# Small Countries and Regionalism

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**Abstract:** The number of regional trade agreements has nearly doubled in the last four years. Interestingly, relatively small countries have put enormous effort into joining regional agreements with larger countries during this period. In this paper, we address the following question: why are small countries so eager to be a part of these agreements? We construct a general equilibrium model of a natural trading block to answer this question. Using this model, we examine the welfare implications of a variety of regional trade agreements between large and small countries. We simulate the model and calculate consumption allocations, prices, trade volume, and tariffs under three different equilibria: Free Trade, Free Trade Association, and Customs Union. The results of this investigation indicate that a relatively small nonmember country might face significant welfare loses if a large regional trading block uses its monopoly power to manipulate external tariffs charged on the exports of the small country. In other words, our findings suggest that being an innocent bystander might be extremely costly for a small economy in a natural trading region.

## 1. Introduction

In recent years, regional trade agreements have mushroomed all over the globe. Specifically, the number of regional agreements has nearly doubled in the last four years. Two major characteristics of these agreements are particularly interesting: first, relatively small countries have generally initiated the negotiation process and formed regional agreements with big countries. For example, NAFTA was signed by two relatively small countries, Canada and Mexico, and a much bigger country, the United States. The EC has recently discussed accepting several relatively small countries as members. Second, the small countries have compromised on several dimensions to have regional agreements with larger countries or with existing regional trading blocs. For example, Mexico accepted several additional provisions about environmental clean-up, and energy pricing policies to join NAFTA. On the other hand, the big parties of NAFTA and EC continued their managed protection practices by limiting international access to some of their "sensitive" sectors.[1]

These developments as well as the ongoing debate about their contribution to the multilateral trading system has put various implications of regional agreements in the forefront of research in international trade.[2] Nevertheless, there have been very few studies which examine the regional trade agreements from the perspective of a small country in

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[1] See Ethier (1996), and Perroni and Whalley (1994) for several common features of recent regional agreements. As Perroni and Whalley note U.S. and Canada have protected their agriculture sector, while Mexico substantially liberalized it as a result of NAFTA. In Europe, new members have to adopt environmental and labor standards of the European Community, and, moreover, they have to accept a variety of protection measures for sensitive sectors, such as agriculture, and textiles, of the existing members. Winters (1993) reviews recent preferential trade arrangements between the European Community and several relatively small countries, such as Hungary, Poland, and the Czech and Slovak Republics. He calls these agreements as "managed liberalization," since "accedants have to accept existing policy unconditionally, even though existing members may be exempt from parts of it… the EC decides what it wants and the EFTA countries take it or leave it." Ethier also observes that recent regional agreements are "one-sided" in the sense that they contain asymmetric concessions. Sampson (1996) provides information about the increase in the number of regional trade agreements. See De Melo and Panagariya (1993), and Anderson and Blackhurst (1993) for a comprehensive review of several issues associated with recent regional trade agreements.

[2] In particular, the impact of recent wave of regional trade agreements on global trading system has a hotly debated issue: on one side we have Bhagwati (1995) who argues that, "… further expansion and creation of free trade areas, instead of concentration now on multilateralism at the WTO, is a mistake." Summers (1991), on the other side of the debate, argues that, "… holding the degree of multilateral progress constant, the world will be better off with more regional liberalization." See Riezman (1996) for an extensive discussion about these issues.

the context of a general equilibrium model. Our main objective is to evaluate the benefits of being a member of a regional trading block for a small country using a fully specified multi-country general equilibrium model. In particular, we address the following questions: first, why are small countries so eager to be a part of these agreements? Second, what are the effects of different types of regional trade agreements, such as customs unions and free trade associations, on welfare, tariffs, prices, and the volume of trade of small countries?

