9

Has Regionalization Entered the Supernatural Zone?

The preceding chapter laid out a theoretical framework within which to evaluate the desirability of possible regional trading arrangements. It is not possible to evaluate a given set of regional arrangements, however, without making some assumptions about a few key parameter values. The desirability of regional preferential trade areas (PTAs) is particularly sensitive to two parameters: the magnitude of intercontinental transport costs, b, and the magnitude of intrabloc preferences, k. Indeed, the spirit of the theoretical framework is that the verdict on regionalism is a contest between b and k. Regional arrangements in which k is low relative to b are natural, but if k is too high relative to b, then regionalization is excessive. Broadly speaking, the issue is the same one we described in chapter 3 as a debate between the Krugman-Summers school, which attributes the observed regional concentration of trade to the natural effects of transport costs, and the Bhagwati-Panagariya school, which attributes it to the effects of existing discriminatory trading arrangements. Bhagwati and Panagariya argue that trade has already become excessively regionalized, while Krugman and Summers argue that regionalization of existing trade policy is still small compared with the natural forces of geography.

An Estimate of Physical Shipping Costs

It would be useful to obtain estimates of the parameters, especially the crucial magnitude of intracontinental transportation costs, b, in order to get a better idea of where the world economic system lies in terms of the competing pictures of optimal global arrangements mapped out above. In this chapter, we consider three kinds of measures of b. We begin first with estimates of physical shipping costs, though we understand these are likely to understate the total costs of doing business across the oceans. The next section will infer costs from simple data on intracontinental trade shares; this measure is likely to be too high. The estimate that is too low and the estimate that is too high will be followed by a Goldilocks estimate that is ''just right,''—that is, our preferred estimate. But all computations must be regarded as rough attempts at approximation.

To measure physical transport costs, one could obtain direct bilateral data from ocean shipping companies, air freight companies, the postal service, and so forth. One disadvantage here is that the range of variation of actual shipping costs is extremely wide across modes of transport and kinds of goods, especially as a percentage of value, and it would be difficult to know how to aggregate different measures.

A more comprehensive measure is the ratio of the cost-insurance-freight (c.i.f.) value of trade to its free-on-board (f.o.b.) value, which we considered in chapter 3. One disadvantage here is that the data are not comprehensively available on a bilateral basis. Another disadvantage of using aggregate c.i.f./f.o.b. numbers is that they depend on the composition of trade. The composition of trade is in turn influenced by the true transportation costs. We saw a consequence of this problem in chapter 3: true transport costs rise more rapidly with distance than does the measured c.i.f./f.o.b. ratio. For present purposes, however, we wish to fit the data to a stylized world in which all trading partners are either close or far; trade is either intracontinental or intercontinental. In this context, it is worth looking at the c.i.f./f.o.b. numbers, if only to get an idea of a lower-bound estimate.

We saw in chapter 3 that for the United States, the c.i.f. margin ranges from less than 2 percent for Mexico to as high as 26 percent for some distant neighbors. The worldwide average for the United States was 4 percent.

The average among other countries is considerably higher (table 3.1). The margin of total worldwide import values above export values is about 6 percent, including insurance and freight.[1] We cannot use this as our estimate of intercontinental costs, b, because much of it pertains to intracontinental trade. Let us treat 6 percent as a weighted average of intracontinental costs and intercontinental costs:[2]

1. The ratio was 1.066 in 1980 and 1.053 in 1989 (UNCTAD 1991, table 36).

2. We use the fact that the portion of the goods arriving in an intercontinental destination is $(1-a)(1-b)$. Transport costs are therefore $1 - (1-a)(1-b) = a + b - ab$.

