
01		125,516	-	-	-	-	19,612	-	393
06	3,980	499,487	7,727,615	-	-	-	-	-	-
11	-	737	-	-	-	9,286	8,463	-	-
15	86,942	168,370	4,446	4,043	9,911	238,804	220,445	65,248	3,067
16	101,553	3,255,877	51,041	14,927	23,016	620,460	397,503	212,023	63,577
191	49,256	36,644	54,581	12,009	15,408	257,918	360,522	606,371	4,029
20	584,277	369,785	26,123	75,159	79,052	445	681	1,093	3,283
21	126,416	860,675	1,650,309	83,552	65,687	89,477	158,591	22,279	61,240
221	1,266,716	817,616	-	195,691	9,841	100,217	495,722	127,237	65,221
222, 231	648,608	69,139	12,657	3,948	37,042	7,148	8,350	3,695	14
25	415,679	4,118,917	1,370	22,328	3,129	10,277	16,517	519	8,421
26	3,504,282	1,637,247	-	1,980	-	-	-	-	-
27	1,249,966	624,980	16,083	1,846	23	1,143	504	-	-
28	622,923	5,520,611	16,325	5,430	716	266,127	88,904	3,851	32,053
29	437,360	365,680	-	26,846	-	240	207	-	-
30	50,296	3,580	145	804	-	257	118	-	-
31	29,925	13,280	-	555	204	169,219	19,351	736	-
32	286,924	15,184	154	73	-	888	1,814	1,353	-
33	1,677,345	469,245	96	667	-	21,789	9,486	146	1,244
34, 3911, 3919	352,600	357,290	131,411	3,028	4,927	64,527	39,600	18,642	7,405
35	20,604,240	-	-	-	-	-	-	-	-
41	70,554	74,068	881,975	297,566	25,955	322,843	321,970	188,101	3,155,658
46	491,558	237,790	2,238,845	181,441	159,895	248,700	1,630,756	129,697	380,924
47	16,374	41,429	19,059	427,785	40,922	39,516	185,811	50,992	39,826
48	13,389	73,509	304,493	6,637	-	60,155	57,776	71,853	1,125
5111011	-	-	-	-	-	988,900	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	208,742	704,341	397,999	17,144	33,287	1,034,193	558,876	2,005,425	5,373,916
55	43,659	243,659	167,181	7,977	9,504	2,300,404	916,974	630,404	1,561,970
5711011	13,166	44,845	9,081	3,523	30,917	304,412	60,611	206,851	3,817
5712011	-	-	-	-	558	-	-	-	-
5721	13,665	39,270	6,236	1,311	11,795	154,958	41,088	150,377	3,381
5722011	9,583	64,942	6,389	13,095	61,531	28,942	27,299	40,245	6,422
5731011	30,281	584,740	71,837	18,089	19,008	1,316,525	651,180	222,121	119,359
5732011	13,968	334,580	18,580	10,175	59,339	799,317	549,050	10,299	3,423
5741011	82	-	54	-	-	-	-	-	-
5742011	59	655	300	46	222	3,451	1,041	3,908	61
5742012	-	9,090	-	-	367	-	-	-	-
5743011	-	-	-	-	-	-	-	-	-
5751011	4,754	576	1,387	683	7,927	117,434	8,141	9,010	455
5751012	2,396	3,024	543	485	1,628	57,744	12,858	5,754	879
5751013	-	-	-	-	-	-	-	252	-
5751014	-	-	3,685	-	-	-	-	-	-
5761011	-	-	-	-	-	-	-	461	-
5771011	256	8	10	3	-	76	640	756	-
1,02,03,04,05,06,09	2,220	20	-	-	-	23,662	1,470	4	-
5791011	3,991	26,964	29,560	7,820	3,706	73,263	66,945	241,684	13,222
59	148,046	512,411	263,645	193,228	39,082	2,073,253	1,821,705	1,939,638	314,181
61	-	-	-	-	-	-	-	-	-
63	1,826,757	93,414	148,148	814	840	187,099	118,483	24,083	120
64	-	70	892	1,195	-	985	1,061	3,837	480
65	12,578	57,280	36,627	44,868	8,057	20,672	31,836	87,409	23,682
66	1,169,135	5,239,389	1,946,452	628,389	207,825	3,121,012	3,567,548	3,437,789	2,096,864
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	4,254	12,927	1,740	1,272	201	54,722	28,750	6,999	43,602
68	15,181	45,986	1,101	3,590	12,730	99,783	104,199	117,971	27,832
69	84,248	825,718	69,048	43,875	4,519	335,020	367,621	132,970	363,135
Fr 01	-	2,429	-	-	-	-	385	-	8
Fr 11	-	29	-	-	-	365	332	-	-
Fr 15,16,25,2229.23	83,993	93,833	2,996	1,635	7,731	47,656	43,710	13,425	881
Fr 20	2,883	1,830	129	371	391	2	3	5	16
Fr 34.39 and Sport	19,666	15,985	4,744	1,041	282	3,652	5,086	3,839	528
Fr 591.592,595102.1	765	3,745	140	72	175	5,024	4,092	3,279	981

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P5)

CODE	571101 Railway transport (passenger)	571201 Railway transport (freight)	5721 Road transport service	572201 Road freight transport	P 573101 Self- transport (passenger)	P 573201 Self- transport (freight)	574101 Internation al shipping	5742011 Coastal and inland water	5742012 Coastal and inland water
01	-	-	-	-	-	-	-	-	-
06	26	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-
15	8,395	188	5,663	18,459	1,266	2,648	2,990	81	10,588
16	4,022	64	2,148	21,754	-	-	2,293	47	6,173
191	7,596	208	2,209	25,944	-	-	87	15	1,942
20	508	15	996	7,615	168	1,018	742	4	490
21	18,927	2,388	275,483	1,018,975	2,377,761	1,392,178	449,586	972	126,572
221	-	-	15	7,590	-	347	150	6	749
222, 231	764	20	331	24,112	3,477	77,145	810	29	3,811
25	29	1	58	696	-	-	328	4	464
26	-	-	-	-	-	-	3	-	11
27	-	-	-	-	-	-	258	2	268
28	1,763	81	1,734	29,864	-	-	89	56	7,250
29	544	17	43	30	-	-	24	-	-
30	75	1	30	214	-	-	-	3	345
31	-	-	-	172	-	-	15	-	48
32	31	1	-	1	-	-	13	-	-
33	1,136	29	1,154	-	979	1,657	11	6	750
34, 3911, 3919	567	18	2,326	7,852	48	135	528	10	1,338
35	249,004	18,358	-	-	750	1,079	4,473	243	31,574
41	140,571	2,528	6,605	27,938	76,050	97,115	816	56	7,236
46	128,641	6,041	10,596	70,307	5,562	6,828	350	22	2,874
47	23,548	474	6,990	16,652	66,743	33,691	448	13	1,715
48	49,103	3,189	3,124	21,850	-	-	1,908	14	1,878
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	189,799	5,523	14,343	150,196	230,220	87,176	32,675	215	27,944
55	8,987	635	21,877	152,269	108,010	7,840	1,807	18	2,407
5711011	357	91	755	9,439	-	-	573	5	660
5712011	1,189	309	-	11,596	-	-	-	-	-
5721	379	28	3,292	8,304	-	-	697	14	1,849
5722011	1,341	60	1,081	16,228	1.82E-12	-	709	2	206
5731011	6,318	140	6,550	10,456	-	-	3,986	32	4,169
5732011	3,289	29	2,035	6,655	-	-	1,104	16	2,048
5741011	3	-	-	331	-	-	1,320,195	-	18
5742011	2	1	40	148	-	-	22	-	14
5742012	-	-	3,225	34,088	34,180	5,784	-	25	3,203
5743011	-	-	-	-	-	-	661,163	88	11,508
5751011	30	2	116	1,645	-	-	339	-	54
5751012	27	4	113	565	-	-	169	1	120
5751013	-	-	-	1,752	-	-	-	-	-
5751014	-	-	-	-	-	-	-	-	-
5761011	-	2,914	-	8,097	-	-	-	-	-
5771011	8	-	-	-	-	-	3	-	-
1,02,03,04,05,06,09	6,167	2	4,470	20,667	49,306	10,762	6,987	41	5,297
5791011	2,706	340	892	5,460	-	-	175	6	794
59	31,354	1,772	33,092	150,096	-	-	10,586	178	23,106
61	-	-	-	-	-	-	-	-	-
63	37,234	1,086	5,189	20,229	404	2,728	3,045	14	1,878
64	228	1	-	6	-	-	-	8	1,103
65	1,617	50	8,143	19,103	-	-	2,584	8	1,008
66	127,782	2,277	174,956	729,060	1,734,395	1,214,746	24,317	144	18,791
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	12,733	45	2,616	3,940	36	51	267	3	388
68	6,278	221	5,177	17,606	3,006	2,078	950	45	5,823
69	80,875	1,914	5,975	99,487	-	-	2,298	20	2,659
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	1,688	38	1,109	7,260	237	502	691	20	2,580
Fr 20	3	-	5	38	1	5	4	-	2
Fr 34.39 and Sport	53	2	89	523	17	347	23	1	78
Fr 591.592,595102.(	324	10	459	1,399	-	-	19	-	46

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P6)

CODE	574301 Harbor transport service	5751011 Internation al air transport	5751012 Domestic air transport	5751013 Domestic air transport	5751014 Aircraft service except air	5761011 Consigned fi	5771011,04,05,06,09 Storage facil	Services rela	Postal serv
01	-	-	-	-	-	-	-	444	-
06	-	-	-	-	-	88	-	-	-
11	-	-	-	-	-	-	-	1,517	-
15	10,446	302	1,025	179	83	1,034	2,288	2,587	3,320
16	3,838	253	859	150	70	4,978	30,623	32,919	1,485
191	2,295	90	304	53	25	3,255	2,181	5,291	12,037
20	25	39	132	23	11	112	2,191	1,505	1,401
21	28,482	24,318	82,456	14,396	6,697	22,902	3,699	2,952	11,711
221	182	126	427	75	35	1,774	9,356	5,011	-
222, 231	3,588	-	2	-	-	580	1,063	125	1,210
25	17	5	19	3	2	12	3	9	-
26	-	-	-	-	-	-	-	2,222	-
27	1	-	-	-	-	-	-	34	-
28	5,860	16	53	9	4	516	7,939	4,785	50
29	11	11	38	7	3	13	259	293	83
30	196	6	22	4	2	240	143	117	55
31	52	3	12	2	1	149	299	121	142
32	-	-	1	-	-	-	2	20	8
33	153	6	20	4	2	20	95	655	-
34, 3911, 3919	849	13	45	8	4	357	187	240	20
35	35,605	12,793	43,376	7,573	3,523	-	-	1,072	-
41	12,258	18	59	10	5	6,711	49,775	24,232	3,844
46	2,590	422	1,430	250	116	2,725	86,704	8,114	9,788
47	274	29	98	17	8	792	3,581	4,653	1,159
48	1,423	68	230	40	19	1,908	1,950	4,043	1,443
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	32,009	1,245	4,221	737	343	12,420	9,463	9,201	1,973
55	274,940	708	2,401	419	195	67,235	135,032	25,723	21,941
5711011	4,296	31	104	18	8	554	1,704	765	743
5712011	-	-	-	-	-	3,441	-	-	1,184
5721	1,524	4	14	2	1	505	746	1,183	1,367
5722011	780	37	125	22	10	302	748	534	87,033
5731011	3,745	132	448	78	36	1,474	2,413	2,798	2,389
5732011	879	32	108	19	9	306	1,310	737	7,639
5741011	-	3	11	2	1	1	-	-	1,175
5742011	72	-	1	-	-	6	30	18	20
5742012	-	-	-	-	-	-	-	-	632
5743011	-	-	-	-	-	-	-	-	-
5751011	60	263	891	156	72	783	120	51	6,677
5751012	155	66	224	39	18	186	123	107	128
5751013	-	-	-	-	-	-	-	-	16,090
5751014	-	36	122	21	10	-	-	17	-
5761011	-	-	-	-	-	1,797	-	-	9,640
5771011	-	27	91	16	7	-	-	-	-
1,02,03,04,05,06,09	618	1,964	6,658	1,162	541	1,490	1,006	417	-
5791011	2,306	84	284	50	23	963	1,558	804	-
59	41,698	1,438	4,874	851	396	10,307	32,025	22,656	28,465
61	-	-	-	-	-	-	-	-	-
63	2,787	120	406	71	33	1,830	6,713	1,230	507
64	-	-	-	-	-	-	36,632	313	47
65	2,498	13	44	8	4	1,019	9,362	1,822	29
66	25,883	19,106	64,782	11,310	5,261	48,367	212,188	110,658	12,005
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	439	47	158	28	13	222	458	305	712
68	3,176	181	613	107	50	3,952	3,194	2,025	5,057
69	18,279	2,300	7,799	1,362	633	4,957	24,951	8,208	564
Fr 01	-	-	-	-	-	-	-	12	-
Fr 11	-	-	-	-	-	-	-	87	-
Fr 15,16,25,2229.23	2,504	57	193	34	16	299	699	616	809
Fr 20	-	-	1	-	-	1	11	7	7
Fr 34.39 and Sport	57	1	5	1	-	36	62	54	54
Fr 591.592,595102.1	121	4	15	3	1	101	218	55	440

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P7)

CODE	59 Information and communication	61 Public administration	63 Education and research	64 Medical, health care and	65 Miscellaneous non-profit	66 Business services	671 Hotels	672 Eating and drinking services	Others 67 Personal services (Excent
01	-	2,834	32,863	217,799	17,673	1,791	102,780	1,436,462	146,586
06	-	527	1,596	-	-	13	-	-	873
11	18	18,386	98,203	543,266	7,114	647	314,914	7,230,706	92,727
15	60,652	179,028	22,221	213,201	140,962	183,154	23,449	17,832	148,435
16	1,081,742	88,742	319,699	521,254	139,130	339,935	19,301	230,562	185,210
191	907,108	368,563	534,731	226,223	215,942	464,172	1,368	13,902	154,161
20	88,076	54,907	257,285	10,136,256	13,906	374,340	10,374	76,668	385,628
21	60,437	476,141	253,158	267,756	35,025	229,084	12,449	209,209	285,094
221	226,457	44,803	175,556	79,772	16,114	215,763	6,026	27,043	92,601
222, 231	53,750	55,266	13,380	68,532	28,886	598,669	3,919	3,404	38,711
25	603	10,894	79,724	68,458	2,658	86,146	8,202	65,956	25,131
26	-	1,250	-	190	25	11,223	66	781	1,045
27	3,392	9,862	2,521	116,981	1,198	39,999	1,954	10,290	8,101
28	21,168	216,025	5,732	26,244	14,124	114,634	2,653	81,504	88,125
29	314	15,584	-	13	-	573,258	-	-	463
30	108	754	-	-	-	905,183	-	-	553
31	9,314	455,866	-	737,183	-	513,346	108	-	41,929
32	54,109	98,216	44,900	281	-	900,550	2	-	603
33	12,791	89,378	22,595	10,223	68	571,559	371	1,503	9,377
34, 3911, 3919	269,030	198,593	279,138	96,047	41,063	533,971	6,691	83,154	234,434
35	-	499,531	2,113	-	-	2,083,659	-	-	2,482
41	322,268	810,258	463,717	312,567	17,787	191,541	9,945	68,663	170,621
46	303,595	390,848	607,358	624,377	19,360	424,431	100,698	609,222	594,471
47	94,635	147,622	322,971	326,850	12,961	57,165	28,546	251,247	184,223
48	114,559	850,445	117,163	161,592	132	15,837	76,893	258,471	195,382
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	218,850	1,626,446	70,243	347,736	317,496	737,510	37,573	113,180	123,079
55	1,213,732	61,246	284,310	1,134,825	101,904	543,965	30,203	278,397	479,724
5711011	49,268	154,446	114,239	57,392	14,521	56,515	1,451	25,920	29,749
5712011	-	-	-	-	-	-	-	-	-
5721	54,255	159,430	51,712	18,873	19,925	50,141	312	7,603	23,713
5722011	73,595	42,096	24,502	19,693	6,118	30,053	794	6,947	95,607
5731011	324,596	293,230	218,659	216,050	34,590	306,478	41,915	30,750	274,412
5732011	86,809	113,653	48,805	67,057	8,338	112,421	4,245	1,603	121,905
5741011	21	-	211	24	16	1,224	-	-	15
5742011	2,318	723	1,927	322	476	1,439	29	880	1,343
5742012	-	-	-	-	-	-	-	-	-
5743011	-	-	-	-	-	-	-	-	-
5751011	35,393	8,267	20,394	5,992	976	17,891	304	-	8,723
5751012	33,941	8,488	26,095	9,186	5,697	27,641	379	2,256	8,400
5751013	3,173	-	-	-	-	5,641	-	-	-
5751014	17,440	1,746	-	-	-	7,040	-	-	-
5761011	1,089	-	-	-	-	3,269	-	-	-
5771011	11,214	194,689	1,384	3	-	191	-	-	-
1,02,03,04,05,06,09	757	305	18	-	-	1,328	6,390	4,687	1,637
5791011	184,140	165,746	90,719	70,305	30,296	52,006	2,369	30,016	30,624
59	7,104,264	1,167,158	951,618	903,785	363,604	4,842,505	47,787	435,410	526,529
61	-	-	-	-	-	-	-	-	-
63	846,210	8,673	92,082	192,019	-	185,566	816	7,876	19,602
64	21,508	896	719	1,867,833	56	863	7	1,695	647
65	64,118	133	53,615	70,967	-	144,492	3,264	35,527	129,855
66	6,688,656	2,979,635	2,004,598	3,041,202	375,707	7,873,162	54,952	644,449	920,612
671	-	-	-	-	-	-	-	-	-
672	-	-	-	462,417	-	-	21,889	113,130	-
Others 67	493,521	20,785	40,974	644,903	12,951	100,626	29,205	83,803	386,752
68	76,959	112,304	132,723	127,638	22,867	100,212	5,056	19,580	59,465
69	316,617	35,197	377,846	222,260	21,035	589,903	3,153	45,290	57,527
Fr 01	-	91	118	8,377	347	35	4,142	63,361	3,268
Fr 11	1	975	3,850	25,731	1,125	25	14,446	334,481	4,172
Fr 15,16,25,2229.23	23,503	41,523	8,124	52,632	31,131	51,982	5,101	5,306	34,283
Fr 20	435	272	1,270	50,122	69	1,852	51	380	1,915
Fr 34.39 and Sport	14,165	8,470	12,804	4,928	2,570	23,752	267	3,028	9,279
Fr 591.592,595102.(	7,903	10,538	11,423	6,906	3,951	26,567	246	1,482	3,052

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P8)

CODE	P		Domestic						
	68 Office supplies	69 Activities not elsewhere	Fr 01 Agriculture, forestry and fishery	Fr 11 Food and beverage	Fr 15,16,25, Fiber, wood, paper	Fr 20 Drug, cosmetic, and film	Fr 34.39 Camera Glasses & Watch:	Fr 591.592,5 Informatio n and communica	Fr 53 Travel insurance and credit
01	-	-	26,083	359,678	35,822	225	4,358	-	-
06	-	709	1	550	5,056	732	360	-	-
11	-	7,465	25,907	682,511	6,249	970	389	-	-
15	24,420	3,808	5,248	2,133	266,334	141	2,109	95	42
16	806,190	14,988	7,496	63,640	33,035	2,436	17,519	19,044	136
191	-	506	124	31,217	3,837	374	4,791	16,621	390
20	29,324	81,563	24,264	43,392	209,282	54,342	27,557	1,204	1
21	-	164,974	20,222	11,665	14,384	11,080	1,152	163	14
221	73,139	49,765	7,157	48,320	42,528	3,011	40,113	150	82
222, 231	13,626	9,561	629	394	32,341	109	3,252	57	2
25	8,962	48,328	749	4,903	8,091	946	3,456	1	-
26	41	63,189	76	-	3,883	6	5,408	-	-
27	1,485	49,609	-	11,775	1,565	795	19,105	86	-
28	842	25,951	911	29,821	20,463	1,368	12,844	61	2
29	-	-	-	-	199	3	1,117	-	-
30	-	-	-	-	62	-	514	-	-
31	43,061	-	14	1	-	-	419	1	-
32	44,467	-	1	3	3	1	99,011	17	1
33	-	7,312	317	1	10	1	8,595	4	-
34, 3911, 3919	257,522	2,779	2,274	3,619	26,116	187	19,120	80	12
35	-	-	9,573	-	-	-	-	-	-
41	-	-	1,673	2,763	8,301	1,004	1,698	447	121
46	-	48,646	2,435	30,212	35,745	3,380	5,445	534	83
47	-	16,277	126	5,302	1,973	368	369	168	33
48	-	18,547	9	3,455	329	228	54	131	46
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	-	24,097	2,623	10,663	20,712	867	4,971	407	1,289
55	-	195,260	307	5,857	5,090	364	1,308	831	405
5711011	-	13,194	119	956	1,764	170	1,196	166	133
5712011	-	-	-	-	-	-	59	-	-
5721	-	3,972	81	1,074	1,630	112	444	122	97
5722011	7.276E-12	209,296	70	1,798	711	37	18,143	342	26
5731011	-	3,830	2,205	14,651	6,121	261	2,993	905	143
5732011	-	54,033	8,231	4,260	4,103	69	2,291	145	7
5741011	-	674	-	-	13	-	4	-	-
5742011	-	168	5	17	79	4	19	4	3
5742012	-	628	-	-	-	-	1,669	-	-
5743011	-	-	-	-	-	-	4,033	-	-
5751011	-	5,563	19	131	676	44	115	301	6
5751012	-	7,688	12	105	382	46	61	297	4
5751013	-	795	-	-	-	-	1	-	-
5751014	-	338	1	-	-	-	-	102	-
5761011	-	11,345	-	-	-	-	60	-	-
5771011	-	-	-	2	6	13	1,333	5	-
1,02,03,04,05,06,09	-	2,539	21	98	88	8	32	22	-
5791011	-	1,599	77	696	872	51	126	938	155
59	-	213,885	1,871	19,279	12,541	1,790	9,001	9,164	1,247
61	-	1,136,566	-	-	-	-	-	-	-
63	-	125,483	463	16,194	26,696	11,067	27,375	1,616	15
64	-	16,035	9	-	-	2	-	21	2
65	-	10,098	1,285	2,890	1,643	258	458	244	56
66	-	261,044	6,494	113,802	49,693	6,036	22,387	10,655	2,210
671	-	-	-	-	-	-	-	-	-
672	-	1,642	-	3,539	-	-	-	-	-
Others 67	-	12,697	205	586	210	15	201	842	5
68	-	891	282	948	1,452	75	500	199	76
69	748	-	5,662	4,152	6,433	202	1,433	354	85
Fr 01	-	-	1,165	14,114	628	5	308	-	-
Fr 11	-	293	1,067	42,275	99	33	6	-	-
Fr 15,16,25,2229.23	9,608	2,719	1,104	732	54,339	61	993	95	9
Fr 20	145	403	120	214	1,034	267	136	6	-
Fr 34.39 and Sport	9,302	326	111	476	1,203	22	831	77	2
Fr 591.592,595102.1	-	184	8	166	143	7	38	12	2

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P9)

CODE	Fr 5711011 Railway (bullet train.	Fr 5721 Bus, taxi hire	Fr 5722011 Home delivery	Fr 5741011 Water transport (ocean)	Fr 5742011 Water transport (coastal)	Fr 5751011 Airplane (internatio nal)	Fr 5751012 Airplane (domestic/ Local)	Fr 2111-01 Gasoline cost	Fr 6612011 Car rental and other transportat
01	-	-	-	-	-	-	-	-	-
06	13	-	-	-	-	-	-	825,169	-
11	-	-	-	-	-	-	-	5	-
15	4,267	775	163	-	1,350	-	2,360	13	33
16	2,044	294	192	-	787	-	1,976	9	292
191	3,861	302	229	-	247	-	699	13	37
20	258	136	67	-	62	-	304	1,517	58
21	9,621	37,679	8,990	-	16,134	-	189,784	70,407	2,092
221	-	2	67	-	95	-	982	172	34
222, 231	388	45	213	-	486	-	4	-	18
25	14	8	6	-	59	-	43	19	-
26	-	-	-	-	1	-	-	-	-
27	-	-	-	-	34	-	-	16	-
28	896	237	263	-	924	-	121	517	781
29	277	6	-	-	-	-	86	-	-
30	38	4	2	-	44	-	50	13	87
31	-	-	2	-	6	-	27	-	-
32	16	-	-	-	-	-	2	1	-
33	577	158	-	-	96	-	47	-	35
34, 3911, 3919	288	318	69	-	171	-	105	86	27
35	126,570	-	-	-	4,025	-	99,837	-	-
41	71,453	903	246	-	922	-	137	476	349
46	65,389	1,449	620	-	366	-	3,290	6,120	1,932
47	11,970	956	147	-	219	-	227	285	198
48	24,959	427	193	-	239	-	530	-	256
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	96,476	1,962	1,325	-	3,562	-	9,716	3,148	10,777
55	4,568	2,992	1,343	-	307	-	5,527	250	4,702
5711011	182	103	83	-	84	-	240	145	125
5712011	605	-	102	-	-	-	-	-	-
5721	193	450	73	-	236	-	31	58	34
5722011	681	148	143	-	26	-	289	42	72
5731011	3,212	896	92	-	531	-	1,030	247	1,023
5732011	1,672	278	59	-	261	-	249	73	747
5741011	2	-	3	-	2	-	24	7	-
5742011	1	5	1	-	2	-	3	3	1
5742012	-	441	301	-	408	-	-	-	-
5743011	-	-	-	-	1,467	-	-	-	-
5751011	15	16	15	-	7	-	2,051	24	16
5751012	14	15	5	-	15	-	515	14	9
5751013	-	-	15	-	-	-	-	-	-
5751014	-	-	-	-	-	-	280	-	-
5761011	-	-	71	-	-	-	-	-	-
5771011	4	-	-	-	-	-	210	101	-
1,02,03,04,05,06,09	3,135	611	182	-	675	-	15,325	-	198
5791011	1,376	122	48	-	101	-	655	26	135
59	15,937	4,526	1,324	-	2,945	-	11,219	750	1,524
61	-	-	-	-	-	-	-	-	-
63	18,926	710	178	-	239	-	935	2,411	172
64	116	-	-	-	141	-	-	-	-
65	822	1,114	169	-	128	-	100	132	1,001
66	64,952	23,930	6,432	-	2,395	-	149,104	3,337	12,588
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	6,472	358	35	-	49	-	363	10	317
68	3,191	708	155	-	742	-	1,410	13	337
69	41,109	817	878	-	339	-	17,951	279	3,151
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	858	152	64	-	329	-	445	3	10
Fr 20	1	1	-	-	-	-	2	7	-
Fr 34.39 and Sport	27	12	5	-	10	-	11	4	1
Fr 591.592,595102.(	164	63	12	-	6	-	33	3	6

