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KAMEYAMA, Yoshihiro
Saga University / Asian Growth Research Institute

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Inbound Tourism Demand and Japanese Regional Productivity Before the COVID-19 Pandemic*: The role of tourism agglomeration and electronic payment

KAMEYAMA Yoshihiro*

* *Faculty of Economics, Saga University and Asian Growth Research Institute (AGI)*

Abstract

This study utilizes prefectural panel data for the 2014-19 period to examine whether inbound demand contributes to the productivity growth of local economies. Before the COVID-19 pandemic, the destinations of inbound visitors gradually diffused to non-metropolitan regions, and a certain number of foreign visitors to Japan would visit many non-metropolitan destinations. With an increase in the number of foreign visitors to each region, IT-related factors, represented by cashless payments and reservation services through travel websites, have advanced throughout Japan. How did the agglomeration of tourism and the use of IT because of the dispersion of visitors to non-metropolitan areas of Japan affect local economies?

In this study, the number of visitors to Japan is measured in terms of Tourism Market Potential (TMP), which is "the size of metropolitan and non-metropolitan (tourism) demand from foreign visitors to Japan," and is used for the agglomeration effect. TMP does not measure the gross effect in terms of the simple scale of the number of visitors to Japan but rather the net effect, which includes accessibility from the origin to the destination. We then analyze how regional TMPs and IT-related factors affect productivity and wages in the prefectures. The estimation results indicate that both TMP- and IT-related factors have a positive impact on productivity and wages in the prefectures visited.

Keywords: Inbound Tourism, Regional Productivity, Cashless Payment, FIT (Foreign Independent Tours)

JEL classification: R11, Z32, Z38

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1. Introduction

According to a report by the Japan National Tourism Organization (JNTO: Japan National Tourism), the number of foreign visitors to Japan was around five million at the beginning of the inbound promotion, that is, the Visit Japan Campaign (VJC) in 2003. Although it took 10 years for the number of foreign visitors to Japan to reach 10 million, double the number in 2003, the number of foreign visitors to Japan accelerated quickly, reaching 24.04 million in 2016, 28.69 million in 2017, 28.56 million in 2018, and 31.88 million in 2019. It is expected to increase further in 2020, which is the year Japan hosted the Olympics. However, the coronavirus pandemic restricted travel worldwide. Therefore, the inbound boom that had been steadily building since the VJC collapsed. Over the past three years, we have had no prospects for foreign visitors to Japan. The JNTO reported that the number of foreign visitors to Japan in September 2022 was approximately 206,500. This figure decreased by 90.9% since September 2019. Following the lead of other countries in eliminating entry restrictions, the Japanese government eased entry restrictions for foreign visitors to Japan on October 11, 2022. These include lifting the cap on the number of inbound visitors, exempting short-term visitors from obtaining visas, and lifting the ban on foreign individual tours. The yen's depreciation further increased inbound demand.

Inbound consumption in 2019 was approximately 4.8 trillion yen (Japan Tourism Agency, 2020). The share of inbound consumption in the GDP was approximately 0.7%. Its production ripple effect was approximately 7.8 trillion yen (Ministry of Economy, Trade and Industry, 2020). To attract these economic benefits to their regions, many local governments have promoted foreign visitors. Before the coronavirus disease, although foreign visitors to Japan were concentrated in metropolitan areas or prominent tourist destinations (Hokkaido, Kyoto, and Okinawa Prefectures) with high accessibility, lodging capacity, and shopping diversity, a certain number would visit the countryside as well. With an increase in the number of foreign visitors to each region, the agglomeration of tourism and IT-related factors has advanced in the tourism industry throughout Japan. Particularly, cashless payments and reservation services via travel websites have become popular. How have the effects of the agglomeration of tourism and the use of IT, because of the dispersion of these visitors to local areas in Japan, affected the local economy?

Based on this discussion, we present our hypotheses. Has the increase in the number of foreign visitors to Japan, the target value for inbound promotion, contributed to gross regional product (GRP), productivity, and wages? It is necessary to verify the effect of net, which encompasses accessibility from origin to destination, rather than the effect of gross, which is a simple scale for the number of foreign visitors.

