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**TOURISM AND OPENNESS TO MERCHANDISE AND SERVICES TRADE IN
SINGAPORE: AN EMPIRICAL INVESTIGATION**

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Abstract: Tourism has been identified as one of the key growth sectors in Singapore economy. Given that the city state has been recognised as one of the most open economies in the world, this study attempts to explore the causality relationships between tourism, openness to merchandise and services trade. Firstly, the study shows bi-direction causality between international visitor arrivals to Singapore and openness to merchandise trade. Secondly, there is a unidirectional causality from openness to services trade to international visitor arrivals to Singapore. The findings imply that further trade liberalisation in goods as well as services sectors can be seen as an important catalyst for the growth, and development of the tourism sector. Conversely, an increase in tourism activities could also encourage the host country to open itself to more international trade. Furthermore, it is imperative to liberalise the services sector in Singapore in order facilitate more openness in merchandise trade given a large scale of services constitutes goods trade.

Keywords: Causality; Trade Openness; Tourism; Singapore

JEL classification codes: F41; L83

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1. Introduction

Singapore has been acknowledged as one of the most open economies in the world owing to successful implementation of free trade regime² and open foreign investment policy³ (Singapore Economic Development Board, 2004). In June 2008, the country's openness as measured by the ratio of its total trade to GDP (Gross Domestic Product) was about 506 per cent.⁴ According to Rivera-Batiz and Romer (1991), Romer (1994), and Pugel and Lindert (2000), a country's openness to trade is a significant determinant of growth. In addition, Gooroochurn and Sugiyarto (2004) found that Singapore is one of the top five most open economies towards tourism⁵, which will continue to be the major contributor to the growth and development of the services sector because of the large number of international visitors (see Table 1) and the supporting industries that tourism requires. Over the period 2002-2007, there was about 36% increase in international visitor arrivals to Singapore (see Table 1) in response to the growth of air traffic, expanding volume of world trade, globalisation of business operations, and internationalisation of financial and business services. Besides, the increase in international travel was attributable to Singapore's strategic location for global investors and international travellers, competitive manufacturing and excellent infrastructure of attracting multinationals. According to Singapore Tourism Board, the tourism industry contributes about 3 per cent of the country's GDP and is one of the largest services sectors in the economy.⁶ Given tourism is a service industry that requires support from other industries, the development of the tourism industry can contribute to the rapid growth of other sectors in Singapore. For instance, tourism can boost domestic demand

² Singapore imposes zero tariffs on all goods and services except for tobacco, alcoholic beverages, motor vehicles and petroleum products. Besides, there no export subsidies and import quotas (Islam and Chowdhury, 1997).

³ There are no restrictions on foreign investment in Singapore as the government believes that multinationals have massive resources and international networks, which are capable to stimulate international trade.

⁴ Total trade is the sum of exports and imports of goods and services. The data on total trade were gathered from *CEIC Asia Economic Database*.

⁵ WTO (World Trade Organisation) defines tourism as "the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes" (Accessed at: <http://www.wto.org>).

⁶ Accessed at <http://app.mti.gov.sg/default.asp?id=375>.

for construction, transportation, the wholesale and retail trade, and even the equipment and instruments required to support tourism activities.