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Table 9.1 Distance between pairs of major cities (kilometers)

	Tokyo	Chicago	Geneva	Sydney	Sao Paulo
Tokyo					
Chicago	10,142.4				
Geneva	9,803.0	7,056.8			
Sydney	7,835.4	14,891.3	16,788.5		
Sao Paulo	18,546.6	8,415.8	9,406.3	13,370.9	
Nairobi	11,278.6	12,894.0	6,078.1	12,162.7	9,289.96

Table 9.2 Average Intercontinental bilateral distances (kilometers)

	Europe	Western Hemisphere	Pacific Asia
Europe	1,491		
Western Hemisphere	9,585	4,163	
Pacific Asia	10,995	15,902	4,293

$$.06 = (ICS)\, a + (1 - ICS)\,(a + b - ab) \tag{9.1}$$

We get our estimate of *ICS* from table 2.1, on intraregional trade shares. Considering only the set of 63 countries examined statistically in chapters 4 to 6, the intracontinental trade share is about .6. (It is somewhat lower in East Asia and the Americas and higher in Europe. The simple average for the three regions is .58 in 1994, up from .50 in 1980.) Thus the equation becomes

$$.06 = a + (.4)\,(b - ab). \tag{9.2}$$

But we need an extra piece of information if we are to separate a from b. Table 9.1 gives distance in kilometers between some major world capitals. Table 9.2 gives the average distance between all the pairs of countries in our sample by continent. European countries tend to be both closer to each other and closer to the other two continents than is the case for countries in the Western Hemisphere or East Asia. Averaging over all the countries in the sample, the mean distance between countries on the same continent is 2,896 kilometers and on different continents is 11,776 kilometers—4.07 times as great.

We saw in chapter 3 that shipping costs, as measured by the c.i.f./f.o.b. margin, seem to rise by about 1 percent of value when distance increases by 1 percent, at least for the case of aggregate US merchandise trade. This would suggest that intercontinental costs are about four times as great as intracontinental costs. Let us proceed on the assumption that $b = 4a$, roughly. Then the equation becomes

$$.06 - .65b + .1b^2 = 0. \tag{9.3}$$

The solution to this quadratic equation[3] is

$$b = .092. \tag{9.4}$$

If 9 or 10 percent is a realistic estimate of intracontinental transport costs, then we can see from figure 8.3, 8.4, or 8.5 that supernatural trading blocs are a real danger. Indeed, for $b = .10$, our base-case parameter values, and a world consisting of three continents of two countries each, negative returns to regionalization set in when preferences are just below 50 percent. Any greater degree of regional preference moves into the zone of negative returns to regionalization (figures 8.5 and 8.7). For this world, 87.6 percent preferences are in the supernatural zone. For a world consisting of four 16-country continents, negative returns set in even sooner. The optimum degree of continental preferences is just 7.6 percent, and the supernatural zone begins at 14.8 percent (figure 8.7). It is likely that the c.i.f./f.o.b. ratio substantially understates the costs of trade by focusing solely on the cost of physical transport. We discussed in chapter 3 other relevant sorts of costs, such as those associated with personal contact between buyer and seller. We are unlikely to be able to measure such costs directly. We must infer them from their effects on trade patterns.

An Estimate of Intercontinental Costs Inferred from Intraregional Trade Shares

Within the confines of our theoretical model, parameter b could be estimated in a simple way from the data on intraregional trade shares if we were willing to assume that the observed current tendency for countries to trade with neighbors was the result solely of geographical proximity and not of preferential trading policies.[4] We pursue this logic now.

Given actual data on intercontinental trade, intracontinental trade, and GDP, the relative demand shares σ_c and σ_{nc} could be computed, and then equation (7.6) could be solved for a and b (given estimates of t and θ).

3. How sensitive is the calculation to the (rather arbitrary) assumption that the ratio of b to a is 4? Equation (9.1) can be expressed as: $b = (.06 - a)/[(1 - ICS)(1 - a)]$. To get an upper-bound estimate of intercontinental shipping costs, let us assume that intracontinental costs, a, are zero (as we did in most of the simulations in the preceding chapter). Then $b \leq .06/(1 - ICS)$. Now we can go directly from our statistic on the intercontinental share of trade, ICS, to b. The upper bound on intercontinental shipping costs is $.06/(1 - .6) = .15$.

4. Krugman (1991b) and Summers (1991), for example, use simple calculations to infer the rough importance of distance in determining trading patterns without explicitly distinguishing the effect of existing trade preferences.

