Do Border Effects and Currency Barriers Exist in APEC?

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Abstract

This paper uses the gravity model to investigate the extent to which currency barriers explain border effects. It focuses on the three monetary unions of the Euro, CFA, and the APEC zone. The traditional theory of optimum currency union shows that APEC countries are not a good fit for introducing a common currency union; however, this paper finds that APEC countries are suitable for currency union. It also shows that CFA is suitable for the introduction of a common currency.

1. Introduction

The Asia-Pacific Economic Cooperation (APEC) was established in 1989 in response to growing interdependence among Asia-Pacific economies. Its goal is to promote economic dynamism and a sense of community in the region. APEC member countries are remarkably different from each other in many respects. This diversity provides suitable trade and investment potential, which contrasts with the European Union (EU), North American Free Trade Agreement (NAFTA), Association of South-East Asian Nations (ASEAN), Mercado Comun del Sur (MERCOSUR), and other economic alliances. Such diversity, however, compounded by a legacy of colonialism and political and military conflicts,

also increases the difficulties of cooperation.

The new common currency, the Euro, was introduced in EU countries in January 1999. Since then, many economists have disputed whether the monetary union is beneficial. In contrast, there is little chance that a common currency will be adopted in APEC and other areas. However, economic linkages among APEC countries and other areas have been increasing rapidly. Barriers to trade and financial transactions have decreased and will continue to decrease.

There have been a few proposals for introducing a common currency among some APEC countries. The proposal is not a radical one. A Free Trade Agreement (FTA) has been established among some APEC countries. A variance of the Asian Currency Unit (ACU), a basket currency of some Asian currencies, like the former European Currency Unit (ECU), or "Asian bonds" should be introduced in conjunction with maintaining the circulation of the countries' individual currencies.

Measuring the impact of national borders in international trade was initiated by the work of McCallum (1995), which emphasized the existence of a border effect in international trade. Heilliwell (1996), Hillberry (1998), and Obstfeld and Rogoff (2000) saw this effect as home bias. Their research showed that some regions have experienced similar border effects as those between the United States and Canada. In addition, Helliwell (1998) and Wei (1996) found that other regions of the world experienced similar border effects.

The research literature provides various explanations for the puzzling border effect. Formal and informal trade barriers as well as international competitiveness and national preferences have an impact. However, another possibility arises from the existence of various currencies, which entails transaction costs, such as currency conversion costs to maintain separate foreign currency use. These costs surely reduce international trade and favor intra-national flows. This paper intends to measure the

extent to which the existence of separate currencies explains the border effect. Using bilateral trade data for APEC and other regions from 1980 to 2002, I empirically test the relationships between currency unions and border effects. Many studies have analyzed the case of the EU; however, there is little research examining border effects specifically for the CFA and APEC countries.

This paper is organized as follows. In section 2, I describe the theoretical model and the gravity model. Section 3 deals with estimation strategy, focuses on the measurement of trade, and shows the data. Section 4 shows the results. The final section provides a brief conclusion.

2. Model

The first attempts of this paper are to derive theoretical foundations for the gravity model from Anderson (1979) an others. I follow Deardorff (1998), Anderson and van Wincoop (2003), and de Sousa and Lochard (2005). They all assume that each country specializes in a single product.

The model starts from the utility of a consumer in country i (U_i).

$$U_i = (\Sigma \alpha_j^{(1-\sigma)/\sigma} \beta_{ij}^{(\sigma-1)/\sigma})^{\sigma/(\sigma-1)} \quad (1)$$

where β_{ij} is the consumption by consumers of country i for goods from country j. $\sigma > 1$ is the elasticity of substitution between goods and α_j is a positive distribution parameter. The consumer's budget constraint is as follows:

$$Y_i = \Sigma p_{ij} \beta_{ij} \quad (2)$$

Y_i is the income of country i and p_{ij} is the price of good j for consumers

in i. Trade costs are assumed to be borne by sellers. p_{ij} is defined as follows:

$$p_{ij} = t_{ij} p_i \tag{3}$$

where p_i is the price received by sellers and t_{ij} is the trade cost factor.

The results of the consumer's utility maximization is as follows:

$$\beta_{ij} = (1/p_{ij}) Y_i (p_{ij} \alpha_{ij} / p_i)^{1-\sigma} \tag{4}$$

$$p_i = (\Sigma (p_{ij} \alpha_j)^{1-\sigma})^{1/1-\sigma} \tag{5}$$

Therefore, the value of imports from j is as follows:

$$IM_{ij} = Y_i (t_{ij} p_j \alpha_j / p_i)^{1-\sigma} \tag{6}$$

Assuming that a market is clear (as per de Sousa and Lochard, 2005), (6) is calculated as follows:

$$IM_{ij} = (Y_i Y_j / Y) (t_{ij} / p_i p_j)^{1-\sigma} \tag{7}$$

where Y is the world income and θ j country j's share of world income, it is as follows:

$$p_i^{1-\sigma} = \Sigma \theta_j (t_{ij} / p_j) \tag{8}$$

As in the traditional gravity model, the value of trade depends positively on the economic size and negatively on trade barriers. Trade is also influenced by prices in both countries.