With this problematic intention, this study utilizes prefectural panel data for the period 2014-19 to examine whether inbound demand contributes to the productivity growth of local economies. This paper utilizes the number of visitors to Japan measured in terms of Tourism Market Potential (TMP), which is "the size of local (tourism) demand from foreign visitors to Japan. It does not measure the gross effect by a simple scale of the number of visitors to Japan, but the net effect, which includes accessibility from origin to destination. We then analyze how regional TMPs and IT-related factors affect productivity and wages in the prefectures.

2. Literature Review

The Japan Standard Industrial Classification (JSIC) has no classification of the tourism industry. The tourism industry itself is included in the “transportation,” and “accommodation and food services” of the JSIC. Transportation, accommodation, and food services have a variety of their own operations and are used daily for commuting, shopping, and business. They are also used for tourism. Therefore, it is difficult to extract a limited portion of tourism purposes from them. This makes it difficult to develop regional versions of tourism-related census data. Morikawa (2016, 2017) and Fukao, Kim, and Kwon (2019) analyzed the productivity of the tourism industry in Japan. Morikawa (2016, 2017) focuses on accommodation services. Fukao, Kim, and Kwon (2019) extensively focused on the tourism industry, including accommodation and food services.

Morikawa (2016) quantitatively analyzes the effects of foreign visitors to Japan on the occupancy rate of accommodation services using prefectural aggregate-level panel data. The estimation results indicate that an increase in the number of foreign guests has a large positive effect on the occupancy rate of the accommodation industry because of a demand-leveling effect and this effect alone can increase the measured total factor productivity (TFP) of the lodging industry by approximately 1 percentage point. Morikawa (2017) quantitatively analyzed the effects of foreign visitors on the productivity of accommodation services using lodging-level microdata for 2011-2015. Morikawa (2017) estimated a production function using the total number of overnight guests as the explained variable. The main explanatory variables are facility capacity, which is a proxy variable for capital stock; the number of employees, which represents labor input; and the ratio of foreign guests. The estimation results indicate that an increase in the number of foreign visitors to Japan contributes significantly to an increase in the TFPQ, as measured by accommodation services. This effect was greater for businesses and city hotels. Fukao, Kim, and Kwon (2019) analyzed the productivity of Japan's tourism industry from 1994-2015 and showed that productivity in accommodation and food services has consistently stagnated. Furthermore, several previous studies on individual cities and regions have used questionnaire survey data to explore the relationship between inbound tourism and local economies. We can identify many case studies in the Japanese literature that utilize questionnaire survey data. Many of these studies conducted quantitative analyses based on questionnaire survey data.

Subsequently, by looking at international studies, we can identify several that analyze the impact of tourism on local economies by using regional versions of tourism-related census data. Paci and Marrocu (2014) analyzed the effects of domestic and international overnight stays on urban economies using a production function framework for 179 EU cities. Liu and Wu (2019) revealed the impact of tourism productivity on economic growth and illustrated the spillover effects between tourism and other sectors caused by the externalities of physical and human capital, and public services. Lia, Liub and Songc (2019) calibrated 30 provincial CGE models and demonstrated that an increase in international tourism receipts decreased the outputs of a number of primary and secondary industries, with a larger decrease in reform-focused industries through crowding-out effects. Croes, Ridderstaat, Bak and Zientara (2021) investigated the effects of tourism specialization and the human capital of the tourism industry on regional development in Poland. As agglomeration economies, they set the location quotient of tourism industry as for the meaning of specialization. Kim, Williams, Park and Chen (2021) investigate the direct and indirect spatial spillover effects of agglomeration economies on tourism industry productivity. They used microeconomic panel data from the United Kingdom. As agglomeration economies, they set the location quotient, skilled labor pooling, knowledge spillover, and spatial spillover effects of the tourism industry. These studies suggest that agglomeration effects based on regional specialization in the tourism industry or knowledge spillover effects based on tourism human resources are effective in improving regional productivity. It is worthwhile to examine these effects in the context of regional economies in Japan.

As these studies show, it is necessary to set GRP, productivity, and wages as explained variables and examine the factor analysis of the same, to identify whether inbound promotion contributes to regional development. In Japan, census data for the regional versions of the tourism industry are not sufficiently developed in monetary terms. However, a lot of data on monetary terms has become available recently. Furthermore, the number of total foreign overnight stays by nationality (place of origin) and prefecture in the "Overnight Travel Statistics Survey" by the Japan Tourism Agency, Ministry of Land, Infrastructure, Transport and Tourism, is effective as data on the scale of demand. Based on these data, this study first addresses the IT responses of inbound travelers. Second, it addresses the inbound traveler-based tourism market potential, which is a projection of the market potential (MP) concept conventionally used in the analysis of industrial clusters. The details of these issues will be discussed in the next section, but these issues have not been addressed in previous studies.