An estimate of b alone can be had more simply. Recall, from chapter 7, the equations (7.6) for the relative demands σ_{ct} and σ_{nc_t}:

$$\sigma_{ct} = \frac{(1 - a)^{\theta/(1-\theta)}}{(1 + t)^{1/(1-\theta)}} \tag{9.5}$$

and

$$\sigma_{nc_t} = \frac{[(1 - a)(1 - b)]^{\theta/(1-\theta)}}{(1 + t)^{1/(1-\theta)}}. \tag{9.6}$$

Taking the ratio of the two, the terms involving a and t cancel out. Solving for b,

$$b = 1 - \left[\frac{\sigma_{nc_t}}{\sigma_{ct}}\right]^{(1-\theta)/\theta}. \tag{9.7}$$

Total intracontinental trade on a continent is $\Sigma S_{c_i} GDP_i$. Total trade undertaken by the continent with other continents (including both imports and exports) is $2\Sigma S_{nc_i} GDP_i$. Thus $ICS = \Sigma S_{c_i} GDP_i / [\Sigma S_{c_i} GDP_i + 2\Sigma S_{nc_i} GDP_i]$. In the special case in which intracontinental trade as a share of GNP in each country i is the same and the intercontinental share of each country is the same, the intracontinental trade share becomes

$$ICS = S_c \Sigma GDP_i / [S_c \Sigma GDP_i + 2S_{nc} \Sigma GDP_i] = \frac{S_c}{S_c + 2S_{nc}}. \tag{9.8}$$

Using equations (7.9) and (7.10), it follows that

$$ICS = \frac{\sigma_c(N - 1)}{\sigma_c(N - 1) + 2\sigma_{nc}(C - 1)N}.$$

Solving for $\frac{\sigma_{nc}}{\sigma_c}$ and substituting that into equation (9.7), we get

$$b = 1 - \left[\frac{(1/ICS) - 1}{2(C - 1)N/(N - 1)}\right]^{\frac{1-\theta}{\theta}}. \tag{9.9}$$

The set of countries from which our trade data come can be approximately described as four continents (including Africa/Mideast along with the other three[5] consisting of 16 countries each. Substituting $C = 4$, $N = 16$, and $\theta = .75$, into equation (9.8), we obtain a sample estimate of $b = .383$.

5. Foroutan and Pritchett (1993) find that the 19 African countries in their sample trade more with each other than the other gravity variables would predict, though the bloc effect is of only borderline significance.

This is quite a high estimate of intracontinental costs, and it would imply a corresponding reduction in the risk of trade policies becoming excessively regionalized.

We know from our gravity estimation, however, that statistically significant tendencies toward regional trade preferences already exist and thus explain part of the proclivity toward intraregional trade that shows up in table 2.1 and in this estimate of b. We thus conclude the chapter by using our preferred estimate of b, which comes from the gravity estimates. These estimates hold constant for the effects of regional trading arrangements already in existence, as well as the effect of per capita GDP and common language.

The Preferred Estimate of Intercontinental Costs from the Gravity Model

We saw above that, aggregating over all countries in the sample, the mean distance between countries on different continents is four times as great as the average distance between countries on the same continent. The gravity equations estimate the coefficient of the log-distance between a pair of countries at about .56. It follows that trade between two countries on the same continent will on average be twice as great as trade between countries on different continents, other things being equal [.56{log(11776/2896)} = .7855, and exp(.7855) = 2.19].

In the algebra of chapter 8, the elasticity of demand, $\epsilon_x = \frac{d\log(Trade)}{d\log(P)}$, is given by $1/(1 - \theta)$. If transport costs show up fully in the price facing the consumer, the percentage change in price associated with being on a different continent is given by $(p_{nc,t}/p_{c,t}) - 1 = b/(1 - b)$. From the data on bilateral trade, this should be approximately equal to $\frac{d\log(P)}{d\log(Distance)}$ log (1176/2896) $= \frac{d\log(Trade)/d\log(Distance)}{d\log(Trade)/d\log(P)} 1.403 = [.56(1 - \theta)]\, 1.403$. Choosing again our baseline value $\theta = .75$, our sample calculation suggests that the difference between intercontinental transportation costs and intracontinental costs is roughly on the order of 16.4 percent.