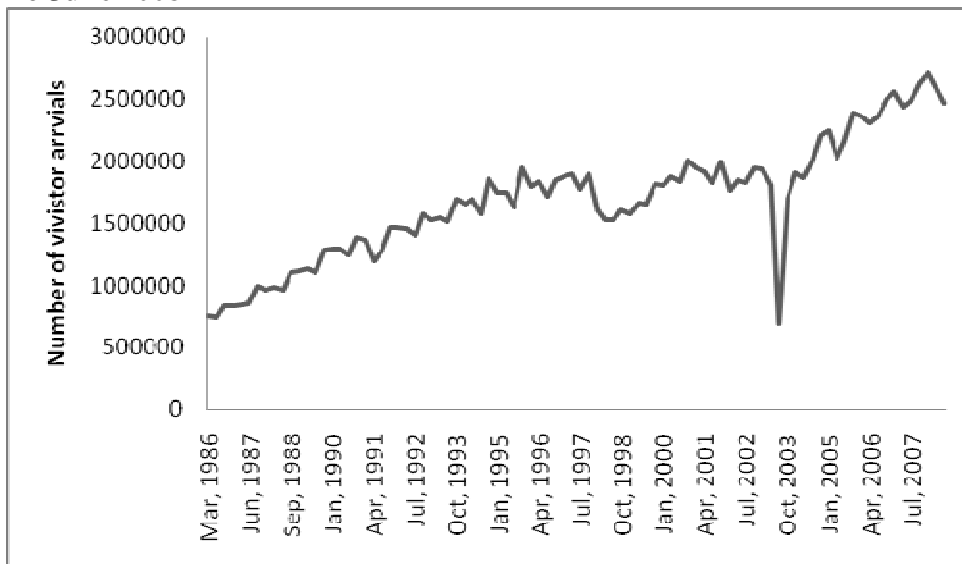
Table 1: International visitor arrivals to Cambodia from 2003-2007

Year	International visitor arrivals
1987	3,678,809
1992	5,989,940
1997	7,197,871
2002	7,567,039
2007	10,284,545

Source: *CEIC Asia Economic Database*

However, the sector's openness in tourism trade was vulnerable to external shocks such as the outbreak of epidemic diseases. In 2003, the economic performance had been affected by health scares from the SARS (Severe Acute Respiratory Syndrome) outbreak in the region. International visitor arrivals in October 2003 declined by 8% as compared to last year (see Figure 1).

Figure 1: Monthly international visitor arrivals to Singapore from March 1986 To June 2008



Source: *CEIC Asia Economic Database*

Although there is a considerable evidence attempts to show the economic relationship between tourism and trade, the empirical work examining the possible causal relationships between tourism and trade openness is relatively limited. For example, Keintz (1971), Webber (2000), and Turner and Witt (2001) examined whether the demand for travel (i.e. international tourism) could be explained by including trade related variables as additional explanatory variables in the tourism demand function. Keintz (1971) found that the total value of trade was an important determinant of the demand for travel in the United States. On the other hand, Webber (2000) examined the influence of exchange rate volatility on the long-run demand for Australian outbound leisure tourism (for nine major tourism destinations) along with other potential explanatory variables such as real disposable income and substitute prices. The evidence shows that the exchange rate volatility had significant impact on one of its tourism destinations, Indonesia. Moreover, using New Zealand data, Turner and Witt (2001) found that international trade plays a major role in influencing the demand for business travel.

Another area of related empirical research documented in the literature is concerned with exploring the possible long-run relationships between the demand for tourism and macroeconomic variables such as trade (imports and exports), and economic growth (see Kulendran and Wilson, 2000; Khan *et al.*, 2005; Lee, 2008). Kulendran and Wilson's (2000) findings suggested that there was a cointegrating as well as causality relationship between international travel (which includes business, holiday, and total) and international trade using the Australian data (and also four important travel and trading partners i.e. the USA, the UK, New Zealand, and Japan). Furthermore, Khan *et al.* (2005) found that there was a unique long-run relationship between business arrivals and real imports as well as a bi-directional causal relationship between these variables using Singapore as a case. Despite the fact that there was some evidence of cointegrating relationship between tourism and international trade variables in Singapore, Lee's (2008) findings shows that there is no cointegration between tourism and economic growth, nevertheless, there is unidirectional causality running from economic growth to tourism in the short run.