Next, I model trade cost, which consists of three factors that

correspond to two different types of costs: non-border costs (NBC) and border costs (BC).

$$t_{ij} = d^{\rho}_{ij} BC_{ij} BE_{ij} \tag{9}$$

The first term is d^{ρ}_{ij}, non-border costs, which are measured by the distance between two countries. BC is the currency barrier that results from the use of different currencies in trade. It is usually 1; however, if both countries do not use the same currency, it is 0. I expect a negative sign. BE is the net border effect, which measures all impediments to international trade related to the national border. The case of international trade is 1, and intra-national trade is 0. It is expected to be negative.

Transforming (7) into log terms leads to the following:

$$\ln(IM_{ij}/Y_i Y_j) = a_0 + a_1 \ln(NBC_{ij}) + a_2(NCU_{ij}) + a_3(BC_{ij}) - (1-\sigma)\ln P_i - (1-\sigma)\ln P_j \tag{10}$$

where the coefficients to be estimated are $a_1 = (1-\sigma)\rho$, $a_2 = (1-\sigma)\ln BC$, $a_3 = (1-\sigma)\ln BE$. We can compute the add valorem tariff equivalent of the border effect (ϕ). Since $BE = 1 + \phi$, $\phi = BE - 1 = \exp(a_3/(1-\sigma))-1$.

3. Estimation Methodology and Data

Two important hypotheses are introduced. The border effect methodology has been applied by many studies (McCallum, 1995). This paper follows Wei (1996) and measures the intra-national distance as one-quarter of the distance to nearest neighbor. This paper introduces in (10) fixed effects for both destination and source countries.

I estimate the equation as follows:

$$\ln(IM_{ij}/\ Y_i Y_j) = a_0 + a_1 \ln(NBC_{ij}) + a_2 (NCU_{ij}) + a_3 (TRA_{ij}) + a_4 S_i + a_5 S_j + a_6 YEAR + \varepsilon_{ij} \quad (11)$$

where i denotes the destination country and j denotes the source country. The variables are as follows:

IM_{ij}: value of bilateral imports between i and j

Y: GDP

NBC: distance between i and j

NCU: a dummy variable equal to 1 if i and j do not use the same currency and 0 otherwise

TRA: a dummy variable equal to 1 if international trade is performed and 0 if intra-trade is performed

S: is a country fixed effect

YEAR: is a vector of year dummies that takes a value of one in each year

ε: is a error term

The data sources are from IFS (IMF) and Direction of Trade Statistics (IMF). Of course some observations are missing. These missing values are 28% of total observations.

4. Results and Interpretations

Estimations are performed by ordinary least squares (OLS), and heteroscedasticity is corrected by White's method. Moreover, I set the coefficient on GDP to unity[1]. There are three equations. Equation (1) applies to all of the EU, CFA[2], and APEC countries. The samples of equation (2) are the same as (1); however, different variables are used to analyze the currency barriers and border effects more clearly. Equation

Table: Border Effect and Currency Barrier

	(1)	(2)	(3)
Distance	-0.62 (-22.15)	-0.55 (-19.88)	-0.48 (-19.75)
Currency Barrier	-1.45 (-29.71)		-1.36 (-24.08)
Border Effect	-5.18 (-34.21)		-5.00 (-39.27)
EU Currency Barrier		-2.23 (-8.16)	
EU Border Effect		-8.12 (-7.33)	
CFA Currency Barrier		-2.83 (-8.72)	
CFA Border Effect		-9.02 (-10.12)	
adj. R squared	0.78	0.77	0.82

(3) contains only APEC countries. The following table reports the results.

Column (1) reports the estimation of the impact on trade of currency barrier and border effect. As expected, the coefficient of currency barrier is negative and significant. Also, the border effect is negative and significant. They are both as expected; however, equation (3) merits additional attention.

In column (2), I estimate the border effect and the currency barrier separately. This uses the same equation (11); however, the process differentiates each dummy depending on whether it concerns EU or CFA countries. Comparing these with equation (3) is important.

Column (3) shows the case of APEC. The effects of distance, currency barriers, and border effects are smaller than in equation (1). The most important reason is the development of transportation and telecommunication, which have had enormous recent advances.

It is also interesting to note the difference between currency barrier and border effect. The border effect is larger than the currency effect[3].

The border effect may be larger for less developed countries.

A large border effect could reflect specialization of the supply structure. Specialization in CFA countries of primary goods translates into high border effects than for other countries. There is some possibility that the existence of unrecorded trade may increase border effects (de Sousa and Lochard, 2005). Moreover, according to IMF (2002), a large border effect can be explained by the existence of non-monetary barriers such as language, culture, religion, and politics that may influence the results.

5. Conclusions

This paper uses a gravity model to analyze the extent to which currency barriers explain the border effect puzzle. I focus on CFA, EU, and APEC countries and compare APEC with other countries. I do not repeat here the results and implications; however, I can say that adopting a common currency is a reasonable policy for developing countries. A common currency reduces border effects. This is not a decisive policy but an important adaptive one.

It is difficult to evaluation the effects of introducing a common currency. OCA theory has contributed greatly to analysis of the suitability of a common currency. However, other aspects should be considered to analyze the suitability.

Notes

1. I control for a potential problem of simultaneity between income and trade. There are some reasons to suspect that income is endogenous.
2. There are 11 countries: 7 belong to the WAEMU and 4 to the CAEMC.
3. The result is similar to Helliwell (1998).

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Acknowledgement

I thank Akihiro Amano for his helpful comments and suggestions.