3. Methodology and Data Description

3.1 Specification of Estimation Equation

In this study, we examine how inbound travelers' IT responses and TMPs affect productivity and wages in prefectures using panel data for prefectures in 2014-19. This was the period after the VJC (before the global division because of the pandemic) when there was no excess or shortage of data for econometric analysis. Before the econometric analysis, we identify the estimating equations and describe the data.

There are several empirical analysis papers based on MP reduced from the theory of *Spatial Economics*. As described by Hanson (2012), the MP of industrial agglomeration (manufacturing) can be defined and measured as "the magnitude of regional demand, aggregated by industry, by dividing the value of shipments of manufactured goods by the transportation costs of individual firms. Several studies, such as Hering and Paillacar (2016) and González-Val, Tirado-Fabregat, and Viladecans-Marsal (2017) analyzed the impact of MP on industrial agglomeration, urban productivity, and population mobility.

This study examines how TMP and IT-related factors affect regional (prefectural) GRP, productivity, and wages based on standard Cobb-Douglas production functions. For the actual estimation, the same function was used to separately estimate all industries, accommodation, and food services, as well as transportation and postal services. We identify the estimated equations as follows:

We set the production function for each region (prefecture) $Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta}$. Where Y_{it} is the value added, A_{it} is TFP, K_{it} is capital stock, L_{it} is labor force, i is the region of destination, and t is a year. A_{it} which is TFP at the regional level, can be expressed as $A_{ikt} = (Inbound_{ikt})^{\delta} V_{ikt}$ for $Inbound_{it}$. The production function was then log-transformed by dividing both sides by L_{it} under the assumption of $\alpha + \beta = 1$. After that, we log-transform the original equation to obtain Equation (1). Hering and Paillacar (2016) and González-Val, Tirado-Fabregat and Viladecans-Marsal (2017) set TFP as MP. This study sets $Inbound_{it}$ as consisting of TMPs and IT-related factors; the IT-related factors are payment and travel methods of inbound travelers. Data is obtained from the *Results of the Consumption Trends of International Visitors to Japan Survey* by the Japan Tourism Agency, Ministry of Land, Infrastructure, Transport and Tourism.

$$\ln(Y_{it} / L_{it}) = \alpha \ln(K_{it} / L_{it}) + \delta(Inbound_{it}) + \eta_i + \mu_{it} \quad (1)$$

The wage is equal to the marginal productivity of labor. With respect to the wage w_{it}, we obtain $w_{it} = (1-\alpha) A_{it} K_{it}^{\alpha} L_{it}^{1-\alpha}$. We transformed this logarithmically using Equation (2).

$$\ln(w_{it}) = \alpha \ln(K_{it}) + \beta \ln(L_{it}) + \delta l(Inbound_{it}) + \eta_i + \mu_{it} \quad (2)$$

Furthermore, based on the human capital theory, we extend the estimation equation by assuming a Mincertype wage function in which the effect of investment in education, including vocational training and work experience, increases wages through the accumulation of human capital. This study addresses the effects of the number of employees in different industries as a worker attribute. To examine these effects, we introduced the number of employees in tourism-related industries. In terms of tourism-related employment, this study focuses on TL, the number of in-county tourism employees of government agencies; L-afs, the number of in-county employees in the accommodation and food services industries; and L-tps, the number of in-county employees in the transportation and postal services industries. As these are all part of L, in this estimation, L is defined as the original L minus these values. We then set TL, L-afs, and L-tps as the new independent variables.

The η_i is region-specific effects and μ_{it} is an error term in equations (1) and (2). We set the shift term in the basic form of equations (1) and (2) as TMP and IT-related factors. In this paper, these effects are investigated in a panel data analysis. The details of the TMP calculation method are described in section 3.2. Regarding the basic independent variables; Y_{it}, K_{it}, L_{it}, w_{it}, we get these from the Cabinet Office's "Prefectural Accounts" (each year version). Y_{it} is gross prefectural product (real value), K_{it} is prefectural capital formation, L_{it} is the number of workers in the prefecture. Wages w_{it} are realized using the deflator from the same statistics. For variables other than wages, the data were obtained separately for all industries, that is, the accommodation and food services, and transportation and postal services.

