Mega Publishing Limited
Bulletin of Applied Economics, 2017, 4(2), 57-64 | December 1, 2017

Foreign Aid and Dutch Disease in Thailand

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Abstract

This paper examines the economic impact of foreign aid, specifically whether it leads to Dutch disease, in Thailand between 1972 and 2014, using a VAR model, together with the Granger causality test and the impulse response test. Few previous studies have been made of Southeast Asian countries even though Thailand has experienced rapid economic growth using foreign aid to construct infrastructure, and by introducing foreign direct investment into manufacturing industries. The causality and impulse response tests indicate that Dutch disease has not occurred; the impact of foreign aid proved positive, as there was little room to increase consumption and the aid contributed directly to capital accumulation.

JEL classification numbers: F35, O53
Keywords: Foreign Aid, Dutch Disease, Thailand

1 Introduction

The effect of foreign aid on economic growth in the recipient country remains under discussion today. An idea that has recently gained popularity is that whether foreign aid is effective in generating economic growth or not depends on the political situation in the recipient country (Burnside and Dollar 2000, Hansen and Trap 2001, Dalgaard, et al. 2004). Another hypothesis is that foreign aid is not effective (Easterly and Roodman 2004, Easterly 2007). It seems clear that, at least, foreign aid does not invariably contribute to economic growth in recipient countries.

The relationship between foreign aid and economic growth can be considered by analyzing capital inflow, to model so-called Dutch disease. From the theoretical viewpoint, Cordon and Neary (1982) give a model for Dutch disease caused by capital inflow using two industries in small open economies. Dutch disease is divided into two phases: the "resource movement effect" and the "spending effect" (Godfrey et al 2002).

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Article Info: *Received*: July 17, 2017. *Revised*: October 22, 2017
Published online: December 1, 2017

In the first phase, the aid flows into non-tradable industry and wages and prices are increased, making tradable industry less attractive. In the second phase, the higher revenue from non-tradable industry flows into both industries. Since the price of tradable industry is fixed as the world price, production incentive flows into non-tradable industry. Since the real effective exchange rate matches the ratio of tradable to non-tradable goods, the resulting appreciation causes the economy to be less competitive in the world market. In addition, capital accumulation causes the production frontier to increase, according to economic growth theory.

From the empirical viewpoint, Fielding and Gibson (2013) examined the effect of foreign aid in causing Dutch disease in sub-Saharan African countries between 1970 and 2000. They find that many such countries experience an appreciation in the real exchange rate, of varying magnitude. Rajan and Subramanian (2011) showed evidence of Dutch disease using cross-country panel data from 32 countries in the 1980s, and 15 countries in the 1990s. In contrast, Tekin (2012) examined 48 African countries between 1970 and 2010, and did not observe Dutch disease according to causality tests. Looking at the relation between foreign aid and the real effective exchange rate, Dufrenot and Yehoue (2005) found no significant effect in 64 countries from 1970 to 2000, but Elbadawi et al. (2008) found that the real effective exchange rate appreciates following an inflow of foreign aid in the annual data of 83 countries during 1980-2004.

The present paper examines the economic impact of foreign aid, specifically whether it induces Dutch disease, looking at Thailand from 1972 to 2014. There are three reasons why Thailand is used here to study Dutch disease. First, Thailand has attained relatively high and stable economic growth while receiving large amounts of foreign aid, as seen in Figure 1. Second, Thailand has essentially attained an open economy. Third, Thailand has experienced continuing relatively high economic growth. A previous study by Burke and Ahmadi-Esfahani (2006) looks at Dutch disease using cross country panel data across Thailand, Indonesia, and Philippines for 1970 to 2000 (total 93 observations), and found that foreign aid is not effective, even in this region. This study did not look at Thailand exclusively, however.

2 Empirics

This section sets out the empirics of Dutch disease effect in Thailand, including the data for key variables, the relevant methodologies involving the VAR model, and the outcomes of estimation, which are discussed.

