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Asymmetrical Informative Estimation for Macroeconomic Model: Special Case in the Tourism Sector of Thailand

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Abstract**—**This paper used an asymmetric informative concept to apply in the macroeconomic model estimation of the tourism sector in Thailand. The variables used to statistically analyze are Thailand international and domestic tourism revenues, the expenditures of foreign and domestic tourists, service investments by private sectors, service investments by the government of Thailand, Thailand service imports and exports, and net service income transfers. All of data is a time-series index which was observed between 2002 and 2015. Empirically, the tourism multiplier and accelerator were estimated by two statistical approaches. The first was the result of the Generalized Method of Moments model (GMM) based on the assumption which the tourism market in Thailand had perfect information (Symmetrical data). The second was the result of the Maximum Entropy Bootstrapping approach (MEboot) based on the process that attempted to deal with imperfect information and reduced uncertainty in data observations (Asymmetrical data). In addition, the tourism leakages were investigated by a simple model based on the injections and leakages concept. The empirical findings represented the parameters computed from the MEboot approach which is different from the GMM method. However, both of the MEboot estimation and GMM model suggests that Thailand's tourism sectors are in a period capable of stimulating the economy.

Keywords**—**Thailand tourism, maximum entropy bootstrapping approach, macroeconomic model, asymmetric information.

I. INTRODUCTION

ECONOMISTS working in many different areas have their own propose of problem solutions. One of critical economic aspects, the (Keynes-) Ramsey rule that informs how optimal growth should develop over the time has been spotlighted in this paper. Following this neoclassical economic theory, many econometricians have tried to conclude a large effort to obtain an accurate estimation of parameters which they already had some information [1], [25]. The attentive question that the authors set in this paper is how we can ensure that our estimated parameters from some information are the best solution which precisely represents the whole groups of data samplings. As a result, an econometrical tool that can overcome the asymmetrical informative condition is crucially required.

In this paper, the optimum growth idea is applied to clarify the structure of tourism growth in Thailand. Generally, the trend of tourism income received from domestic and foreign tourists was continuously increased during 2001 to 2015 (as seen in Fig. 1) [23]. However, with this graphical increment only, we cannot statistically state that the tourism trend is satisfied since asymmetrical information and uncertain conditions are neglected. Moreover, these statistical conditions still appear in our time-series variables inevitably. Hence, this is why the MEboot, which satisfactorily deals with imperfect information and reduces data uncertainty, is chosen to compare with the GMM mode.

To specifically express the details of tourism growth, a tourism multiplier, accelerator, and leakage must be investigated. Empirically, time-series factors in this paper are estimated in two models and two assumptions. Firstly, the model contains the assumption that the variables have the symmetrical informative condition. Secondly, the variables hold imperfect information condition. Ultimately, the findings of this research will inform the general and specific structure of tourism in Thailand more clearly, and these research results will support authorities to activated tourism policies appropriately.

II. RESEARCH OBJECTIVES

In this paper, the objectives are divided into two sections; 1) to statistically compare the details of the tourism multiplier and accelerator in Thailand's economy estimated by employing the GMM which is based on the assumption of symmetrical information, and the MEboot which uses the presupposition of asymmetrical information; 2) to investigate the leakage in Thailand's tourism explained by the circular flow model.

III. THE SCOPE OF RESEARCH AND CONCEPTUAL FRAMEWORK

This quantitative research used yearly time-series data such as Thailand tourism revenues, tourists' expenditures, private investments in service sectors, government expenditures in tourism, Thailand service exports, Thailand service imports, and net services income and transfers between 2001 and 2015. Graphically explaining, the motivation for studying the tourism multiplier and accelerator is described in Fig. 2, and the consideration of the tourism leakage is shown in Fig. 3.