3.2 Setting the Tourism Market Potential

Next, the TMP was set with reference to the MP, which has been used in the analysis of industrial agglomeration in manufacturing industries. We define TMP as "the size of the regional (tourism) demand for foreign visitors to Japan." This is calculated by dividing the number of foreign visitors by nationality (place of origin) in each prefecture by the transportation time from the originating foreign country (place of origin) to the destination prefecture (place of destination), and then summing up by region. This definition can be formulated as in Equation (3): We used this to calculate the TMP for each prefecture (regional i). This data processing allowed us to verify the effect of net, which encompasses accessibility from origin to destination, rather than the effect of gross, which is a simple scale that includes the number of inbound travelers.

$$TMP_{it} = \frac{NoFVJ_{it}}{t_{iit}} + \sum_{f} \frac{NoFVJ_{ft}}{Time_{fit}} \tag{3}$$

The $NoFVJ_{it}$ (number of foreign visitors to Japan) is the total number of foreign visitors to Japan as a destination (prefecture i). t_{iit} is travel time to the destination=destination (prefecture). The first term is the total number of inbound travelers in each prefecture divided by travel time ***t*** within each prefecture. $NoFVJ_{ft}$ is the number of foreign visitors to Japan from an overseas origin (country) f. $Time_{fit}$ is the international flight time between the two points of origin (country) f and the destination (prefecture) i. The second term would be the number of foreign visitors to Japan by nationality (place of origin) for each prefecture, discounted by international flight hours by nationality (place of origin).

The dataset required for calculating the TMP was prepared using the following procedure. $NoFVJ_{ft}$ shows the total number of foreign overnight guests by nationality (place of origin) and prefecture obtained from the annual survey reports of the Japan Tourism Agency, Ministry of Land, Infrastructure, Transport, and Tourism. The nationalities (places of origin) of foreign visitors were limited to South Korea, China, Hong Kong, and Taiwan, as they accounted for 71.0% of the total (2007-19 average) foreign visitors to Japan. The reason for this is that foreign visitors from South Korea, China, Hong Kong, and Taiwan account for 64.0% (2010-19 average) of total inbound travel spending. Moreover, international flight times between these other two points of origin (country) and destination (prefecture) are limited to those at base airports in the greater economic zone or to Tokyo or Kansai International Airport. To measure the travel time of foreign visitors to Japan within the destination (prefecture), travel time from international airports to JR stations in each prefecture was determined using "Ekispert " from Val Research Institute Co. However, for prefectures without an airport or regular international flights, the travel time from the nearest international hub airport (in the prefecture) to the railroad (JR) hub station in the prefecture was calculated. Regarding the point of departure (country), we provide airport addresses for Incheon (Korea), Pudong (China), Hong Kong, and Taoyuan (Taiwan). Based on these factors, we obtained airtime data from the GLOBAL BUSINESS TRAVEL (https://gbtnta.jp/webflightschedule/).

4. Empirical Findings

In this section, we test the effects of TMP. The degree of IT use represented by cashless payment and reservation services through travel websites has been better at promoting economic growth in each regional economy. Here, we present the estimation results of the fixed-effects model validated using the Hausman test. The estimation results are shown separately by total industry, accommodation and food services, and transport and postal services. The estimation results for the entire industry are presented in Table 1. Those for accommodation, food services, transport, and postal services are shown in Tables 2 and 3, respectively.

Table 1-1 reveals that, along with the capital equipment ratio, TMP, an indicator of tourism agglomeration, contributes to labor productivity in the regional economy, confirming that the effects of credit payments and group tours contribute to labor productivity if we remove this TMP from the independent variables.

Table 1-2 reveals that, along with capital accumulation, the labor force and TMP as indicators of tourism agglomeration contribute to the total GRP of the regional economy. In Tables 1-2a and 1-2b, we can see the positive effects of group tours and FIT. Again, we can confirm that the effects of credit payments contribute to total GRP if we remove this TMP from the independent variables.