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P10)

CODE	Outbound									
	Fr 578 Entry fee, Parking, Toll road	Fr 64 Medical and health care	Fr 6711011 Accommod ation	Fr 6821011 Eating and drinking services	Fr 6312, 659 Personal and other recreational	Fr 01 Agriculture, forestry and fisherv	Fr 11 Food and beverage	Fr 15,16,25,26 Fiber, wood, paper.	Fr 20 Drug, cosmetic, and film	
06	2,030	166	98,665	129,244	6,709	-	6,977	5,096	34	112
11	6,925	414	302,305	650,575	4,683	-	17,228	877	149	
15	11,811	162	22,511	1,604	9,900	-	50	20,430	22	
16	150,316	397	18,528	20,745	13,498	-	1,565	1,537	374	
191	24,159	172	1,313	1,251	13,456	-	763	305	57	
20	6,870	7,725	9,958	6,898	22,947	-	1,081	21,926	8,339	
21	13,480	204	11,950	18,823	21,530	-	294	1,144	1,700	
221	22,881	61	5,785	2,433	5,886	-	1,174	6,822	462	
222, 231	569	52	3,762	306	1,880	-	9	5,881	17	
25	40	52	7,874	5,934	1,784	-	131	166	145	
26	10,145	-	64	70	53	-	-	558	1	
27	155	89	1,875	926	581	-	304	144	122	
28	21,851	20	2,547	7,333	5,779	-	755	3,380	210	
29	1,340	-	-	-	24	-	-	-	-	
30	534	-	-	-	28	-	-	-	-	
31	553	562	104	-	3,953	-	-	-	-	
32	89	-	2	-	35	-	-	-	-	
33	2,992	8	356	135	365	-	-	-	-	
34, 3911, 3919	1,098	73	6,423	7,482	16,118	-	97	2,114	29	
35	4,893	-	-	-	186	-	-	-	-	
41	110,647	238	9,547	6,178	12,734	-	63	748	154	
46	37,052	476	96,666	54,814	39,151	-	742	3,078	519	
47	21,245	249	27,403	22,606	13,823	-	124	180	57	
48	18,462	123	73,815	23,256	10,970	-	85	19	35	
5111011	-	-	-	-	-	-	-	-	-	
5112011	-	-	-	-	-	-	-	-	-	
53	42,011	265	36,068	10,183	11,245	-	264	1,655	133	
55	117,457	865	28,994	25,048	30,693	-	138	494	56	
5711011	3,494	44	1,393	2,332	2,520	-	23	180	26	
5712011	-	-	-	-	-	-	-	-	-	
5721	5,400	14	300	684	1,588	-	27	187	17	
5722011	2,438	15	762	625	5,116	-	45	83	6	
5731011	12,776	165	40,237	2,767	16,573	-	344	544	40	
5732011	3,367	51	4,075	144	7,783	-	103	277	11	
5741011	-	-	-	-	2	-	-	2	-	
5742011	84	-	28	79	72	-	-	7	1	
5742012	-	-	-	-	-	-	-	-	-	
5743011	-	-	-	-	-	-	-	-	-	
5751011	232	5	292	-	588	-	3	64	7	
5751012	487	7	364	203	668	-	3	34	7	
5751013	-	-	-	-	-	-	-	-	-	
5751014	77	-	-	-	-	-	-	-	-	
5761011	-	-	-	-	-	-	-	-	-	
5771011	2	-	-	-	-	-	-	-	2	
1,02,03,04,05,06,09	1,903	-	6,135	422	29	-	2	10	1	
5791011	3,672	54	2,274	2,701	2,415	-	17	71	8	
59	103,450	689	45,873	39,176	32,887	-	465	1,353	275	
61	-	-	-	-	-	-	-	-	-	
63	5,618	146	784	709	1,509	-	395	3,052	1,698	
64	1,430	1,423	6	153	48	-	-	-	-	
65	8,321	54	3,134	3,196	9,020	-	70	138	40	
66	505,283	2,318	52,751	57,984	74,161	-	2,858	5,538	926	
671	-	-	-	-	-	-	-	-	-	
672	-	352	21,012	10,179	-	-	104	-	-	
Others 67	1,391	491	28,036	7,540	15,532	-	14	20	2	
68	9,247	97	4,854	1,762	3,862	-	21	127	11	
69	37,481	169	3,027	4,075	5,192	-	91	867	31	
Fr 01	55	6	3,976	5,701	151	-	140	93	1	
Fr 11	397	20	13,868	30,095	215	-	1,072	13	5	
Fr 15,16,25,2229.23	2,812	40	4,896	477	2,185	-	18	4,690	9	
Fr 20	34	38	49	34	114	-	5	108	41	
Fr 34.39 and Sport	245	4	257	272	645	-	12	121	3	
Fr 591.592,595102.1	253	5	236	133	332	-	4	15	1	

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P11)

CODE	Fr 34.39 Camera Glasses & Watch:	Fr 591.592,5 Informatio n and communica	Fr 53 Travel insurance and credit	Fr 5711011 Railway (bullet train.	Fr 5721 Bus, taxi hire	Fr 5722011 Home delivery	Fr 5741011 Water transport (ocean)	Fr 5742011 Water transport (coastal)	Fr 5751011 Airplane (internatio nal)
01	322	-	-	-	-	-	-	-	-
06	34	-	-	-	-	-	-	-	-
11	37	-	-	-	-	-	-	-	-
15	191	11	69	68	50	9	-	15	1,102
16	1,380	2,398	225	32	19	11	-	9	922
191	390	2,090	644	61	19	13	-	3	326
20	1,737	152	1	4	9	4	-	1	142
21	101	20	24	152	2,420	514	32	183	88,599
221	3,103	19	135	-	-	4	-	1	459
222, 231	298	6	4	6	3	12	-	6	2
25	323	-	1	-	1	-	-	1	20
26	537	-	-	-	-	-	-	-	-
27	1,918	11	-	-	-	-	-	-	-
28	1,260	7	4	14	15	15	-	10	57
29	113	-	-	4	-	-	-	-	40
30	42	-	-	1	-	-	-	-	23
31	43	-	1	-	-	-	-	-	13
32	10,211	2	1	-	-	-	-	-	1
33	885	-	-	9	10	-	-	1	22
34, 3911, 3919	1,874	9	20	5	20	4	-	2	49
35	-	-	-	2,006	-	-	-	46	46,608
41	141	49	200	1,132	58	14	-	10	64
46	444	60	138	1,036	93	35	-	4	1,536
47	31	19	54	190	61	8	-	2	106
48	5	13	76	396	27	11	-	3	247
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	468	47	2,128	1,529	126	76	2	40	4,536
55	114	98	669	72	192	77	-	3	2,580
5711011	113	20	220	3	7	5	-	1	112
5712011	6	-	-	10	-	6	-	-	-
5721	41	14	160	3	29	4	-	3	15
5722011	1,746	42	43	11	9	8	-	-	135
5731011	278	111	236	51	58	5	-	6	481
5732011	219	17	11	26	18	3	-	3	116
5741011	-	-	-	-	-	-	94	-	11
5742011	2	-	4	-	-	-	-	-	1
5742012	160	-	-	-	28	17	-	5	-
5743011	388	-	-	-	-	-	47	17	-
5751011	10	38	10	-	1	1	-	-	958
5751012	5	37	6	-	1	-	-	-	241
5751013	-	-	-	-	-	1	-	-	-
5751014	-	13	-	-	-	-	-	-	131
5761011	6	-	-	-	-	4	-	-	-
5771011	128	-	1	-	-	-	-	-	98
1,02,03,04,05,06,09	3	3	-	50	39	10	-	8	7,154
5791011	11	114	257	22	8	3	-	1	306
59	883	995	2,059	253	291	76	1	33	5,238
61	-	-	-	-	-	-	-	-	-
63	2,696	191	26	300	46	10	-	3	437
64	-	2	4	2	-	-	-	2	-
65	43	30	93	13	72	10	-	1	47
66	2,055	1,261	3,649	1,029	1,537	367	2	27	69,608
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	-
Others 67	19	99	7	103	23	2	-	1	169
68	48	24	125	51	45	9	-	8	658
69	134	39	141	651	52	50	-	4	8,380
Fr 01	28	-	-	-	-	-	-	-	-
Fr 11	1	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	90	12	14	14	10	4	-	4	208
Fr 20	9	1	-	-	-	-	-	-	1
Fr 34.39 and Sport	77	10	4	-	1	-	-	-	5
Fr 591.592,595102.1	4	1	3	3	4	1	-	-	16

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P12)

CODE	Fr 5751012	Fr 2111-01	Fr 6612011	Fr 578	Fr 64	Fr 6711011	Fr 6821011	Fr 6312, 659	Fr 01	Inbound
	Airplane (domestic/ Local)	Gasoline cost	Car rental and other transportat	Entry fee, Parking, Toll road	Medical and health care	Accommod ation	Eating and drinking services	Personal and other recreations	Agriculture, forestry and fisherv	
01	-	-	-	802	-	1,137	1,782	560	-	-
06	-	5,525	-	-	-	-	-	2	-	-
11	-	-	-	2,737	-	3,484	8,972	446	-	-
15	57	-	-	4,668	-	259	22	349	-	-
16	48	-	-	59,413	-	214	286	741	-	-
191	17	-	-	9,549	-	15	17	863	-	-
20	7	10	-	2,715	-	115	95	1,293	-	-
21	4,590	471	-	5,328	-	138	260	1,798	-	-
221	24	1	-	9,044	-	67	34	130	-	-
222, 231	-	-	-	225	-	43	4	116	-	-
25	1	-	-	16	-	91	82	146	-	-
26	-	-	-	4,010	-	1	1	3	-	-
27	-	-	-	61	-	22	13	36	-	-
28	3	3	-	8,637	-	29	101	365	-	-
29	2	-	-	529	-	-	-	2	-	-
30	1	-	-	211	-	-	-	2	-	-
31	1	-	-	219	-	1	-	23	-	-
32	-	-	-	35	-	-	-	2	-	-
33	1	-	-	1,183	-	4	2	13	-	-
34, 3911, 3919	3	1	-	434	-	74	103	966	-	-
35	2,415	-	-	1,934	-	-	-	34	-	-
41	3	3	-	43,733	-	110	85	1,713	-	-
46	80	41	-	14,645	-	1,114	756	3,059	-	-
47	5	2	-	8,397	-	316	312	1,350	-	-
48	13	-	-	7,297	-	851	321	516	-	-
5111011	-	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-	-
53	235	21	-	16,605	-	416	140	383	-	-
55	134	2	-	46,425	-	334	345	1,729	-	-
5711011	6	1	-	1,381	-	16	32	429	-	-
5712011	-	-	-	-	-	-	-	-	-	-
5721	1	-	-	2,134	-	3	9	151	-	-
5722011	7	-	-	964	-	9	9	361	-	-
5731011	25	2	-	5,050	-	464	38	968	-	-
5732011	6	-	-	1,331	-	47	2	382	-	-
5741011	1	-	-	-	-	-	-	-	-	-
5742011	-	-	-	33	-	-	1	6	-	-
5742012	-	-	-	-	-	-	-	-	-	-
5743011	-	-	-	-	-	-	-	-	-	-
5751011	50	-	-	92	-	3	-	59	-	-
5751012	12	-	-	192	-	4	3	90	-	-
5751013	-	-	-	-	-	-	-	-	-	-
5751014	7	-	-	30	-	-	-	-	-	-
5761011	-	-	-	-	-	-	-	-	-	-
5771011	5	1	-	1	-	-	-	-	-	-
1,02,03,04,05,06,09	371	-	-	752	-	71	6	-	-	-
5791011	16	-	-	1,451	-	26	37	331	-	-
59	271	5	-	40,889	-	529	540	2,153	-	-
61	-	-	-	-	-	-	-	-	-	-
63	23	16	-	2,220	-	9	10	76	-	-
64	-	-	-	565	-	-	2	10	-	-
65	2	1	-	3,289	-	36	44	113	-	-
66	3,606	22	-	199,714	-	608	800	7,597	-	-
671	-	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	242	140	-	-	-
Others 67	9	-	-	550	-	323	104	733	-	-
68	34	-	-	3,655	-	56	24	336	-	-
69	434	2	-	14,815	-	35	56	722	-	-
Fr 01	-	-	-	22	-	46	79	10	-	-
Fr 11	-	-	-	157	-	160	415	19	-	-
Fr 15,16,25,2229.23	11	-	-	1,111	-	56	7	86	-	-
Fr 20	-	-	-	13	-	1	-	6	-	-
Fr 34.39 and Sport	-	-	-	97	-	3	4	38	-	-
Fr 591.592,595102.1	1	-	-	100	-	3	2	37	-	-

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P13)

CODE	Fr 11 Food and beverage	Fr 15,16,25, Fiber, wood, paper,	Fr 20 Drug, cosmetic, and film	Fr 34.39 and Camera Glasses & Watch:	Fr 591.592,5 Informatio n and communica	Fr 53 Travel insurance and credit	Fr 5711011 Railway (bullet train.	Fr 5721 Bus, taxi hire	Fr 5722011 Home delivery
01	6,995	3,217	65	433	-	-	-	-	-
06	11	15	211	56	-	-	-	-	-
11	14,902	539	280	62	-	-	-	-	-
15	50	4,205	41	304	-	-	94	32	-
16	1,332	729	703	1,973	-	-	45	12	-
191	626	98	108	572	-	-	85	12	-
20	919	9,965	15,676	1,955	-	-	6	6	-
21	278	424	3,196	157	-	-	213	1,537	-
221	1,115	4,657	869	4,365	-	-	-	-	-
222, 231	8	4,207	32	477	-	-	9	2	-
25	136	91	273	522	-	-	-	-	-
26	-	415	2	903	-	-	-	-	-
27	245	109	229	3,241	-	-	-	-	-
28	739	2,386	394	2,101	-	-	20	10	-
29	-	-	1	193	-	-	6	-	-
30	-	-	-	62	-	-	1	-	-
31	-	-	-	73	-	-	-	-	-
32	-	-	-	17,514	-	-	-	-	-
33	-	-	-	1,518	-	-	13	6	-
34, 3911, 3919	94	601	54	3,124	-	-	6	13	-
35	-	-	-	-	-	-	2,798	-	-
41	56	327	290	210	-	-	1,579	37	-
46	674	1,232	975	653	-	-	1,445	59	-
47	116	75	106	47	-	-	265	39	-
48	65	8	66	7	-	-	552	17	-
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	247	463	250	762	-	-	2,133	80	-
55	123	212	105	176	-	-	101	122	-
5711011	19	84	49	185	-	-	4	4	-
5712011	-	-	-	9	-	-	13	-	-
5721	22	98	32	66	-	-	4	18	-
5722011	35	45	11	2,879	-	-	15	6	-
5731011	287	199	75	449	-	-	71	37	-
5732011	89	71	20	360	-	-	37	11	-
5741011	-	1	-	1	-	-	-	-	-
5742011	-	2	1	3	-	-	-	-	-
5742012	-	-	-	264	-	-	-	18	-
5743011	-	-	-	639	-	-	-	-	-
5751011	3	25	13	15	-	-	-	1	-
5751012	2	12	13	8	-	-	-	1	-
5751013	-	-	-	-	-	-	-	-	-
5751014	-	-	-	-	-	-	-	-	-
5761011	-	-	-	9	-	-	-	-	-
5771011	-	-	4	211	-	-	-	-	-
1,02,03,04,05,06,09	2	6	2	4	-	-	69	25	-
5791011	14	19	15	17	-	-	30	5	-
59	394	670	516	1,473	-	-	352	185	-
61	-	-	-	-	-	-	-	-	-
63	349	1,610	3,192	4,505	-	-	418	29	-
64	-	-	1	-	-	-	3	-	-
65	60	46	74	69	-	-	18	45	-
66	2,442	2,930	1,741	3,290	-	-	1,436	976	-
671	-	-	-	-	-	-	-	-	-
672	111	-	-	-	-	-	-	-	-
Others 67	12	8	4	31	-	-	143	15	-
68	21	46	22	79	-	-	71	29	-
69	89	551	58	218	-	-	909	33	-
Fr 01	141	59	1	44	-	-	-	-	-
Fr 11	869	8	10	1	-	-	-	-	-
Fr 15,16,25,2229.23	17	1,434	18	143	-	-	19	6	-
Fr 20	5	49	77	10	-	-	-	-	-
Fr 34.39 and Sport	11	53	6	124	-	-	1	-	-
Fr 591.592,595102.1	3	7	2	6	-	-	4	3	-

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P14)

CODE	Fr 5741011 Water transport (ocean)	Fr 5742011 Water transport (coastal)	Fr 5751011 Airplane (internatio nal)	Fr 5751012 Airplane (domestic/ Local)	Fr 2111-01 Gasoline cost	Fr 6612011 Car rental and other transportat	Fr 578 Entry fee, Parking, Toll road	Fr 64 Medical and health care	Fr 6711011 Accommod
01	-	-	-	-	-	-	2	-	11,077
06	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	8	-	33,940
15	-	-	946	14	-	1	14	-	2,527
16	-	-	792	12	-	10	174	-	2,080
191	-	-	280	4	-	1	28	-	147
20	-	-	122	2	-	2	8	-	1,118
21	-	-	76,086	1,155	-	70	16	-	1,342
221	-	-	394	6	-	1	27	-	649
222, 231	-	-	1	-	-	1	1	-	422
25	-	-	17	-	-	-	-	-	884
26	-	-	-	-	-	-	12	-	7
27	-	-	-	-	-	-	-	-	211
28	-	-	49	1	-	26	25	-	286
29	-	-	35	1	-	-	2	-	-
30	-	-	20	-	-	3	1	-	-
31	-	-	11	-	-	-	1	-	12
32	-	-	1	-	-	-	-	-	-
33	-	-	19	-	-	1	3	-	40
34, 3911, 3919	-	-	42	1	-	1	1	-	721
35	-	-	40,025	608	-	-	6	-	-
41	-	-	55	1	-	12	128	-	1,072
46	-	-	1,319	20	-	64	43	-	10,853
47	-	-	91	1	-	7	25	-	3,077
48	-	-	212	3	-	9	21	-	8,287
5111011	-	-	-	-	-	-	-	-	-
5112011	-	-	-	-	-	-	-	-	-
53	-	-	3,895	59	-	360	49	-	4,049
55	-	-	2,216	34	-	157	136	-	3,255
5711011	-	-	96	1	-	4	4	-	156
5712011	-	-	-	-	-	-	-	-	-
5721	-	-	13	-	-	1	6	-	34
5722011	-	-	116	2	-	2	3	-	86
5731011	-	-	413	6	-	34	15	-	4,517
5732011	-	-	100	2	-	25	4	-	457
5741011	-	-	10	-	-	-	-	-	-
5742011	-	-	1	-	-	-	-	-	3
5742012	-	-	-	-	-	-	-	-	-
5743011	-	-	-	-	-	-	-	-	-
5751011	-	-	822	12	-	1	-	-	33
5751012	-	-	207	3	-	-	1	-	41
5751013	-	-	-	-	-	-	-	-	-
5751014	-	-	112	2	-	-	-	-	-
5761011	-	-	-	-	-	-	-	-	-
5771011	-	-	84	1	-	-	-	-	-
1,02,03,04,05,06,09	-	-	6,144	93	-	7	2	-	689
5791011	-	-	263	4	-	4	4	-	255
59	-	-	4,498	68	-	51	120	-	5,150
61	-	-	-	-	-	-	-	-	-
63	-	-	375	6	-	6	7	-	88
64	-	-	-	-	-	-	2	-	1
65	-	-	40	1	-	33	10	-	352
66	-	-	59,777	908	-	420	585	-	5,922
671	-	-	-	-	-	-	-	-	-
672	-	-	-	-	-	-	-	-	2,359
Others 67	-	-	146	2	-	11	2	-	3,148
68	-	-	565	9	-	11	11	-	545
69	-	-	7,197	109	-	105	43	-	340
Fr 01	-	-	-	-	-	-	-	-	446
Fr 11	-	-	-	-	-	-	-	-	1,557
Fr 15,16,25,2229.23	-	-	178	3	-	-	3	-	550
Fr 20	-	-	1	-	-	-	-	-	6
Fr 34.39 and Sport	-	-	4	-	-	-	-	-	29
Fr 591.592,595102.1	-	-	13	-	-	-	-	-	26

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P15)

CODE	490,525,030			Final demand sectors		RoW_Export Exports total	Trade margin Trade margins (wholesale+	
	Fr 6821011	Fr 6312, 659	7111001-911:9211000-9511	Consumption	Investment			810000
	Eating and drinking services	Personal and other recreational	Labor Capital	HH, Gov: Consumption	Saving- Investment			71, 72, 73 74, 75, 76, 77
01	9,082	133		6,253,669	424,609	75,089	-4,820,267	
06	-	1		-	1,735	39,327	-410,234	
11	45,717	95		40,961,282	236,943	364,425	-19,059,141	
15	113	117		7,789,745	320,653	605,819	-5,634,764	
16	1,458	174		1,209,279	486,196	498,968	-5,013,917	
191	88	159		131,519	12,754	45,704	-369,410	
20	485	276		6,180,328	275,069	5,928,205	-9,450,433	
21	1,323	272		8,698,543	151,435	1,677,113	-4,831,559	
221	171	72		701,451	114,135	1,716,679	-3,004,041	
222, 231	22	29		2,011,865	16,767	910,005	-1,385,688	
25	417	26		323,805	43,394	1,078,836	-1,929,224	
26	5	1		-	240,555	3,955,604	-2,854,997	
27	65	5		358,978	481,422	2,598,420	-1,885,562	
28	515	66		575,026	368,866	829,924	-2,116,735	
29	-			23,680	4,424,597	3,457,483	-1,354,017	
30	-	1		24,190	8,189,945	6,963,956	-2,503,662	
31	-	41		559,567	4,846,671	1,615,652	-1,863,298	
32	-	1		197,156	351,704	6,101,380	-1,109,590	
33	10	6		5,054,829	5,862,614	5,283,350	-4,092,701	
34, 3911, 3919	526	219		10,544,915	7,717,388	3,172,784	-7,573,092	
35	-	4		7,724,819	6,515,581	15,283,543	-4,348,882	
41	434	211		-	42,741,258	-	-	
46	3,852	581		6,322,850	-	26,304	-	
47	1,589	187		1,886,956	-	9,004	-	
48	1,634	164		986,687	-	3,083	-	
5111011	-	-		98,638	-	793,468	54,617,200	
5112011	-	-		656,150	217,655	5,474	37,267,228	
53	716	160		15,531,911	-	838,222	-	
55	1,760	362		59,265,802	-	21,813	-	
5711011	164	46		2,622,144	-	9,135	-	
5712011	-	-		304	-	-	-	
5721	48	27		1,965,837	-	3,281	-	
5722011	44	97		1,424,591	-	3,105	-	
5731011	194	248		-	-	-	-	
5732011	10	98		-	-	-	-	
5741011	-	-		1,900	-	2,962,379	-	
5742011	6	1		99,158	-	285	-	
5742012	-	-		4,475	-	-	-	
5743011	-	-		-	-	331,916	-	
5751011	-	10		763,924	-	27,225	-	
5751012	14	11		248,807	-	1,178	-	
5751013	-	-		11,230	-	-	-	
5751014	-	-		2,272	-	-	-	
5761011	-	-		34,181	-	-	-	
5771011	-	-		4,514	-	-	-	
1,02,03,04,05,06,09	30	1		126,392	-	736,792	-	
5791011	190	41		197,000	-	17,650	-	
59	2,753	409		14,140,016	8,365,182	294,879	-2,383,645	
61	-	-		38,268,628	-	-	-	
63	50	22		23,555,959	-	83,570	-	
64	11	1		58,267,379	-	234	-	
65	225	95		4,004,494	-	21,561	-	
66	4,075	1,260		4,085,282	2,188,790	1,221,366	-	
671	-	-		2,664,579	-	53,206	-	
672	715	-		22,650,507	-	34,941	-	
Others 67	530	268		19,626,799	1,225	58,582	-1,223	
68	124	51		-	-	-	-	
69	286	79		19,828	-	3,883	-136,458	
Fr 01	401	3		173,896	2,705	-	-176,934	
Fr 11	2,115	4		3,428,100	13,426	-	-1,448,491	
Fr 15,16,25,2229.23	34	27		1,774,567	62,381	-	-1,262,374	
Fr 20	2	1		30,994	1,350	-	-43,306	
Fr 34.39 and Sport	19	9		341,460	239,315	14,465	-255,048	
Fr 591.592,595102.1	9	4		53,530	16	-	-38,744	