If taken at face value, the .164 estimate together with figure 8.5 suggests that the optimal degree of preferences within a continental group is roughly 55 percent—that is, intraregional liberalization to 45 percent of the level of worldwide trade barriers in a stylized six-country world. Only if regionalization proceeds past that point does it enter into the zone of negative returns to liberalization. For the more realistic 64-country world of figure 8.7, negative returns to regionalization set in as early as at 23.1 percent preferences and the supernatural zone at 44.2 percent preferences.

Figures 8.11a through c addressed the problem of multiple small preferential trading areas on each continent. With our estimate of b in the range of .1 to .2, we can also see that if preferences are set in the vicinity of 10 percent, then regional blocs of any size are beneficial. More precisely, the formation of eight two-country PTAs on each continent is welfare-improving, as is each subsequent doubling of the membership, on up to formation of continentwide blocs of 16 members.

An Estimate of Existing Preferences from the Gravity Model

The last step is to try to extract from our gravity estimates of chapters 4 to 6 a measure of k, the degree of preferences prevailing in existing regional trading blocs, in order to help evaluate whether the world trading system has in fact entered the supernatural zone. Our gravity estimates in chapter 5 suggest that the European Community in 1990 increased trade among its members by roughly 50 percent. Other parts of the world have weaker or stronger arrangements. We have found that free trade areas (FTAs) such as Mercosur have effects on trade that are considerably greater (proportionally) than does the European Union. Let us ask the following hypothetical question: what would be the effect on world economic welfare if the trading system settled down to an array of regional blocs that each had the same level of preferences as the European Union's?

Let the percentage effect on trade of bloc formation be represented by γ.[6] Using our model of chapter 8, a bit of algebra reveals that the formation of a bloc with preferences of k lowers the prices of goods in intrabloc trade by $-tk/(1 + t)$. The ratio of the change in quantity to the change in price is equal to the elasticity of demand:

$$\frac{\gamma}{tk/(1 + t)} = \epsilon_x = 1/(1 - \theta). \qquad (9.10)$$

Solving for the parameter we wish to estimate, we get

$$k = \gamma\,(1 + t)\,(1 - \theta)/t. \qquad (9.11)$$

Taking $\gamma = 0.5$ from the EC estimate, $\theta = 0.75$, and $t = .30$, the implied estimate of k is .54. In other words, EC preferences reduce trade barriers by 54 percent for intrabloc trade.

Srinivasan (1996, note 1) argues on technical grounds that the regional bias terms are even larger than those we have estimated (essentially an instance of Jensen's inequality). We assume T_{ij} is log-normally distributed—that is, that $\log T_{ij}$ is normally distributed with mean $\mu + \upsilon B_{ij}$ and variance σ^2, where B_{ij} is the dummy variable representing common membership in a bloc, υ is its coefficient, μ represents the other known

6. The coefficient in the gravity equation is actually the log of $(1 + \gamma)$.

deterministic components of the gravity equation, and σ^2 represents the variance of the regression error—that is, all the unknown or stochastic determinants of bilateral trade. Then, argues Srinivasan, the mathematical expectation of T_{ij} is really $\exp[\mu + \upsilon B_{ij} + \sigma^2/2]$, whereas we ignore the $\sigma^2/2$ term. As a description of the parameter estimate for a "percentage change," it would be a bit silly to quibble over how one chooses to identify the central tendency in the distribution. But it must be agreed that the nonlinearity in these calculations is one of the respects in which it should be viewed as primarily illustrative.

In any case, the estimated parameter value lies within our supernatural zone. It follows, within the assumptions of our model, that if all continents followed the EU example, the regionalization of world trade would be excessive, in the sense that world economic welfare would be reduced relative to the most-favored nation norm.

Conclusion on the Welfare Effects of Partial Regionalization

The conclusion of this chapter, within the confines of the model, is that some degree of preferences along natural continental lines, such as the Free Trade Area of the Americas, or enlargement of the European Union to include Central Europe, would be a good thing, but that the formation of free trade areas in which the preferences approach 100 percent would represent an excessive degree of regionalization of world trade. This is especially true if the prospective FTAs consist of entire continents. The overall conclusion of the analysis so far is that the world trading system is currently in danger of entering the zone of excessive regionalization.

