The Determinants of Bilateral Trade Among Asia-Pacific Countries

Chwo-Ming Joseph Yu and Dixie S. Zietlow

Using a gravity model, this article empirically tests the determinants of bilateral trade flows among fourteen Asia-Pacific countries. The results show that market size, political stability, physical distance, cultural similarity, membership in the Association of Southeast Asian Nations (ASEAN), and being a newly industrialized country are significant indicators of the bilateral trade relationships in the Pacific Basin.

I. Introduction

During the last two decades, most Asia-Pacific developing countries have achieved impressive increases in income, industrial production and exports. More recently, in 1988 the eight Pacific Basin developing countries, Hong Kong, Singapore, Taiwan, Korea, Malaysia, Thailand, Philippines and Indonesia, accounted for almost 10 per cent of world trade (Noland 1990, p. 5). Studies (Rana 1990) also find NIC (newly industrialized countries) and ASEAN (Association of Southeast Asian Nations) country gains in commodity trade where world demand was growing relatively fast. As shown in Table 1, the Pacific region, including both developed and developing countries, experienced a marked increase in their share of world exports from the early to late 1980s.

The significant growth experienced in world trade by the Pacific Basin countries is dwarfed by the growing importance of intraregional trade and

investment, which is expected to grow as in the past (Riedel 1991). Almost two-thirds of Asia-Pacific trade is now with other Asia-Pacific countries, up from one-half in the mid-1960s (Anderson 1991). Okita (1990) estimated that 80 per cent of direct foreign investment in the Asia-Pacific region comes from other countries in the region.

Though the importance of Asia-Pacific countries as trade partners has been recognized, Frankel (1992) is the only study that explores intraregional trade relationships in Pacific Asia. Frankel reported that the APEC (Asia-Pacific Economic Co-operation) forum was the strongest trading group in Asia. We further investigate the trade relationships in this area by comparing 1980 and 1989 trading activities and considering additional variables such as political stability, price indexes, and cultural distance. We may expect the factors affecting bilateral trade activities among OECD or developed countries (Bergstrand 1985; Geraci and Prewo 1977) to exert a similar impact

TABLE 1
Share of Total World Exports
(Percentages)

	1980	1989
United States	11.66	11.95
Canada	3.39	3.93
Japan	6.96	9.48
Australia	1.18	1.14
New Zealand	.29	.30
China	.98	1.81
Hong Kong	1.06	.99
Singapore	1.04	1.54
South Korea	1.94	2.15
Taiwan	1.06	2.29
Indonesia	1.18	.75
Malaysia	.70	.86
Philippines	.31	.27
Thailand	.35	.69
Total Share	31.10	38.15

SOURCES: Council for Economic Planning and Development, *Taiwan Statistical Data Book 1989*, R.O.C. July 1989; *World Tables 1991* (Baltimore: The Johns Hopkins University Press, May 1991); *World Development Report 1991* (Oxford: Oxford University Press, June 1991).

on Asia-Pacific countries. However, we still have no evidence to support this claim. Therefore, the purpose of this article is to assess the factors affecting the level of trade between fourteen countries in the Asia-Pacific region.

We define the Asia-Pacific region to include the APEC country members: the United States, Canada, Japan, Australia, New Zealand, Hong Kong, Singapore, South Korea, Taiwan (Republic of China), Philippines, Indonesia, Malaysia, Thailand and People's Republic China. These countries intend to co-operate economically (*U.S. News & World Report* 1989).[1] Brunei was excluded from this study due to data unavailability.

In Section II we discuss the hypotheses in the context of a gravity model. The research methodology and statistical results are presented in

Sections III and IV. Section V concludes the article.

II. Determinants of Bilateral Trade: The Gravity Model Approach

Ever since Tinbergen (1962) pioneered the use of the gravity model to study bilateral trade, this approach has been used successfully by researchers to examine the determinants of bilateral trade flows (Drysdale and Garnaut 1982; Brada and Mendez 1983; Bergstrand 1985). The log-linear equation typically seeks to explain trade flows between two countries by considering economic factors that can either accelerate or retard these flows.