2.1 Data

To determine the economic impact of foreign aid, three endogenous variables and one control variable are used. The first endogenous variable is the official development aid (ODA) divided by GDP (*OOY*). The second endogenous variable is the real effective exchange rate (*RER*); this is defined by following equation, in which the consumption price index (CPI) and world import unit value (WIUV) are both set at 100 in 2010:

$$\text{rer} = \frac{(Consumer\ Price\ Index)/(Exchange\ rate\ Baht\ per\ US\ Dollar)}{World\ Import\ Unit\ Value}$$

The third endogenous variable is the manufacturing service ratio (*MOS*) with a GDP base. The control variable is the amount of foreign direct investment divided by GDP (*FOY*). The world import unit value is taken from the International Financial Statistics of the International Monetary Fund; all other statistics are from the World Development Indicators given by the World Bank.

Figure 1 gives overviews and data descriptions of these variables from 1972 to 2014. This figure reveals that the three variables have differing trends. The ODA and GDP ratio (*OOY*) shows a negative trend in the long run, whereas the manufacturing service ratio (*MOS*) is positive. The real effective exchange rate (*RER*) is relatively stable. Since Thailand appears to be far from suffering Dutch disease through all the periods shown in this figure, the Granger causality test and the impulse response are used, by using the VAR model for the sub-period at the same time.

2.2 Methodologies

We conduct the estimation using the VAR model. This model is used because it allows for endogenous relations among the variables of interest, and facilitates the tracing of the dynamic responses of variables from the exogenous shock.

Before constructing the VAR model, we conduct the unit root test for stationarity. The augmented Dickey-Fuller test (ADF test) and the Phillips Perron test (PP test) are used to judge whether these statistics have unit roots. The test involves the null hypotheses of unit root on the values and at their first difference, including both "intercept" and "trend and intercept". The results, in Table 1, show that the null hypotheses are rejected at 99% in all variables, although none is rejected in the series for the values themselves. We therefore judge that all key variables are random effects, I(1), and we use the first difference series denoted as $\mathrm{D}(OOY_t)$, $\mathrm{D}(RER_t)$, $\mathrm{D}(MOS_t)$, and $\mathrm{D}(FOY_t)$, in the period t, respectively.

We next construct the VAR model, according to the following equation,

$$\begin{bmatrix} \mathrm{D(OOY)}_t \\ \mathrm{D(RER)}_t \\ \mathrm{D(MOS)}_t \end{bmatrix} = \alpha_t + \begin{bmatrix} \beta_1 & \gamma_1 & \delta_1 \\ \beta_2 & \gamma_2 & \delta_2 \\ \beta_3 & \gamma_3 & \delta_3 \end{bmatrix} \begin{bmatrix} \mathrm{D(OOY)}_{t-1} \\ \mathrm{D(RER)}_{t-1} \\ \mathrm{D(MOS)}_{t-1} \end{bmatrix} + \begin{bmatrix} \beta_4 & \gamma_4 & \delta_4 \\ \beta_5 & \gamma_5 & \delta_5 \\ \beta_6 & \gamma_6 & \delta_6 \end{bmatrix} \begin{bmatrix} \mathrm{D(FOY)}_t \\ \mathrm{D(FOY)}_t \\ \mathrm{D(FOY)}_t \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix}$$

In this model there are three endogenous variables: $\mathrm{D}(OOY_t)$, $\mathrm{D}(RER_t)$, and $\mathrm{D}(MOS_t)$. In addition there is one control variable, $\mathrm{D}(FOY_t)$, which is the first difference of the foreign direct investment and GDP ratio. Other terms in the equation are: α denotes the constant term, while β, γ, and δ represent the endogenous variables, and ε represents the error terms.

Based on this VAR model, we use bilateral Granger causality tests among the three variables $\mathrm{D}(OOY_t)$, $\mathrm{D}(RER_t)$, and $\mathrm{D}(MOS_t)$. We also investigate the impulse response to a one standard deviation shock from the ODA divided by GDP (OOY, about 0.0048 or 0.48% from Figure 1). We see the 10-year dynamic effects in the accumulated terms.