In order to extend the empirical literature further, this study aims to examine the causality pattern between tourism, and the openness to merchandise and services trade by means of a causality approach since the available empirical evidence is limited for both tourism-trade openness linkages and Singapore tourism sector. The contributions of this study can be outlined as follows. Firstly, tourism is an important source of growth for the economy. Secondly, Singapore is still actively in pursuit of trade liberalisation agenda to foster competition. The empirical results can shed lights on the potential impact of trade liberalisation in goods and services (e.g. the recent free trade agreement (FTA) signed between the United States and Singapore⁷) on Singapore's tourism industry, which is seen as a high value-added industry in terms its diverse linkages with other industries as tourism is not just related to leisure and recreation markets. Thirdly, the findings can also provide useful policy implications for promoting the tourism industry in order to increase trade openness, which appears to be beneficial to economic growth and development for the country.

The structure of this study is as follows. Section 2 deals with the conceptual framework, data use and availability of each variable of interest, followed by providing the justification and discussion of the procedure for non-causality test in an '*augmented*' VAR (vector autoregressive) framework (Toda and Yamamoto, 1995). The results of non-causality tests and causal linkages are reported and analysed in Section 3. The concluding remarks and policy implications are discussed in Section 4.

2. Conceptual Framework, Data and Non-Causality Test

Conceptual Framework

Trade openness can be seen as an important catalyst for the growth and development of tourism industry in an economy. As in the case of Singapore, its high degree of trade openness can enhance market access to its goods and services sectors including tourism,

⁷ The United States and Singapore signed a comprehensive FTA on the 6th of May, 2003 and it took effect on the 1st of January, 2004.

which is dependent on diverse supporting industries. In addition, there is a positive impact of trade openness on cross-border inter- and intra firm trade activities, which have the tendency to facilitate international travel and hence, encourage tourism (see Keintz, 1971; Turner and Witt, 2001). Furthermore, liberalisation of trade such as the signing of a free trade agreement (FTA) is instrumental in the growth and development of tourism industry in the country as reflected by increased competition that leads to lower domestic prices, increased quality and variety of goods. The pioneering work examining the different competitiveness measurements of tourist destination is available from Summers and Heston (1991), Kozak and Rimmington (1998, 1999), Dwyer *et al.*, (1999, 2000) and Gooroochurn and Sugiyarto (2004). Hence, trade openness has the propensity to promote tourism via the following channels: the opening up of more international trade not only can improve market access to the tourism sector itself and foster international travel but also can increase competition so that international visitors can enjoy lower prices of goods and services with a greater diversity and a wider variety.

There is also likely to be a reverse causality, running from tourism to openness to trade. For instance, if there is a significant growth in international visitor arrivals to Singapore attributable to, for example, lower cost through economies of scale in both goods and services production (see Copeland, 2001), this can lead to further international trade activities via two effects. The direct effect relates to the international travellers who consume the final goods and services (which, in this particular case, is also known as consumption abroad⁸) from the different sectors (such as banking, financial, hotels and restaurants, telecommunication, travels and transport, retail etc.) of the host country. Perceptibly, this tends to promote the export trade for the country. While the indirect effect involves the tourism-related sectors (i.e. in the host country) in turn purchase the intermediate goods and services from abroad (Cai *et al.*, 2004; Grosso *et al.*, 2007), which provides the opportunity for higher import trade. Clearly, to some extent, tourism can encourage the host country to open itself to more international trade.

⁸ Consumption abroad involves the consumer moving to the foreign supplier as in tourism and education (Hardin and Holmes, 1997, p. 7-8).