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P16)

CODE	Transportation charges					970000
	901100	901200	901301	901400	901500	
	Transportation charges	Transportation charges	Transportation charges	Transportation charges	Transportation charges	Domestic production (gross outputs)
01	-11,162	-501,225	-55,671	-8,157	-181,644	14,238,847
06	-2,294	-534,016	-471,230	-	-445,986	24,123,416
11	-17,644	-1,476,137	-46,822	-5,848	-281,295	39,259,667
15	-535	-223,855	-4,555	-2,030	-34,519	6,178,566
16	-14,734	-822,201	-58,088	-488	-144,546	13,015,203
191	-283	-146,372	-	-	-38,178	5,144,908
20	-14,082	-850,092	-88,170	-1,736	-147,211	33,177,408
21	-15,661	-280,755	-176,187	-31	-76,945	22,421,632
221	-1,730	-312,155	-7,721	-260	-67,538	10,656,124
222, 231	-417	-119,767	-10,496	-573	-16,242	4,082,823
25	-1,793	-353,262	-53,744	-96	-41,457	6,937,649
26	-791	-610,427	-194,136	-	-108,355	31,898,280
27	-942	-298,151	-20,645	-190	-102,339	12,649,932
28	-1,668	-496,428	-16,690	-102	-48,529	10,906,204
29	-204	-126,136	-5,349	-448	-18,979	10,412,988
30	-306	-169,292	-7,047	-149	-25,336	15,617,674
31	-66	-115,475	-3,635	-532	-14,445	7,879,335
32	-102	-123,470	-6,299	-3,467	-25,277	16,480,434
33	-714	-159,828	-7,284	-784	-26,230	18,016,215
34, 3911, 3919	-966	-430,401	-12,478	-2,177	-44,730	18,193,845
35	-2,821	-586,947	-136,830	-2,158	-85,527	48,376,726
41	-	-	-	-	-	52,514,485
46	-	-	-	-	-	21,188,293
47	-	-	-	-	-	4,829,924
48	-	-	-	-	-	3,765,338
5111011	-	-	-	-	-	56,498,206
5112011	-	-	-	-	-	38,146,507
53	-	-	-	-	-	32,945,955
55	-	-	-	-	-	71,189,199
5711011	-	-	-	-	-	4,104,880
5712011	100,442	-	-	-	-	121,192
5721	-	-	-	-	-	2,989,485
5722011	-	9,163,424	-	-	-	11,994,968
5731011	-	-	-	-	-	5,663,199
5732011	-	-	-	-	-	3,269,468
5741011	-	-	-	-	-	4,289,454
5742011	-	-	-	-	-	124,029
5742012	-	-	568,525	-	-	705,911
5743011	-	-	857,810	-	-	1,961,848
5751011	-	-	-	-	-	1,114,879
5751012	-	-	-	-	-	501,021
5751013	-	-	-	33,572	-	72,801
5751014	-	-	-	-	-	33,866
5761011	-	-	-	-	607,197	681,964
5771011	-	-	-	-	1,506,977	1,766,981
1,02,03,04,05,06,09	-	-	-	-	-	1,085,390
5791011	-	-	-	-	-	1,425,071
59	-1,224	-165,029	-340	-825	-32,113	46,753,885
61	-	-	-	-	-	39,405,194
63	-	-	-	-	-	34,807,454
64	-	-	-	-	-	60,232,811
65	-	-	-	-	-	5,197,465
66	-	-	-	-	-	67,451,745
671	-	-	-	-	-	2,717,785
672	-	-	-	-	-	23,403,525
Others 67	-	-211	-	-	-10	21,790,799
68	-	-	-	-	-	1,325,036
69	-7,732	-32,673	-26,502	-2,075	-68,495	5,049,812
Fr 01	-220	-13,481	-1,050	-532	-5,257	359,924
Fr 11	-1,039	-106,625	-2,363	-332	-15,126	2,656,698
Fr 15,16,25,2229.23	-176	-56,598	-2,293	-428	-8,228	1,538,335
Fr 20	-61	-3,544	-362	-8	-604	139,138
Fr 34.39 and Sport	-39	-16,013	-442	-63	-1,855	570,142
Fr 591.592,595102.1	-32	-3,644	-	-12	-652	115,678

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P17)

CODE		Intermediate Demand	
		'01	'06
Fr 53	Travel insurance and credit card admission fee	44	17
Fr 5711011	Railway (bullet train, railway, ski lift)	649	1,114
Fr 5721	Bus, taxi hire	129	724
Fr 5722011	Home delivery	1,866	25
Fr 5741011	Water transport (ocean)	-	-
Fr 5742011	Water transport (coastal)	33	105
Fr 5751011	Airplane (international)	-	-
Fr 5751012	Airplane (domestic/Local)	699	950
Fr 2111-01	Gasoline cost	16,129	1,512
Fr 6612011	Car rental and other transportation expense	-	-
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	1,580	203
Fr 64	Medical and health care services	3	-
Fr 6711011	Accommodation	-	-
Fr 6821011	Eating and drinking services	-	-
Fr 6312, 659, 6611,	Personal and other recreational services	482	110
Fr 01	Agriculture, forestry and fishery	-	-
Fr 11	Food and beverage	1,489	-
Fr 15,16,25,2229.23	Fiber, wood, paper, ceramic, glass products; Shoes and	1,515	203
Fr 20	Drug, cosmetic, and film	705	9
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and spor	103	9
Fr 591.592,595102.	Information and communication	35	5
Fr 53	Travel insurance and credit card admission fee	72	28
Fr 5711011	Railway (bullet train, railway, ski lift)	10	18
Fr 5721	Bus, taxi hire	8	47
Fr 5722011	Home delivery	107	1
Fr 5741011	Water transport (ocean)	-	-
Fr 5742011	Water transport (coastal)	-	1
Fr 5751011	Airplane (international)	153	321
Fr 5751012	Airplane (domestic/Local)	17	23
Fr 2111-01	Gasoline cost	108	10
Fr 6612011	Car rental and other transportation expense	-	-
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	625	80
Fr 64	Medical and health care services	-	-
Fr 6711011	Accommodation	-	-
Fr 6821011	Eating and drinking services	-	-
Fr 6312, 659, 6611,	Personal and other recreational services	25	10
Fr 01	Agriculture, forestry and fishery	-	-
Fr 11	Food and beverage	-	-
Fr 15,16,25,2229.23	Fiber, wood, paper, ceramic, glass products; Shoes and	-	-
Fr 20	Drug, cosmetic, and film	-	-
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and spor	-	-
Fr 591.592,595102.	Information and communication	-	-
Fr 53	Travel insurance and credit card admission fee	-	-
Fr 5711011	Railway (bullet train, railway, ski lift)	-	-
Fr 5721	Bus, taxi hire	-	-
Fr 5722011	Home delivery	-	-
Fr 5741011	Water transport (ocean)	-	-
Fr 5742011	Water transport (coastal)	-	-
Fr 5751011	Airplane (international)	-	-
Fr 5751012	Airplane (domestic/Local)	-	-
Fr 2111-01	Gasoline cost	-	-
Fr 6612011	Car rental and other transportation expense	-	-
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	-	-
Fr 64	Medical and health care services	-	-
Fr 6711011	Accommodation	-	-
Fr 6821011	Eating and drinking services	-	-
Fr 6312, 659, 6611,	Personal and other recreational services	-	-
7111001-9113000	Labor	1,372,544	180,063
9211000-9511000	Capital	4,276,742	160,053
71, 72, 73	HH, GoV		
74, 75, 76, 77	Saving-Investment		
	RoW_Import	2,562,809	23,363,436
	Trade margin		
901100	Transportation charges (railway)		
901200	Transportation charges (road)		
901301	Transportation charges (coastal and inland water+harbor)		
901400	Transportation charges (air)		
901500	Transportation charges (forwarding+Stor)		
9700000	Domestic production (gross inputs)	14,238,847	24,123,416

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P18)

CODE	11	15	16	191	20	21	221	222, 231	25
Fr 53	103	25	63	27	110	33	16	8	41
Fr 5711011	4,726	1,307	3,501	5,306	16,904	1,460	8,522	1,276	5,343
Fr 5721	1,155	291	704	235	2,942	141	1,164	385	793
Fr 5722011	5,395	206	2,275	670	2,790	654	847	209	1,348
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	77	105	129	63	624	58	149	60	100
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	1,762	1,337	2,316	1,627	17,443	617	2,406	732	1,213
Fr 2111-01	11,392	1,417	4,849	637	137,629	72,868	1,036	947	11,832
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	11,124	907	11,184	4,869	17,193	373	12,228	1,543	11,242
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	7,110	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	1,344	79	448	345	1,196	105	276	151	396
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	5,813	1	22	-	175	-	-	-	4
Fr 15,16,25,2229.23	815	7,997	1,269	177	1,069	29	386	4,324	628
Fr 20	303	252	392	169	8,087	30	2,017	454	207
Fr 34.39 and Sport	347	171	354	114	230	151	909	68	260
Fr 591.592,595102.1	169	28	59	50	168	10	29	25	27
Fr 53	170	42	105	45	181	54	27	13	67
Fr 5711011	75	21	55	84	268	23	135	20	85
Fr 5721	74	19	45	15	189	9	75	25	51
Fr 5722011	308	12	130	38	159	37	48	12	77
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	1	1	1	1	7	1	2	1	1
Fr 5751011	685	474	884	1,226	3,612	178	1,061	521	725
Fr 5751012	43	32	56	39	422	15	58	18	29
Fr 2111-01	76	9	32	4	922	488	7	6	79
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	4,397	358	4,421	1,925	6,796	148	4,833	610	4,444
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	98	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	168	3	52	15	235	6	13	25	76
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.1	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-
7111001-9113000	4,650,254	745,139	2,176,560	1,578,366	2,747,272	253,285	2,210,044	646,828	1,477,991
9211000-9511000	7,205,678	14,466	1,278,233	891,618	4,042,105	3,883,492	727,155	326,351	1,320,956
71, 72, 73									
74, 75, 76, 77									
	6,497,425	3,938,076	1,991,606	54,810	5,744,118	3,775,657	717,685	1,362,382	556,921
901100									
901200									
901301									
901400									
901500									
9700000	39,259,667	6,178,566	13,015,203	5,144,908	33,177,408	22,421,632	10,656,124	4,082,823	6,937,649

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P19)

CODE	26	27	28	29	30	31	32	33	34, 3911, 39	
Fr 53		68	43	66	37	59	39	49	46	71
Fr 5711011	4,400	2,365	6,148	4,913	9,108	5,442	15,286	10,203	13,576	
Fr 5721	602	336	1,545	1,647	2,288	992	3,780	1,921	1,281	
Fr 5722011	2,598	955	1,100	765	964	518	981	1,171	4,788	
Fr 5741011	-	-	-	-	-	-	-	-	-	-
Fr 5742011	44	28	157	62	229	68	481	279	314	
Fr 5751011	-	-	-	-	-	-	-	-	-	-
Fr 5751012	2,430	904	2,458	2,359	4,592	1,955	2,509	6,421	2,364	
Fr 2111-01	6,651	2,372	2,601	1,179	1,405	575	2,074	1,460	1,425	
Fr 6612011	-	-	-	-	-	-	-	-	-	-
Fr 578	31,531	6,663	3,518	5,315	4,058	1,714	5,940	25,887	6,372	
Fr 64	-	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	518	209	573	826	1,509	338	1,941	2,107	1,321	
Fr 01	-	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	770	187	738	2,452	4,302	2,689	2,146	3,490	2,820	
Fr 20	93	90	88	39	61	107	239	200	215	
Fr 34.39 and Sport	1,337	691	23	52	189	116	144	197	1,566	
Fr 591.592,595102.0	18	25	73	45	74	45	105	101	106	
Fr 53	113	70	109	62	97	65	81	77	117	
Fr 5711011	70	37	97	78	144	86	242	162	215	
Fr 5721	39	22	99	106	147	64	243	123	82	
Fr 5722011	148	55	63	44	55	30	56	67	274	
Fr 5741011	-	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	2	1	3	1	5	3	4	
Fr 5751011	577	200	1,654	1,612	2,551	805	1,026	2,209	872	
Fr 5751012	59	22	59	57	111	47	61	155	57	
Fr 2111-01	45	16	17	8	9	4	14	10	10	
Fr 6612011	-	-	-	-	-	-	-	-	-	-
Fr 578	12,463	2,634	1,390	2,101	1,604	677	2,348	10,232	2,519	
Fr 64	-	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	44	23	135	164	255	63	507	495	248	
Fr 01	-	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.0	-	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-	-
7111001-9113000	1,731,362	986,748	3,177,808	2,280,981	3,783,547	1,405,592	3,049,521	3,213,313	2,497,021	
9211000-9511000	3,982,773	1,125,982	634,879	1,310,502	2,054,803	655,118	713,454	1,357,979	1,052,116	
71, 72, 73										
74, 75, 76, 77										
	1,411,064	3,588,041	774,944	988,187	1,258,552	1,445,575	3,072,053	2,973,562	6,387,881	
901100										
901200										
901301										
901400										
901500										
9700000	31,898,280	12,649,932	10,906,204	10,412,988	15,617,674	7,879,335	16,480,434	18,016,215	18,193,845	

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P20)

CODE	35	41	46	47	48	511101	511201	53	55
Fr 53	134	452	255	11	21	664	359	1,287	3,448
Fr 5711011	6,642	22,623	4,581	1,777	15,597	153,568	30,577	104,351	1,926
Fr 5721	1,825	5,244	833	175	1,575	20,692	5,487	20,080	451
Fr 5722011	4,014	9,233	2,757	222	637	929	952	732	161
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	43	476	218	33	161	2,509	757	2,841	44
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	4,601	5,807	1,042	931	3,126	110,875	24,689	11,049	1,689
Fr 2111-01	7,690	21,346	78,966	5,348	4,116	5,735	10,176	1,428	3,923
Fr 6612011	-	198	-	-	-	-	-	-	112
Fr 578	23,906	210	-	-	-	254,828	15,836	44	-
Fr 64	-	-	1	1	-	1	1	3	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	2,075	8,688	1,795	363	192	6,507	4,610	2,484	2,575
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	1	-	-	-	11	10	-	-
Fr 15,16,25,2229.23	14,234	4,493	467	181	1,323	3,464	3,254	1,003	42
Fr 20	442	281	20	57	60	-	1	1	3
Fr 34.39 and Sport	1,416	1,299	434	44	20	262	264	176	34
Fr 591.592,595102.1	96	463	17	8	21	603	497	399	120
Fr 53	221	746	422	18	35	1,095	592	2,124	5,691
Fr 5711011	105	359	73	28	247	2,434	485	1,654	31
Fr 5721	117	337	53	11	101	1,329	352	1,290	29
Fr 5722011	229	527	158	13	36	53	54	42	9
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	5	2	-	2	28	9	32	1
Fr 5751011	1,959	237	571	281	3,265	48,377	3,353	3,712	187
Fr 5751012	111	140	25	23	76	2,682	597	267	41
Fr 2111-01	51	143	529	36	28	38	68	10	26
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	9,449	83	-	-	-	100,721	6,259	18	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	319	510	393	20	20	451	413	268	158
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.1	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-
7111001-9113000	6,782,161	19,378,968	2,160,584	642,564	1,911,324	20,459,189	18,669,867	10,769,900	4,219,964
9211000-9511000	2,304,161	4,333,200	2,607,850	1,548,235	825,792	18,650,298	6,333,298	10,311,483	53,160,172
71, 72, 73									
74, 75, 76, 77	2,805,224	-	1,015	262,529	214	988,900	-	906,647	1,666
901100									
901200									
901301									
901400									
901500									
9700000	48,376,726	52,514,485	21,188,293	4,829,924	3,765,338	56,498,206	38,146,507	32,945,955	71,189,199

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P21)

CODE	571101	571201	5721	572201	P 573101	P 573201	574101	5742011	5742012	
Fr 53	122	4	9	96	148	56	21		18	
Fr 5711011	180	46	381	4,762	-	-	289	3	333	
Fr 5721	51	4	440	1,109	-	-	93	2	247	
Fr 5722011	29	1	89	296	129	132	34		20	
Fr 5741011	-	-	-	-	-	-	-	-	-	
Fr 5742011	1	1	29	108	-	-	16		10	
Fr 5751011	-	-	-	-	-	-	-	-	-	
Fr 5751012	51	7	217	1,086	-	-	324	2	230	
Fr 2111-01	1,202	152	17,637	65,220	152,374	89,153	28,767	62	8,100	
Fr 6612011	-	-	205	4,554	75,725	71,628	-	-	-	
Fr 578	66,419	27	48,141	222,581	531,008	115,905	75,245	438	57,051	
Fr 64	-	-	-	-	-	-	-	-	1	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	-	-	-	-	-	-	
Fr 6312, 659, 6611,	1,689	47	264	665	20	123	75		30	
Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	-	-	
Fr 15,16,25,2229.23	138	3	87	1,022	18	38	66	2	265	
Fr 20	-	-	1	6	-	1	1		-	
Fr 34.39 and Sport	3	-	8	35	1	13	2		6	
Fr 591.592,595102.(	40	1	58	175	-	-	2		5
Fr 53	201	6	15	159	244	92	35		30	
Fr 5711011	3	1	6	75	-	-	5		5	
Fr 5721	3	-	28	71	-	-	6		16	
Fr 5722011	2	-	5	17	7	8	2		1	
Fr 5741011	-	-	-	-	-	-	211		-	
Fr 5742011	-	-	-	1	-	-	-		-	
Fr 5751011	12	1	48	678	-	-	139		22	
Fr 5751012	1	-	5	26	-	-	8		6	
Fr 2111-01	8	1	118	437	1,020	597	193		54	
Fr 6612011	-	-	-	-	-	-	-	-	-	
Fr 578	26,252	11	19,028	87,976	209,882	45,812	29,741	173	22,549	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	-	-	-	-	-	-	
Fr 6312, 659, 6611,	453	18	36	66	8	50	3		1	
Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	-	-	
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-	
Fr 20	-	-	-	-	-	-	-	-	-	
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-	
Fr 591.592,595102.(-	-	-	-	-	-	-	-	-	
Fr 53	-	-	-	-	-	-	-	-	-	
Fr 5711011	-	-	-	-	-	-	-	-	-	
Fr 5721	-	-	-	-	-	-	-	-	-	
Fr 5722011	-	-	-	-	-	-	-	-	-	
Fr 5741011	-	-	-	-	-	-	-	-	-	
Fr 5742011	-	-	-	-	-	-	-	-	-	
Fr 5751011	-	-	-	-	-	-	-	-	-	
Fr 5751012	-	-	-	-	-	-	-	-	-	
Fr 2111-01	-	-	-	-	-	-	-	-	-	
Fr 6612011	-	-	-	-	-	-	-	-	-	
Fr 578	-	-	-	-	-	-	-	-	-	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	-	-	-	-	-	-	
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-	
7111001-9113000	967,125	42,603	1,984,111	6,501,988	-	-	58,795	988	128,591	
9211000-9511000	1,844,875	27,144	229,346	2,301,413	-	-	233,576	1,264	164,490	
71, 72, 73 74, 75, 76, 77										
	39,999	-	74,067	13,674	-	-	1,320,500	118,606	-	
901100										
901200										
901301										
901400										
901500										
	9700000	4,104,880	121,192	2,989,485	11,994,968	5,663,199	3,269,468	4,289,454	124,029	705,911

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P22)

CODE	574301	5751011	5751012	5751013	5751014	5761011	5771011,04,05,06,09	5791011		
Fr 53	21	1	3			8	6	6	1	
Fr 5711011	2,167	16	53	9	4	280	860	386	375	
Fr 5721	204	1	2			67	100	158	183	
Fr 5722011	19	4	14	2	1	11	30	29	841	
Fr 5741011	-	-	-	-	-	-	-	-	-	
Fr 5742011	52		1			5	22	13	15	
Fr 5751011	-	-	-	-	-	-	-	-	-	
Fr 5751012	298	127	430	75	35	357	237	205	247	
Fr 2111-01	1,823	1,555	5,274	921	428	1,466	237	189	751	
Fr 6612011	-	-	-	-	-	603	-	171	-	
Fr 578	6,652	21,148	71,705	12,519	5,824	16,043	10,832	4,489	-	
Fr 64	-	-	-	-	-	-	28	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	-	-	-	-	-	-	
Fr 6312, 659, 6611,	93	73	249	43	20	59	145	65	61	
Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	2	-	
Fr 15,16,25,2229.23	256	4	14	2	1	33	65	39	84	
Fr 20	-	-	-	-	-	-	2	1	1	
Fr 34.39 and Sport	4					2	3	2	2	
Fr 591.592,595102.1	14	1	2			13	27	7	55	
Fr 53	34	1	4	1		13	10	10	2	
Fr 5711011	34		1			4	14	6	6	
Fr 5721	13					4	6	10	12	
Fr 5722011	1		1			1	2	2	48	
Fr 5741011	-					-	-	-	-	
Fr 5742011	1					-	-	-	-	
Fr 5751011	25	108	367	64	30	323	49	21	2,751	
Fr 5751012	7	3	10	2	1	9	6	5	6	
Fr 2111-01	12	10	35	6	3	10	2	1	5	
Fr 6612011	-	-	-	-	-	-	-	-	-	
Fr 578	2,629	8,359	28,342	4,948	2,302	6,341	4,281	1,774	-	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	-	-	-	-	-	-	
Fr 6312, 659, 6611,	11	3	10	2	1	10	13	8	12	
Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	-	-	
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-	
Fr 20	-	-	-	-	-	-	-	-	-	
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-	
Fr 591.592,595102.1	-	-	-	-	-	-	-	-	-	
Fr 53	-	-	-	-	-	-	-	-	-	
Fr 5711011	-	-	-	-	-	-	-	-	-	
Fr 5721	-	-	-	-	-	-	-	-	-	
Fr 5722011	-	-	-	-	-	-	-	-	-	
Fr 5741011	-	-	-	-	-	-	-	-	-	
Fr 5742011	-	-	-	-	-	-	-	-	-	
Fr 5751011	-	-	-	-	-	-	-	-	-	
Fr 5751012	-	-	-	-	-	-	-	-	-	
Fr 2111-01	-	-	-	-	-	-	-	-	-	
Fr 6612011	-	-	-	-	-	-	-	-	-	
Fr 578	-	-	-	-	-	-	-	-	-	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	-	-	-	-	-	-	
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-	
7111001-9113000	546,571	13,685	46,402	8,101	3,769	247,628	426,909	243,771	1,059,101	
9211000-9511000	336,353	11,463	38,869	6,786	3,157	197,955	639,995	269,168	85,398	
71, 72, 73										
74, 75, 76, 77										
	537,579	991,900	84,034	-	-	-	-	271,487	20,032	
901100										
901200										
901301										
901400										
901500										
	9700000	1,961,848	1,114,879	501,021	72,801	33,866	681,964	1,766,981	1,085,390	1,425,071

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P23)

CODE	59	61	63	64	65	66	671	672	Others	67
Fr 53	140	1,044	45	223	204	473	24	73	79	
Fr 5711011	24,854	77,914	57,630	28,953	7,325	28,510	732	13,076	15,008	
Fr 5721	7,245	21,289	6,905	2,520	2,661	6,695	42	1,015	3,166	
Fr 5722011	1,813	1,069	956	3,348	281	1,860	155	2,792	1,362	
Fr 5741011	-	-	-	-	-	-	-	-	-	
Fr 5742011	1,685	526	1,401	234	346	1,046	21	640	977	
Fr 5751011	-	-	-	-	-	-	-	-	-	
Fr 5751012	65,171	16,299	50,106	17,639	10,938	53,075	728	4,332	16,129	
Fr 2111-01	3,859	30,484	16,216	17,121	2,125	14,642	797	11,853	18,205	
Fr 6612011	1,266	-	-	11	-	2,837	1,067	-	1,128	
Fr 578	8,151	3,287	190	-	-	14,302	68,823	50,481	17,630	
Fr 64	16	1	1	1,423	-	-	1	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	40,970	-	-	1,939	10,023	-	
Fr 6312, 659, 6611,	26,493	3,842	3,294	36,833	904	12,395	1,532	4,888	16,966	
Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	22	113	548	29	1	322	7,652	96	
Fr 15,16,25,2229.23	2,548	4,059	731	5,079	2,835	5,774	443	351	3,223	
Fr 20	67	42	195	7,691	11	284	8	58	294	
Fr 34.39 and Sport	1,055	707	1,028	373	176	1,940	23	278	811	
Fr 591.592,595102.(	878	1,319	1,433	864	495	3,279	31	177	380	
Fr 53	232	1,723	74	368	336	781	40	120	130	
Fr 5711011	394	1,235	913	459	116	452	12	207	238	
Fr 5721	465	1,367	444	162	171	430	3	65	203	
Fr 5722011	104	61	55	191	16	106	9	159	78	
Fr 5741011	-	-	-	-	-	-	-	-	-	
Fr 5742011	19	6	16	3	4	12	-	7	11	
Fr 5751011	14,580	3,405	8,401	2,468	402	7,370	125	-	3,594	
Fr 5751012	1,576	394	1,212	427	265	1,284	18	105	390	
Fr 2111-01	26	204	109	115	14	98	5	79	122	
Fr 6612011	-	-	-	-	-	-	-	-	-	
Fr 578	3,222	1,299	75	-	-	5,653	27,203	19,953	6,968	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	565	-	-	27	138	-	
Fr 6312, 659, 6611,	4,824	199	104	2,465	37	1,689	90	414	1,009	
Fr 01	-	-	-	-	-	-	-	-	-	
Fr 11	-	-	-	-	-	-	-	-	-	
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-	
Fr 20	-	-	-	-	-	-	-	-	-	
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-	
Fr 591.592,595102.(-	-	-	-	-	-	-	-	-	
Fr 53	-	-	-	-	-	-	-	-	-	
Fr 5711011	-	-	-	-	-	-	-	-	-	
Fr 5721	-	-	-	-	-	-	-	-	-	
Fr 5722011	-	-	-	-	-	-	-	-	-	
Fr 5741011	-	-	-	-	-	-	-	-	-	
Fr 5742011	-	-	-	-	-	-	-	-	-	
Fr 5751011	-	-	-	-	-	-	-	-	-	
Fr 5751012	-	-	-	-	-	-	-	-	-	
Fr 2111-01	-	-	-	-	-	-	-	-	-	
Fr 6612011	-	-	-	-	-	-	-	-	-	
Fr 578	-	-	-	-	-	-	-	-	-	
Fr 64	-	-	-	-	-	-	-	-	-	
Fr 6711011	-	-	-	-	-	-	-	-	-	
Fr 6821011	-	-	-	-	-	-	-	-	-	
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-	
7111001-9113000	11,477,493	14,898,441	22,201,126	29,036,049	2,748,040	23,888,161	656,367	7,177,387	6,458,661	
9211000-9511000	12,730,301	12,033,471	4,016,388	6,637,844	263,668	16,553,258	396,281	2,731,896	8,597,241	
71, 72, 73 74, 75, 76, 77										
	722,834	-	136,686	3,620	56,173	1,518,977	513,861	391,685	183,843	
901100										
901200										
901301										
901400										
901500										
9700000	46,753,885	39,405,194	34,807,454	60,232,811	5,197,465	67,451,745	2,717,785	23,403,525	21,790,799	