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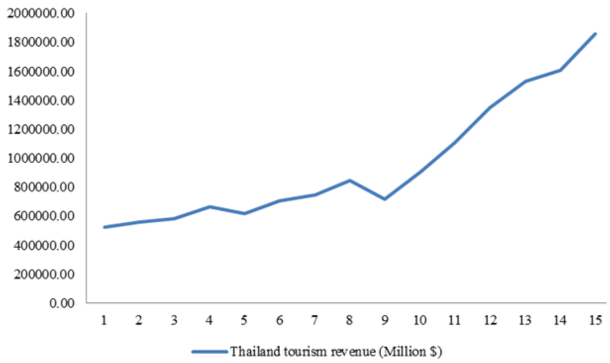

Fig. 1 Thailand tourism revenue (foreign and domestic tourists) between 2001 and 2015

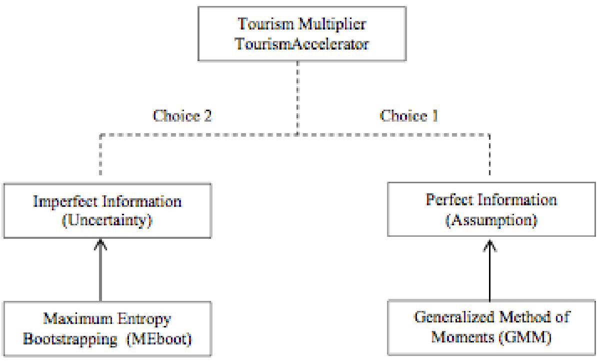

Fig. 2 The estimation of the multiplier and accelerator in Thailand tourism

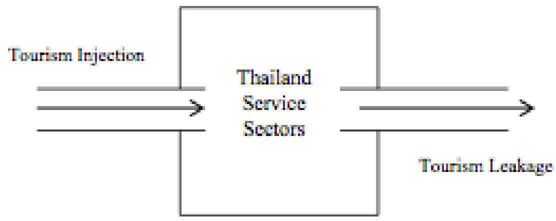

Fig. 3 The circular model flow model

IV. Literatures and Statistical Models

A. The Concept of the Tourism Multiplier

The multiplier effect refers to an economic idea which was formulated in the nineteenth century, but not formalized till the conceptual development of John Maynard Keynes in the 1930s [2]. The multiplier effect is quantified in two terms: the multiplier effect from tourism and the expenditure effect in term of tourism, considering the creation of new income in the national economy and the multiplier effect from foreign investments. For instance, the money spent by tourists on a hotel will be categorized as a new investment (equipment, facilities, and utilities) [3]. The tourism multiplier tends to be higher in larger regions and countries with self-sufficient economic systems and lower in smaller regions and countries where earnings leak out of the economy through importing goods and services to satisfy tourism demand [4]. For empirically expressing tourism in Thailand, the multiplier can be illustrated by using an equation as

$$Y = C + I + G + (X - M) \tag{1}$$

Y: gross tourism revenue in Thailand (foreign and domestic income), C: foreign and domestic tourists' fixed expenditures, I: tourism investments in Thailand, G: government expenditures in Thailand tourism, X: services exports from Thailand, M: service imports in Thailand.

In this paper, the impact of tourism in economy applied from [5] relays on the Keynesian multiplier as:

$$Y = C_a + b[Y - (T_a + tY)] + I_a + iY + G + [X - (M + mY)]. \tag{2}$$

$$Multiplier = \frac{1}{1 - b + t - i + m}. \tag{3}$$

where b is the marginal propensity to the expense of tourists in Thailand, t is the marginal propensity to tax the tourism sector in Thailand, i is the marginal propensity to invest in the tourism sector in Thailand, and m is the marginal propensity to import tourism services in Thailand.

B. The Concept of the Tourism Accelerator

The principle of the accelerator introduced by [6] is a crucial parallel concept to Keynes' multiplier [7]. The accelerator is solely a special case in the neoclassical theory of investment, which the price variable is fixed to be constant [8]. In other words, the principle is the proportion of demand that an increment in the consumption of goods accelerates the investment to manifold. Hence, the acceleration of investment positively relies on the marginal propensity to consume.