Tables 1-3 and 1-4 reveal the impact of each variable on the wages of the total regional industry. Each table reveals that capital accumulation and TMP as indicators of tourism agglomeration, contribute to the wages of the total regional industry. The results in Table 1-4 show that government-related tourism has a positive effect on wages. Furthermore, the number of employees in accommodation and food services had a positive effect on wages, albeit only partially. This suggests that tourism-related human capital formation is effective. In these cases, group tours and FIT contribute to wages, with and without TMP. Moreover, we can see the positive and negative effects of credit and debit card use respectively.

Table 1: Effects of TMP and degree of IT use during travel to each regional economy

(1-1) Dependent variable: ln (Y/L) of total industries

	1-1a		1-1b		1-1c		1-1d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln (K/L)	0.20246	0.000	0.21846	0.000	0.20576	0.000	0.21036	0.000
ln TMP	0.01781	0.001			0.02294	0.000	0.01833	0.000
Cash-share	0.00007	0.909	0.00045	0.484	0.00009	0.888		
Credit-share	0.00028	0.246	0.00070	0.001	0.00017	0.471		
Debit-share	-0.00042	0.157	-0.00010	0.727	-0.00049	0.104		
Grouptour	0.00055	0.225	0.00107	0.015			0.00050	0.262
FIT	0.00019	0.624	0.00044	0.270			0.00016	0.682
Adj. R^2	0.330		0.298		0.323		0.329	
N	282		282		282		282	

(1-2) Dependent variable: lnY of the total industry

	1-2a		1-2b		1-2c		1-2d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln K	0.19607	0.000	0.21565	0.000	0.19677	0.000	0.20610	0.000
ln L	0.34617	0.000	0.38408	0.000	0.36864	0.000	0.33999	0.000
ln TMP	0.02135	0.000			0.02602	0.000	0.02325	0.000
Cash-share	0.00006	0.917	0.00051	0.415	0.00020	0.742		
Credit-share	0.00035	0.120	0.00084	0.000	0.00027	0.235		
Debit-share	-0.00034	0.234	0.00003	0.921	-0.00038	0.185		
Grouptour	0.00095	0.031	0.00151	0.001			0.00088	0.043
FIT	0.00067	0.085	0.00090	0.025			0.00063	0.101
Adj. R^2	0.489		0.451		0.482		0.488	
N	282		282		282		282	

(1-3) Dependent variable: ln w of the total industry

	1-3a		1-3b		1-3c		1-3d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln K	0.21728	0.000	0.25065	0.000	0.21318	0.000	0.22996	0.000
ln L	0.01996	0.852	0.08456	0.466	0.11012	0.291	0.00798	0.941
ln TMP	0.03637	0.000			0.03827	0.000	0.03800	0.000
Cash-share	0.00034	0.616	0.00109	0.133	0.00065	0.338		
Credit-share	0.00048	0.063	0.00130	0.000	0.00045	0.075		

Debit-share	-0.00064	0.046	-0.00001	0.967	-0.00063	0.054		
Grouptour	0.00140	0.005	0.00235	0.000			0.00134	0.007
FIT	0.00137	0.002	0.00176	0.000			0.00134	0.002
Adj. R^2	0.523		0.437		0.506		0.514	
N	282		282		282		282	

(1-4) Dependent variable: ln w of the total industry

	1-4a		1-4b		1-4c		1-4d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln K	0.2063	0.000	0.2313	0.000	0.2049	0.000	0.2166	0.000
ln (L-TL)	0.0176	0.755	0.0294	0.625	0.0505	0.369	0.0311	0.580
ln TL	0.0187	0.050	0.0257	0.011	0.0193	0.047	0.0176	0.061
ln L-afs	0.0280	0.147	0.0457	0.025	0.0330	0.091	0.0365	0.052
ln L-tps	0.0102	0.647	0.0267	0.254	0.0250	0.254	0.0152	0.492
ln TMP	0.0322	0.000			0.0332	0.000	0.0328	0.000
Cash-share	0.0002	0.725	0.0008	0.268	0.0005	0.421		
Credit-share	0.0004	0.116	0.0010	0.000	0.0004	0.132		
Debit-share	-0.0006	0.071	0.0000	0.944	-0.0005	0.109		
Grouptour	0.0013	0.009	0.0020	0.000			0.0012	0.014
FIT	0.0013	0.003	0.0016	0.001			0.0012	0.005
Adj. R^2	0.532		0.470		0.517		0.527	
N	282		282		282		282	

Note: Significant at the following each level; p<0.001、p<0.01、p<0.05、p<0.1

Table 2 presents the estimation results for accommodation and food services. It reveals that along with the capital equipment ratio, TMP, an indicator of tourism agglomeration, and credit card payments contribute to the labor productivity of accommodation and food services in each regional economy. We can confirm that the effects of cash, credit card, and debit card payments, group tours, and FIT contribute to labor productivity if we remove this TMP from the independent variables.