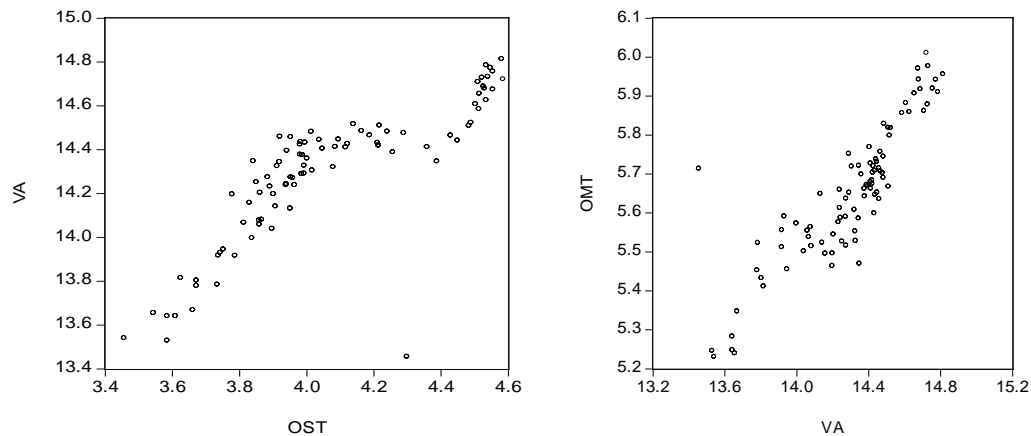
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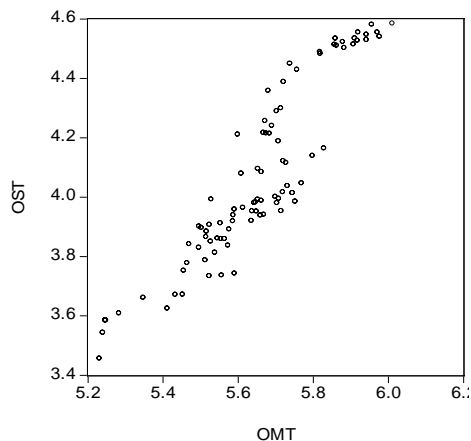
The tourism data which can be represented by international visitor arrivals to Singapore (VA) are accessible from the *CEIC* Asia Economic Database. Both the openness to merchandise and services trade data are also obtained from the same source and can be computed as follows:

- Openness to merchandise trade = $[(\text{exported goods} + \text{imported goods})/\text{GDP}] \times 100$ (OMT)
- Openness to services trade = $[(\text{services exports} + \text{services imports})/\text{GDP}] \times 100$ (OST)

All the raw data are transformed into natural logarithm (Ln). The estimation period starts from the first quarter of 1986 to the second quarter of 2008. The choice of this sample period is based on the availability of the data, especially the series for OMT and OST. Preliminary, the scatter plots in Figure 2 show there is a positive correlation relationship between total visitor arrivals to Singapore and openness in merchandise and services trade (i.e. VA-OMT, VA-OST) as well as between OMT and OST.

Figure 2: Scatter Plots between International Visitor Arrivals to Singapore (VA), Openness to Merchandise Trade (OMT), and Openness to Services Trade (OST)





Non-causality test (Toda and Yamamoto, 1995)

This study applies the non-causality test procedure proposed by Toda and Yamamoto (1995) in order to ascertain the potential linkages between VA, OMT and OST. The main advantage of this test procedure is that there is no prerequisite to test whether the individual series are stationary around a linear trend ($I(0)$), $I(1)$, or $I(2)$, or whether the individual series are cointegrated or not before performing the non-causality test. Moreover, the test has a limiting chi-squared distribution even if there is no cointegration or the stability and rank conditions are not satisfied as long as the order of integration of the process does not exceed the true lag length of the model (Toda and Yamamoto, 1995, p. 225).

More formally, performing the non-causality test involves a number of important steps in the followings:

1. Specification of the VAR model;
2. Decision on lag length for the most adequate VAR model;
3. Estimation; and
4. The non-causality test based on MWALD (modified Wald) test procedure (Toda and Yamamoto, 1995).