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P24)

CODE	P		Fr 01	Fr 11	Fr 15,16,25,2229.23	Fr 20	Fr 34.39 and Sport	Fr 591.592,595102.1	Fr 53
	68	69							
Fr 53	-	15	2	7	13	1	3		1
Fr 5711011	-	6,656	60	482	890	86	603	84	67
Fr 5721	-	530	11	143	218	15	59	16	13
Fr 5722011	480	2,107	34	452	149	14	213	16	
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	122	3	12	58	3	14	3	2
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	14,761	22	201	734	88	116	570	7
Fr 2111-01	-	10,551	1,294	745	903	698	72	10	1
Fr 6612011	-	2,935	-	-	-	-	-	1	-
Fr 578	-	27,340	230	1,057	949	87	343	236	
Fr 64	-	12	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	145	-	314	-	-	-	-	-
Fr 6312, 659, 6611,	-	739	21	127	72	6	57	48	2
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	9	20	1,071	-	1	-	-	-
Fr 15,16,25,2229.23	767	358	91	42	4,627	5	133	3	1
Fr 20	22	62	18	33	159	41	21	1	
Fr 34.39 and Sport	855	17	9	24	97	1	69	3	
Fr 591.592,595102.1	-	18	1	21	18	1	5	1	
Fr 53	-	26	3	11	22	1	5		1
Fr 5711011	-	105	1	8	14	1	10	1	1
Fr 5721	-	34	1	9	14	1	4	1	1
Fr 5722011	27	120	2	26	9	1	12	1	
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	1	-	-	1	-	-	-	-
Fr 5751011	-	2,291	8	54	279	18	47	124	2
Fr 5751012	-	357	1	5	18	2	3	14	
Fr 2111-01	-	71	9	5	6	5	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	10,806	91	418	375	34	136	93	
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	2	-	4	-	-	-	-	-
Fr 6312, 659, 6611,	-	74	1	24	9	1	10	5	
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.1	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-
7111001-9113000	-	195,085	55,357	436,470	484,161	13,934	121,752	28,460	6,925
9211000-9511000	-	1,803,662	133,728	619,902	65,304	20,501	51,373	18,913	6,630
71, 72, 73									
74, 75, 76, 77									
	-	39,537	-	-	25,267	-	13,802	340	-
901100									
901200									
901301									
901400									
901500									
9700000	1,325,036	5,049,812	359,924	2,656,698	1,538,335	139,138	570,142	115,678	20,601

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P25)

CODE	Fr 5711011	Fr 5721	Fr 5722011	Fr 5741011	Fr 5742011	Fr 5751011	Fr 5751012	Fr 2111-01	Fr 6612011
Fr 53	62	1	1	-	2	-	6	2	7
Fr 5711011	92	52	42	-	42	-	121	73	63
Fr 5721	26	60	10	-	31	-	4	8	5
Fr 5722011	15	12	3	-	3	-	31	29	1
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	1	4	1	-	1	-	2	2	1
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	26	30	10	-	29	-	989	26	18
Fr 2111-01	611	2,412	575	-	1,033	-	12,139	4,505	134
Fr 6612011	-	28	40	-	-	-	-	-	-
Fr 578	33,761	6,585	1,964	-	7,272	-	165,040	2	2,133
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	859	36	6	-	4	-	572	2	30
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	70	12	9	-	34	-	32	-	1
Fr 20	-	-	-	-	-	-	-	1	-
Fr 34.39 and Sport	2	1	-	-	1	-	1	-	-
Fr 591.592,595102.1	20	8	2	-	1	-	4	-	1
Fr 53	102	2	1	-	4	-	10	3	11
Fr 5711011	1	1	1	-	1	-	2	1	1
Fr 5721	2	4	1	-	2	-	-	-	-
Fr 5722011	1	1	-	-	-	-	2	2	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	6	7	6	-	3	-	845	10	7
Fr 5751012	1	1	-	-	1	-	24	1	-
Fr 2111-01	4	16	4	-	7	-	81	30	1
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	13,344	2,603	776	-	2,874	-	65,233	1	843
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	230	5	1	-	-	-	23	-	3
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.1	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-
7111001-9113000	491,594	271,377	57,362	-	16,391	-	106,802	13,196	26,470
9211000-9511000	937,757	31,369	20,304	-	20,967	-	89,463	269,353	108,525
71, 72, 73	-	-	-	-	-	-	-	-	-
74, 75, 76, 77	-	-	-	-	-	-	-	-	-
901100	-	-	-	-	-	-	-	-	-
901200	-	-	-	-	-	-	-	-	-
901301	-	-	-	-	-	-	-	-	-
901400	-	-	-	-	-	-	-	-	-
901500	-	-	-	-	-	-	-	-	-
9700000	2,066,195	398,757	105,702	-	89,980	-	959,757	1,203,175	181,433

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P26)

CODE	Fr 578	Fr 64	Fr 6711011	Fr 6821011	Fr 6312, 659 Fr 01	Fr 11	Fr 15,16,25,23 Fr 20		
Fr 53	27		23	7	7	-	1		
Fr 5711011	1,762	22	703	1,176	1,271	-	12	91	13
Fr 5721	721	2	40	91	212	-	4	25	2
Fr 5722011	133	3	149	251	80	-	11	14	2
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	61		20	58	53	-		5	
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	934	13	699	390	1,282	-	5	66	14
Fr 2111-01	863	13	766	1,066	1,376	-	19	73	107
Fr 6612011	781		1,024	-	58	-	-	-	-
Fr 578	20,496	-	66,068	4,542	315	-	25	109	13
Fr 64	1	1				-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	31	1,862	902	-	-	9	-	-
Fr 6312, 659, 6611, Fr 01	296	28	1,471	440	848	-	3	9	1
Fr 11	10		309	688	5	-	28		
Fr 15,16,25,2229.23	178	4	425	32	193	-	1	464	1
Fr 20	5	6	8	5	17	-	1	17	6
Fr 34.39 and Sport	11		22	25	56	-	1	9	
Fr 591.592,595102.1	31	1	29	16	41	-		2	
Fr 53	44		38	11	12	-		2	
Fr 5711011	28		11	19	20	-		1	
Fr 5721	46		3	6	14	-		2	
Fr 5722011	8		9	14	5	-	1	1	
Fr 5741011	-		-	-	-	-	-	-	-
Fr 5742011	1			1	1	-			
Fr 5751011	96	2	120	-	242	-	1	26	3
Fr 5751012	23		17	9	31	-		2	
Fr 2111-01	6		5	7	9	-			1
Fr 6612011	-		-	-	-	-	-	-	-
Fr 578	8,101	-	26,113	1,795	125	-	10	43	5
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-		26	12	-	-	-	-	-
Fr 6312, 659, 6611, Fr 01	34	2	87	37	57	-	1	1	
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.1	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-
7111001-9113000	1,113,104	22,128	630,088	645,778	431,043	-	10,571	49,705	2,138
9211000-9511000	1,229,071	5,059	380,415	245,799	553,730	-	16,087	8,978	3,146
71, 72, 73									
74, 75, 76, 77									
	37,860	-	-	-	-	-	-	2,313	-
901100									
901200									
901301									
901400									
901500									
9700000	3,754,289	45,900	2,115,682	2,070,466	1,422,355	-	64,484	156,128	21,350

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P27)

CODE	Fr 34.39 and Fr 591.592,5 Fr 53	Fr 5711011	Fr 5721	Fr 5722011	Fr 5741011	Fr 5742011	Fr 5751011		
Fr 53		1	1				3		
Fr 5711011	57	10	111	1	3	2	56		
Fr 5721	5	2	21		4	1	2		
Fr 5722011	20	2	1		1		15		
Fr 5741011	-	-	-	-	-	-	-		
Fr 5742011	1		3				1		
Fr 5751011	-	-	-	-	-	-	-		
Fr 5751012	10	72	12		2	1	462		
Fr 2111-01	6	1	2	10	155	33	2	12	5,667
Fr 6612011	-	-	-	-	2	2	-	-	-
Fr 578	29	30		535	423	112	5	82	77,048
Fr 64									
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	6	6	3	14	2				267
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	12		1	1	1	1			15
Fr 20	1								
Fr 34.39 and Sport	7								
Fr 591.592,595102.1					1				2
Fr 53			2	2					5
Fr 5711011	1		2						1
Fr 5721			1						
Fr 5722011	1								1
Fr 5741011			-		-				
Fr 5742011									
Fr 5751011	4	16	4						395
Fr 5751012		2							11
Fr 2111-01					1				38
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	11	12		211	167	44	2	33	30,453
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	1	1		4					11
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.1	-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-
7111001-9113000	10,912	3,503	11,430	7,790	17,430	3,277	4	186	49,860
9211000-9511000	4,600	2,127	10,944	14,861	2,015	1,160	17	238	41,765
71, 72, 73									
74, 75, 76, 77									
	744	43	-	-	-	-	-	-	-
901100									
901200									
901301									
901400									
901500									
9700000	51,639	13,911	34,004	32,743	25,612	6,038	212	1,020	448,055

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P28)

CODE									Inbound
	Fr 5751012	Fr 2111-01	Fr 6612011	Fr 578	Fr 64	Fr 6711011	Fr 6821011	Fr 6312, 659	Fr 01
Fr 53				11					
Fr 5711011	3			697		8	16	217	
Fr 5721				285			1	20	
Fr 5722011	1			53		2	3	6	
Fr 5741011									
Fr 5742011				24			1	4	
Fr 5751011									
Fr 5751012	24			369		8	5	172	
Fr 2111-01	294	30		341		9	15	115	
Fr 6612011				309		12		4	
Fr 578	3,992			8,101		761	63		
Fr 64									
Fr 6711011									
Fr 6821011						21	12		
Fr 6312, 659, 6611,	14			117		17	6	47	
Fr 01									
Fr 11				4		4	9		
Fr 15,16,25,2229.23	1			70		5		8	
Fr 20				2				1	
Fr 34.39 and Sport				4				3	
Fr 591.592,595102.(				12				5	
Fr 53				18					
Fr 5711011				11				3	
Fr 5721				18				1	
Fr 5722011				3					
Fr 5741011									
Fr 5742011									
Fr 5751011	20			38		1		24	
Fr 5751012	1			9				4	
Fr 2111-01	2			2				1	
Fr 6612011									
Fr 578	1,578			3,202		301	25		
Fr 64									
Fr 6711011									
Fr 6821011									
Fr 6312, 659, 6611,	1			14		1	1	4	
Fr 01									
Fr 11									
Fr 15,16,25,2229.23									
Fr 20									
Fr 34.39 and Sport									
Fr 591.592,595102.(
Fr 53									
Fr 5711011									
Fr 5721									
Fr 5722011									
Fr 5741011									
Fr 5742011									
Fr 5751011									
Fr 5751012									
Fr 2111-01									
Fr 6612011									
Fr 578									
Fr 64									
Fr 6711011									
Fr 6821011									
Fr 6312, 659, 6611,									
7111001-9113000	2,583	88		439,957		7,261	8,906	37,806	
9211000-9511000	2,164	1,804		485,794		4,384	3,390	29,236	
71, 72, 73									
74, 75, 76, 77				14,964					
901100									
901200									
901301									
901400									
901500									
9700000	23,213	8,056		1,483,893		24,382	28,554	99,039	

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P29)

CODE	Fr 11	Fr 15,16,25,26,Fr 20	Fr 34.39 and Fr 591.592,5 Fr 53	Fr 5711011	Fr 5721	Fr 5722011
Fr 53						
Fr 5711011	10	42	25	93	-	2
Fr 5721	3	13	4	9	-	2
Fr 5722011	10	6	4	33	-	-
Fr 5741011	-	-	-	-	-	-
Fr 5742011	-	2	1	2	-	-
Fr 5751011	-	-	-	-	-	-
Fr 5751012	4	23	26	16	-	1
Fr 2111-01	18	27	201	10	-	98
Fr 6612011	-	-	-	-	-	1
Fr 578	21	65	25	44	-	269
Fr 64	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-
Fr 6821011	10	-	-	-	-	-
Fr 6312, 659, 6611,	3	5	2	9	-	1
Fr 01	-	-	-	-	-	-
Fr 11	22	-	-	-	-	-
Fr 15,16,25,2229.23	1	191	2	19	-	2
Fr 20	1	8	12	1	-	-
Fr 34.39 and Sport	1	3	-	11	-	-
Fr 591.592,595102.(	-	1	-	1	-	-
Fr 53	-	-	-	1	-	2
Fr 5711011	-	1	-	1	-	-
Fr 5721	-	1	-	1	-	-
Fr 5722011	1	-	-	2	-	-
Fr 5741011	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-
Fr 5751011	1	10	5	6	-	-
Fr 5751012	-	1	1	-	-	-
Fr 2111-01	-	-	1	-	-	1
Fr 6612011	-	-	-	-	-	-
Fr 578	8	26	10	17	-	295
Fr 64	-	-	-	-	-	106
Fr 6711011	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	1	-	2	-	5
Fr 01	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-
Fr 591.592,595102.(-	-	-	-	-	-
Fr 53	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-
7111001-9113000	9,176	22,743	4,019	17,193	-	10,867
9211000-9511000	14,466	6,506	5,914	7,244	-	11,071
71, 72, 73						20,729
74, 75, 76, 77						1,280
901100						
901200						
901301						
901400						
901500						
9700000	57,486	71,687	40,136	81,291	-	45,673
						16,267

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P30)

CODE	Fr 5741011	Fr 5742011	Fr 5751011	Fr 5751012	Fr 2111-01	Fr 6612011	Fr 578	Fr 64	Fr 6711011
Fr 53	-	-	2	-	-	-	-	-	3
Fr 5711011	-	-	49	1	-	2	2	-	79
Fr 5721	-	-	2	-	-	-	1	-	4
Fr 5722011	-	-	12	-	-	-	-	-	17
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	1	-	-	-	-	-	2
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	397	6	-	1	1	-	78
Fr 2111-01	-	-	4,866	74	-	4	1	-	86
Fr 6612011	-	-	-	-	-	-	1	-	115
Fr 578	-	-	66,166	1,005	-	71	24	-	7,417
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	209
Fr 6312, 659, 6611,	-	-	229	3	-	1	-	-	165
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	35
Fr 15,16,25,2229.23	-	-	13	-	-	-	-	-	48
Fr 20	-	-	-	-	-	-	-	-	1
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	3
Fr 591.592,595102.(	-	-	2	-	-	-	-	-	3
Fr 53	-	-	4	-	-	-	-	-	4
Fr 5711011	-	-	1	-	-	-	-	-	1
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	1	-	-	-	-	-	1
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	339	5	-	-	-	-	13
Fr 5751012	-	-	10	-	-	-	-	-	2
Fr 2111-01	-	-	33	-	-	-	-	-	1
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	26,152	397	-	28	9	-	2,932
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	3
Fr 6312, 659, 6611,	-	-	9	-	-	-	-	-	10
Fr 01	-	-	-	-	-	-	-	-	-
Fr 11	-	-	-	-	-	-	-	-	-
Fr 15,16,25,2229.23	-	-	-	-	-	-	-	-	-
Fr 20	-	-	-	-	-	-	-	-	-
Fr 34.39 and Sport	-	-	-	-	-	-	-	-	-
Fr 591.592,595102.(-	-	-	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	-	-	-	-
Fr 5721	-	-	-	-	-	-	-	-	-
Fr 5722011	-	-	-	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	-	-	-	-
Fr 2111-01	-	-	-	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	-	-	-	-
Fr 578	-	-	-	-	-	-	-	-	-
Fr 64	-	-	-	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	-	-	-	-
Fr 6821011	-	-	-	-	-	-	-	-	-
Fr 6312, 659, 6611,	-	-	-	-	-	-	-	-	-
7111001-9113000	-	-	42,818	650	-	883	1,289	-	70,740
9211000-9511000	-	-	35,867	545	-	3,622	1,424	-	42,709
71, 72, 73	-	-	-	-	-	-	-	-	-
74, 75, 76, 77	-	-	-	-	-	-	-	-	-
901100	-	-	-	-	-	-	-	-	-
901200	-	-	-	-	-	-	-	-	-
901301	-	-	-	-	-	-	-	-	-
901400	-	-	-	-	-	-	-	-	-
901500	-	-	-	-	-	-	-	-	-
9700000	-	-	384,775	5,843	-	6,055	4,304	-	237,527

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P31)

CODE	Fr 6821011	Fr 6312, 659	7111001-9113	9211000-9511	Final demand sectors		RoW_Export	Trade margin
					Consumption	Investment		
Fr 53					71, 72, 73	74, 75, 76, 77	810000	
Fr 5711011	83	23			9,965			
Fr 5721	6	4			1,322,802			
Fr 5722011	18	1			262,504			
Fr 5741011	-	-			30,654	5,560		
Fr 5742011	4	1			-			
Fr 5751011	-	-			72,102			
Fr 5751012	27	21			-			
Fr 2111-01	75	17			477,738			
Fr 6612011	-	1			557,730	9,788		-298,359
Fr 578	319	6			16,613			
Fr 64	-	-			1,361,201			
Fr 6711011	-	-			44,402			
Fr 6821011	63	-			2,115,682			
Fr 6312, 659, 6611,	31	14			2,006,844			
Fr 01	-	-			1,261,155	109		
Fr 11	48	-			-			
Fr 15,16,25,2229.23	2	3			83,339	323		-34,658
Fr 20	-	-			170,977	4,557		-114,888
Fr 34.39 and Sport	2	1			4,756	207		-6,645
Fr 591.592,595102.1	1	-			33,719	24,173	523	-23,888
Fr 53	1	-			6,407	2		-4,884
Fr 5711011	1	-			16,449			
Fr 5721	-	-			20,962			
Fr 5722011	1	-			16,860			
Fr 5741011	-	-			1,751	318		
Fr 5742011	-	-			-			
Fr 5751011	-	4			818			
Fr 5751012	1	1			314,696			
Fr 2111-01	1	-			11,555			
Fr 6612011	-	-			3,734	66		-1,998
Fr 578	126	3			-			
Fr 64	-	-			538,019			
Fr 6711011	-	-			-			
Fr 6821011	1	-			24,382			
Fr 6312, 659, 6611,	3	1			27,676			
Fr 01	-	-			81,715			
Fr 11	-	-			-		68,889	-9,237
Fr 15,16,25,2229.23	-	-			-		87,636	-13,608
Fr 20	-	-			-		48,089	-6,569
Fr 34.39 and Sport	-	-			-		94,754	-12,257
Fr 591.592,595102.1	-	-			-		-	
Fr 53	-	-			-		-	
Fr 5711011	-	-			-		45,673	
Fr 5721	-	-			-		16,267	
Fr 5722011	-	-			-		-	
Fr 5741011	-	-			-		-	
Fr 5742011	-	-			-		-	
Fr 5751011	-	-			-		384,775	
Fr 5751012	-	-			-		5,843	
Fr 2111-01	-	-			-		-	
Fr 6612011	-	-			-		6,055	
Fr 578	-	-			-		4,304	
Fr 64	-	-			-		-	
Fr 6711011	-	-			-		237,527	
Fr 6821011	-	-			-		145,495	
Fr 6312, 659, 6611,	-	-			-		19,482	
7111001-9113000	45,380	5,979						
9211000-9511000	17,273	7,229						
71, 72, 73			262,054,319	214,849,884				
74, 75, 76, 77					81,340,611		13,620,827	
901100								
901200								
901301								
901400								
901500								
9700000	145,495	19,482	262,054,319	214,849,884	476,904,203	94,961,438	84,565,407	

SAM for Transportation – Tourism analysis, Purchaser price, Japan 2011 (P32)

CODE	Transportation charges					970000
	901100	901200	901301	901400	901500	
Fr 53	-	-	-	-	-	20,601
Fr 5711011	-	-	-	-	-	2,066,195
Fr 5721	-	-	-	-	-	398,757
Fr 5722011	-	-	-	-	-	105,702
Fr 5741011	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	89,980
Fr 5751011	-	-	-	-	-	-
Fr 5751012	-	-	-	-	-	959,757
Fr 2111-01	-892	-13,183	-9,103	-2	-4,287	1,203,175
Fr 6612011	-	-	-	-	-	181,433
Fr 578	-	-	-	-	-	3,754,289
Fr 64	-	-	-	-	-	45,900
Fr 6711011	-	-	-	-	-	2,115,682
Fr 6821011	-	-	-	-	-	2,070,466
Fr 6312, 659, 6611,	-	-	-	-	-	1,422,355
Fr 01	-	-	-	-	-	-
Fr 11	-28	-2,688	-61	-4	-314	64,484
Fr 15,16,25,2229.23	-12	-5,044	-224	-38	-727	156,128
Fr 20	-9	-544	-56	-1	-93	21,350
Fr 34.39 and Sport	-3	-1,387	-38	-6	-148	51,639
Fr 591.592,595102.	-4	-459	-	-2	-82	13,911
Fr 53	-	-	-	-	-	34,004
Fr 5711011	-	-	-	-	-	32,743
Fr 5721	-	-	-	-	-	25,612
Fr 5722011	-	-	-	-	-	6,038
Fr 5741011	-	-	-	-	-	212
Fr 5742011	-	-	-	-	-	1,020
Fr 5751011	-	-	-	-	-	448,055
Fr 5751012	-	-	-	-	-	23,213
Fr 2111-01	-6	-88	-61	-	-29	8,056
Fr 6612011	-	-	-	-	-	-
Fr 578	-	-	-	-	-	1,483,893
Fr 64	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	24,382
Fr 6821011	-	-	-	-	-	28,554
Fr 6312, 659, 6611,	-	-	-	-	-	99,039
Fr 01	-	-	-	-	-	-
Fr 11	-22	-1,871	-36	-3	-233	57,486
Fr 15,16,25,2229.23	-9	-1,883	-168	-3	-276	71,687
Fr 20	-15	-1,056	-117	-1	-195	40,136
Fr 34.39 and Sport	-4	-1,009	-42	-10	-141	81,291
Fr 591.592,595102.	-	-	-	-	-	-
Fr 53	-	-	-	-	-	-
Fr 5711011	-	-	-	-	-	45,673
Fr 5721	-	-	-	-	-	16,267
Fr 5722011	-	-	-	-	-	-
Fr 5741011	-	-	-	-	-	-
Fr 5742011	-	-	-	-	-	-
Fr 5751011	-	-	-	-	-	384,775
Fr 5751012	-	-	-	-	-	5,843
Fr 2111-01	-	-	-	-	-	-
Fr 6612011	-	-	-	-	-	6,055
Fr 578	-	-	-	-	-	4,304
Fr 64	-	-	-	-	-	-
Fr 6711011	-	-	-	-	-	237,527
Fr 6821011	-	-	-	-	-	145,495
Fr 6312, 659, 6611,	-	-	-	-	-	19,482
7111001-9113000	-	-	-	-	-	262,054,319
9211000-9511000	-	-	-	-	-	214,849,884
71, 72, 73	-	-	-	-	-	476,904,203
74, 75, 76, 77	-	-	-	-	-	94,961,438
	-	-	-	-	-	84,565,407
901100	-	-	-	-	-	-
901200	-	-	-	-	-	-
901301	-	-	-	-	-	-
901400	-	-	-	-	-	-
901500	-	-	-	-	-	-
9700000	-	-	-	-	-	2,157,575,514

Appendix 7. List of industries classified in Input-Output table and SAM for Transportation – Tourism analysis, Japan 2011

Category	Industry's code	Name of industry
Non-tourism industries	01	Agriculture, forestry and fishery
	06	Mining
	11	Beverages and Foods
	15	Textile product
	16	Pulp, paper and wooden products
	191	Printing, plate making and book binding
	20	Chemical products
	21	Petroleum and coal products
	221	Plastic products
	222, 231	Rubber products; Leather, fur skins and miscellaneous leather products
	25	Ceramic, stone and clay products
	26	Iron and steel
	27	Non-ferrous metals
	28	Metal products
	29	General-purpose machinery
	30	Production machinery
	31	Business oriented machinery
	32	Electronic components
	33	Electrical machinery
	34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products
	35	Transportation equipment
	41	Construction
	46	Electricity, gas and heat supply
	47	Water supply
	48	Waste management services
	5111011	Wholesale trade
	5112011	Retail trade
	53	Finance and insurance
	55	Real estate
	5711011	Railway transport (passengers)
	5712011	Railway transport (freight)
	5721	Road transport service (bus, taxi)
	5722011	Road freight transport (except self-transport)
	5731011	Self-transport (passengers)
	5732011	Self-transport (freight)
	5741011	International shipping
5742011	Coastal and inland water transport (passengers)	
5742012	Coastal and inland water transport (freight)	
5743011	Harbor transport service	