Table 2-2 reveals that, along with capital accumulation, labor force, and TMP as indicators of tourism agglomeration, credit card payments contribute to the value-added of accommodation and food services in each regional economy. In Table 2-2b, we see the positive effects of group tours and FIT if TMP is removed from the independent variables.

Table 2: Effects of TMP and degree of IT use during travel to each regional economy

(2-1) Dependent variable: ln (Y/L) for accommodation and food services

	2-1a		2-1b		2-1c		2-1d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln (K/L)	0.79755	0.000	0.68886	0.000	0.79414	0.000	0.79233	0.000
ln TMP	0.11138	0.000			0.10223	0.000	0.13114	0.000
Cash-share	0.00139	0.367	0.00299	0.087	0.00172	0.261		
Credit-share	0.00152	0.007	0.00400	0.000	0.00172	0.002		
Debit-share	-0.00007	0.921	0.00181	0.022	0.00011	0.879		
Grouptour	0.00035	0.749	0.00307	0.011			0.00006	0.954
FIT	0.00108	0.260	0.00222	0.041			0.00103	0.281
Adj. R^2	0.615		0.498		0.610		0.608	
N	282		282		282		282	

(2-2) Dependent variable: ln Y for accommodation and food services

	2-2a		2-2b		2-2c		2-2d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln K	0.48716	0.000	0.24121	0.007	0.46649	0.000	0.52685	0.000
ln L	0.15110	0.000	0.21263	0.000	0.15089	0.000	0.16340	0.000
ln TMP	0.09714	0.000			0.08956	0.000	0.11151	0.000
Cash-share	0.00029	0.850	0.00102	0.544	0.00049	0.744		
Credit-share	0.00147	0.007	0.00344	0.000	0.00161	0.003		
Debit-share	-0.00123	0.105	-0.00031	0.709	-0.00116	0.127		
Grouptour	0.00035	0.742	0.00254	0.025			0.00000	0.998
FIT	0.00090	0.331	0.00173	0.090			0.00074	0.424
Adj. R^2	0.308		0.150		0.304		0.288	
N	282		282		282		282	

Note: Significant at the following each level; p<0.001、p<0.01、p<0.05、p<0.1

Table 3 shows the estimation results for transport and postal services. Table 3-1 reveals that along with the capital equipment ratio, TMP, an indicator of tourism agglomeration, and credit card payments contribute to the labor productivity of the transport and postal services in each regional economy. Moreover, we confirm the negative effects of debit card payments on the contribution to the transport and postal service labor productivity.

Table 3-2 reveals that along with capital accumulation, labor force, and TMP as indicators of tourism agglomeration, credit card payments contribute to the value-added of the transport and postal services in each regional economy. In Tables 3-2a and 3-2c, we see that the negative effects of debit card payments contribute to the labor productivity of the transport and postal services.

Table 3: Effects of TMP and degree of IT use during travel to each regional economy

(3-1) Dependent variable: ln (Y/L) for transportation and postal services.

	3-1a		3-1b		3-1c		3-1d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln (K/L)	0.94631	0.000	0.94434	0.000	0.94879	0.000	0.94241	0.000
ln TMP	0.00722	0.156			0.00893	0.044	0.01219	0.001
Cash-share	0.00008	0.903	0.00022	0.717	-0.00006	0.917		
Credit-share	0.00074	0.001	0.00093	0.000	0.00070	0.002		
Debit-share	-0.00074	0.012	-0.00061	0.030	-0.00080	0.007		
Grouptour	-0.00034	0.451	-0.00013	0.760			-0.00053	0.242
FIT	-0.00050	0.199	-0.00041	0.287			-0.00062	0.115
Adj. R^2	0.951		0.950		0.950		0.948	
N	282		282		282		282	