In step 1, the VAR specification for possible causal linkages between VA, OMT and OST can be written as follows:

$$Ln\widehat{VA}_t = a_0 + a_{1i} \sum_{i=1}^n LnOMT_{t-i} + a_{2i} \sum_{i=1}^n LnOST_{t-i} + a_{3i} \sum_{i=1}^n LnVA_{t-i} \quad (1)$$

$$Ln\widehat{OMT}_t = b_0 + b_{1i} \sum_{i=1}^n LnVA_{t-i} + b_{2i} \sum_{i=1}^n LnOST_{t-i} + b_{3i} \sum_{i=1}^n LnOMT_{t-i} \quad (2)$$

$$Ln\widehat{OST}_t = c_0 + c_{1i} \sum_{i=1}^n LnOMT_{t-i} + c_{2i} \sum_{i=1}^n LnVA_{t-i} + c_{3i} \sum_{i=1}^n LnOST_{t-i} \quad (3)$$

Step 2 involves finding the most appropriate lag length for the VAR model. Short lag lengths may lead to incorrect specification, but, we also face the problem degree of freedom if long lags are used. The selection of the order of lag length is based on the principle of parsimony i.e. the most preferred VAR model requires the smallest number of parameters that adequately represent the data. The best adequate VAR model is selected when it minimises the distinct loss functions (e.g. Final prediction error (FPE), Akaike information criterion (AIC), Schwarz criterion (SC) and Hannan-Quinn information criterion (HQ)) in addition to the Likelihood ratio (LR) statistic. Hence, an optimal lag length for the augmented VAR($k+d_{max}$) can be determined, where k represents the order of lag length; d_{max} is the maximum order of integration suspected to occur in the system. In general, a magnitude of one (i.e. $I(1)$) is used for d_{max} .

After the best adequate VAR($k+d_{max}$) is estimated by the Ordinary Least Squares (OLS) estimator in step 3, we perform the MWALD (modified Wald) test. More formally, the test procedure is a test on the restrictions imposed on the parameters of VAR(k) excluding the additional lag d_{max} . If the restrictions on the parameters (i.e. the variables with lag length of k in VAR($k+d_{max}$)) are significantly different from zero, then it indicates there is a causality relationship. The test has an asymptotic χ^2 distribution when an VAR($k+d_{max}$) is estimated. For example, in equation (1), the null hypothesis of non-

causality from $LnOMT$ to $LnVA$ (i.e. $a_{11} = a_{12} = \dots = a_{1n} = 0$) is rejected if the a_{1n} are jointly significantly different from zero.

3. Empirical Results

Table 2 provides the calculated values of the loss functions based on a set of statistical selection information criteria such as the Likelihood ratio (LR), Final prediction error (FPE), Akaike information criterion (AIC), Schwarz criterion (SC) and Hannan-Quinn information criterion (HQ). Based on the results, the optimal lag length for the chosen VAR models is five, three, three, one and one lags as indicated by LR, FPE, AIC, SC and HQ, respectively. Since the results of the information criteria are not clear cut, the VAR(k) models with one, three and five lags are chosen.

Table 2: Results of information criteria for the VAR model (endogenous variables: OMT, OST, VA)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	141.4386	NA	5.77E-06	-3.54971	-3.45907	-3.51342
1	325.4127	349.0789	6.50E-08	-8.03622	-7.673652*	-7.891079*
2	335.0282	17.50514	6.40E-08	-8.05201	-7.41751	-7.798
3	345.918	18.98736	6.12e-08*	-8.100461*	-7.19404	-7.7376
4	351.6692	9.585366	6.68E-08	-8.01716	-6.83881	-7.54544
5	363.8643	19.38705*	6.21E-08	-8.09908	-6.6488	-7.51851
6	370.6266	10.23021	6.65E-08	-8.04171	-6.3195	-7.35228
7	376.9454	9.073128	7.25E-08	-7.97296	-5.97882	-7.17467
8	380.2048	4.429403	8.60E-08	-7.82576	-5.5597	-6.91862
9	386.1773	7.657006	9.58E-08	-7.74814	-5.21014	-6.73213
10	396.932	12.96079	9.52E-08	-7.79313	-4.98321	-6.66826
11	400.5648	4.098577	1.15E-07	-7.65551	-4.57366	-6.42179
12	414.5767	14.73047	1.07E-07	-7.78402	-4.43024	-6.44144