Category	Industry's code	Name of industry
	5751011	International air transport
	5751012	Domestic air transport (passengers)
	5751013	Domestic air transport (freight)
	5751014	Aircraft service except air transport
	5761011	Consigned freight forwarding
	5771011	Storage facility service
	578=5781-01;578901,02,03,04,05,06,09	Services relating to transport
	5791011	Postal services and mail delivery
	59	Information and communications
	61	Public administration
	63	Education and research
	64	Medical, health care and welfare
	65	Miscellaneous non-profit services
	66	Business services
	671	Hotels
	672	Eating and drinking services
	Others 67	Personal services (Except Eating, Drinking)
	68	Office supplies
	69	Activities not elsewhere classified
Domestic tourism	Fr 01	Agriculture, forestry and fishery
	Fr 11	Food and beverage
	Fr 15,16,25,2229.2311.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags
	Fr 20	Drug, cosmetic, and film
	Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment
	Fr 591.592,595102.03	Information and communication
	Fr 53	Travel insurance and credit card admission fee
	Fr 5711011	Railway (bullet train, railway, ski lift)
	Fr 5721	Bus, taxi hire
	Fr 5722011	Home delivery
	Fr 5741011	Water transport (ocean)
	Fr 5742011	Water transport (coastal)
	Fr 5751011	Airplane (international)
	Fr 5751012	Airplane (domestic/Local)
	Fr 2111-01	Gasoline cost
	Fr 6612011	Car rental and other transportation expense
	Fr 578	Entry fee, Parking, Toll road fee, expressway toll
	Fr 64	Medical and health care services
	Fr 6711011	Accommodation
	Fr 6821011	Eating and drinking services
	Fr 6312, 659, 6611, 67	Personal and other recreational services

Category	Industry's code	Name of industry
Outbound tourism	Fr 01	Agriculture, forestry and fishery
	Fr 11	Food and beverage
	Fr 15,16,25,2229.2311.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags
	Fr 20	Drug, cosmetic, and film
	Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment
	Fr 591.592,595102.03	Information and communication
	Fr 53	Travel insurance and credit card admission fee
	Fr 5711011	Railway (bullet train, railway, ski lift)
	Fr 5721	Bus, taxi hire
	Fr 5722011	Home delivery
	Fr 5741011	Water transport (ocean)
	Fr 5742011	Water transport (coastal)
	Fr 5751011	Airplane (international)
	Fr 5751012	Airplane (domestic/Local)
	Fr 2111-01	Gasoline cost
	Fr 6612011	Car rental and other transportation expense
	Fr 578	Entry fee, Parking, Toll road fee, expressway toll
	Fr 64	Medical and health care services
	Fr 6711011	Accommodation
	Fr 6821011	Eating and drinking services
Fr 6312, 659, 6611, 67	Personal and other recreational services	
Inbound tourism	Fr 01	Agriculture, forestry and fishery
	Fr 11	Food and beverage
	Fr 15,16,25,2229.2311.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags
	Fr 20	Drug, cosmetic, and film
	Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment
	Fr 591.592,595102.03	Information and communication
	Fr 53	Travel insurance and credit card admission fee
	Fr 5711011	Railway (bullet train, railway, ski lift)
	Fr 5721	Bus, taxi hire
	Fr 5722011	Home delivery
	Fr 5741011	Water transport (ocean)
	Fr 5742011	Water transport (coastal)
	Fr 5751011	Airplane (international)
	Fr 5751012	Airplane (domestic/Local)
	Fr 2111-01	Gasoline cost
	Fr 6612011	Car rental and other transportation expense
	Fr 578	Entry fee, Parking, Toll road fee, expressway toll
	Fr 64	Medical and health care services
	Fr 6711011	Accommodation

Category	Industry's code	Name of industry
	Fr 6821011	Eating and drinking services
	Fr 6312, 659, 6611, 67	Personal and other recreational services
Gross Value-Added sectors	7111001-9113000	Labor
	9211000-9511000	Capital
	71, 72, 73	HH, GoV
	74, 75, 76, 77	Saving-Investment
Rest of the World		RoW_Import/export
		Trade margin
	901100	Transportation charges (railway)
	901200	Transportation charges (road)
	901301	Transportation charges (coastal and inland water way + harbor)
	901400	Transportation charges (air)
	901500	Transportation charges (forwarding + Storage)
	9700000	Domestic production (gross inputs)

Appendix 8. Industrial ranking in economy by HEM total linkage indicator

Rank	Industry	Total loss of gross output %	Total loss of gross output normalized	Gross output lost per 1JPY HE	Gross output lost per 1JPY HE normalized	Aggregate indicator
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(4)*(6)
1	Construction	7.095%	3.346	1.269	1.272	4.255
2	Transportation equipment	6.532%	3.081	1.347	1.349	4.156
3	Medical, health care and welfare	5.629%	2.655	0.878	0.880	2.336
4	Beverages and Foods	4.039%	1.905	1.154	1.156	2.201
5	Electricity, gas and heat supply	3.138%	1.480	1.392	1.394	2.063
6	Chemical products	3.525%	1.662	1.206	1.208	2.008
7	Business services	5.400%	2.546	0.770	0.771	1.963
8	Transport services	3.903%	1.840	0.941	0.942	1.734
9	Petroleum and coal products	2.674%	1.261	1.348	1.350	1.702
10	Eating and drinking services	2.971%	1.401	1.200	1.202	1.685
11	Information and communications	4.028%	1.900	0.822	0.824	1.565
12	Electrical machinery	2.195%	1.035	1.371	1.374	1.422
13	Tourism	2.100%	1.035	0.998	1.354	1.402
14	Iron and steel	3.089%	1.457	0.952	0.954	1.389
15	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	1.843%	0.869	1.466	1.469	1.276
16	Production machinery	1.985%	0.936	1.299	1.301	1.218
17	Commerce	4.622%	2.180	0.464	0.465	1.013
18	Metal products	1.496%	0.705	1.387	1.389	0.980
19	Public administration	2.737%	1.291	0.653	0.654	0.844
20	Finance and insurance	2.442%	1.152	0.716	0.717	0.826
21	Electronic components	1.541%	0.727	1.080	1.082	0.786
22	General-purpose machinery	1.282%	0.604	1.278	1.280	0.774

Rank	Industry	Total loss of gross output %	Total loss of gross output normalized	Gross output lost per 1JPY HE	Gross output lost per 1JPY HE normalized	Aggregate indicator
23	Business oriented machinery	1.054%	0.497	1.540	1.543	0.767
24	Plastic and rubber products; Leather, fur skins and miscellaneous leather products	1.414%	0.667	1.039	1.041	0.694
25	Pulp, paper and wooden products	1.198%	0.565	1.021	1.023	0.578
26	Real estate	2.803%	1.322	0.370	0.371	0.490
27	Agriculture, forestry and fishery	1.084%	0.511	0.872	0.874	0.446
28	Personal services (Except Eating, Drinking)	1.431%	0.675	0.619	0.620	0.418
29	Office supplies	0.353%	0.167	2.504	2.508	0.418
30	Printing, plate making and book binding	0.659%	0.311	1.216	1.218	0.378
31	Activities not elsewhere classified	0.611%	0.288	1.147	1.149	0.331
32	Water supply	0.503%	0.237	1.034	1.036	0.245
33	Non-ferrous metals	0.674%	0.318	0.699	0.701	0.223
34	Ceramic, stone and clay products	0.539%	0.254	0.794	0.795	0.202
35	Textile product	0.299%	0.141	1.203	1.205	0.170
36	Miscellaneous non-profit services	0.436%	0.206	0.797	0.798	0.164
37	Hotels	0.300%	0.141	1.080	1.082	0.153
38	Education and research	1.028%	0.485	0.279	0.279	0.135
39	Waste management services	0.255%	0.120	0.635	0.637	0.076
40	Mining	-0.049%	-0.023	-0.608	-0.609	0.014

Appendix 9. Industrial ranking in economic by multiplier indicator

Ranking	Industry	Output Multiplier	Value added	Aggregate indicator
(1)	(2)	(3)	(4)	(5)
1	Transportation equipment	2.712	0.768	2.083
2	Office supplies	2.702	0.737	1.991
3	Hotels	1.939	0.939	1.821
4	Iron and steel	2.711	0.659	1.787
5	Water supply	1.917	0.917	1.758
6	Activities not elsewhere classified	1.932	0.906	1.750
7	Construction	1.966	0.883	1.735
8	Eating and drinking services	1.924	0.877	1.688
9	Printing, plate making and book binding	1.885	0.886	1.670
10	Information and communications	1.770	0.939	1.662
11	Metal products	2.152	0.761	1.637
12	Production machinery	1.990	0.797	1.585
13	Medical, health care and welfare	1.694	0.916	1.551
14	Miscellaneous non-profit services	1.659	0.932	1.547
15	General-purpose machinery	2.014	0.766	1.543
16	Business services	1.650	0.923	1.523
17	Public administration	1.536	0.950	1.459
18	Plastic products; Rubber products; Leather, fur skins and miscellaneous leather products	1.979	0.726	1.437
19	Finance and insurance	1.524	0.940	1.433
20	Commerce	1.503	0.946	1.422
21	Personal services (Except Eating, Drinking)	1.490	0.942	1.404
22	Waste management services	1.457	0.936	1.364
23	Transport services	1.682	0.808	1.359
24	Education and research	1.410	0.956	1.348
25	Pulp, paper and wooden products	1.874	0.701	1.314
26	Real estate	1.320	0.983	1.297
27	Ceramic, stone and clay products	1.694	0.750	1.271
28	Electrical machinery	1.875	0.677	1.269
29	Beverages and Foods	1.727	0.716	1.237
30	Business oriented machinery	1.795	0.675	1.211
31	Electronic components	1.815	0.654	1.186
32	Chemical products	1.863	0.632	1.177
33	Agriculture, forestry and fishery	1.529	0.715	1.093
34	Tourism	1.412	0.686	0.970

Ranking	Industry	Output Multiplier	Value added	Aggregate indicator
(1)	(2)	(3)	(4)	(5)
35	Electricity, gas and heat supply	1.726	0.551	0.952
	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	1.459	0.544	0.794
36				
37	Non-ferrous metals	1.392	0.421	0.586
38	Textile product	0.952	0.379	0.360
39	Petroleum and coal products	1.003	0.253	0.254
40	Mining	0.060	0.028	0.002

Appendix 10. Constant Elasticity of Substitution (from GTAP)

Industry code	Name of industry	GTAP code	Domestic/I	Factor
			mported substitution σ_D	Elasticity of Substitution σ_{VA}
I	Non-tourism industries			
01	Agriculture, forestry and fishery	v_f	1.85	0.24
06	Mining	omn	0.9	0.2
11	Beverages and Foods	b_t	1.15	1.12
15	Textile product	tex	3.75	1.26
16	Pulp, paper and wooden products	lum	3.4	1.26
191	Printing, plate making and book binding	ppp	2.95	1.26
20	Chemical products	crp	3.3	1.26
21	Petroleum and coal products	p_c	2.1	1.26
221	Plastic products	crp	3.3	1.26
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	crp	3.3	1.26
25	Ceramic, stone and clay products	From omf	3.75	1.26
26	Iron and steel	i_s	2.95	1.26
27	Non-ferrous metals	nfm	4.2	1.26
28	Metal products	fmp	3.75	1.26
29	General-purpose machinery	ome	4.05	1.26
30	Production machinery	ome	4.05	1.26
31	Business oriented machinery	ome	4.05	1.26
32	Electronic components	ele	4.4	1.26
33	Electrical machinery	ome	4.05	1.26
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	ome	4.05	1.26
35	Transportation equipment	otn	4.3	1.26
41	Construction	cns	1.9	1.68
46	Electricity, gas and heat supply	ely	2.8	1.26
47	Water supply	wtr	2.8	1.26
48	Waste management services	osg	1.9	1.26
5111011	Wholesale trade	trd	1.9	1.68
5112011	Retail trade	trd	1.9	1.68
53	Finance and insurance	ofi,isr	1.9	1.26
55	Real estate	dwe	1.9	1.26

Industry code	Name of industry	GTAP code	Domestic/Imported substitution	Factor Elasticity of Substitution
			σ_D	σ_{VA}
5711011	Railway transport (passengers)	otp	1.9	1.68
5712011	Railway transport (freight)	otp	1.9	1.68
5721	Road transport service (bus, taxi)	otp	1.9	1.68
5722011	Road freight transport (except self-transport)	otp	1.9	1.68
5731011	Self-transport (passengers)	otp	1.9	1.68
5732011	Self-transport (freight)	otp	1.9	1.68
5741011	International shipping	wtp	1.9	1.68
5742011	Coastal and inland water transport (passengers)	wtp	1.9	1.68
5742012	Coastal and inland water transport (freight)	wtp	1.9	1.68
5743011	Harbor transport service	wtp	1.9	1.68
5751011	International air transport	atp	1.9	1.68
5751012	Domestic air transport (passengers)	atp	1.9	1.68
5751013	Domestic air transport (freight)	atp	1.9	1.68
5751014	Aircraft service except air transport	atp	1.9	1.68
5761011	Consigned freight forwarding	otp	1.9	1.68
5771011	Storage facility service	otp	1.9	1.68
578=5781-01;578901,02,03,04,05,06,09	Services relating to transport	otp	1.9	1.68
5791011	Postal services and mail delivery	otp	1.9	1.68
59	Information and communications	cmn	1.9	1.26
61	Public administration	osg	1.9	1.26
63	Education and research	osg	1.9	1.26
64	Medical, health care and welfare	obs	1.9	1.26
65	Miscellaneous non-profit services	obs	1.9	1.26
66	Business services	obs	1.9	1.26
671	Hotels	dwe	1.9	1.26
672	Eating and drinking services	ros	1.9	1.26
Others 67	Personal services (Except Eating, Drinking)	ros	1.9	1.26
68	Office supplies	ros	1.9	1.26
69	Activities not elsewhere classified	ros	1.9	1.26
II	Tourism industries			
Fr 01	Agriculture, forestry and fishery	ros	1.9	1.26
Fr 11	Food and beverage	ros	1.9	1.26

Industry code	Name of industry	GTAP code	Domestic/Imported substitution σ_D	Factor Elasticity of Substitution σ_{VA}
Fr 15,16,25,222 9.2311.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	ros	1.9	1.26
Fr 20	Drug, cosmetic, and film	ros	1.9	1.26
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	ros	1.9	1.26
Fr 591.592,5951 02.03	Information and communication	ros	1.9	1.26
Fr 53	Travel insurance and credit card admission fee	ros	1.9	1.26
Fr 5711011	Railway (bullet train, railway, ski lift)	ros	1.9	1.26
Fr 5721	Bus, taxi hire	ros	1.9	1.26
Fr 5722011	Home delivery	ros	1.9	1.26
Fr 5741011	Water transport (ocean)	ros	1.9	1.26
Fr 5742011	Water transport (coastal)	ros	1.9	1.26
Fr 5751011	Airplane (international)	ros	1.9	1.26
Fr 5751012	Airplane (domestic/Local)	ros	1.9	1.26
Fr 2111-01	Gasoline cost	ros	1.9	1.26
Fr 6612011	Car rental and other transportation expense	ros	1.9	1.26
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	ros	1.9	1.26
Fr 64	Medical and health care services	ros	1.9	1.26
Fr 6711011	Accommodation	ros	1.9	1.26
Fr 6821011	Eating and drinking services	ros	1.9	1.26
Fr 6312, 659, 6611, 67	Personal and other recreational services	ros	1.9	1.26

Appendix 11a. Results of Impacts on GDP of cross-industry

Industry code	Name of industry	Sector GDP (Mil JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
01	Agriculture, forestry and fishery	5,649,286	0.06%	2.00%	0.33%	0.11%	2.51%
06	Mining	340,116	0.07%	1.25%	0.33%	0.10%	1.76%
11	Beverages and Foods	11,855,932	0.05%	2.07%	0.32%	0.12%	2.56%
15	Textile product	759,605	0.06%	1.91%	0.33%	0.13%	2.44%
16	Pulp, paper and wooden products	3,454,793	0.05%	1.50%	0.26%	0.10%	1.93%
191	Printing, plate making and book binding	2,469,985	0.05%	1.19%	0.23%	0.10%	1.58%
20	Chemical products	6,789,376	0.05%	1.63%	0.30%	0.11%	2.10%
21	Petroleum and coal products	4,136,778	0.09%	1.06%	0.33%	0.10%	1.58%
221	Plastic products	2,937,198	0.07%	1.60%	0.29%	0.10%	2.07%
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	973,179	0.06%	1.68%	0.31%	0.11%	2.17%
25	Ceramic, stone and clay products	2,798,948	0.04%	1.59%	0.30%	0.10%	2.03%
26	Iron and steel	5,714,135	0.04%	1.70%	0.31%	0.08%	2.15%
27	Non-ferrous metals	2,112,730	0.05%	1.76%	0.33%	0.10%	2.24%
28	Metal products	3,812,687	0.04%	1.55%	0.30%	0.11%	2.00%
29	General-purpose machinery	3,591,483	0.03%	1.70%	0.34%	0.11%	2.19%
30	Production machinery	5,838,350	0.03%	1.65%	0.33%	0.11%	2.12%
31	Business oriented machinery	2,060,710	0.03%	1.66%	0.31%	0.13%	2.13%
32	Electronic components	3,762,975	0.08%	1.66%	0.32%	0.12%	2.18%
33	Electrical machinery	4,571,292	0.04%	1.72%	0.33%	0.12%	2.22%
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	3,549,137	0.04%	1.86%	0.33%	0.13%	2.37%
35	Transportation equipment	9,086,322	0.06%	1.80%	0.35%	0.05%	2.26%
41	Construction	23,712,168	0.02%	1.44%	0.29%	0.10%	1.86%
46	Electricity, gas and heat supply	4,768,434	0.06%	1.46%	0.34%	0.08%	1.93%
47	Water supply	2,190,799	0.05%	1.24%	0.24%	0.08%	1.61%
48	Waste management services	2,737,116	0.08%	1.11%	0.24%	0.06%	1.50%
5111011	Wholesale trade	39,109,487	0.09%	1.09%	0.18%	0.12%	1.49%

Industry code	Name of industry	Sector GDP (Mil JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
5112011	Retail trade	25,003,165	0.04%	1.20%	0.20%	0.09%	1.55%
53	Finance and insurance	21,081,383	0.03%	1.06%	0.20%	0.10%	1.38%
55	Real estate	57,380,136	0.01%	1.01%	0.17%	0.08%	1.27%
5711011	Railway transport (passengers)	2,812,000	0.02%	1.14%	0.22%	-11.62%	-10.40%
5712011	Railway transport (freight)	69,747	0.05%	-0.41%	0.20%	-16.59%	-16.97%
5721	Road transport service (bus, taxi)	2,213,457	0.02%	-2.04%	0.24%	0.10%	-1.69%
5722011	Road freight transport (except self-transport)	8,803,401	0.04%	14.36 %	0.21%	0.08%	-14.08%
5731011	Self-transport (passengers)	-	0.00%	0.00%	0.00%	0.00%	0.00%
5732011	Self-transport (freight)	-	0.00%	0.00%	0.00%	0.00%	0.00%
5741011	International shipping	292,371	0.07%	0.61%	-0.38%	0.09%	0.39%
5742011	Coastal and inland water transport (passengers)	2,252	0.05%	1.76%	-17.16%	0.14%	-15.57%
5742012	Coastal and inland water transport (freight)	293,081	0.06%	0.27%	-15.99%	0.08%	-15.74%
5743011	Harbor transport service	882,924	0.06%	0.86%	-10.67%	0.09%	-9.78%
5751011	International air transport	25,149	-17.81%	1.65%	0.35%	0.13%	-16.06%
5751012	Domestic air transport (passengers)	85,272	-43.14%	1.35%	0.29%	0.11%	-42.18%
5751013	Domestic air transport (freight)	14,887	-9.16%	1.02%	0.29%	0.09%	-7.94%
5751014	Aircraft service except air transport	6,925	0.10%	1.20%	0.24%	0.10%	1.64%
5761011	Consigned freight forwarding	445,583	0.05%	0.80%	0.18%	0.00%	1.04%
5771011	Storage facility service	1,066,904	0.04%	0.99%	0.19%	0.08%	1.29%
578=5781							
01;57890 1,02,03,04 ,05,06,09	Services relating to transport	512,939	0.31%	0.32%	0.01%	0.04%	0.68%
5791011	Postal services and mail delivery	1,144,499	0.05%	1.06%	0.21%	0.10%	1.42%
59	Information and communications	24,207,794	0.05%	1.17%	0.21%	0.10%	1.53%
61	Public administration	26,931,912	0.01%	1.11%	0.23%	0.12%	1.48%
63	Education and research	26,217,514	0.04%	1.23%	0.25%	0.11%	1.65%

Industry code	Name of industry	Sector GDP (Mil JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
64	Medical, health care and welfare	35,673,893	0.01%	1.25%	0.26%	0.11%	1.63%
65	Miscellaneous non-profit services	3,011,709	0.05%	1.15%	0.24%	0.12%	1.56%
66	Business services	40,441,419	0.06%	1.08%	0.23%	0.09%	1.47%
671	Hotels	1,052,649	0.02%	1.45%	0.29%	0.11%	1.88%
672	Eating and drinking services	9,909,283	0.02%	1.51%	0.28%	0.11%	1.93%
Others 67	Personal services (Except Eating, Drinking)	15,055,903	0.02%	1.15%	0.24%	0.10%	1.52%
68	Office supplies	-	0.00%	0.00%	0.00%	0.00%	0.00%
69	Activities not elsewhere classified	1,998,747	0.07%	1.08%	0.20%	0.03%	1.37%
Fr 01	Agriculture, forestry and fishery	189,085	0.07%	1.93%	0.31%	0.11%	2.43%
Fr 11	Food and beverage	1,056,372	0.03%	2.06%	0.30%	0.11%	2.51%
Fr 15,16,25,229.2311.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	549,465	0.05%	1.77%	0.29%	0.12%	2.23%
Fr 20	Drug, cosmetic, and film	34,435	0.05%	1.62%	0.30%	0.11%	2.09%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	173,125	0.04%	1.78%	0.30%	0.12%	2.24%
Fr 591.592,595102.03	Information and communication	47,373	0.08%	1.34%	0.24%	0.10%	1.76%
Fr 53	Travel insurance and credit card admission fee	13,555	0.03%	1.04%	0.20%	0.10%	1.37%
Fr 5711011	Railway (bullet train, railway, ski lift)	1,429,351	0.02%	1.13%	0.22%	16.11%	17.71%
Fr 5721	Bus, taxi hire	302,746	0.02%	17.73%	0.24%	0.10%	18.14%
Fr 5722011	Home delivery	77,666	0.05%	1.32%	0.27%	0.10%	1.74%
Fr 5742011	Water transport (coastal)	37,358	0.03%	1.35%	20.41%	0.11%	22.21%
Fr 5751012	Airplane (domestic/Local)	196,265	12.52%	1.31%	0.29%	0.11%	14.45%
Fr 2111-01	Gasoline cost	282,549	0.09%	1.00%	0.34%	0.10%	1.54%
Fr 6612011	Car rental and other transportation expense	134,995	0.07%	0.87%	0.22%	0.09%	1.25%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	2,342,175	0.31%	0.25%	-0.01%	0.03%	0.59%
Fr 64	Medical and health care services	27,187	0.01%	1.25%	0.26%	0.11%	1.63%

Industry code	Name of industry	Sector GDP (Mil JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
Fr 6711011	Accommodation	1,010,502	0.02%	1.34%	0.27%	0.11%	1.73%
Fr 6821011	Eating and drinking services	891,577	0.02%	1.51%	0.28%	0.11%	1.92%
Fr 6312, 659, 6611, 67	Personal and other recreational services	984,773	0.03%	1.15%	0.24%	0.10%	1.52%
Fr 11	Food and beverage	26,658	0.03%	2.07%	0.29%	0.11%	2.51%
Fr 15,16,25,2 229.2311. 2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	58,683	0.06%	1.72%	0.29%	0.11%	2.18%
Fr 20	Drug, cosmetic, and film	5,284	0.05%	1.62%	0.30%	0.11%	2.09%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	15,513	0.03%	1.78%	0.30%	0.13%	2.25%
Fr 591.592,5 95102.03	Information and communication	5,630	0.08%	1.34%	0.24%	0.10%	1.76%
Fr 53	Travel insurance and credit card admission fee	22,374	0.03%	1.04%	0.20%	0.10%	1.37%
Fr 5711011	Railway (bullet train, railway, ski lift)	22,651	0.02%	1.13%	0.22%	0.09%	1.47%
Fr 5721	Bus, taxi hire	19,445	0.02%	1.09%	0.24%	0.10%	1.45%
Fr 5722011	Home delivery	4,437	0.05%	1.32%	0.27%	0.10%	1.74%
Fr 5741011	Water transport (ocean)	21	0.07%	0.61%	-0.34%	0.09%	0.43%
Fr 5742011	Water transport (coastal)	424	0.03%	1.35%	0.31%	0.11%	1.80%
Fr 5751011	Airplane (international)	91,625	17.64%	1.35%	0.32%	0.11%	19.75%
Fr 5751012	Airplane (domestic/Local)	4,747	0.06%	1.31%	0.29%	0.11%	1.77%
Fr 2111-01	Gasoline cost	1,892	0.09%	1.00%	0.34%	0.10%	1.54%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	925,751	0.31%	0.25%	-0.01%	0.03%	0.59%
Fr 6711011	Accommodation	11,645	0.02%	1.34%	0.27%	0.11%	1.73%
Fr 6821011	Eating and drinking services	12,296	0.02%	1.51%	0.28%	0.11%	1.92%
Fr 6312, 659, 6611, 67	Personal and other recreational services	67,042	0.05%	1.15%	0.24%	0.11%	1.55%
Fr 11	Food and beverage	23,642	15.65%	1.14%	0.22%	0.07%	17.31%
Fr 15,16,25,2 229.2311. 2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	29,249	15.64%	1.02%	0.24%	0.07%	17.19%