To illustrate the acceleration principle, this can be written as (4):

$$Accelerator = \frac{b}{i}. \tag{4}$$

where b is the marginal propensity to the expense of tourists in Thailand, and i is the marginal propensity to invest in the tourism sector in Thailand. From the equation, it states that if the demand for consumption goods increases, then it will be an increment in the demand for the factors of production like capital goods [7].

C. The Concept of the Tourism Leakage

When other sectors of the domestic economy cannot be assembled, a significant part of the development potential stemming from tourism activities is lost. Leakages are defined as the loss of foreign exchange and other hidden costs deriving from tourism-related activities [9]. Some leakage happens internally, or it can occur externally. Leakage can have many formations; interest rates are just one way for money to leak out of an economy. High taxes can have the same effect, as can excessive saving or higher interest in purchasing imported goods [10]. Here, the concept of injections and leakages is the movement that tourism proceeds, and the "circular flow model" has significant implications explaining the incoming and outgoing of money in the industry and the economy as a whole. The injection model are the earnings of tourism firms from local and foreign tourists (Export), government expenditures on infrastructures and facilities (Government Spending), and expenditures provided for developing new tourism businesses (Investments). On the other hand, the leakages are a discontinuation of profits from tourism businesses (Savings), revenues accumulated by the government from tourism services and products (Tax), and expenditures made to collect tourism related products and services from overseas (Import) [11]. To explain more clearly, the circular flow model can be written as

$$\text{Net Tourism Income} = \text{Injections} - \text{Leakages} = [X+G+I]-[S+T+M]. \quad (5)$$

D.The Generalized Method of Moments

The approach is the GMM introduced by [12]. Basically, the idea behind this approach is to employ the GMM estimator directly to orthogonal conditions stated by the first-order conditions of factors' optimization problems [13]-[15]. Especially, in the classical paper by Hansen and Singleton in 1982, the movement of assets over time in a consumption-based capital asset pricing model was analyzed [17]. To define the notation, Let β_0 denote the $k \times 1$ parameter vector of interest, and let $g_t(\beta)$ denote an $m \times 1$ vector of moments that relies on data through β, with $m \geq k$. The vector of moments is stationary and satisfies the orthogonal condition; $Eg_t(\beta_0)=0$ [16]. The systems of a equation with additive regression errors are considered and written the orthogonality condition as

$$EW_t u_t = 0. \quad (6)$$

In (6), W_t is an $m \times a$ matrix of instruments and u_t is a $a \times 1$ vector of regression errors from the a equations in the system. Thus, the dependence of u_t on the parameter factor in (6) is suppressed without confusion.

We let $\hat{D}$ be an $m \times m$ positive definite weighting matrix emphasizing that $\hat{D}$ probably be sample dependent. Let T be the sample size. Hansen's GMM estimator nominates $\hat{\beta}$ for minimizing [16],

$$\left[T^{-1}\sum_{t=1}^{T} g_t(\beta)\right]' \hat{D} \left[T^{-1}\sum_{t=1}^{T} g_t(\beta)\right]. \quad (7)$$

Equation (7) displayed that general condition, $\hat{\beta}$ is $\sqrt{T}$ and asymptotically normal.

We let Ω be the long-run covariance of $g_t(\beta_0)$, $\Omega = \sum_{j=-\infty}^{\infty} Eg_t(\beta_0) g_{t-j}(\beta_0)'$. The GMM estimator selects $\hat{D}$ that $\hat{D}^{-1}\sqrt{b^2-4ac} \rightarrow_p \Omega$. For assuming, the efficient estimation called the weighting matrix $\hat{\Omega}^{-1}$ was employed. Let G_i is characterized as the $m \times k$ matrix of derivatives of the orthogonal condition. As a result, the first order condition settles by $\hat{\beta}$ is $\hat{G}\hat{\Omega}^{-1}[T]^{-1}\sum_{t=1}^{T} g_t(\hat{\beta}) = 0$. This was represented in (8),

$$\left[T^{-1}\sum_{t=1}^{T} \hat{Z}_t, \hat{u}_t\right] = 0, \quad \hat{Z}_t = \hat{G}' \hat{\Omega}^{-1} W_t, \quad \hat{u}_t = u_t(\hat{\beta}). \quad (8)$$

As a result, if there are more moment conditions than parameters ($m > k$), then GMM takes a linear combination of the instruments chosen to minimize the asymptotic variance of the estimator, and ensures zero sample correlation between this linear combination and the residual [16].