Notes: * indicates order of lag length selected by the information criteria. LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, and HQ: Hannan-Quinn information criterion

In order to determine whether there is a cointegrating relationship (i.e. stable long-run equilibrium among the variables), the Johansen's multivariate cointegration procedure has been used and the lag length is based on those suggested by the information criteria reported in Table 2. In general, the Trace test and Maximum Eigen-value test results are ambiguous i.e. the results are found to be sensitive to the lag length as well as the

restrictions imposed such as the choice of trend and test (see Appendix A). This provides a valid reason to apply Toda and Yamamoto's (1995) non-causality test procedure.

The results of unit root tests (ADF, and PP), and stationary test (KPSS) are reported in Table 3. It appears that the unit root test results pertaining to $LnVA$ and $LnOMT$ are inconclusive (i.e. whether they are $I(0)$ or $I(1)$), with the exception for OST, which is $I(1)$. Hence, the non-causality test procedure developed by Toda and Yamamoto (1995) can be used to accommodate the inconsistent results of unit root tests shown in Table 3 while the Granger non-causality test procedure requires all the underlying variables to be the same order of integration, so to speak. Since it has been well-documented in the empirical literature that many macroeconomic variables are to be, say, nonstationary, or $I(1)$, a magnitude of one (i.e. lag length of one is used for d_{max}). Hence, the augmented vector autoregressive model used for non-causality test becomes VAR($k+1$).

Table 3 Summary of unit root and stationary tests

Series	ADF (H_0 : a unit root)	PP (H_0 : a unit root)	KPSS (H_0 : stationary)
$LnVA$	Reject the null (stationary)	Reject the null (stationary)	Reject the null (a unit root)
$LnOMT$	Do not reject the null (a unit root)	Reject the null (stationary)	Do not reject the null (stationary)
$LnOST$	Do not reject the null (a unit root)	Do not reject the null (a unit root)	Reject the null (a unit root)

Notes: the results are not reported here but are available from authors upon request. A constant and a trend are included in the equations for unit root tests. The alternative hypothesis (H_A) is stationary for both ADF and PP tests, respectively; while the alternative hypothesis (H_A) is a unit root for KPSS. The statement in the (.) refers to the finding of unit root or stationary.

The first set of regression results (see Table 4 and Figure 3) indicate that there is a bi-directional causal relationship between OMT and VA. The causation from OMT to VA supports the economic argument that openness to merchandise trade can promote tourism in Singapore because firstly, liberalisation of merchandise trade can potentially encourage business travel, which is an integral part of tourism, and secondly, lower prices, improved quality and more product variety as the result of the liberalisation of merchandise trade, could generate an inflows of international visitors to the country.

Moreover, the reverse causality from VA to OMT can be explained by the fact that the growth in the tourism industry is instrumental in the opening up of merchandise trade through an increase in the consumption of domestic goods by international visitors (i.e. direct effect) as well as an increase in the consumption of foreign goods by tourism-related industries in the domestic economy (i.e. indirect effect).