Empirical studies confirm the positive and significant impact of market size on the importing and exporting countries' bilateral trade flows (Geraci and Prewo 1977; Bergstrand 1985; Srivastava and Green 1986). The market size of the importing country indicates its capability to absorb imports; the market size of the exporting country reflects its capability to manufacture products needed by foreign customers. While large home markets are conducive to export of goods produced under increasing returns to scale, small home markets are conducive to export of goods produced under constant returns to scale (Keesing 1968). The market size of a country also reflects its stage of economic development, and thus its pattern of demand. Trade is more intensive between countries with similar economic structure as in developed countries (Linder 1967).

Another important factor is political stability. A politically stable country usually exhibits higher economic growth rates, enhances the international competitiveness of local firms, and reduces the risk of foreign firms doing business with local firms. This is particularly so in the setting of importing developing countries. Therefore, the political stability of a country affects the inflow and outflow of trade. Srivastava and Green (1986) examines the impact of political stability on bilateral trade flows and finds that only the political instability of the exporting country affects trade flows. Their results may be a consequence of

measuring irregular political power transfers during 1958–67 while examining trade flows in 1977. A more recently developed measure of political instability used in this study might produce a different result.

The price levels of nations also affect trade activities (Thomas 1988). If export and import indexes are calculated similarly for several countries using a common base period, then variations across nations in these indexes in a given year can approximate the cross-nation variation of export/import price levels (Bergstrand 1985). A higher level of the export price index reduces exports and a higher level of import price index increases imports.

The physical distance between countries hinders trade activities. As a proxy for transportation cost, longer distance implies a higher level of transportation cost and thus reduces trade flows (Bergstrand 1985; Srivastava and Green 1986).

Cultural similarity between nations is an important determinant of trade flows between nations (Beckerman 1956; Geraci and Prewo 1977; Srivastava and Green 1986). The similarity of two countries' key characteristics, such as dominant religion, business language, form of government, and economic development, indicates the cultural

distance between them. Sharing similar culture not only reflects the tendency of the people in two countries to consume similar goods but indicates a lower cost of doing business for firms from one country in another.

The formation of a regional economic agreement increases the market size of member countries and attracts non-member countries to do business there (Root 1984; Geraci and Prewo 1977; Bergstrand 1985). With Indonesia, Malaysia, the Philippines, Singapore and Thailand as charter member countries, the Association of Southeast Asian Nations (ASEAN) was formed in 1975 (Root 1984). The association seeks closer economic integration and co-operation through establishment of complementary industries and investment incentives for non-member countries (Jain 1990). Due to the attractiveness of the enlarged market, ASEAN countries tend to receive more imports from other countries.

The hypotheses on the impact of the factors discussed above on bilateral trade flows among Asia-Pacific countries are summarized in Table 2.[2] As the NICs, namely, Hong Kong, Singapore, South Korea, and Taiwan, are noted for their export activities, a control variable (NIC) is introduced in the model.

TABLE 2
Summary of the Hypotheses

Determinants	Hypothesized Direction
Market size of exporting country (lnGNPi)	+
Market size of importing country (lnGNPj)	+
Political stability (lnPOLi)	+
Political stability (lnPOLj)	+
Export price index (lnEXPi)	−
Import price index (lnIMPj)	+
Physical distance (lnDIST)	−
Cultural similarity (CULSIM)	+
ASEAN as importers (ASEAN)	+
NICs as exporters (NIC)	+

III. Empirical Model and Data Sources

A gravity model is used in the empirical analysis. The model has exhibited high statistical explanatory power of trade flows. Anderson (1979) and Bergstrand (1985) provide strong theoretical support for use of the gravity model in explaining trade flows. The model investigated by this study is:

$$TR_{ij} = b0 * GDP_i^{b1} * GDP_j^{b2} * POL_i^{b3} * POL_j^{b4} * EXP_i^{b5} * IMP_j^{b6} * DIST^{b7} * \exp(b8*CULSIM + b9*ASEAN + b10*NIC) *U_{ij}$$

where

TR:	bilateral trade flow from exporting country i to importing country j
GDP:	market size
POL:	political stability
EXP:	export price index
IMP:	import price index
DIST:	physical distance between major cities (or capitals) of countries i and j
CULSIM:	cultural similarity
ASEAN:	country j is a member of ASEAN
NIC:	country i is a newly industrialized country
U_{ij}:	normally distributed random error.