2.3 Estimation Outcomes and Discussion

Table 2 shows the results of estimation using the VAR model. Because the first difference is used, the number of observations is 41. The variable $\mathrm{D(OOY}_{-1})$ shows at the 5% significant level for D(OOY), and the sign condition is not satisfied for Dutch disease, because the minimum in $\mathrm{D(OOY}_{-1})$ is negative in D(RER) and positive in D(MOS). Table 3 shows the results of the pairwise Granger causality test. Causality is observed from

D(MOS) to D(RER) and from D(RER) to D(OOY) at the 10% level. These findings imply that the increased manufacturing ratio causes appreciation of the local currency, the Thai baht, in real base, and that this appreciation causes the ODA divided by the GDP ratio (OOY) to decrease. These results nevertheless indicate that there is no Dutch disease effect in Thailand, because an increasing inflow of foreign aid (OOY) does not affect the manufacturing service ratio (MOS).

Since we judge that the Dutch disease effect is absent in Thailand on the basis of the Granger causality test, the impulse response test (shown in Figure 2) can be taken as a reference. The assumption is an increasing ODA/GDP ratio to one standard deviation (0.48%). The real effective exchange rate (RER) is decreased by 0.5% and the manufacture service ratio (MOS) is increased by 2%. This impact emerges two years later in both variables, with stability thereafter.

In conclusion, foreign aid received by Thailand does not induce Dutch disease. The explanation involves three points. First, a greater part of the foreign aid consists of loans for constructing infrastructure facilities that are intended to attract manufacturing industries. Infrastructure such as highways and seaports are considered to assist in reducing the costs of the manufacturing sector and narrowing the competitiveness gap with prices in the world market. Foreign aid may therefore be regarded as a type of investment. Next, the economic situation in Thailand has been relatively stable over the long term. Figure 3 shows the savings ratio, trade surplus, and external debt. A high savings ratio has contributed not only to capital accumulation through financing for firms, but also to the prevention of Dutch disease via weak consumption. The trade deficit was not large during the past century, and a trade surplus has emerged in the present century. The external debt has been less than 40% of GNI except for several years before and after the 1997 crisis. Finally, foreign direct investment increased during 1980s, as seen in Figure 1, partly because of a change in the regime for foreign direct investment at the beginning of the 1980s. Most was used in the locating of manufacturing sector industries. As a result, the manufacturing value added ratio has grown, from 13% in 1960 to around 30% in the present decade, as shown in Figure 3.

These results are interpreted as follows. First, the “resource movement effect” is relatively small in terms of the real effective exchange rate, as seen in Figure 1. Second, from the perspective of the “spending effect”, the associated reductions in cost are considered to assist in increase factor prices such as wages and interest. In addition, the savings rate was high and trade deficit was not increased, as seen in Figure 3. Third, from the perspective of economic growth theory and the accumulation of capital, foreign direct investment and the high savings rate are promoting the growth of production.

3 Concluding Remarks

This paper has examined the economic impact of foreign aid in Thailand between 1972 and 2014 in terms of whether it causes Dutch disease. The methodology is to construct a VAR model, and involves Granger causality and the impulse response among the ODA to GDP ratio, the real effective exchange rate, and the manufacturing to service ratio. It was found that the ODA to GDP ratio does not cause appreciation of the real effective exchange rate, nor a lower manufacturing to service ratio. These empirical findings imply that Thailand has never suffered from Dutch disease, but rather show that foreign aid has had a good effect. We speculate that the use of foreign aid in Thailand, which focused on the construction of infrastructure, gave little room for increasing consumption and

contributed directly to capital accumulation.