Industry code	Name of industry	Sector GDP (Mil JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
Fr 20	Drug, cosmetic, and film	9,933	15.63%	1.04%	0.22%	0.06%	17.17%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	24,438	15.65%	0.90%	0.22%	0.06%	17.02%
Fr 5711011	Railway (bullet train, railway, ski lift)	31,596	15.65%	0.97%	0.23%	0.07%	17.11%
Fr 5721	Bus, taxi hire	12,351	15.65%	0.88%	0.24%	0.08%	17.04%
Fr 5751011	Airplane (international)	78,684	15.62%	1.13%	0.23%	0.09%	17.30%
Fr 5751012	Airplane (domestic/Local)	1,195	15.63%	0.82%	0.19%	0.06%	16.88%
Fr 6612011	Car rental and other transportation expense	4,505	15.65%	1.02%	0.23%	0.06%	17.17%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	2,713	15.65%	0.93%	0.24%	0.07%	17.07%
Fr 6711011	Accommodation	113,449	15.65%	0.84%	0.23%	0.07%	16.96%
Fr 6821011	Eating and drinking services	62,652	15.65%	0.76%	0.23%	0.07%	16.87%
Fr 6312, 659, 6611, 67	Personal and other recreational services	13,207	15.64%	0.94%	0.23%	0.06%	17.06%

Appendix 11b. Results of Impacts on Demand (domestic final demand and export) of cross-industry

Industry code	Name of industry	Final demand (F _C +F _X) Benchmark (Unit of goods)	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
01	Agriculture, forestry and fishery	4,852,415	-0.03%	1.10%	0.16%	0.05%	1.28%
06	Mining	38,117	0.02%	0.33%	0.14%	0.02%	0.51%
11	Beverages and Foods	27,129,332	-0.03%	1.21%	0.12%	0.04%	1.35%
15	Textile product	4,356,572	-0.01%	1.21%	0.17%	0.06%	1.44%
16	Pulp, paper and wooden products	1,452,987	-0.02%	1.55%	0.17%	0.06%	1.76%
191	Printing, plate making and book binding	171,502	-0.03%	0.95%	0.06%	0.04%	1.03%
20	Chemical products	9,395,471	-0.01%	0.90%	0.15%	0.05%	1.09%
21	Petroleum and coal products	8,489,606	-0.01%	1.01%	0.45%	0.07%	1.52%
221	Plastic products	1,920,110	0.00%	0.83%	0.09%	0.04%	0.96%
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	2,112,983	-0.01%	1.04%	0.15%	0.05%	1.22%
25	Ceramic, stone and clay products	1,076,724	-0.02%	0.80%	0.14%	0.03%	0.95%
26	Iron and steel	3,560,279	-0.01%	0.71%	0.11%	0.01%	0.82%
27	Non-ferrous metals	2,908,245	-0.01%	0.91%	0.15%	0.03%	1.08%
28	Metal products	1,423,899	-0.02%	1.09%	0.15%	0.03%	1.25%
29	General-purpose machinery	6,907,346	-0.03%	0.80%	0.14%	0.04%	0.95%
30	Production machinery	12,936,771	-0.03%	0.72%	0.12%	0.04%	0.85%
31	Business oriented machinery	5,601,804	-0.02%	0.85%	0.12%	0.05%	1.00%
32	Electronic components	6,175,056	0.02%	0.73%	0.10%	0.04%	0.89%
33	Electrical machinery	13,086,449	-0.02%	0.80%	0.13%	0.05%	0.96%
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	14,736,181	-0.02%	1.02%	0.13%	0.06%	1.19%
35	Transportation equipment	26,324,747	-0.01%	0.93%	0.18%	0.00%	1.10%
41	Construction	42,741,258	-0.04%	0.58%	0.10%	0.03%	0.67%
46	Electricity, gas and heat supply	6,349,154	-0.03%	0.73%	0.29%	0.05%	1.04%
47	Water supply	1,634,545	-0.04%	0.24%	0.05%	0.03%	0.28%
48	Waste management services	989,770	-0.02%	0.17%	0.03%	0.09%	0.28%
5111011	Wholesale trade	892,106	0.03%	0.12%	0.02%	0.05%	0.18%

Industry code	Name of industry	Final demand (F _c +F _x) Benchmark (Unit of goods)	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
5112011	Retail trade	879,279	-0.04%	0.17%	0.03%	0.02%	0.19%
53	Finance and insurance	16,370,133	-0.04%	0.13%	0.02%	0.07%	0.18%
55	Real estate	59,287,615	-0.06%	-0.01%	0.01%	0.01%	-0.04%
5711011	Railway transport (passengers)	2,631,278	-0.05%	0.13%	0.03%	-0.02%	0.09%
5712011	Railway transport (freight)	304	-0.05%	0.26%	0.06%	0.03%	0.30%
5721	Road transport service (bus, taxi)	1,969,117	-0.05%	0.19%	0.05%	0.01%	0.20%
5722011	Road freight transport (except self-transport)	1,427,669	-0.05%	0.13%	0.05%	0.02%	0.14%
5731011	Self-transport (passengers)	-	0.00%	0.00%	0.00%	0.00%	0.00%
5732011	Self-transport (freight)	-	0.00%	0.00%	0.00%	0.00%	0.00%
5741011	International shipping	2,964,279	0.02%	-0.39%	-	0.02%	-0.93%
5742011	Coastal and inland water transport (passengers)	99,443	-0.01%	0.92%	0.15%	0.07%	1.13%
5742012	Coastal and inland water transport (freight)	4,475	-0.04%	0.42%	0.13%	0.04%	0.54%
5743011	Harbor transport service	331,916	0.01%	-0.09%	10.86%	0.02%	10.93%
5751011	International air transport	791,149	-0.62%	0.88%	0.19%	0.07%	0.52%
5751012	Domestic air transport (passengers)	249,985	-0.20%	0.54%	0.16%	0.04%	0.53%
5751013	Domestic air transport (freight)	11,230	0.00%	0.46%	0.15%	0.03%	0.64%
5751014	Aircraft service except air transport	2,272	0.00%	0.46%	0.15%	0.03%	0.64%
5761011	Consigned freight forwarding	34,181	-0.04%	0.11%	0.03%	0.02%	0.12%
5771011	Storage facility service	4,514	-0.05%	0.13%	0.03%	0.02%	0.14%
578=5781	-	-	-	-	-	-	-
01;57890	Services relating to transport	859,668	0.22%	-0.50%	-	-0.03%	-0.47%
1,02,03,0					0.16%		
4,05,06,0							
9							
5791011	Postal services and mail delivery	214,650	-0.02%	0.11%	0.01%	0.00%	0.11%
59	Information and communications	21,598,855	-0.01%	0.25%	0.02%	0.03%	0.29%
61	Public administration	38,268,628	-0.04%	0.15%	0.02%	0.05%	0.18%
63	Education and research	23,639,530	-0.02%	0.16%	0.02%	0.04%	0.19%
64	Medical, health care and welfare	58,267,613	-0.04%	0.32%	0.05%	0.02%	0.35%
65	Miscellaneous non-profit services	4,026,055	-0.01%	0.28%	0.03%	0.04%	0.34%
66	Business services	7,495,438	-0.02%	0.20%	0.03%	0.02%	0.22%

Industry code	Name of industry	Final demand (F _C +F _X) Benchmark (Unit of goods)	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
671	Hotels	2,717,785	-0.03%	0.49%	0.08%	0.04%	0.57%
672	Eating and drinking services	22,685,449	-0.04%	0.57%	0.07%	0.03%	0.63%
Others 67	Personal services (Except Eating, Drinking)	19,685,302	-0.03%	0.17%	0.03%	0.03%	0.19%
68	Office supplies	-	0.00%	0.00%	0.00%	0.00%	0.00%
69	Activities not elsewhere classified	22,491	0.03%	0.28%	0.13%	0.06%	0.50%
Fr 01	Agriculture, forestry and fishery	114,035	-0.02%	0.95%	0.13%	0.04%	1.10%
Fr 11	Food and beverage	2,161,144	-0.04%	1.14%	0.09%	0.04%	1.22%
Fr 15,16,25, 2229.231 1.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	964,136	-0.02%	1.07%	0.12%	0.05%	1.22%
Fr 20	Drug, cosmetic, and film	24,063	-0.01%	1.09%	0.19%	0.06%	1.33%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	399,398	-0.03%	0.98%	0.10%	0.06%	1.10%
Fr 591.592,5 95102.03	Information and communication	38,736	0.08%	1.02%	0.06%	0.04%	1.20%
Fr 53	Travel insurance and credit card admission fee	9,965	-0.04%	0.11%	0.01%	0.08%	0.15%
Fr 5711011	Railway (bullet train, railway, ski lift)	1,322,802	-0.05%	0.12%	0.03%	25.02%	25.15%
Fr 5721	Bus, taxi hire	262,504	-0.05%	25.22%	0.05%	0.01%	25.22%
Fr 5722011	Home delivery	36,214	-0.05%	0.17%	0.05%	0.02%	0.18%
Fr 5742011	Water transport (coastal)	72,102	-0.04%	0.42%	25.16%	0.04%	25.68%
Fr 5751012	Airplane (domestic/Local)	477,738	25.00%	0.46%	0.15%	0.03%	25.81%
Fr 2111-01	Gasoline cost	446,582	-0.02%	1.15%	0.54%	0.07%	1.75%
Fr 6612011	Car rental and other transportation expense	16,613	-0.05%	0.03%	0.02%	0.02%	0.02%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	1,323,341	-0.05%	0.18%	0.03%	0.02%	0.18%
Fr 64	Medical and health care services	44,402	-0.04%	0.32%	0.05%	0.02%	0.35%
Fr 6711011	Accommodation	2,115,682	-0.04%	0.38%	0.06%	0.03%	0.43%
Fr 6821011	Eating and drinking services	2,006,844	-0.04%	0.56%	0.07%	0.03%	0.62%
Fr 6312, 659, 6611, 67	Personal and other recreational services	1,261,264	-0.03%	0.16%	0.03%	0.03%	0.20%
Fr 11	Food and beverage	52,768	-0.04%	1.14%	0.09%	0.04%	1.22%

Industry code	Name of industry	Final demand (F _c +F _x) Benchmark (Unit of goods)	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
Fr 15,16,25, 2229.231 1.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	96,976	-0.02%	1.01%	0.11%	0.04%	1.14%
Fr 20	Drug, cosmetic, and film	3,692	-0.01%	1.09%	0.19%	0.06%	1.33%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	38,788	-0.03%	0.95%	0.10%	0.06%	1.07%
Fr 591.592,5 95102.03	Information and communication	4,575	0.08%	1.06%	0.06%	0.04%	1.25%
Fr 53	Travel insurance and credit card admission fee	16,449	-0.04%	0.11%	0.01%	0.08%	0.15%
Fr 5711011	Railway (bullet train, railway, ski lift)	20,962	-0.05%	0.12%	0.03%	0.02%	0.12%
Fr 5721	Bus, taxi hire	16,860	-0.05%	0.18%	0.05%	0.01%	0.18%
Fr 5722011	Home delivery	2,069	-0.05%	0.17%	0.05%	0.02%	0.18%
Fr 5741011	Water transport (ocean)		-0.03%	0.59%	25.23%	0.05%	26.00%
Fr 5742011	Water transport (coastal)	818	-0.04%	0.42%	0.13%	0.04%	0.54%
Fr 5751011	Airplane (international)	314,696	25.00%	0.46%	0.15%	0.03%	25.81%
Fr 5751012	Airplane (domestic/Local)	11,555	0.00%	0.46%	0.15%	0.03%	0.64%
Fr 2111-01	Gasoline cost	2,990	-0.02%	1.15%	0.54%	0.07%	1.75%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	523,054	-0.05%	0.18%	0.03%	0.02%	0.18%
Fr 6711011	Accommodation	24,382	-0.04%	0.38%	0.06%	0.03%	0.43%
Fr 6821011	Eating and drinking services	27,676	-0.04%	0.56%	0.07%	0.03%	0.62%
Fr 6312, 659, 6611, 67	Personal and other recreational services	81,715	-0.01%	0.17%	0.03%	0.05%	0.25%
Fr 11	Food and beverage	57,486	15.58%	0.16%	0.02%	-0.01%	15.78%
Fr 15,16,25, 2229.231 1.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	71,687	15.58%	0.09%	0.03%	-0.01%	15.70%
Fr 20	Drug, cosmetic, and film	40,136	15.57%	0.06%	0.02%	-0.01%	15.64%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	81,291	15.58%	-0.04%	0.01%	-0.02%	15.52%
Fr 5711011	Railway (bullet train, railway, ski lift)	45,673	15.59%	-0.02%	0.03%	0.00%	15.58%
Fr 5721	Bus, taxi hire	16,267	15.59%	-0.04%	0.02%	0.00%	15.56%
Fr 5751011	Airplane (international)	384,775	15.56%	0.17%	0.02%	0.01%	15.79%

Industry code	Name of industry	Final demand (F _C +F _X) Benchmark (Unit of goods)	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
Fr 5751012	Airplane (domestic/Local)	5,843	15.57%	-0.14%	0.02%	-0.01%	15.37%
Fr 6612011	Car rental and other transportation expense	6,055	15.59%	0.01%	0.03%	-0.01%	15.62%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	4,304	15.58%	-0.04%	0.03%	-0.01%	15.56%
Fr 6711011	Accommodation	237,527	15.58%	-0.11%	0.02%	-0.01%	15.46%
Fr 6821011	Eating and drinking services	145,495	15.58%	-0.18%	0.01%	-0.01%	15.38%
Fr 6312, 659, 6611, 67	Personal and other recreational services	19,482	15.58%	-0.04%	0.02%	-0.01%	15.55%

Appendix 11c. Results of Impacts on gross output (production) of cross-industry

Industry code	Name of industry	Gross production (Mil. JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
01	Agriculture, forestry and fishery	14,238,847	0.04%	1.34%	0.21%	0.08%	1.68%
06	Mining	24,123,416	0.02%	0.30%	0.13%	0.02%	0.47%
11	Beverages and Foods	39,259,667	0.02%	1.31%	0.20%	0.08%	1.61%
15	Textile product	6,060,385	0.01%	1.08%	0.15%	0.06%	1.30%
16	Pulp, paper and wooden products	12,952,852	0.02%	0.51%	0.11%	0.05%	0.69%
191	Printing, plate making and book binding	5,144,908	0.02%	0.52%	0.14%	0.05%	0.74%
20	Chemical products	33,177,408	0.00%	0.83%	0.14%	0.05%	1.03%
21	Petroleum and coal products	22,421,632	0.05%	-0.01%	-0.06%	0.05%	0.03%
221	Plastic products	10,655,466	0.03%	0.84%	0.17%	0.04%	1.09%
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	4,055,903	0.02%	0.92%	0.16%	0.05%	1.16%
25	Ceramic, stone and clay products	6,937,649	0.01%	0.97%	0.15%	0.05%	1.17%
26	Iron and steel	31,685,859	0.01%	0.63%	-0.03%	0.04%	0.65%
27	Non-ferrous metals	12,649,932	0.01%	0.80%	0.11%	0.04%	0.96%
28	Metal products	10,906,204	0.01%	0.79%	0.09%	0.06%	0.95%
29	General-purpose machinery	10,412,988	0.00%	1.05%	0.19%	0.06%	1.30%
30	Production machinery	15,617,674	0.00%	1.07%	0.20%	0.07%	1.33%
31	Business oriented machinery	7,879,335	-0.01%	0.99%	0.18%	0.07%	1.23%
32	Electronic components	16,480,434	0.04%	0.98%	0.18%	0.05%	1.26%
33	Electrical machinery	18,016,215	0.00%	1.04%	0.20%	0.06%	1.30%
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	18,070,767	0.00%	1.15%	0.19%	0.06%	1.41%
35	Transportation equipment	48,008,665	0.03%	0.99%	0.16%	0.00%	1.19%
41	Construction	52,514,485	0.00%	0.87%	0.18%	0.06%	1.10%
46	Electricity, gas and heat supply	21,188,293	0.02%	0.69%	0.04%	0.02%	0.77%
47	Water supply	4,568,509	0.03%	0.94%	0.18%	0.05%	1.21%
48	Waste management services	3,765,338	0.03%	0.94%	0.19%	-0.03%	1.13%
5111011	Wholesale trade	56,498,206	0.02%	0.94%	0.15%	0.06%	1.17%
5112011	Retail trade	38,146,507	0.02%	1.03%	0.16%	0.06%	1.27%
53	Finance and insurance	32,945,955	0.01%	0.90%	0.17%	0.02%	1.10%
55	Real estate	71,189,199	0.00%	0.94%	0.16%	0.07%	1.17%
5711011	Railway transport (passengers)	4,104,880	0.01%	0.96%	0.18%	-11.64%	-10.62%
5712011	Railway transport (freight)	121,192	0.03%	-0.68%	0.13%	-16.61%	-17.29%
5721	Road transport service (bus, taxi)	2,989,485	0.01%	-2.22%	0.18%	0.08%	-1.96%

Industry code	Name of industry	Gross production (Mil. JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
5722011	Road freight transport (except self-transport)	11,994,942	0.03%	-14.50%	0.15%	0.06%	-14.30%
5731011	Self-transport (passengers)	5,663,199	0.03%	0.57%	-0.04%	0.05%	0.61%
5732011	Self-transport (freight)	3,269,468	0.02%	0.58%	-0.03%	0.05%	0.62%
5741011	International shipping	4,289,454	0.03%	-0.15%	-0.58%	0.03%	-0.66%
5742011	Coastal and inland water transport (passengers)	124,029	-0.01%	0.80%	-17.33%	0.06%	-16.64%
5742012	Coastal and inland water transport (freight)	705,911	0.03%	-0.18%	-16.10%	0.04%	-16.29%
5743011	Harbor transport service	1,961,848	0.04%	0.51%	-10.75%	0.04%	-10.23%
5751011	International air transport	1,114,879	-17.85%	0.73%	0.14%	0.06%	-17.09%
5751012	Domestic air transport (passengers)	501,021	-43.18%	0.78%	0.12%	0.07%	-42.66%
5751013	Domestic air transport (freight)	72,801	-9.22%	0.53%	0.14%	0.06%	-8.62%
5751014	Aircraft service except air transport	33,866	0.03%	0.71%	0.09%	0.06%	0.89%
5761011	Consigned freight forwarding	681,964	0.02%	0.67%	0.14%	-0.02%	0.82%
5771011	Storage facility service	1,766,981	0.02%	0.82%	0.15%	0.05%	1.04%
578=578							
1-01;5789							
01,02,03,04,05,06,09	Services relating to transport	1,081,875	0.29%	-0.08%	-0.07%	0.00%	0.14%
5791011	Postal services and mail delivery	1,425,071	0.00%	0.97%	0.18%	0.08%	1.24%
59	Information and communications	46,746,208	0.00%	0.95%	0.18%	0.07%	1.20%
61	Public administration	39,405,194	-0.01%	0.94%	0.20%	0.07%	1.20%
63	Education and research	34,807,454	0.00%	1.09%	0.22%	0.06%	1.38%
64	Medical, health care and welfare	60,232,811	-0.01%	0.94%	0.20%	0.07%	1.21%
65	Miscellaneous non-profit services	5,197,465	-0.01%	0.90%	0.19%	0.07%	1.15%
66	Business services	67,451,745	0.03%	0.85%	0.19%	0.07%	1.14%
671	Hotels	2,717,785	-0.01%	0.94%	0.20%	0.07%	1.21%
672	Eating and drinking services	23,403,525	-0.01%	0.94%	0.20%	0.07%	1.21%
Others	Personal services (Except Eating, Drinking)	21,790,799	-0.01%	0.95%	0.20%	0.07%	1.21%
67							
68	Office supplies	1,325,036	0.02%	-0.53%	-0.04%	0.02%	-0.53%
69	Activities not elsewhere classified	5,049,812	-0.02%	0.79%	0.14%	-0.02%	0.90%
Fr 01	Agriculture, forestry and fishery	359,924	0.05%	1.41%	0.21%	0.08%	1.76%
Fr 11	Food and beverage	2,656,698	0.01%	1.38%	0.21%	0.08%	1.69%
Fr 15,16,25,2229,231	Fiber, wood, paper, ceramic, glass products; Shoes and bags	1,513,069	0.01%	1.11%	0.17%	0.06%	1.36%
1.2312							
Fr 20	Drug, cosmetic, and film	139,138	0.00%	0.87%	0.15%	0.05%	1.07%

Industry code	Name of industry	Gross production (Mil. JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	566,947	0.00%	1.17%	0.20%	0.06%	1.44%
Fr 591.592, 595102.03	Information and communication	115,338	-0.06%	0.76%	0.17%	0.06%	0.93%
Fr 53	Travel insurance and credit card admission fee	20,601	0.01%	0.91%	0.17%	0.02%	1.11%
Fr 5711011	Railway (bullet train, railway, ski lift)	2,066,195	0.01%	0.96%	0.18%	16.09%	17.43%
Fr 5721	Bus, taxi hire	398,757	0.01%	17.54%	0.18%	0.08%	17.85%
Fr 5722011	Home delivery	105,702	0.03%	1.16%	0.21%	0.08%	1.48%
Fr 5742011	Water transport (coastal)	89,980	0.00%	0.90%	20.24%	0.07%	21.41%
Fr 5751012	Airplane (domestic/Local)	959,757	12.44%	0.82%	0.13%	0.07%	13.61%
Fr 2111-01	Gasoline cost	1,203,175	0.05%	-0.06%	-0.08%	0.05%	-0.04%
Fr 6612011	Car rental and other transportation expense	181,433	0.06%	0.77%	0.19%	0.07%	1.10%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	3,716,429	0.29%	0.04%	-0.04%	0.01%	0.30%
Fr 64	Medical and health care services	45,900	-0.01%	0.94%	0.20%	0.07%	1.21%
Fr 6711011	Accommodation	2,115,682	-0.01%	0.94%	0.20%	0.07%	1.21%
Fr 6821011	Eating and drinking services	2,070,466	-0.01%	0.94%	0.20%	0.07%	1.21%
Fr 6312, 659, 6611, 67	Personal and other recreational services	1,422,355	0.00%	0.95%	0.20%	0.07%	1.22%
Fr 11	Food and beverage	64,484	0.01%	1.41%	0.21%	0.08%	1.71%
Fr 15,16,25, 2229.231 1.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	153,816	0.01%	1.09%	0.18%	0.06%	1.35%
Fr 20	Drug, cosmetic, and film	21,350	0.00%	0.87%	0.15%	0.05%	1.07%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	51,278	0.00%	1.19%	0.20%	0.06%	1.46%
Fr 591.592, 595102.03	Information and communication	13,868	-0.06%	0.74%	0.17%	0.06%	0.90%
Fr 53	Travel insurance and credit card admission fee	34,004	0.01%	0.91%	0.17%	0.02%	1.11%
Fr 5711011	Railway (bullet train, railway, ski lift)	32,743	0.01%	0.96%	0.18%	0.08%	1.23%
Fr 5721	Bus, taxi hire	25,612	0.01%	0.93%	0.18%	0.08%	1.20%
Fr 5722011	Home delivery	6,038	0.03%	1.16%	0.21%	0.08%	1.48%

Industry code	Name of industry	Gross production (Mil. JPY) Benchmark	S1: Air -20%	S2: Road -20%	S3: Water -20%	S4: Rail -20%	S5: All modes -20%
Fr 5741011	Water transport (ocean)	212	0.04%	-0.04%	-0.54%	0.04%	-0.50%
Fr 5742011	Water transport (coastal)	1,020	0.00%	0.90%	0.17%	0.07%	1.14%
Fr 5751011	Airplane (international)	448,055	17.56%	0.86%	0.16%	0.07%	18.86%
Fr 5751012	Airplane (domestic/Local)	23,213	0.00%	0.82%	0.13%	0.07%	1.02%
Fr 2111-01	Gasoline cost	8,056	0.05%	-0.06%	-0.08%	0.05%	-0.04%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	1,468,929	0.29%	0.04%	-0.04%	0.01%	0.30%
Fr 6711011	Accommodation	24,382	-0.01%	0.94%	0.20%	0.07%	1.21%
Fr 6821011	Eating and drinking services	28,554	-0.01%	0.94%	0.20%	0.07%	1.21%
Fr 6312, 659, 6611, 67	Personal and other recreational services	99,039	0.00%	0.96%	0.20%	0.05%	1.20%
Fr 11	Food and beverage	57,486	15.62%	0.49%	0.14%	0.04%	16.39%
Fr 15,16,25, 2229,231 1,2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	71,687	15.60%	0.43%	0.14%	0.02%	16.28%
Fr 20	Drug, cosmetic, and film	40,136	15.58%	0.29%	0.07%	0.00%	16.00%
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	81,291	15.61%	0.33%	0.13%	0.00%	16.13%
Fr 5711011	Railway (bullet train, railway, ski lift)	45,673	15.64%	0.79%	0.19%	0.05%	16.84%
Fr 5721	Bus, taxi hire	16,267	15.64%	0.72%	0.17%	0.06%	16.75%
Fr 5751011	Airplane (international)	384,775	15.55%	0.65%	0.07%	0.05%	16.44%
Fr 5751012	Airplane (domestic/Local)	5,843	15.55%	0.34%	0.04%	0.03%	16.02%
Fr 6612011	Car rental and other transportation expense	6,055	15.64%	0.92%	0.21%	0.05%	17.00%
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	4,304	15.63%	0.72%	0.20%	0.04%	16.74%
Fr 6711011	Accommodation	237,527	15.62%	0.44%	0.16%	0.04%	16.35%
Fr 6821011	Eating and drinking services	145,495	15.62%	0.20%	0.14%	0.03%	16.05%
Fr 6312, 659, 6611, 67	Personal and other recreational services	19,482	15.60%	0.74%	0.19%	0.02%	16.69%