Taking the natural log, the equation becomes:

$$lnTR_{ij} = lnb0 + b1*lnGDP_i + b2* lnGDP_j + b3*lnPOL_i + b4*lnPOL_j + b5*lnEXP_i + b6*lnIMP_j + b7*lnDIST + b8*CULSIM + b9*ASEAN + b10*NIC + e_{ij}$$

The empirical model was estimated for two years, 1980 and 1989. Since the bilateral trade equations show a high level of structural instability even for the United States in the 1970s and 1980s (Cushman 1990), the pooling of observations of the two years examined, which are eight years apart, may be unjustifiable. Due to missing bilateral trade data and other explanatory variables, 173 cases are examined for 1980, and 152

for 1989. The measures and data sources are discussed below.

Market size is measured by a country's gross domestic product (GDP) adjusted by price deflectors. The data are taken from *International Financial Statistics*. Political stability is proxied by *Institutional Investor*'s 1980 and 1989 country credit ratings. The investor credit rating is a 0–100 scale indicating the most (100) and the least (0) stable countries. Export and import price indices are from information in *World Tables 1991* (with 1987=100) for 1980 and 1989. Geographical distance between countries is estimated by airline distance in miles between major cities. Data are available on PC Globe Version 3 1990. Cultural similarity is measured by a dummy variable that is 1 if both countries share the same dominant religion and language, or 0 if otherwise (Srivastava and Green 1986). Information on the most prevalent country religions and languages is taken from the *World Almanac 1991*. Finally, membership in ASEAN or a NIC is measured by a dummy variable that is 1 for members and 0 for non-members in each group.

IV. Results

To assess the relative changes of share in trade for the countries examined, a commonly used measure of industrial concentration, the Herfindahl

index $(H = \sum_{c=1}^{n} P_i*P_j$, where P_i is country i's export as a percentage of total export of the fourteen countries and the value of H is between 0 and 1), is used. Over the nine-year period, the index dropped from 0.159 to 0.149. This indicates that over time trade is less concentrated and small trading countries, among the countries examined, tend to grow faster in trade than those large ones.

Table 3 reports the statistical results. The model performs well in both years and the explanatory power is significantly higher in 1989 than in 1980. Furthermore, the R value in 1989 for APEC is very close to the findings of Bergstrand (1985) in 1976 which examined Organization for Economic Co-operation and Development (OECD)

countries. This suggests that, as the economies develop, the trade patterns among APEC country members are very similar to those of OECD countries. Except for cultural similarity, statistical tests show that the same set of variables have a significant impact on bilateral trade in both years. As expected, the market size (LnGNP) of both countries has a positive impact on trade flows, and countries that are politically stable (LnPOL) tend to export and import more. Also, as predicted, member countries of ASEAN (ASEAN) attract more imports, and NICs (NIC) export more. The impact of cultural similarity (CULSIM) on trade flows is correctly signed and increases over time, reaching statistical significance in 1989.[3] Physical distance (LnDIST) between countries discourages trade activities and price levels (LnEXP and LnIMP) are insignificant.

Earlier we stated that the impact of the determinants on trade flows may differ over time. Therefore, we were motivated to examine the data separately. We tested the difference between the

TABLE 3
Gravity Equation Coefficient Estimates for Aggregate Trade Flows

Variables	1980	1989	Difference
Constant	−19.36	−.16	
	(−3.32)**	(−.01)	
lnGNPi	.52	.59	.07
	(6.74)**	(10.19)**	
lnGNPj	.47	.64	−.17**
	(6.55)**	(12.37)**	
lnPOLi	3.17	1.36	1.81**
	(6.87)**	(4.81)**	
lnPOLj	2.72	1.11	1.61**
	(5.59)**	(4.18)**	
lnEXPi	.69	.78	−.09
	(1.18)	(.44)	
lnIMPj	.64	−.21	.85
	(.75)	(−.11)	
lnDIST	−.85	−.85	.0
	(−7.56)**	(−10.28)**	
CULSIM	.07	.39	−.32**
	(.34)	(2.58)**	
ASEAN	.59	.34	.25**
	(2.54)**	(1.82)*	
NIC	.65	.63	.02
	(2.70)**	(3.46)**	
R^2	.63	.81	
N	173	152	
D-W	2.06	1.92	

**Significant at 1% (one-tailed test)
*Significant at 5% (one-tailed test)

estimates for two years statistically. The last column in Table 3 demonstrates that, over time, the impact of some factors may change. Though the market size of the importing country and cultural similarity become more important, political stability of both countries exerts less influence and member countries of ASEAN are less able to attract trade activities.