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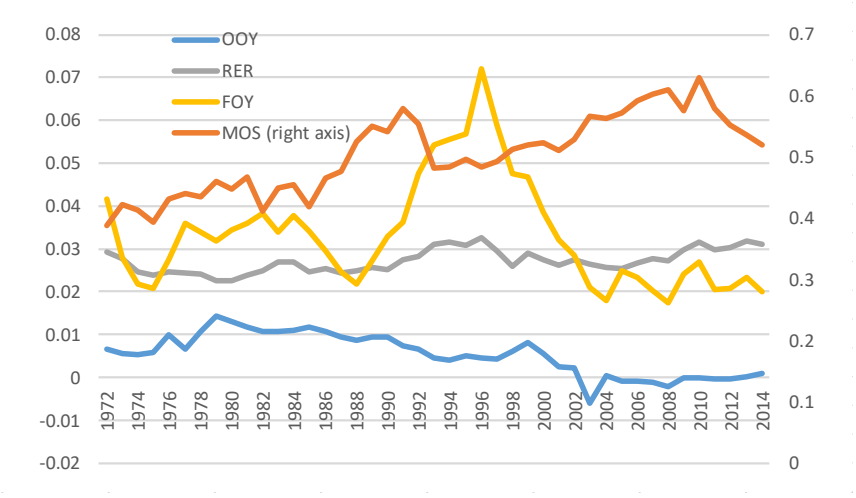

	OOY	MOS	RER	FOY
average	0.005344	0.503426	0.027113	0.033178
standard deviation	0.004808	0.062916	0.002693	0.01251
maximum	0.014288	0.628868	0.032471	0.07206
minimum	−0.00618	0.388337	0.022431	0.01739

Figure 1: Overviews of Variables and Data Description
Sources: World Development Indicators (World Bank) and International Financial Statistics (IMF)

Table 1: Unit Root Test for variables

	OOY: I(1)				RER: I(1)			
	ADF		PP		ADF		PP	
	intercept	intercept&trend	intercept	intercept&trend	intercept	intercept&trend	intercept	intercept&trend
level	−1.412	−2.898	−1.233	−2.779	−1.774	−3.001	−2.033	−3.229*
first difference	−8.364***	−8.327***	−8.364***	−8.327***	−6.313***	−6.323***	−6.319***	−6.326***
	MOS: I(1)				FOY: I(1)			
	ADF		PP		ADF		PP	
	intercept	intercept&trend	intercept	intercept&trend	intercept	intercept&trend	intercept	intercept&trend
level	−2.065	−2.519	−2.049	−2.730	−1.508	−1.544	−1.880	−1.902
first difference	−7.533***	−7.548***	−7.486***	−7.509***	−5.275***	−5.263***	−5.265***	−5.235***

Note: ***, **, and * denote rejection of null hypothesis at the 99%, 95%, and 90% level of significance, respectively.
Sources: World Development Indicators (World Bank) and International Financial Statistics (IMF)

Table 2: Estimated VAR model

	D(OOY)	D(RER)	D(MOS)
D(OOY(−1))	−0.320248	−0.1381	2.053737
	[−2.05069]**	[−1.66702]	[1.02922]
D(RER(−1))	−0.398134	−0.048138	−0.79794
	[−1.82683]	[−0.41638]	[−0.28654]
D(MOS(−1))	−0.002772	−0.018696	−0.163665
	[−0.22477]	[−2.85798]***	[−1.03866]
C	−0.000121	0.000166	0.003172
	[−0.33964]	[0.87936]	[0.69939]
D(FOY)	0.061143	0.180938	−1.05729
	[0.99587]	[5.55547]***	[−1.34773]
Adj. R-squared	0.083527	0.456926	−0.006169

Note: ***, **, and * denote rejection of null hypothesis at the 99%, 95%, and 90% level of significance, respectively.
Sources: World Development Indicators (World Bank) and International Financial Statistics (IMF)

Table 3: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic
D(RER) does not Granger Cause D(OOY)	41	3.17082*
D(OOY) does not Granger Cause D(RER)	41	0.03284
D(MOS) does not Granger Cause D(OOY)	41	0.02792
D(OOY) does not Granger Cause D(MOS)	41	0.51978
D(MOS) does not Granger Cause D(RER)	41	3.79049*
D(RER) does not Granger Cause D(MOS)	41	0.14253

Note: ***, **, and * denote rejection of null hypothesis at the 99%, 95%, and 90% level of significance, respectively.
Sources: World Development Indicators (World Bank) and International Financial Statistics (IMF)