Appendix 12a. Sensitive test of Constant Elasticity of Transformation σ_{CET} with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
01	Agriculture, forestry and fishery	14,238,847	14,477,542	14,477,536	14,477,536	14,477,536	14,477,536
06	Mining	24,123,416	24,236,015	24,236,009	24,236,009	24,236,009	24,236,009
11	Beverages and Foods	39,259,667	39,892,784	39,892,769	39,892,769	39,892,769	39,892,769
15	Textile product	6,060,385	6,139,177	6,139,175	6,139,175	6,139,175	6,139,175
16	Pulp, paper and wooden products	12,952,852	13,042,460	13,042,458	13,042,458	13,042,458	13,042,458
191	Printing, plate making and book binding	5,144,908	5,182,962	5,182,961	5,182,961	5,182,961	5,182,961
20	Chemical products	33,177,408	33,517,713	33,517,750	33,517,750	33,517,750	33,517,750
21	Petroleum and coal products	22,421,632	22,428,372	22,428,368	22,428,368	22,428,368	22,428,368
221	Plastic products	10,655,466	10,771,266	10,771,263	10,771,263	10,771,263	10,771,263
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	4,055,903	4,102,882	4,102,880	4,102,880	4,102,880	4,102,880
25	Ceramic, stone and clay products	6,937,649	7,018,941	7,018,939	7,018,939	7,018,939	7,018,939
26	Iron and steel	31,685,859	31,891,739	31,891,726	31,891,726	31,891,726	31,891,726
27	Non-ferrous metals	12,649,932	12,770,970	12,770,966	12,770,966	12,770,966	12,770,966
28	Metal products	10,906,204	11,009,858	11,009,854	11,009,854	11,009,854	11,009,854
29	General-purpose machinery	10,412,988	10,548,820	10,548,816	10,548,816	10,548,816	10,548,816
30	Production machinery	15,617,674	15,825,479	15,825,473	15,825,473	15,825,473	15,825,473
31	Business oriented machinery	7,879,335	7,976,447	7,976,447	7,976,447	7,976,447	7,976,447
32	Electronic components	16,480,434	16,687,637	16,687,632	16,687,632	16,687,632	16,687,632
33	Electrical machinery	18,016,215	18,249,678	18,249,671	18,249,671	18,249,671	18,249,671
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	18,070,767	18,326,051	18,326,044	18,326,044	18,326,044	18,326,044
35	Transportation equipment	48,008,665	48,579,929	48,579,910	48,579,910	48,579,910	48,579,910
41	Construction	52,514,485	53,094,386	53,094,367	53,094,367	53,094,367	53,094,367
46	Electricity, gas and heat supply	21,188,293	21,352,272	21,352,266	21,352,266	21,352,266	21,352,266
47	Water supply	4,568,509	4,623,563	4,623,562	4,623,562	4,623,562	4,623,562
48	Waste management services	3,765,338	3,807,982	3,807,981	3,807,981	3,807,981	3,807,981
5111011	Wholesale trade	56,498,206	57,160,456	57,160,448	57,160,448	57,160,448	57,160,448
5112011	Retail trade	38,146,507	38,632,064	38,631,990	38,631,990	38,631,990	38,631,990
53	Finance and insurance	32,945,955	33,307,277	33,307,268	33,307,268	33,307,268	33,307,268

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
55	Real estate	71,189,199	72,024,905	72,024,913	72,024,913	72,024,913	72,024,913
5711011	Railway transport (passengers)	4,104,880	3,669,000	3,668,998	3,668,998	3,668,998	3,668,998
5712011	Railway transport (freight)	121,192	100,234	100,234	100,234	100,234	100,234
5721	Road transport service (bus, taxi)	2,989,485	2,930,944	2,930,942	2,930,942	2,930,942	2,930,942
5722011	Road freight transport (except self-transport)	11,994,942	10,280,047	10,280,053	10,280,053	10,280,053	10,280,053
5731011	Self-transport (passengers)	5,663,199	5,697,654	5,697,652	5,697,652	5,697,652	5,697,652
5732011	Self-transport (freight)	3,269,468	3,289,823	3,289,822	3,289,822	3,289,822	3,289,822
5741011	International shipping	4,289,454	4,261,187	4,261,186	4,261,186	4,261,186	4,261,186
5742011	Coastal and inland water transport (passengers)	124,029	103,388	103,388	103,388	103,388	103,388
5742012	Coastal and inland water transport (freight)	705,911	590,919	590,919	590,919	590,919	590,919
5743011	Harbor transport service	1,961,848	1,761,153	1,761,152	1,761,152	1,761,152	1,761,152
5751011	International air transport	1,114,879	924,388	924,388	924,388	924,388	924,388
5751012	Domestic air transport (passengers)	501,021	287,286	287,286	287,286	287,286	287,286
5751013	Domestic air transport (freight)	72,801	66,528	66,528	66,528	66,528	66,528
5751014	Aircraft service except air transport	33,866	34,167	34,167	34,167	34,167	34,167
5761011	Consigned freight forwarding	681,964	687,536	687,536	687,536	687,536	687,536
5771011	Storage facility service	1,766,981	1,785,383	1,785,382	1,785,382	1,785,382	1,785,382
578=5781-01;578901,02,03,04,05,06,09	Services relating to transport	1,081,875	1,083,393	1,083,393	1,083,393	1,083,393	1,083,393
5791011	Postal services and mail delivery	1,425,071	1,442,767	1,442,766	1,442,766	1,442,766	1,442,766
59	Information and communications	46,746,208	47,305,716	47,305,701	47,305,701	47,305,701	47,305,701
61	Public administration	39,405,194	39,879,025	39,879,008	39,879,008	39,879,008	39,879,008
63	Education and research	34,807,454	35,287,457	35,287,447	35,287,447	35,287,447	35,287,447
64	Medical, health care and welfare	60,232,811	60,959,092	60,959,310	60,959,310	60,959,310	60,959,310
65	Miscellaneous non-profit services	5,197,465	5,257,360	5,257,358	5,257,358	5,257,358	5,257,358
66	Business services	67,451,745	68,217,725	68,217,713	68,217,713	68,217,713	68,217,713
671	Hotels	2,717,785	2,750,585	2,750,584	2,750,584	2,750,584	2,750,584
672	Eating and drinking services	23,403,525	23,685,554	23,685,545	23,685,545	23,685,545	23,685,545
Others 67	Personal services (Except Eating, Drinking)	21,790,799	22,055,232	22,055,225	22,055,225	22,055,225	22,055,225
68	Office supplies	1,325,036	1,317,971	1,317,971	1,317,971	1,317,971	1,317,971

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
69	Activities not elsewhere classified	5,049,812	5,095,149	5,095,148	5,095,148	5,095,148	5,095,148
Fr 01	Agriculture, forestry and fishery	359,924	366,265	366,265	366,265	366,265	366,265
Fr 11	Food and beverage	2,656,698	2,701,503	2,701,502	2,701,502	2,701,502	2,701,502
Fr 15,16,25,2229,2311,2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	1,513,069	1,533,672	1,533,672	1,533,672	1,533,672	1,533,672
Fr 20	Drug, cosmetic, and film	139,138	140,626	140,626	140,626	140,626	140,626
Fr 34,39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	566,947	575,096	575,095	575,095	575,095	575,095
Fr 591,592,595102,03	Information and communication	115,338	116,405	116,405	116,405	116,405	116,405
Fr 53	Travel insurance and credit card admission fee	20,601	20,830	20,830	20,830	20,830	20,830
Fr 5711011	Railway (bullet train, railway, ski lift)	2,066,195	2,426,373	2,426,372	2,426,372	2,426,372	2,426,372
Fr 5721	Bus, taxi hire	398,757	469,952	469,952	469,952	469,952	469,952
Fr 5722011	Home delivery	105,702	107,271	107,271	107,271	107,271	107,271
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-
Fr 5742011	Water transport (coastal)	89,980	109,249	109,249	109,249	109,249	109,249
Fr 5751011	Airplane (international)	-	-	-	-	-	-
Fr 5751012	Airplane (domestic/Local)	959,757	1,090,389	1,090,389	1,090,389	1,090,389	1,090,389
Fr 2111-01	Gasoline cost	1,203,175	1,202,689	1,202,689	1,202,689	1,202,689	1,202,689
Fr 6612011	Car rental and other transportation expense	181,433	183,427	183,427	183,427	183,427	183,427
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	3,716,429	3,727,633	3,727,632	3,727,632	3,727,632	3,727,632
Fr 64	Medical and health care services	45,900	46,454	46,454	46,454	46,454	46,454
Fr 6711011	Accommodation	2,115,682	2,141,216	2,141,215	2,141,215	2,141,215	2,141,215
Fr 6821011	Eating and drinking services	2,070,466	2,095,423	2,095,422	2,095,422	2,095,422	2,095,422
Fr 6312,659,6611,67	Personal and other recreational services	1,422,355	1,439,640	1,439,639	1,439,639	1,439,639	1,439,639
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-
Fr 11	Food and beverage	64,484	65,588	65,588	65,588	65,588	65,588

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 15,16,25,2229.23 11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	153,816	155,889	155,889	155,889	155,889	155,889
Fr 20	Drug, cosmetic, and film	21,350	21,579	21,579	21,579	21,579	21,579
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	51,278	52,025	52,025	52,025	52,025	52,025
Fr 591.592, 595102.03	Information and communication	13,868	13,993	13,993	13,993	13,993	13,993
Fr 53	Travel insurance and credit card admission fee	34,004	34,382	34,382	34,382	34,382	34,382
Fr 5711011	Railway (bullet train, railway, ski lift)	32,743	33,147	33,147	33,147	33,147	33,147
Fr 5721	Bus, taxi hire	25,612	25,918	25,918	25,918	25,918	25,918
Fr 5722011	Home delivery	6,038	6,128	6,128	6,128	6,128	6,128
Fr 5741011	Water transport (ocean)	212	211	211	211	211	211
Fr 5742011	Water transport (coastal)	1,020	1,032	1,032	1,032	1,032	1,032
Fr 5751011	Airplane (international)	448,055	532,578	532,578	532,578	532,578	532,578
Fr 5751012	Airplane (domestic/Local)	23,213	23,449	23,449	23,449	23,449	23,449
Fr 2111-01	Gasoline cost	8,056	8,053	8,053	8,053	8,053	8,053
Fr 6612011	Car rental and other transportation expense	-	-	-	-	-	-
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	1,468,929	1,473,357	1,473,357	1,473,357	1,473,357	1,473,357
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	24,382	24,676	24,676	24,676	24,676	24,676
Fr 6821011	Eating and drinking services	28,554	28,898	28,898	28,898	28,898	28,898
Fr 6312, 659, 6611, 67	Personal and other recreational services	99,039	100,227	100,227	100,227	100,227	100,227
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-
Fr 11	Food and beverage	57,486	66,907	66,907	66,907	66,907	66,907
Fr 15,16,25,2229.23 11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	71,687	83,359	83,359	83,359	83,359	83,359

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 20	Drug, cosmetic, and film	40,136	46,557	46,557	46,557	46,557	46,557
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	81,291	94,400	94,400	94,400	94,400	94,400
Fr 591.592, 595102. 03	Information and communication	-	-	-	-	-	-
Fr 53	Travel insurance and credit card admission fee	-	-	-	-	-	-
Fr 5711011	Railway (bullet train, railway, ski lift)	45,673	53,365	53,365	53,365	53,365	53,365
Fr 5721	Bus, taxi hire	16,267	18,992	18,992	18,992	18,992	18,992
Fr 5722011	Home delivery	-	-	-	-	-	-
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-
Fr 5742011	Water transport (coastal)	-	-	-	-	-	-
Fr 5751011	Airplane (international)	384,775	448,019	448,019	448,019	448,019	448,019
Fr 5751012	Airplane (domestic/Local)	5,843	6,778	6,778	6,778	6,778	6,778
Fr 2111-01	Gasoline cost	-	-	-	-	-	-
Fr 6612011	Car rental and other transportation expense	6,055	7,084	7,084	7,084	7,084	7,084
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	4,304	5,025	5,025	5,025	5,025	5,025
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	237,527	276,374	276,374	276,374	276,374	276,374
Fr 6821011	Eating and drinking services	145,495	168,849	168,849	168,849	168,849	168,849
Fr 6312, 659, 6611, 67	Personal and other recreational services	19,482	22,735	22,735	22,735	22,735	22,735

Appendix 12b. Sensitive test of Constant Elasticity of Substitution between Domestic/Import good σ_D with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
01	Agriculture, forestry and fishery	14,238,847	14,478,447	14,477,536	14,472,744	14,470,540	14,467,374
06	Mining	24,123,416	24,236,432	24,236,009	24,233,784	24,232,760	24,231,289
11	Beverages and Foods	39,259,667	39,895,303	39,892,769	39,879,438	39,873,307	39,864,499
15	Textile product	6,060,385	6,139,508	6,139,175	6,137,424	6,136,619	6,135,462
16	Pulp, paper and wooden products	12,952,852	13,043,140	13,042,458	13,038,869	13,037,219	13,034,848
191	Printing, plate making and book binding	5,144,908	5,183,285	5,182,961	5,181,255	5,180,470	5,179,343
20	Chemical products	33,177,408	33,519,524	33,517,750	33,508,418	33,504,125	33,497,959
21	Petroleum and coal products	22,421,632	22,429,196	22,428,368	22,424,008	22,422,003	22,419,122
221	Plastic products	10,655,466	10,771,926	10,771,263	10,767,774	10,766,169	10,763,863
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	4,055,903	4,103,102	4,102,880	4,101,713	4,101,176	4,100,405
25	Ceramic, stone and clay products	6,937,649	7,019,349	7,018,939	7,016,780	7,015,787	7,014,361
26	Iron and steel	31,685,859	31,893,439	31,891,726	31,882,714	31,878,569	31,872,615
27	Non-ferrous metals	12,649,932	12,771,495	12,770,966	12,768,181	12,766,900	12,765,060
28	Metal products	10,906,204	11,010,506	11,009,854	11,006,425	11,004,848	11,002,583
29	General-purpose machinery	10,412,988	10,549,491	10,548,816	10,545,264	10,543,630	10,541,283
30	Production machinery	15,617,674	15,826,501	15,825,473	15,820,061	15,817,572	15,813,997
31	Business oriented machinery	7,879,335	7,976,928	7,976,447	7,973,915	7,972,751	7,971,078
32	Electronic components	16,480,434	16,688,651	16,687,632	16,682,268	16,679,801	16,676,257
33	Electrical machinery	18,016,215	18,250,820	18,249,671	18,243,623	18,240,841	18,236,845
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	18,070,767	18,327,166	18,326,044	18,320,138	18,317,421	18,313,519
35	Transportation equipment	48,008,665	48,582,994	48,579,910	48,563,684	48,556,221	48,545,500
41	Construction	52,514,485	53,097,821	53,094,367	53,076,193	53,067,835	53,055,827
46	Electricity, gas and heat supply	21,188,293	21,353,306	21,352,266	21,346,795	21,344,278	21,340,663
47	Water supply	4,568,509	4,623,870	4,623,562	4,621,941	4,621,196	4,620,125
48	Waste management services	3,765,338	3,808,241	3,807,981	3,806,618	3,805,990	3,805,089
5111011	Wholesale trade	56,498,206	57,163,746	57,160,448	57,143,098	57,135,119	57,123,656
5112011	Retail trade	38,146,507	38,634,280	38,631,990	38,619,939	38,614,397	38,606,435

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
53	Finance and insurance	32,945,955	33,309,481	33,307,268	33,295,620	33,290,263	33,282,567
55	Real estate	71,189,199	72,029,684	72,024,913	71,999,806	71,988,259	71,971,671
5711011	Railway transport (passengers)	4,104,880	3,669,242	3,668,998	3,667,717	3,667,127	3,666,281
5712011	Railway transport (freight)	121,192	100,240	100,234	100,205	100,191	100,172
5721	Road transport service (bus, taxi)	2,989,485	2,931,134	2,930,942	2,929,933	2,929,469	2,928,803
5722011	Road freight transport (except self-transport)	11,994,942	10,280,667	10,280,053	10,276,824	10,275,340	10,273,206
5731011	Self-transport (passengers)	5,663,199	5,697,897	5,697,652	5,696,362	5,695,768	5,694,916
5732011	Self-transport (freight)	3,269,468	3,289,963	3,289,822	3,289,079	3,288,738	3,288,248
5741011	International shipping	4,289,454	4,261,350	4,261,186	4,260,324	4,259,928	4,259,358
5742011	Coastal and inland water transport (passengers)	124,029	103,393	103,388	103,360	103,347	103,329
5742012	Coastal and inland water transport (freight)	705,911	590,946	590,919	590,777	590,711	590,617
5743011	Harbor transport service	1,961,848	1,761,247	1,761,152	1,760,653	1,760,423	1,760,093
5751011	International air transport	1,114,879	924,428	924,388	924,180	924,084	923,947
5751012	Domestic air transport (passengers)	501,021	287,301	287,286	287,208	287,173	287,121
5751013	Domestic air transport (freight)	72,801	66,532	66,528	66,507	66,498	66,484
5751014	Aircraft service except air transport	33,866	34,169	34,167	34,157	34,152	34,145
5761011	Consigned freight forwarding	681,964	687,574	687,536	687,334	687,242	687,109
5771011	Storage facility service	1,766,981	1,785,473	1,785,382	1,784,907	1,784,689	1,784,375
578=57 81- 01;5789 01,02,03 ,04,05,0 6,09	Services relating to transport	1,081,875	1,083,455	1,083,393	1,083,066	1,082,915	1,082,699
5791011	Postal services and mail delivery	1,425,071	1,442,865	1,442,766	1,442,247	1,442,008	1,441,665
59	Information and communications	46,746,208	47,308,847	47,305,701	47,289,145	47,281,531	47,270,593
61	Public administration	39,405,194	39,881,637	39,879,008	39,865,172	39,858,809	39,849,667
63	Education and research	34,807,454	35,289,921	35,287,447	35,274,424	35,268,435	35,259,831
64	Medical, health care and welfare	60,232,811	60,963,320	60,959,310	60,938,204	60,928,498	60,914,553
65	Miscellaneous non-profit services	5,197,465	5,257,708	5,257,358	5,255,516	5,254,669	5,253,451
66	Business services	67,451,745	68,222,295	68,217,713	68,193,601	68,182,511	68,166,581
671	Hotels	2,717,785	2,750,765	2,750,584	2,749,632	2,749,194	2,748,564
672	Eating and drinking services	23,403,525	23,687,102	23,685,545	23,677,352	23,673,584	23,668,170

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Others 67	Personal services (Except Eating, Drinking)	21,790,799	22,056,679	22,055,225	22,047,575	22,044,057	22,039,003
68	Office supplies	1,325,036	1,318,030	1,317,971	1,317,660	1,317,516	1,317,311
69	Activities not elsewhere classified	5,049,812	5,095,488	5,095,148	5,093,359	5,092,536	5,091,354
Fr 01	Agriculture, forestry and fishery	359,924	366,290	366,265	366,130	366,068	365,979
Fr 11	Food and beverage	2,656,698	2,701,681	2,701,502	2,700,559	2,700,125	2,699,502
Fr 15,16,25 ,2229.23 11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	1,513,069	1,533,770	1,533,672	1,533,156	1,532,919	1,532,579
Fr 20	Drug, cosmetic, and film	139,138	140,634	140,626	140,581	140,560	140,531
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	566,947	575,133	575,095	574,899	574,809	574,679
Fr 591.592, 595102. 03	Information and communication	115,338	116,412	116,405	116,365	116,346	116,320
Fr 53	Travel insurance and credit card admission fee	20,601	20,831	20,830	20,822	20,819	20,814
Fr 5711011	Railway (bullet train, railway, ski lift)	2,066,195	2,426,533	2,426,372	2,425,523	2,425,132	2,424,571
Fr 5721	Bus, taxi hire	398,757	469,983	469,952	469,789	469,714	469,606
Fr 5722011	Home delivery	105,702	107,278	107,271	107,230	107,212	107,185
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-
Fr 5742011	Water transport (coastal)	89,980	109,256	109,249	109,212	109,195	109,170
Fr 5751011	Airplane (international)	-	-	-	-	-	-
Fr 5751012	Airplane (domestic/Local)	959,757	1,090,455	1,090,389	1,090,040	1,089,879	1,089,649
Fr 2111- 01	Gasoline cost	1,203,175	1,202,738	1,202,689	1,202,433	1,202,315	1,202,146
Fr 6612011	Car rental and other transportation expense	181,433	183,440	183,427	183,360	183,330	183,286
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	3,716,429	3,727,887	3,727,632	3,726,291	3,725,675	3,724,789
Fr 64	Medical and health care services	45,900	46,457	46,454	46,438	46,430	46,420
Fr 6711011	Accommodation	2,115,682	2,141,356	2,141,215	2,140,473	2,140,132	2,139,643
Fr 6821011	Eating and drinking services	2,070,466	2,095,560	2,095,422	2,094,697	2,094,364	2,093,884

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 6312, 659, 6611, 67	Personal and other recreational services	1,422,355	1,439,735	1,439,639	1,439,139	1,438,908	1,438,577
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-
Fr 11	Food and beverage	64,484	65,592	65,588	65,565	65,555	65,539
Fr 15,16,25, 2229,23 11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	153,816	155,899	155,889	155,836	155,811	155,776
Fr 20	Drug, cosmetic, and film	21,350	21,580	21,579	21,572	21,568	21,564
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	51,278	52,028	52,025	52,007	51,999	51,987
Fr 591.592, 595102. 03	Information and communication	13,868	13,994	13,993	13,988	13,986	13,983
Fr 53	Travel insurance and credit card admission fee	34,004	34,385	34,382	34,370	34,365	34,356
Fr 5711011	Railway (bullet train, railway, ski lift)	32,743	33,149	33,147	33,135	33,130	33,122
Fr 5721	Bus, taxi hire	25,612	25,920	25,918	25,909	25,905	25,899
Fr 5722011	Home delivery	6,038	6,128	6,128	6,125	6,124	6,123
Fr 5741011	Water transport (ocean)	212	211	211	211	211	211
Fr 5742011	Water transport (coastal)	1,020	1,032	1,032	1,032	1,031	1,031
Fr 5751011	Airplane (international)	448,055	532,611	532,578	532,402	532,321	532,205
Fr 5751012	Airplane (domestic/Local)	23,213	23,450	23,449	23,442	23,438	23,433
Fr 2111-01	Gasoline cost	8,056	8,053	8,053	8,051	8,050	8,049
Fr 6612011	Car rental and other transportation expense	-	-	-	-	-	-
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	1,468,929	1,473,457	1,473,357	1,472,827	1,472,583	1,472,233
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	24,382	24,678	24,676	24,667	24,663	24,658
Fr 6821011	Eating and drinking services	28,554	28,900	28,898	28,888	28,883	28,877
Fr 6312, 659, 6611, 67	Personal and other recreational services	99,039	100,234	100,227	100,192	100,176	100,153
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 11	Food and beverage	57,486	66,910	66,907	66,891	66,884	66,873
Fr 15,16,25,2229.23,11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	71,687	83,362	83,359	83,340	83,332	83,320
Fr 20	Drug, cosmetic, and film	40,136	46,558	46,557	46,548	46,544	46,538
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	81,291	94,404	94,400	94,380	94,370	94,356
Fr 591.592, 595102.03	Information and communication	-	-	-	-	-	-
Fr 53	Travel insurance and credit card admission fee	-	-	-	-	-	-
Fr 5711011	Railway (bullet train, railway, ski lift)	45,673	53,368	53,365	53,349	53,341	53,331
Fr 5721	Bus, taxi hire	16,267	18,993	18,992	18,986	18,984	18,980
Fr 5722011	Home delivery	-	-	-	-	-	-
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-
Fr 5742011	Water transport (coastal)	-	-	-	-	-	-
Fr 5751011	Airplane (international)	384,775	448,053	448,019	447,839	447,756	447,638
Fr 5751012	Airplane (domestic/Local)	5,843	6,779	6,778	6,777	6,776	6,775
Fr 2111-01	Gasoline cost	-	-	-	-	-	-
Fr 6612011	Car rental and other transportation expense	6,055	7,084	7,084	7,082	7,081	7,079
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	4,304	5,025	5,025	5,023	5,023	5,022
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	237,527	276,388	276,374	276,302	276,269	276,221
Fr 6821011	Eating and drinking services	145,495	168,856	168,849	168,807	168,788	168,761
Fr 6312, 659, 6611, 67	Personal and other recreational services	19,482	22,736	22,735	22,728	22,725	22,721

