

Impacts of Thai baht on Tourism, Sectoral Final Demand and Sectoral Output in Thailand

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Abstract— The Thai baht had been volatile since the implementation of the managed floating system in July 1997. At the same period, expenditures of foreign tourists in Thailand had been the major sector that contributed a significant growth on Thai GDP and generated domestic final demand and final outputs. This paper aims to explore the impact of Thai baht on expenditures of foreign tourists in Thailand, sectoral final demand and sectoral output by using two-step approach cointegration, bridge matrix and input-output table. In the first section, the behavioral equation of expenditures of foreign tourists was estimated based on the annual data during 1997-2012. The results indicated that world GDP per capita, exchange rate and development of tourism sector significantly determined expenditures of foreign tourists. In contrast, domestic economic growth and political stability cannot explained the level of expenditures of foreign tourists with statistical significance. For every one baht depreciation against US dollar, expenditures of foreign tourists increased by 83.6 million baht. For the second section, the calculated final demand coefficients organized by 180 sector input-output table in 2005 shows that over 90 percent of aggregate final demand derived from expenditures of foreign tourists was contributed by only 14 sectors. For every one-baht depreciation, it contributed to various impact on sectoral outputs -- higher outputs in 147 sectors, lower outputs in 25 sectors, and unchanged outputs in 8 sectors. The last section was devoted to simulate the response of expenditures of foreign tourists, sectoral final demand and sectoral outputs on five scenarios of exchange rates ranging between 29-33 baht per US dollar. The results show that expenditures of foreign tourists will increase continuously during 2013-2016. However, there is a slight impact of the Thai baht on expenditures of foreign tourists, sectoral final demand and sectoral outputs. Based on the finding, the tourism authority should promote the policy that attracts the international tourists to Thailand and monitor the exchange rate closely in order to enhance the tourism sector for sustainable economic expansion.

Keywords— Exchange rate, Tourism in Thailand, MacroIO Model

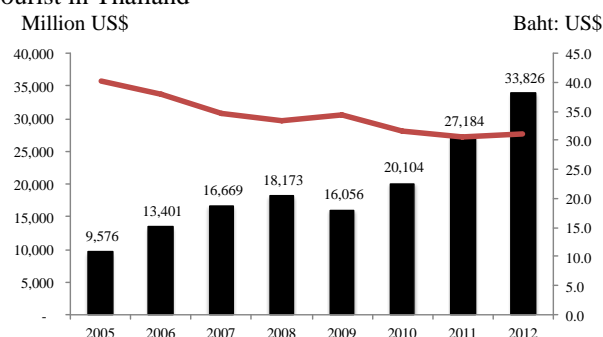
I. Introduction

The Thai baht had been volatile since the implementation of the managed floating system in July 1997. Because the value of baht had been moved freely in response to the economic fundamentals. As a result, expenditures of foreign tourists in Thailand that rely on the exchange rate was volatile.

At the same period, expenditures of foreign tourists in Thailand had been the major sector that contributed a significant growth on Thai GDP and generated domestic final demand and final outputs. Tourism became a major sector that supports the sustainable growth in Thai economy even in the recession period.

This paper aims to explore the impact of Thai baht on expenditures of foreign tourists in Thailand, sectoral final demand and sectoral output. Two-step approach cointegration, bridge matrix and input-output table will be used together in order to explore the impact of Thai baht on the sectoral final demand and sectoral output by 180 sectors.

FIGURE1. Exchange Rate and Expenditures of Foreign Tourist in Thailand



Source: Bank of Thailand

II. Model and Methodology

In order to estimate the impacts of Thai baht on expenditures of foreign tourists, sectoral final demand and sectoral final output, there are 3 steps that applied in this paper. First, the behavioral equation of expenditures of foreign tourists will be set up to find the determinants of expenditures of foreign tourist in Thailand. Second, the input-output table of Thai economy presented by NESDB will be employed to identify the bridge matrix. This matrix will be used to distribute the aggregate expenditures of foreign tourists into the sectoral level. Finally, in the third step, Leontief's inverse matrix is used to calculate the sectoral final output.

Based on the empirical work of Protomo (2002), Akal (2004), Naude and Saayman (2004), Algieri and Kanellopoulou (2009), Vietze (2009), Ibrahim (2011), Seeanah (2011), Hankfiah et.al. (2011) and Tsangari and

Haritini (2012), the behavioral equation of expenditures of foreign tourists is

$$TR = f(PY, EX, RP, OP, NT, SA, TREND) \quad (1)$$

where TR is expenditures of foreign tourist in Thailand, PY is real per capita income of major foreign tourist in Thailand, RP is relative consumer price index between Thailand and rest of the world, OP is degree of international trade openness (ratio of trade volume to GDP), NT is development of tourism sector measured by number of foreign tourist, SA is dummy variable of political instability and TREND is time trend.