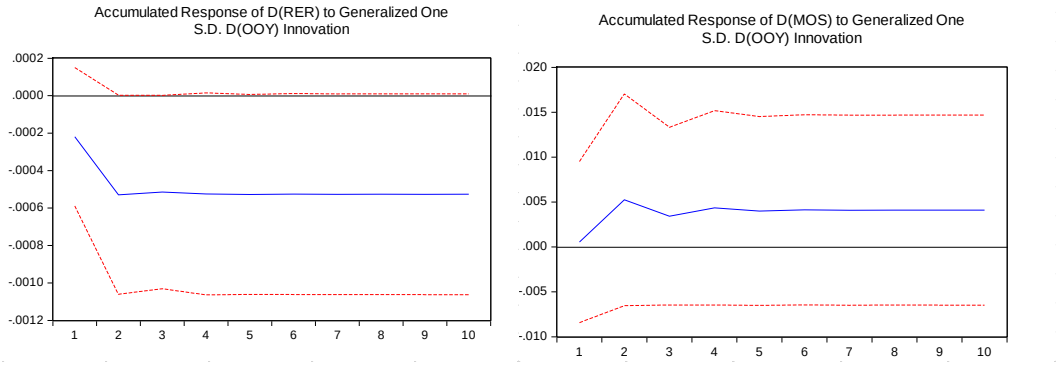

Figure 2: Accumulated Effect of One SD. D(OOY) Innovation
Note: The dotted lines denote a 95 % error band over 10 year horizons.
Sources: World Development Indicators (World Bank) and International Financial Statistics (IMF)

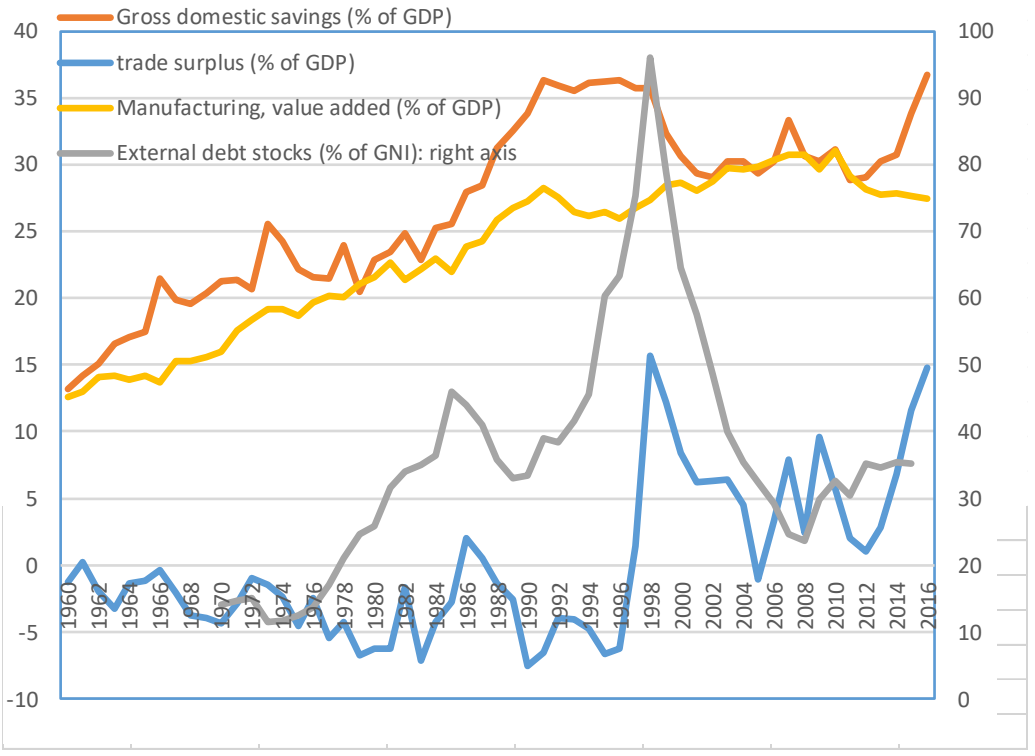

Figure 3: Savings and Trade Surplus Ratio
Source: World Development Indicators (World Bank)