The asymptotic variance of the GMM estimator is $\left[(EG_t')\Omega^{-1}(EG_t)\right]^{-1}$. The criterion function (7), evaluated at the estimated parameter vector and suitably normalized by sample size, is asymptotically chi-squared,

$$J \equiv T\left[T^{-1}\sum_{t=1}^{T} g_t(\hat{\beta})\right] \sim_A \chi^2(m-k). \quad (9)$$

We refer to the use of (8) as the "J test". It can also be called a test of overidentifying restrictions. Though we cannot generally find an exact solution for an overidentified system, we can reformulate the problem as one of a $\hat{\beta}$ so that the sample moment $g_t(\hat{\beta})$ is as "close" to zero as possible.

E. The MEboot Approach

Maximum entropy is a powerful statistical tool for avoiding unnecessary distributional assumptions and dealing with the asymmetrical condition of observations. Let $f(x)$ defines the density of x_t. The entropy H is defined as [18]:

$$H = E(-\log f(x)) \quad (10)$$

In this paper, the ME bootstrap has a simple set of T uniformly distributed mixture of finite pieces joined together into what we call *the ME density* [18]. It provides a reliable resampling algorithm for short non-stationary time series data. The ME bootstrap is more appealing because it simultaneously avoids all three problems, including none of resampled values, the requirement of the bootstrap resampling to lie in the interval [min (x_t), max (x_t)], and the bootstrap resample shuffles [19]. Using the idea of the maximum entropy density, the ME algorithm to generate multiple ensembles of stochastic process realization is specified in the following 7 steps. *The first step* arranges the original data in an increasing order to create order statistics $X_{(1)}$ and stores the ordering index vector. *The second step* computes an intermediate points $Z_{(t)} = (X_{(t)} + X_{(t-1)}) / 2$ for t = 1,.....T – 1 from the order statistics. *The third step* computes the trimmed mean m_{trm} of deviations $X_t - X_{t-1}$ among all consecutive observations, and computes the lower limit for left tail as $Z_0 = X_{(1)} - m_{trm}$ and the upper limit for right tail as $Z_T = X_{(T)} - m_{trm}$. *The forth step* determines the mean of the maximum entropy density in each interval that the "mean-preserving constraint" $E(X) = \sum_{t=1}^{T} m_t / T = \bar{x}$ is assured, interval means are denoted as m_t. *The fifth step* generates random numbers from the uniform interval [0, 1] and computes the sample quantiles of the ME density. *The sixth step* reorders the sorts of sample quantiles by using the ordering index of step. Finally, *the seventh step* recovers the time dependence relationships of the originally observed data, and severally repeats the step 2 to 6 [20].

V. Results and Discussion

A. Descriptive Information

Applying the Keynesian macroeconomic model, yearly data [23], [24] including tourism revenues, tourists' expenditures, private investments in service sectors, government expenditures in tourism, Thailand service exports, Thailand service imports, and net services income and transfers was described as a symbol, which is simple to interpret. The data was shown in Table I.