This behavioral equation was estimated by using annual data during 1997-2012. The 2-step approach of cointegration test also applied to avoid the problem of spurious regression.

Second, the final demand in input-output table calculated as

$$X = (I - A)^{-1}D \quad (2)$$

where X is 180x1 vector of final demand, $(I - A)^{-1}$ is the inverse Leontief's matrix 180x180, A is input coefficient matrix 180x180, and D is 180x1 vector of final demand.

Vector D in equation (2) is included consumption, investment, change in inventory, government expenditure and exports. The exports component in D is divided into to 2 parts: exports (EX) and special exports (SX). Therefore,

$$X = (I - A)^{-1}(EX + SX) \quad (3)$$

Vector SX contains expenditures from foreign tourists. The expenditures of foreign tourist in Thailand in aggregate level which is calculated by equation (1) can be disaggregated into sector final demand as following:

$$SX = B TR \quad (4)$$

where B is 180x1 vector, called bridge matrix.

Vector B is the linkage between expenditures of foreign tourist in Thailand in aggregate level to disaggregate level.

The calculation of bridge matrix in this paper based on the Thai's input-output table in 2005. After adjusted the value in column 306, special exports, the column vector of bridge matrix is generated. Final step, sectoral final output was calculated as

$$X = (I - A)^{-1}EX + (I - A)^{-1} B TR \quad (5)$$

iii. Results

By using annual data during 1997-2012, LM statistic for KPSS test in Table 1 indicates that all of variables in equation (1) are stationary at first difference. The parameters in equation (1) were estimated by OLS. The estimated equation which improving the results by specific-to-general basis show as following:

$$TR_t = -10462.22 + 2.05 PY_t + 2.28 EX_t + 0.002 NT_t + 1190.23 TREND_t \quad (3.79)$$

$$R\text{-squared} = 0.991221 \quad F\text{-stat} = 310.5026$$

$$DW\text{-stat.} = 1.88$$

TABLE 1. LM Statistic for KPSS Stationarity Test
 Null Hypothesis: E is stationary

	LM-Stat.
KPSS test statistic:	0.121668
Asymptotic Critical Values:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

LM statistic of the estimated error is 0.12. Therefore, the estimated error from this equation a stationary process or I(0). It means that the variables in estimated equation are cointegrated. The results indicated that world GDP per capita, exchange rate and development of tourism sector significantly determined expenditures of foreign tourists. In contrast, domestic economic growth and political stability cannot explained the level of expenditures of foreign tourists with statistical significance. For every one baht depreciation against US dollar, expenditures of foreign tourists increased by 83.6 million baht.

For the distribution of expenditures of foreign tourist in Thailand (TR), the calculated final demand coefficients organized by 180 sector input-output table in 2005 shows that

over 90 percent of aggregate final demand derived from expenditures of foreign tourists was contributed by only 14 sectors as shown in Table 2. Every one-baht depreciation, it contributed to various impact on sectoral outputs -- higher outputs in 147 sectors, lower outputs in 25 sectors, and unchanged outputs in 8 sectors. There are 4 sectors, petroleum refineries, petroleum and natural gas, air transport, and ocean transport, which will increase their final output higher than 10 millions in response to 1 baht depreciation.

To simulate the response of expenditures of foreign tourists, sectoral final demand and sectoral outputs on five scenarios of exchange rates ranging between 29-33 baht per US dollar. The results show that expenditures of foreign tourists will increase continuously during 2013-2016. However, there is a slight impact of the Thai baht on expenditures of foreign tourists, sectoral final demand and sectoral outputs.

TABLE2. Final Demand in Response of Change in 1 baht per US\$ (Top 10 Sectors)

Code	Sector	Value (Baht)
156	Air transport	9,148,477.0
148	Hotels and places of loading	8,619,400.8
153	Ocean transport	8,125,173.9
147	Restaurants and drinking places	7,649,735.3
150	Road passenger transport	7,562,814.4
178	Personal service	6,249,876.5
93	Petroleum refineries	4,957,817.3
159	Post and telecommunication	4,741,310.2
72	Wearing apparel	4,094,278.2
163	Real estate	4,075,094.3
146	Retail trade	3,074,347.1
145	Wholesale trade	2,746,360.7
169	Hospital	2,722,340.7
132	Jewelry and related articles	2,502,099.2

IV. Conclusion

Based on the finding, the expenditures of foreign tourist in Thailand, the sectoral final demand and the sectoral final output will response to the change in baht value with statistically significance. Therefore, the tourism authority should promote the policy that attracts the international tourists to Thailand and monitor the exchange rate closely in order to enhance the tourism sector for sustainable economic expansion.

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