(3-2) Dependent variable: ln Y for the transport and postal services

	3-2a		3-2b		3-2c		3-2d	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
ln K	0.83320	0.000	0.84945	0.000	0.83100	0.000	0.83116	0.000
ln L	0.03019	0.032	0.03740	0.007	0.02745	0.049	0.03414	0.018
ln TMP	0.01254	0.015			0.01431	0.002	0.01908	0.000
Cash-share	0.00033	0.590	0.00052	0.393	0.00024	0.697		
Credit-share	0.00081	0.000	0.00110	0.000	0.00077	0.000		
Debit-share	-0.00064	0.026	-0.00044	0.114	-0.00068	0.018		
Grouptour	-0.00022	0.615	0.00010	0.820			-0.00040	0.360
FIT	-0.00036	0.343	-0.00024	0.530			-0.00046	0.233
Adj. R^2	0.784		0.779		0.784		0.771	
N	282		282		282		282	

Note: Significant at the following each level; p<0.001、p<0.01、p<0.05、p<0.1

These estimation results indicate that the capital equipment ratio and TMP, as indicators of tourism agglomeration, impact productivity for all industries; however, the coefficient of determination is not high. This can be attributed to the fact that other factors such as the effect of manufacturing agglomeration, which contributes to the productivity of all industries, are not included. Furthermore, the parameter estimates show that the capital equipment ratio is larger than the TMP, which in turn, is larger than the IT-related factor. In other words, they affect productivity in this order. A comparison of the estimated values indicates that the effects of TMP- and IT-related factors were small.

Subsequently, the estimated results for accommodation and food services and transportation and postal services indicate that the capital equipment ratio and TMP affect the productivity of these tourism-related industries. The coefficient of determination is also higher for these industries than for all other industries. This indicates that tourism agglomeration has a certain effect on tourism-related industries, such as accommodation and food services and transportation and postal services. This study also verified the positive effects of credit card payments, group tours, and FIT. This is indicative of one aspect of the effects of IT use, suggesting that its introduction increases productivity and adds value. Attention is often drawn to over-tourism in newspapers and television. Therefore, group tours are often viewed as a nuisance. However, the results of this analysis indicate that group tours have a positive effect. Group tours work according to time plans and economies of scale are at work in food reservations. Therefore, group tours contribute efficiently to the economy. Finally, the effectiveness of debit card payment has been detected negatively in some tables. Not all stores accept all electronic payments because of their initial costs. In this sense, we understand that this result is because debit card payment requires special terminals. Moreover, the debit card is tied directly to the bank account; because the amount of the debit card's usage range is tied to the deposit balance, it tends to make small purchases (small transactions) rather than large ones. Consequently, when the number of small purchases increases, lines are formed in the cash register. These are a nuisance to other customers who sometimes give up on their purchases. This suggests that small purchases using debit cards are linked to the store’s reduced productivity.

5. Conclusion

In this study, we examined how inbound travelers' IT responses and TMPs affected productivity and wages in prefectures using 2014–19 panel data for prefectures. The difference between previous studies and the present one is two-fold. First, this study addresses the IT responses of inbound travelers. Second, it considers the inbound traveler-based tourism market potential, which is a projection of the MP concept conventionally used in the analysis of industrial clusters.

The estimation results indicate that both IT-related factors and TMP positively impact productivity and wages in each economy. The small estimates for IT-related factors and TMP can be attributed to the small size of the tourism economy and the low productivity of the tourism industry. The lower tourism-related estimates are consistent with Fukao, Kim, and Kwon (2019). Whether the target of each region's tourism attraction is foreign visitors to Japan or domestic Japanese tourists, it is necessary to increase the economic scale of the tourism industry and promote IT-related factors to increase the tourism industry's productivity. To achieve this, it is necessary to enhance the existing IT network for credit card payment services while switching to other cashless payment methods with relatively low initial costs. This promotion of IT is not only with regard to payments and reservations, but can also be achieved through unmanned food delivery services, mechanization of kitchens, and so on. This needs to be promoted regardless of the restaurant or hotel size. Fukao, Kim, and Kwon (2019) revealed that productivity in accommodation and food services has consistently stagnated, and this must be overcome through the promotion of IT.

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