TABLE I
THE DATA OF TOURISM VARIABLES IN THAILAND BETWEEN 2002 AND 2015
UNIT: BILLION BATH

R	C	PI	G	T	E	M	S
552.8	187.2	2,917.6	3.1	348.7	3,359.1	3,051.0	225.1
558.8	197.6	3,133.7	5.0	396.4	3,502.4	3,170.6	200.0
583.3	226.1	3,320.1	11.9	464.2	3,898.9	3,533.3	184.0
667.5	289.9	3,667.7	10.6	511.2	4,591.5	4,319.8	49.5
621.9	257.6	3,977.6	6.9	601.4	5,206.5	5,347.0	-444.7
705.0	398.1	4,316.8	7.6	629.5	5,785.2	5,570.5	-430.7
747.6	424.8	4,644.4	6.4	659.7	6,268.1	5,622.7	-382.2
848.2	434.5	4,893.7	6.8	674.1	6,950.3	6,800.1	-547.7
716.1	340.5	4,976.9	7.6	645.4	6,212.8	5,311.5	-410.4
904.4	434.6	5,347.1	4.1	826.8	7,168.0	6,566.3	-625.9
1,109.3	502.7	5,685.2	5.8	884.9	7,949.6	7,753.6	-246.6
1,349.8	605.6	6,297.5	10.3	915.7	8,559.1	8,455.1	-253.9
1,531.1	691.6	6,678.7	9.2	1,150.4	8,729.8	8,407.6	-363.6
1,605.7	743.9	6,926.0	13.8	1,085.5	9,099.1	8,232.5	-297.7
Mean							
890.8	409.6	4,770.2	7.8	699.6	6,234.3	5,867.3	-238.9
Standard Error							
364.7	177.7	1,304.7	3.0	244.2	1,947.5	1,910.1	286.0

Noted: R: tourism revenue, C: Tourists' consumption (International and domestic tourists), PI: Private investment in service sectors, G: Government's expenditures in service sectors, T: Taxes on service sectors, E: Thailand service exports, M: Thailand service imports, S: Net service income and transfers.

B. The Empirical Results of the Tourism Multipliers and Accelerators

First of all, the details of the variables used in this paper were displayed in Table II. All of eight indexes were collected as a yearly rate of expansions and checked for a stationary condition by using the ADF unit root testing [21].

Considering the statistical modeling estimation in Table III, the essential parameters, following the Keynesian multiplier, showed the consumption multiplier (*b*), private investment multiplier (*i*), tax multiplier (*t*), and the multiplier of service imports (*m*), respectively. In the first section, the GMM estimators provided the results of the multiplier parameters based on the symmetrical distribution condition without the sample correlation between linear combinations and residuals, which are $b = 0.68$, $i = 0.32$, $t = 0.57$, and $m = 0.67$. The tourism multiplier and accelerator from the GMM estimation were 0.806 and 2.125, respectively. This implies that the increasing amount of capital investments and aggregate demand components for service sectors by one unit will be the 0.806 multiple increment of Thailand tourism revenue. In addition, the accelerator equals 2.125, and this intimated that the increment of tourist spending by one unit was a positive effect to doubly accelerate the capital investment.

TABLE II
THE DESCRIPTION OF RESEARCH VARIABLES

Details	Index	N	ADF unit root testing (Including intercept) (P-value)
Tourism revenue	R	14	0.0107**
Tourists' consumption	C	14	0.0020***
Private investment in service sectors	PI	14	0.0972*
Government's expenditures in service sectors	G	14	0.0444**
Taxes on service sectors	T	14	0.0052***
Thailand service exports	E	14	0.0275**
Thailand service import	M	14	0.0166**
Net services income and transfers	S	14	0.0309**

From: Computed. **Noted**: *** Significance at the confident level 99%, **Significance at the confident level 95%, *Significance at the confident level 90%.

TABLE III
THE COMPARISON OF PARAMETERS ESTIMATED BY GMM AND MEBOOT

Index	β	Statistical Models	
		GMM	MEboot (Interval value)
R	-	-	-
C	*b*	0.68	0.395
PI	*i*	0.32	0.891
G	-	-	-
T	*t*	0.57	0.346
E	-	-	-
M	*m*	0.67	0.518
S	-	-	-
Multiplier		**0.806**	**1.730**
Accelerator		**2.125**	**0.443**

From: Computed.