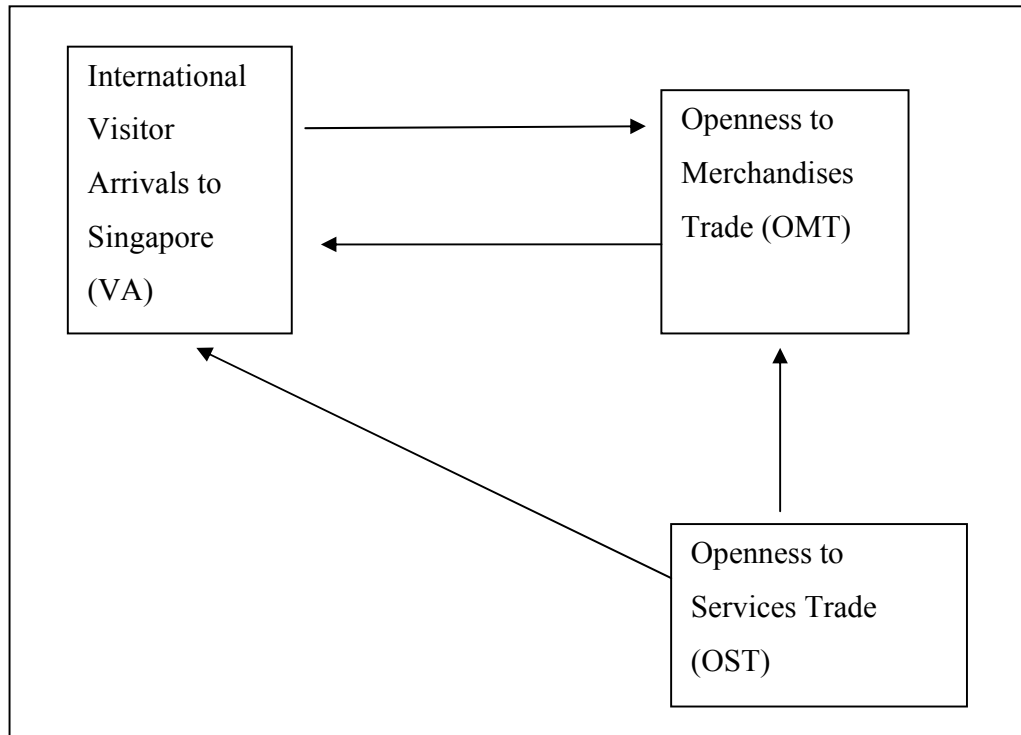
Table 4: Results of non-causality tests

	VAR(5+1) [LR]	VAR(3+1) [FPE & AIC]	VAR(1+1) [SC & HQ]
OMT → VA	8.556173 (0.1281)	6.614972* (0.0852)	2.574556** (0.0119)
VA → OMT	10.00727* (0.0750)	14.44727*** (0.0024)	2.236122** (0.0281)
OST → VA	14.33262** (0.0136)	4.278471 (0.2329)	-0.907542 (0.3668)
VA → OST	2.968659 (0.7048)	5.565688 (0.1348)	0.640389 (0.5237)
OST → OMT	7.189398 (0.2069)	7.620944* (0.0545)	-1.847257* (0.0684)
OMT → OST	3.265067 (0.6592)	2.497379 (0.4758)	-0.353903 (0.7243)

VAR (k+d_{max}) LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, and HQ: Hannan-Quinn information criterion. (.) is p-value. *, **, and *** indicate significant at 10%, 5%, and 1% level. VAR(1+1) is t-statistic, and VAR(5+1) and VAR(3+1) are χ^2 statistics.

The results from the second set of regression (see also Table 3 and Figure 3) show a unidirectional causality from OST to VA, suggesting that openness to services trade can also encourage holiday travel and hence, tourism in Singapore. These findings corroborate the preceding evidence that the increase in openness to merchandise trade can foster the growth in tourism in Singapore. On the other hand, the findings do not seem to support the reverse causality from VA to OST, perhaps, due to the relatively strong presence of multinational corporations (MNCs) in Singapore to support the increase in demand for services trade generated by the tourism industry.