The optimal path to liberalization appears to feature a sharp departure from Article XXIV. It entails reducing intraregional barriers by only 10 or 50 percent. Apparently, the optimal path concentrates on extending the scope of the preferential trade arrangements from two-country agreements to wider subcontinental agreements, and then to the continental level, and then finally to the worldwide level, *before* liberalizing completely within any unit. This route is illustrated as the optimal path in appendix figure D.4. At least, such a path would in our model raise economic welfare at each step of the way.

The hope that regional trading arrangements can be steppingstones to global free trade is something of a tradition in economists' analysis of FTAs. For expansion of regional trading arrangements to be beneficial at each stage, they must be restricted in some way. We have suggested the restriction that the margin of preferences be partial rather than 100 percent. The traditional restriction is that the FTA compensate nonmembers by reducing barriers somewhat against nonmembers so as to minimize trade diversion. The logic is that, under this restriction, nonmembers will not suffer an adverse shift in their terms of trade. Thus the formation of the FTA will not harm them while it helps members.[7] Unfortunately, the degree of liberalization that members of an FTA must grant to outsiders under this partial-equilibrium criterion may be rather large—larger than a typical bloc is politically prepared to grant.

Imagine, however, that we are designing rules for a global trading regime—for example, a revised Article XXIV. It then becomes a general equilibrium issue. We must consider a situation in which all regional groups might opt to form an FTA subject to the restrictions of the regime, not just one. It can be shown that the degree of liberalization required in such a rule is far more modest and attainable than the no-trade-diversion criterion that would be required of a single group acting in isolation (Wei and Frankel 1995b). This is all the more true if the internal preferences are partial, as in our model, rather than 100 percent, as in the traditional analysis. Consider this model, for example, when interbloc costs are 15 percent and intrabloc preferences are 50 percent, along the lines of the parameter estimates in this chapter. (Assume a world of three continental blocs of 15 countries each.) A simulation suggests that the Kemp-Wan-McMillan restriction is rather severe: to prevent trade diversion, each PTA must liberalize externally by 85 percent as much as it liberalizes internally (lowering tariffs on nonmembers from 30 percent to 17 percent). If so great a liberalization were politically possible, one wonders, why would the negotiation of worldwide free trade not be possible? But if all three blocs are forming their trade policies in a simultaneous equilibrium, the criterion necessary to raise economic welfare is much more moderate: PTAs need only liberalize externally by 25 percent as much as internally (lowering external tariffs from 30 percent to 26 percent). This should be easier to manage.

The conclusions of this and the preceding chapters are tentative because the analysis has left many factors out. We have explored some extensions of the basic theoretical analysis, such as the generalization of the model of trade to include differences in factor endowments in addition to imperfect substitutes. Other extensions remain to be done, however. At this point in the book, the highest priority is to relax the assumption that the worldwide level of trade barriers—the magnitude of tariffs applied to nonmembers—is exogenously fixed. In reality, there are many ways that the phenomenon of regionalism interacts with the determinants of global protection and liberalization. The preceding two paragraphs, for example, concluded that the optimal path toward worldwide free trade might

7. This is a useful way of interpreting McMillan (1993), who in turn interprets Kemp and Wan (1976). Winters (1997b) points out that the original Kemp-Wan theorem says nothing explicit about reducing tariffs to nonmembers' exports, or increasing their welfare. It merely says that if the trade quantities and prices experienced by nonmembers are the same after formation of a customs union as before, then they cannot have been adversely affected.

entail the formation of regional PTAs that are then steadily expanded geographically. This scenario implicitly makes the assumption that a pathway of small steps will be more likely to reach the ultimate goal of worldwide free trade than one huge leap, provided economic welfare goes up at each of the steps. This is an assertion regarding how the political system works, both within countries and between them. A consideration of such matters takes us into the realm of political economy, the subject of the next chapter.