TABLE IV
THE RESULTS OF THE GMM

Index	Coefficient	P-value	J-Statistic
C	0.681313	0.0303**	0.000
PI	0.327548	0.0005***	0.000
T	0.558929	0.0001***	0.000
M	0.662634	0.0058***	0.000

From: Computed. **Noted**: *** Significance at the confident level 99%, **Significance at the confident level 95%, *Significance at the confident level 90%.

In the second section, the MEboot approach was employed for handling an uncertainty situation of data samplings. Based on no assumption regarding symmetrical distribution condition, the parameters from this estimation were totally different from the results of GMM. The tourism multiplier and accelerator from the MEboot estimation were 1.730 and 0.443, respectively. This implied that the increasing amount of capital investments and aggregate demand components for service sectors by one unit will be the 1.730 multiple increment of Thailand tourism revenue, higher than the counterpart from GMM. On the other hand, the accelerator equals 0.443, lower than the accelerator form GMM. However, this still indicated that the increment of tourist spending by one unit was a positive impact to accelerate the capital investment in Thailand service sectors.

C. The Empirical Result of the Tourism Leakage by the Circular Flow Model

The circular flow model applied from Chowhury et al. [11]. In this paper, the tourism injection model consists of service exports (E), government's expenditures in service sectors (G), and private investments (PI). On the other side, the tourism leakage model includes service imports (M), a discontinuation of profits from tourism businesses (S), and Taxes on service sectors (T).

Empirically, Table IV represented the flow model of Thailand service sectors. The results stated that the money flow in service sectors was an overplus of the service injection. In other words, Thailand net tourism income was a continuous excess during 2002 to 2015. Thus, following this theoretical flow model, the result implied that Thailand service sectors have been being in the stimulating period for the last decade.

TABLE V
THE RESULTS OF THE MEBOOT

Index	Simple. percentile	Asymmetric, around. 0	Boot. percentile	**Boot. norm**
C				
2.5%	0.1315	0.0486	0.1315	**0.2203**
97.5%	0.4816	0.4449	0.4825	**0.5691**
PI				
2.5%	0.1121	-0.1099	0.1092	**0.2185**
97.5%	1.4899	1.3993	1.4905	**1.5631**
T				
2.5%	0.0578	-0.0384	0.0566	**0.0769**
97.5%	0.5967	0.5388	0.5995	**0.6143**
M				
2.5%	0.1184	-0.0493	0.1183	**0.3114**
97.5%	0.5335	0.4967	0.5336	**0.7244**

From: Computed in R software version 3.1.3

TABLE VI
THE CIRCULAR FLOW MODEL OF THAILAND SERVICE SECTORS, UNIT: BILLION BATH

	Injection Model			Leakage Model			Net Tourism Income
Year	E	G	PI	M	T	S	
2002	3,359.1	3.1	2,917.6	3,051.0	348.7	225.1	**2,655.0**
2003	3,502.4	5.0	3,133.7	3,170.6	396.4	200.0	**2,874.1**
2004	3,898.9	11.9	3,320.1	3,533.3	464.2	184.0	**3,049.4**
2005	4,591.5	10.6	3,667.7	4,319.8	511.2	49.5	**3,389.3**
2006	5,206.5	6.9	3,977.6	5,347.0	601.4	-444.7	**3,687.3**
2007	5,785.2	7.6	4,316.8	5,570.5	629.5	-430.7	**4,340.3**
2008	6,268.1	6.4	4,644.4	5,622.7	659.7	-382.2	**5,018.7**
2009	6,950.3	6.8	4,893.7	6,800.1	674.1	-547.7	**4,924.3**
2010	6,212.8	7.6	4,976.9	5,311.5	645.4	-410.4	**5,650.8**
2011	7,168.0	4.1	5,347.1	6,566.3	826.8	-625.9	**5,752.0**
2012	7,949.6	5.8	5,685.2	7,753.6	884.9	-246.6	**5,248.7**
2013	8,559.1	10.3	6,297.5	8,455.1	915.7	-253.9	**5,750.0**
2014	8,729.8	9.2	6,678.7	8,407.6	1,150.4	-363.6	**6,223.3**
2015	9,099.1	13.8	6,926.0	8,232.5	1,085.5	-297.7	**7,018.6**