The importing countries' market size could be a more important determinant of trade flows because of the industrialization under way in many of the lesser developed Asia-Pacific countries. As these economies develop, imports are necessary to fuel internal industrial growth and satisfy domestic demand. For example, the industrialization of Asia is driving capital equipment and component purchases from Japan (*Far Eastern Economic Review* 1991). Therefore, in the Pacific Basin region the importing country market size variable may represent a disproportionate quantity of developing countries who are seeking imports to promote internal economic growth. The progress of development, represented by market size, will largely determine their participation in regional trading activities.

The emergence of developing Asian countries may also explain, in part, the increased importance of the cultural similarity variable. As Asian countries, both developed and developing, dominate the Asia-Pacific trade area, variables reflecting Eastern values should dominate over Western values. Specifically, the cultural similarity variable could capture the importance of ingroup relationships characteristic of collectivist cultures in Asia. For instance, South Korea, Taiwan, and Indonesia ranked in the lower 20 per cent of sampled countries and regions in the world on an individualism index, reflecting a collectivist orientation (Hofstede 1991).

Finally, the reduced impact of the political stability variable may represent fewer policy changes towards foreign trade activity during politically unstable times. Political instability is less threatening to international trade or investment if policies towards foreigners are not affected. There is evidence that fiscal policies in developing countries as a group may be more stable than that

of developed countries (Brewer 1985; Yu 1987). The traders in this region may be aware of this development, and thus did not deter their activities according to political instability.

V. Conclusion

We aimed to identify and empirically test the factors affecting the level of trade between fourteen countries in the Asia-Pacific region. This study successfully demonstrates that market size, political stability, physical distance, cultural similarity, membership in ASEAN, and being a newly industrialized country are significant indicators of the bilateral trade relationships in the Pacific Basin.

Furthermore, our study largely confirms the results of previous research in bilateral trade flows (Geraci and Prewo [1977]; Srivastava and Green [1986]; and Bergstrand [1985]). By identifying similar predictor variables in the Pacific Basin countries, previously only tested in OECD or developed countries, we support the use of the gravity model and the previously mentioned variables to accurately account for bilateral trade flows in the Asia-Pacific region. Interestingly, we discovered that the parameter estimates for market size and distance are different from Frankel's (1992) study. This result indicates that the impact of the two factors on trade patterns may be different for the subset of Asia-Pacific countries compared to the sixty-two countries included in Frankel's study. This study also confirms previous findings that factors affecting trade may exert differential influence over time (Cushman 1990).

Future work in this area could focus on Japanese trade relationships within the Asia-Pacific region. As noted by Stubbs (1992), "the increasingly extensive economic links between Japan and ... the wider economic integration of the Asia-Pacific region, require more in-depth exploration." Indeed, the consequences of Japan's rapidly expanding links with the original five ASEAN states for U.S.–Japanese trade must be addressed by policy makers. In the medium and long term, the U.S. Government should reconsider its policy of dealing with Japan in isolation from the other economies of the Asia-Pacific region.

NOTES

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1. By admitting China, Taiwan, and Hong Kong, the members in APEC increased from 12 to 15 in 1991 (*Wall Street Journal* 1991).
2. In general, developing countries have a comparative advantage in labour-intensive industries while developed countries have a comparative advantage in technological intensive industries (Gruber et al. 1967; van Hulst et al. 1991; Cotsomitis et al. 1991; Wood 1991). We were unable to address this in the article because the information on the proxies for these advantages (for example average wage level, and research and development expenses) were unavailable for most of the developing countries examined.
3. We ran another set of equations with religion and language as separate dummy variables. Both were insignificant in 1980 and language was positively significant in 1989. All other results are the same.

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Chwo-Ming Joseph Yu is Professor of Business Administration at the National Cheng-chi University, Taipei, Taiwan. **Dixie S. Zietlow** is a doctoral candidate in International Business at the University of Illinois at Urbana-Champaign.