Appendix 12c. Sensitive test of Constant Elasticity of Substitution of production factors (L,K) σ_{VA} with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
01	Agriculture, forestry and fishery	14,238,847	14,478,390	14,477,53 6	14,476,76 6	14,476,672	14,476,59 5
06	Mining	24,123,416	24,236,299	24,236,00 9	24,235,74 8	24,235,716	24,235,69 0
11	Beverages and Foods	39,259,667	39,893,828	39,892,76 9	39,891,81 4	39,891,697	39,891,60 3
15	Textile product	6,060,385	6,139,219	6,139,175	6,139,136	6,139,131	6,139,127
16	Pulp, paper and wooden products	12,952,852	13,042,703	13,042,45 8	13,042,23 6	13,042,209	13,042,18 7
191	Printing, plate making and book binding	5,144,908	5,182,943	5,182,961	5,182,977	5,182,979	5,182,980
20	Chemical products	33,177,408	33,520,098	33,517,75 0	33,515,63 3	33,515,374	33,515,16 4
21	Petroleum and coal products	22,421,632	22,429,885	22,428,36 8	22,427,00 0	22,426,833	22,426,69 7
221	Plastic products	10,655,466	10,771,165	10,771,26 3	10,771,35 2	10,771,363	10,771,37 2
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	4,055,903	4,102,963	4,102,880	4,102,806	4,102,797	4,102,790
25	Ceramic, stone and clay products	6,937,649	7,019,371	7,018,939	7,018,549	7,018,502	7,018,463
26	Iron and steel	31,685,859	31,895,684	31,891,72 6	31,888,15 6	31,887,721	31,887,36 7
27	Non-ferrous metals	12,649,932	12,771,647	12,770,96 6	12,770,35 2	12,770,277	12,770,21 6
28	Metal products	10,906,204	11,009,861	11,009,85 4	11,009,84 8	11,009,847	11,009,84 7
29	General-purpose machinery	10,412,988	10,548,987	10,548,81 6	10,548,66 1	10,548,642	10,548,62 7
30	Production machinery	15,617,674	15,825,622	15,825,47 3	15,825,33 8	15,825,321	15,825,30 8
31	Business oriented machinery	7,879,335	7,976,518	7,976,447	7,976,383	7,976,376	7,976,369
32	Electronic components	16,480,434	16,687,353	16,687,63 2	16,687,88 3	16,687,914	16,687,93 9
33	Electrical machinery	18,016,215	18,249,819	18,249,67 1	18,249,53 7	18,249,520	18,249,50 7

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	18,070,767	18,326,190	18,326,04 4	18,325,91 2	18,325,896	18,325,88 3
35	Transportation equipment	48,008,665	48,579,961	48,579,91 0	48,579,86 3	48,579,857	48,579,85 3
41	Construction	52,514,485	53,093,540	53,094,36 7	53,095,11 3	53,095,204	53,095,27 8
46	Electricity, gas and heat supply	21,188,293	21,353,077	21,352,26 6	21,351,53 4	21,351,445	21,351,37 2
47	Water supply	4,568,509	4,623,946	4,623,562	4,623,216	4,623,174	4,623,140
48	Waste management services	3,765,338	3,807,861	3,807,981	3,808,090	3,808,103	3,808,114
5111011	Wholesale trade	56,498,206	57,162,331	57,160,44 8	57,158,75 0	57,158,543	57,158,37 5
5112011	Retail trade	38,146,507	38,633,005	38,631,99 0	38,631,07 4	38,630,963	38,630,87 2
53	Finance and insurance	32,945,955	33,306,901	33,307,26 8	33,307,59 9	33,307,639	33,307,67 2
55	Real estate	71,189,199	72,028,761	72,024,91 3	72,021,44 1	72,021,018	72,020,67 3
5711011	Railway transport (passengers)	4,104,880	3,669,190	3,668,998	3,668,825	3,668,804	3,668,787
5712011	Railway transport (freight)	121,192	100,239	100,234	100,230	100,229	100,229
5721	Road transport service (bus, taxi)	2,989,485	2,930,822	2,930,942	2,931,051	2,931,064	2,931,075
5722011	Road freight transport (except self-transport)	11,994,942	10,280,245	10,280,05 3	10,279,88 0	10,279,859	10,279,84 2
5731011	Self-transport (passengers)	5,663,199	5,698,024	5,697,652	5,697,316	5,697,276	5,697,242
5732011	Self-transport (freight)	3,269,468	3,290,019	3,289,822	3,289,644	3,289,623	3,289,605
5741011	International shipping	4,289,454	4,261,437	4,261,186	4,260,960	4,260,932	4,260,910
5742011	Coastal and inland water transport (passengers)	124,029	103,389	103,388	103,387	103,387	103,387
5742012	Coastal and inland water transport (freight)	705,911	590,955	590,919	590,887	590,883	590,880
5743011	Harbor transport service	1,961,848	1,761,227	1,761,152	1,761,085	1,761,077	1,761,070
5751011	International air transport	1,114,879	924,398	924,388	924,379	924,378	924,377
5751012	Domestic air transport (passengers)	501,021	287,295	287,286	287,278	287,277	287,276
5751013	Domestic air transport (freight)	72,801	66,531	66,528	66,526	66,525	66,525
5751014	Aircraft service except air transport	33,866	34,168	34,167	34,166	34,166	34,166

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
5761011	Consigned freight forwarding	681,964	687,562	687,536	687,512	687,510	687,507
5771011	Storage facility service	1,766,981	1,785,463	1,785,382	1,785,310	1,785,301	1,785,294
578=57 81- 01;5789 01,02,03 ,04,05,0 6,09	Services relating to transport	1,081,875	1,083,434	1,083,393	1,083,356	1,083,351	1,083,348
5791011	Postal services and mail delivery	1,425,071	1,442,545	1,442,766	1,442,966	1,442,990	1,443,010
59	Information and communications	46,746,208	47,307,395	47,305,70 1	47,304,17 1	47,303,985	47,303,83 3
61	Public administration	39,405,194	39,879,438	39,879,00 8	39,878,61 8	39,878,571	39,878,53 2
63	Education and research	34,807,454	35,286,507	35,287,44 7	35,288,29 3	35,288,396	35,288,48 0
64	Medical, health care and welfare	60,232,811	60,959,937	60,959,31 0	60,958,74 3	60,958,674	60,958,61 8
65	Miscellaneous non-profit services	5,197,465	5,257,262	5,257,358	5,257,444	5,257,455	5,257,464
66	Business services	67,451,745	68,218,403	68,217,71 3	68,217,09 2	68,217,016	68,216,95 4
671	Hotels	2,717,785	2,750,613	2,750,584	2,750,558	2,750,555	2,750,552
672	Eating and drinking services	23,403,525	23,685,825	23,685,54 5	23,685,29 3	23,685,262	23,685,23 7
Others 67	Personal services (Except Eating, Drinking)	21,790,799	22,055,637	22,055,22 5	22,054,85 3	22,054,807	22,054,77 0
68	Office supplies	1,325,036	1,317,982	1,317,971	1,317,961	1,317,959	1,317,958
69	Activities not elsewhere classified	5,049,812	5,095,937	5,095,148	5,094,437	5,094,350	5,094,279
Fr 01	Agriculture, forestry and fishery	359,924	366,289	366,265	366,243	366,240	366,238
Fr 11	Food and beverage	2,656,698	2,701,560	2,701,502	2,701,449	2,701,443	2,701,438
Fr 15,16,25 ,2229,23 11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	1,513,069	1,533,657	1,533,672	1,533,685	1,533,687	1,533,688
Fr 20	Drug, cosmetic, and film	139,138	140,636	140,626	140,616	140,615	140,614
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	566,947	575,097	575,095	575,094	575,094	575,094
Fr 591.592, 595102. 03	Information and communication	115,338	116,407	116,405	116,403	116,403	116,403
Fr 53	Travel insurance and credit card admission fee	20,601	20,829	20,830	20,830	20,830	20,830

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 5711011	Railway (bullet train, railway, ski lift)	2,066,195	2,426,484	2,426,372	2,426,271	2,426,258	2,426,248
Fr 5721	Bus, taxi hire	398,757	469,936	469,952	469,967	469,968	469,970
Fr 5722011	Home delivery	105,702	107,268	107,271	107,273	107,274	107,274
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-
Fr 5742011	Water transport (coastal)	89,980	109,251	109,249	109,247	109,247	109,247
Fr 5751011	Airplane (international)	-	-	-	-	-	-
Fr 5751012	Airplane (domestic/Local)	959,757	1,090,422	1,090,389	1,090,359	1,090,355	1,090,352
Fr 2111-01	Gasoline cost	1,203,175	1,202,781	1,202,689	1,202,606	1,202,596	1,202,588
Fr 6612011	Car rental and other transportation expense	181,433	183,464	183,427	183,393	183,389	183,386
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	3,716,429	3,727,801	3,727,632	3,727,479	3,727,460	3,727,445
Fr 64	Medical and health care services	45,900	46,454	46,454	46,453	46,453	46,453
Fr 6711011	Accommodation	2,115,682	2,141,237	2,141,215	2,141,195	2,141,192	2,141,190
Fr 6821011	Eating and drinking services	2,070,466	2,095,447	2,095,422	2,095,400	2,095,397	2,095,395
Fr 6312, 659, 6611, 67	Personal and other recreational services	1,422,355	1,439,668	1,439,639	1,439,613	1,439,610	1,439,607
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-
Fr 11	Food and beverage	64,484	65,589	65,588	65,587	65,587	65,586
Fr 15,16,25, 2229,23, 11,2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	153,816	155,888	155,889	155,890	155,890	155,890
Fr 20	Drug, cosmetic, and film	21,350	21,580	21,579	21,577	21,577	21,577
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	51,278	52,025	52,025	52,025	52,025	52,025
Fr 591.592, 595102.03	Information and communication	13,868	13,993	13,993	13,993	13,993	13,993
Fr 53	Travel insurance and credit card admission fee	34,004	34,382	34,382	34,383	34,383	34,383
Fr 5711011	Railway (bullet train, railway, ski lift)	32,743	33,148	33,147	33,145	33,145	33,145
Fr 5721	Bus, taxi hire	25,612	25,917	25,918	25,919	25,919	25,920

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 5722011	Home delivery	6,038	6,127	6,128	6,128	6,128	6,128
Fr 5741011	Water transport (ocean)	212	211	211	211	211	211
Fr 5742011	Water transport (coastal)	1,020	1,032	1,032	1,032	1,032	1,032
Fr 5751011	Airplane (international)	448,055	532,588	532,578	532,569	532,567	532,566
Fr 5751012	Airplane (domestic/Local)	23,213	23,450	23,449	23,448	23,448	23,448
Fr 2111-01	Gasoline cost	8,056	8,053	8,053	8,052	8,052	8,052
Fr 6612011	Car rental and other transportation expense	-	-	-	-	-	-
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	1,468,929	1,473,424	1,473,357	1,473,296	1,473,289	1,473,283
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	24,382	24,676	24,676	24,676	24,676	24,676
Fr 6821011	Eating and drinking services	28,554	28,898	28,898	28,898	28,898	28,898
Fr 6312, 659, 6611, 67	Personal and other recreational services	99,039	100,229	100,227	100,226	100,226	100,226
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-
Fr 11	Food and beverage	57,486	66,913	66,907	66,902	66,901	66,900
Fr 15,16,25,2229,2311,2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	71,687	83,351	83,359	83,366	83,367	83,368
Fr 20	Drug, cosmetic, and film	40,136	46,558	46,557	46,556	46,555	46,555
Fr 34,39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	81,291	94,392	94,400	94,408	94,409	94,409
Fr 591.592, 595102.03	Information and communication	-	-	-	-	-	-
Fr 53	Travel insurance and credit card admission fee	-	-	-	-	-	-
Fr 5711011	Railway (bullet train, railway, ski lift)	45,673	53,371	53,365	53,359	53,358	53,357
Fr 5721	Bus, taxi hire	16,267	18,987	18,992	18,996	18,996	18,997
Fr 5722011	Home delivery	-	-	-	-	-	-
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 5742011	Water transport (coastal)	-	-	-	-	-	-
Fr 5751011	Airplane (international)	384,775	448,036	448,019	448,003	448,001	448,000
Fr 5751012	Airplane (domestic/Local)	5,843	6,779	6,778	6,778	6,778	6,778
Fr 2111-01	Gasoline cost	-	-	-	-	-	-
Fr 6612011	Car rental and other transportation expense	6,055	7,086	7,084	7,082	7,082	7,082
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	4,304	5,025	5,025	5,025	5,025	5,025
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	237,527	276,371	276,374	276,377	276,377	276,378
Fr 6821011	Eating and drinking services	145,495	168,843	168,849	168,854	168,854	168,855
Fr 6312, 659, 6611, 67	Personal and other recreational services	19,482	22,736	22,735	22,733	22,733	22,733

Appendix 12d. Sensitive test of price elasticity of demand of tourism export σ_P with 20% cost reduction of all transportation modes: Gross output (production) of cross-industry

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
01	Agriculture, forestry and fishery	14,238,847	14,477,169	14,477,536	14,480,331	14,482,910	14,490,625
06	Mining	24,123,416	24,234,021	24,236,009	24,251,415	24,266,001	24,311,122
11	Beverages and Foods	39,259,667	39,894,082	39,892,769	39,882,544	39,872,793	39,842,359
15	Textile product	6,060,385	6,139,719	6,139,175	6,134,989	6,131,059	6,119,029
16	Pulp, paper and wooden products	12,952,852	13,042,621	13,042,458	13,041,206	13,040,043	13,036,526
191	Printing, plate making and book binding	5,144,908	5,183,145	5,182,961	5,181,549	5,180,228	5,176,204
20	Chemical products	33,177,408	33,518,729	33,517,750	33,510,318	33,503,471	33,483,031
21	Petroleum and coal products	22,421,632	22,424,293	22,428,368	22,459,933	22,489,798	22,582,095
221	Plastic products	10,655,466	10,770,813	10,771,263	10,774,757	10,778,075	10,788,371
222, 231	Rubber products; Leather, fur skins and miscellaneous leather products	4,055,903	4,102,905	4,102,880	4,102,698	4,102,541	4,102,115
25	Ceramic, stone and clay products	6,937,649	7,019,488	7,018,939	7,014,706	7,010,731	6,998,562
26	Iron and steel	31,685,859	31,893,703	31,891,726	31,876,552	31,862,365	31,819,190
27	Non-ferrous metals	12,649,932	12,771,453	12,770,966	12,767,234	12,763,750	12,753,166
28	Metal products	10,906,204	11,010,591	11,009,854	11,004,193	10,998,887	10,982,686
29	General-purpose machinery	10,412,988	10,550,239	10,548,816	10,537,851	10,527,555	10,496,040
30	Production machinery	15,617,674	15,827,894	15,825,473	15,806,820	15,789,298	15,735,636
31	Business oriented machinery	7,879,335	7,977,678	7,976,447	7,966,967	7,958,060	7,930,780
32	Electronic components	16,480,434	16,686,659	16,687,632	16,695,149	16,702,237	16,724,040
33	Electrical machinery	18,016,215	18,252,022	18,249,671	18,231,566	18,214,568	18,162,551
34, 3911, 3919	Information and communication electronics equipment; Toys and games, sporting and athletic goods; Miscellaneous manufacturing products	18,070,767	18,328,543	18,326,044	18,306,791	18,288,702	18,233,293
35	Transportation equipment	48,008,665	48,577,719	48,579,910	48,597,025	48,613,399	48,664,706
41	Construction	52,514,485	53,102,411	53,094,367	53,032,381	52,974,125	52,795,619
46	Electricity, gas and heat supply	21,188,293	21,352,496	21,352,266	21,350,462	21,348,727	21,343,252
47	Water supply	4,568,509	4,623,630	4,623,562	4,623,030	4,622,512	4,620,860
48	Waste management services	3,765,338	3,807,608	3,807,981	3,810,829	3,813,466	3,821,396
5111011	Wholesale trade	56,498,206	57,159,539	57,160,448	57,167,580	57,174,438	57,196,055
5112011	Retail trade	38,146,507	38,633,208	38,631,990	38,622,624	38,613,846	38,587,047

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
53	Finance and insurance	32,945,955	33,310,691	33,307,268	33,280,882	33,256,074	33,180,029
55	Real estate	71,189,199	72,035,541	72,024,913	71,943,021	71,866,069	71,630,332
5711011	Railway transport (passengers)	4,104,880	3,669,441	3,668,998	3,665,590	3,662,388	3,652,582
5712011	Railway transport (freight)	121,192	100,228	100,234	100,284	100,332	100,478
5721	Road transport service (bus, taxi)	2,989,485	2,931,319	2,930,942	2,928,039	2,925,311	2,916,959
5722011	Road freight transport (except self-transport)	11,994,942	10,279,958	10,280,053	10,280,804	10,281,533	10,283,855
5731011	Self-transport (passengers)	5,663,199	5,697,493	5,697,652	5,698,864	5,699,993	5,703,406
5732011	Self-transport (freight)	3,269,468	3,289,833	3,289,822	3,289,737	3,289,659	3,289,421
5741011	International shipping	4,289,454	4,260,830	4,261,186	4,263,953	4,266,578	4,274,720
5742011	Coastal and inland water transport (passengers)	124,029	103,403	103,388	103,274	103,167	102,840
5742012	Coastal and inland water transport (freight)	705,911	590,860	590,919	591,381	591,819	593,169
5743011	Harbor transport service	1,961,848	1,761,014	1,761,152	1,762,221	1,763,232	1,766,364
5751011	International air transport	1,114,879	930,711	924,388	875,483	829,293	686,871
5751012	Domestic air transport (passengers)	501,021	287,301	287,286	287,169	287,059	286,725
5751013	Domestic air transport (freight)	72,801	66,530	66,528	66,512	66,497	66,450
5751014	Aircraft service except air transport	33,866	34,160	34,167	34,223	34,275	34,436
5761011	Consigned freight forwarding	681,964	687,518	687,536	687,678	687,813	688,236
5771011	Storage facility service	1,766,981	1,785,346	1,785,382	1,785,664	1,785,934	1,786,776
578=5781-01;578901,02,03,04,05,06,09	Services relating to transport	1,081,875	1,081,747	1,083,393	1,096,115	1,108,116	1,145,063
5791011	Postal services and mail delivery	1,425,071	1,442,841	1,442,766	1,442,191	1,441,649	1,439,990
59	Information and communications	46,746,208	47,309,606	47,305,701	47,275,628	47,247,389	47,160,952
61	Public administration	39,405,194	39,885,855	39,879,008	39,826,251	39,776,678	39,624,813
63	Education and research	34,807,454	35,291,340	35,287,447	35,257,484	35,229,373	35,143,427
64	Medical, health care and welfare	60,232,811	60,970,226	60,959,310	60,875,199	60,796,157	60,553,991
65	Miscellaneous non-profit services	5,197,465	5,258,068	5,257,358	5,251,882	5,246,735	5,230,960
66	Business services	67,451,745	68,214,622	68,217,713	68,241,708	68,264,478	68,335,107
671	Hotels	2,717,785	2,751,078	2,750,584	2,746,781	2,743,207	2,732,258
672	Eating and drinking services	23,403,525	23,689,536	23,685,545	23,654,785	23,625,867	23,537,226

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Others 67	Personal services (Except Eating, Drinking)	21,790,799	22,058,732	22,055,225	22,028,187	22,002,762	21,924,810
68	Office supplies	1,325,036	1,317,939	1,317,971	1,318,219	1,318,452	1,319,167
69	Activities not elsewhere classified	5,049,812	5,094,700	5,095,148	5,098,617	5,101,895	5,112,016
Fr 01	Agriculture, forestry and fishery	359,924	366,248	366,265	366,397	366,518	366,884
Fr 11	Food and beverage	2,656,698	2,701,728	2,701,502	2,699,757	2,698,112	2,693,048
Fr 15,16,25,2229,23,11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	1,513,069	1,533,780	1,533,672	1,532,836	1,532,052	1,529,658
Fr 20	Drug, cosmetic, and film	139,138	140,630	140,626	140,594	140,565	140,477
Fr 34,39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	566,947	575,163	575,095	574,577	574,090	572,598
Fr 591.592, 595102.03	Information and communication	115,338	116,412	116,405	116,349	116,296	116,134
Fr 53	Travel insurance and credit card admission fee	20,601	20,832	20,830	20,813	20,798	20,750
Fr 5711011	Railway (bullet train, railway, ski lift)	2,066,195	2,426,686	2,426,372	2,423,949	2,421,673	2,414,701
Fr 5721	Bus, taxi hire	398,757	470,016	469,952	469,460	468,997	467,581
Fr 5722011	Home delivery	105,702	107,273	107,271	107,248	107,228	107,164
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-
Fr 5742011	Water transport (coastal)	89,980	109,265	109,249	109,123	109,004	108,641
Fr 5751011	Airplane (international)	-	-	-	-	-	-
Fr 5751012	Airplane (domestic/Local)	959,757	1,090,472	1,090,389	1,089,753	1,089,157	1,087,339
Fr 2111-01	Gasoline cost	1,203,175	1,202,444	1,202,689	1,204,589	1,206,386	1,211,938
Fr 6612011	Car rental and other transportation expense	181,433	183,418	183,427	183,498	183,565	183,767
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	3,716,429	3,721,962	3,727,632	3,771,446	3,812,778	3,940,026
Fr 64	Medical and health care services	45,900	46,462	46,454	46,390	46,329	46,145
Fr 6711011	Accommodation	2,115,682	2,141,599	2,141,215	2,138,255	2,135,472	2,126,949
Fr 6821011	Eating and drinking services	2,070,466	2,095,775	2,095,422	2,092,701	2,090,143	2,082,301

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 6312, 659, 6611, 67	Personal and other recreational services	1,422,355	1,439,847	1,439,639	1,438,036	1,436,529	1,431,910
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-
Fr 11	Food and beverage	64,484	65,594	65,588	65,544	65,503	65,375
Fr 15,16,25, 2229.23, 11.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	153,816	155,897	155,889	155,823	155,761	155,574
Fr 20	Drug, cosmetic, and film	21,350	21,579	21,579	21,574	21,569	21,556
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	51,278	52,032	52,025	51,973	51,925	51,776
Fr 591.592, 595102. 03	Information and communication	13,868	13,994	13,993	13,986	13,980	13,961
Fr 53	Travel insurance and credit card admission fee	34,004	34,386	34,382	34,355	34,330	34,251
Fr 5711011	Railway (bullet train, railway, ski lift)	32,743	33,151	33,147	33,116	33,087	32,997
Fr 5721	Bus, taxi hire	25,612	25,922	25,918	25,893	25,868	25,795
Fr 5722011	Home delivery	6,038	6,128	6,128	6,126	6,125	6,122
Fr 5741011	Water transport (ocean)	212	211	211	211	211	212
Fr 5742011	Water transport (coastal)	1,020	1,032	1,032	1,031	1,030	1,026
Fr 5751011	Airplane (international)	448,055	532,624	532,578	532,225	531,895	530,889
Fr 5751012	Airplane (domestic/Local)	23,213	23,451	23,449	23,438	23,427	23,395
Fr 2111-01	Gasoline cost	8,056	8,051	8,053	8,066	8,078	8,115
Fr 6612011	Car rental and other transportation expense	-	-	-	-	-	-
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	1,468,929	1,471,116	1,473,357	1,490,674	1,507,011	1,557,306
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	24,382	24,680	24,676	24,642	24,610	24,512
Fr 6821011	Eating and drinking services	28,554	28,903	28,898	28,860	28,825	28,717
Fr 6312, 659, 6611, 67	Personal and other recreational services	99,039	100,241	100,227	100,121	100,021	99,714
Fr 01	Agriculture, forestry and fishery	-	-	-	-	-	-

Industry code	Name	Based scenario/ Benchmark	T0	T1: Central	T2	T3	T4
Fr 11	Food and beverage	57,486	62,344	66,907	102,221	135,600	238,632
Fr 15,16,25,2229,2311.2312	Fiber, wood, paper, ceramic, glass products; Shoes and bags	71,687	77,690	83,359	127,194	168,579	296,115
Fr 20	Drug, cosmetic, and film	40,136	43,360	46,557	71,337	94,814	167,495
Fr 34.39 and Sport	Camera Glasses & Watch; Electric appliances; and sport equipment	81,291	88,057	94,400	143,295	189,263	330,155
Fr 591.592, 595102.03	Information and communication	-	-	-	-	-	-
Fr 53	Travel insurance and credit card admission fee	-	-	-	-	-	-
Fr 5711011	Railway (bullet train, railway, ski lift)	45,673	49,906	53,365	79,777	104,303	178,312
Fr 5721	Bus, taxi hire	16,267	17,758	18,992	28,423	37,188	63,650
Fr 5722011	Home delivery	-	-	-	-	-	-
Fr 5741011	Water transport (ocean)	-	-	-	-	-	-
Fr 5742011	Water transport (coastal)	-	-	-	-	-	-
Fr 5751011	Airplane (international)	384,775	417,515	448,019	683,976	906,855	1,594,183
Fr 5751012	Airplane (domestic/Local)	5,843	6,328	6,778	10,237	13,475	23,349
Fr 2111-01	Gasoline cost	-	-	-	-	-	-
Fr 6612011	Car rental and other transportation expense	6,055	6,627	7,084	10,570	13,802	23,537
Fr 578	Entry fee, Parking, Toll road fee, expressway toll	4,304	4,698	5,025	7,521	9,841	16,851
Fr 64	Medical and health care services	-	-	-	-	-	-
Fr 6711011	Accommodation	237,527	258,203	276,374	415,639	545,586	940,065
Fr 6821011	Eating and drinking services	145,495	157,648	168,849	254,887	335,413	580,821
Fr 6312, 659, 6611, 67	Personal and other recreational services	19,482	21,255	22,735	34,048	44,569	76,371