Figure 3: Inter-linkage between international visitor arrivals to Singapore, openness to merchandise and services trade



Finally, the causation from OST to OSM implies that an increase in openness to services trade (e.g. a deregulation of the services sector) can lead to further openness to merchandise trade because, firstly, there is a high degree of services is traded by means of goods trade in Singapore⁹, and secondly, the increase in services trade could attract FDI inflows, which are instrumental in the growth of merchandise trade (and hence, merchandise trade openness) via forward and backward integrations. For instance, a forward integration is achieved when the intermediate or final goods are being produced and exported back to the home countries of MNCs or affiliates elsewhere for assembly and distribution while a backward integration is achieved when inputs are being imported

⁹ For example, the procurement and distribution of goods (such as raw materials, components and finished products) may include an extensive set of heterogeneous services such as accounting, banking, financial, logistics, transport, telecommunication, tourism and hospitality (travel, hotel, restaurant, fast-food) services.

from abroad or home countries of MNCs for value added in host country (Sieh-Lee, 2000).

4. Conclusions

This study attempts to explore the possible causality relationships between tourism, openness to merchandise and services trade using the non-causality test approach developed by Toda and Yamamoto (1995). The motivation of this study is that openness to merchandise and services trade provides market access to diverse sectors of the economy, which could potentially promote tourism because it comprises sellers of many heterogeneous products and services (Grosso *et al.* 2007). Moreover, trade openness can also encourage tourism by reducing inefficiency through increased international competition, which provides lower prices, greater product variety and better quality for international visitors. On the other hand, the growth of the tourism industry can also increase trade openness through higher consumption in the host economy by international visitors (i.e. consumption abroad), which in turn, could lead to higher inter- and intra-firm trade activities e.g. the tourism industry may contract out their production processes to lower-wage countries in the region or the home countries of MNCs. Therefore, these could lead to exports of raw materials (or intermediate) products to these countries. Consequently, the intermediate (or final) products are exported back to Singapore for final assembly (or marketing and distribution). On the whole, an increase in tourism activities can raise the level of international trade activities.

In general, the findings show two-way causality between tourism and openness to merchandise trade. The evidence showing the causation from merchandise trade openness to tourism implies that further trade liberalisation in the goods sector (e.g. entry into a FTA) can be seen as an important means for the growth of the tourism sector. For instance, with bilateral (or multilateral) FTA, Singapore can have preferential access to certain sectors of its counterpart(s), and vice versa. Thus, FTA helps to promote two-way trade (or multilateral engagement), which in turn could stimulate international business travel plus other related purposes. In this respect, the enhancement of merchandise openness via entry into a FTA is instrumental in boosting tourism, which is targeted to

earn S\$30 billion of foreign exchange with double international visitor arrivals to 17 million visitors by 2015 (Ministry of Trade and Industry, Singapore, 2008).

Conversely, a boost in tourism activities in Singapore could result in further merchandise trade openness via two channels – the consumption of final goods by international visitors in the host economy; and the purchase of intermediate or final goods from abroad by the domestic tourism-related industries since tourism is a high value-added industry requiring a broad range of goods and services to support it. Therefore, an increase in international visitor arrivals is conducive in promoting openness to merchandise trade. In addition, a unidirectional causality from services trade openness to tourism implies that liberalisation in services trade could play a vital role in the growth and development of the tourism industry, which has important implications for export earnings, employment generation and value added for the Singapore economy. Evidently, the study also shows that it is imperative to liberalise the services sector in Singapore in order to facilitate the country to open itself further for merchandise trade given that a large extent of services is traded through goods trade. In order to sustain the tourism development in a very competitive environment, the Singapore Tourism Board plans to diversify tourism by working closely with international investors to develop new world-class attractions, and attract strategic business and leisure events to Singapore (Ministry of Trade and Industry, Singapore, 2008).

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Appendix A

Summary Results of Johansen's Multivariate Cointegration Tests

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Lags interval:					
Trace statistics					
1 to 1	1	2	2	2	3
1 to 3	2	1	2	1	3
1 to 5	1	0	0	0	3
Maximum Eigenvalue Statistics					
1 to 1	2	2	2	0	3
1 to 3	2	2	2	0	0
1 to 5	1	0	0	0	0

Note: the values written in the Table represents the number of cointegrating vectors.