From: Computed. **Noted**: PI: Private investment in service sectors, G: Government's expenditures in service sectors, T: Taxes on service sectors, E: Thailand service exports, M: Thailand service imports, S: Net service income and transfers

VI. CONCLUSION AND RECOMMENDATIONS

The investigation of economic impacts of tourism has been considered by researchers and policy makers. However, it is a difficult task to measure the economic effects of tourism since it is not a distinct sector. Interestingly, the solution to clarify this problem is the statistical time-series analysis of the tourism multiplier, accelerator, and leakage. Thus, this paper aims to empirically express these three indexes by applying the Keynesian economic theory and econometrical tools.

The objectives of this research were separated into two sections. The first target was to statistically compare the details of the tourism multiplier and accelerator in Thailand's economy estimated by employing the GMM and MEboot. The second intention was to investigate the leakage in Thailand's tourism explaining by the circular flow model

To illuminate the first objective, the estimated parameters of the tourism multiplier and accelerator from GMM and MEboot were entirely different (as seen the details in Table III). For the GMM estimation, this method is more likely a theoretical model which is complicated to explain realistic situations because statistical assumptions such as the assumption of symmetrical information and the property of data stationary condition were employed into its analysis. Otherwise comparing the counterpart approach, MEboot is the powerful statistical tool that can efficiently overcome the uncertain stochastic problem in econometrical models since this method does not require the assumption of symmetrical distribution condition but uses the resampling algorithm. Hence, the outcomes of estimated parameters are uncertainly minimizing and closer to real circumstances.

Empirically, the tourism multiplier from MEboot equals 1.730, better than the counterpart from GMM (0.806). This result implied that the increasing amount of capital investments and aggregate demand components for service sectors by one bath will cause Thailand tourism revenue to increase by 1.730 baht. To recommend a policy for encouraging tourism activities, it is reasonable that the government and other organizations concerned with growing Thailand's service sectors would do well to strengthen such internal linkages through policies to encourage the location of service suppliers to local tourism businesses [4].

Considering the tourism accelerator, the theoretical principle of the economic acceleration stated by Kates [22] is the proposition that changes in demands for consumption goods lead to larger proportional changes in the demand capital goods. In other words, if a rapid downturn in economic activities occurs, then a more rapid fall in the demand of capital goods is surely inevitable. The result from Table III represents that the accelerator estimated by GMM equals 2.125. This is over-identified and implies that Thailand service sectors are maladjustment when facing economic recession periods. For policy makers, this kind of results is hardly to accept. Hence, it is sensible to focus on the estimated accelerator from MEboot (0.443), which is more realistic by minimizing uncertain information, and this indicates that Thailand service sectors can be well adjustable when downturns in demands for tourism services occur.

To answer the second objective, the circular flow model adapted from the Keynesian economic model (see the details in Table VI) displayed the capital injection in Thailand's service sectors as being larger than the capital leakage since the last 14 years. This indicates that the service sectors have been in a stimulating period. However, this positive result cannot ensure that Thailand's local tourism markets are beneficial stakeholders. The study of tourism leakage in Thailand stated by Boz [10] estimated that 70% of all money spent by tourists ended up leaving Thailand (via foreign-owned tour operators, airlines, hotels, imported drinks and food, etc.). Inevitably, to reduce tourism's negative impacts, sustainable tourism development and smart economy should be intensively considered.

Finally, Tourism is one of the fastest growing industries in the world. Precisely forecasting analysis is becoming more and more crucial. In further studies, an efficient econometrical stimulation tool for estimating the tourism multiplier, accelerator, and leakage will be employed.

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