We construct a simple multi-country general equilibrium model of a "natural trading region."[3] This model was developed in Riezman (1985) and Kennan and Riezman (1990). We assume that all transaction costs associated with international trade are zero in the model. This assumption can be justified for several reasons. For example, countries in a natural trading region are located near each other, or have similar languages, cultures, or legal systems. One of the common characteristics of recent trade agreements is that they are regional, i.e. these agreements have been established by neighboring countries (see Ethier (1996).) As one would expect, a trade agreement among the countries in a natural trading region could potentially result in significant welfare gains. In our model, there are three countries: two of which are relatively big and have a symmetric endowment distribution. The third country is small with an important advantage over the big countries: it has a more even endowment distribution than the big ones. Therefore, its reliance on international trade is less than the other countries in the region. We calibrate our model this way to give the small country a better chance of benefiting from a potential trade war. Presumably, if the small country's endowment was uneven, it would suffer more from such a trade war.

In this region, countries set tariffs optimally and consider all possible trade agreements when they decide what to do. To be more specific, countries optimize at all stages both in terms of who they cooperate with and what tariffs they charge given the constraints imposed by their cooperative agreements. Our results depend only on the endowment structure we specify, since all the variables, including tariffs, are endogenously

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[3] Natural trading region is defined as a group of countries with low natural trading costs. We assume that transaction costs are prohibitive between the natural trading region and the rest of the world.

determined in the model. Moreover, our preference formulation generates a linear expenditure system which can be solved using numerical methods.

The big countries get together and form a regional agreement, either a Free Trade Association (FTA) or a Customs Union (CU), in our simulations. In the FTA, member countries agree to free trade between themselves but are allowed to set their external tariffs independently. A customs union is an FTA with the additional provision that the external tariff is set jointly by the members. First, we simulate our model economy by assuming that the small country is left out of the regional agreement. Then, we analyze the free trade equilibrium in which small country also becomes a participant in the agreement. We examine the effects of the changes in the relative size of these countries by simply changing the size of big countries in their export markets. For each endowment structure and trading regime, we calculate equilibrium prices, consumption allocations, tariffs, and trade volume. We, then, study the welfare implications of these agreements for each country in the region.

As the number of regional trade agreements has increased, the research program that aims to provide answers to a variety of questions about these agreements has also expanded. Kennan and Riezman (1988) study the implications of a possible trade war between a small country and a big one in a general equilibrium model. They find that big countries can win tariff wars. This implies that by having trade agreements with the big countries, small countries could avoid losing a possible trade war.[4] Markusen and Wigle (1989) analyze the implications of free trade arrangement between Canada and the U.S. Employing a computable general equilibrium model, they find that moving from the Nash equilibrium to free trade results in much larger welfare gains for Canada than for the United States.

Krugman (1991a) discusses the recent expansion of regional trade agreements and its impact on countries which are left out of this process. He provides a simple example to illustrate the importance of "the innocent bystander problem", i.e. the problem faced by a country which is excluded from a regional agreement. He concludes that the bystander can

suffer from significant welfare losses noting that ".. inward turning free trade areas, while doing little damage to themselves or each other, can easily inflict much more harm on economically smaller players that for one reason or another are not part of any of the big blocks."

Perroni and Whalley (1994), employing a computable general equilibrium model, study the role of small countries in the recent regional trade agreements. They claim that the main motive of small countries is to provide themselves with "safe havens" by securing their access to larger country markets. In other words, they interpret the recent regional agreements as insurance arrangements for small countries. They also find that small countries have to make some transfer payments to be a part of regional trading arrangements, since a big regional block can be better off by simply manipulating the terms of trade in its favor. In a recent paper, Bond and Syropoulos (1996) examine the implications of bloc size for tariffs and welfare. They extend Krugman (1991b)'s model and show that a trading bloc can achieve a welfare level, that is higher than that of the free trade, through an increase in its relative size.

In another study, Nordstrom (1995) investigates the effects of trade agreements on regional outsiders using a multi-country intraindustry trade model. The results of his simulations indicate that the cost of regional trade agreements can be significant in welfare terms for nonmember countries if there are large transaction costs associated with trade with other regions. Moreover, member countries can enjoy welfare gains by excluding some countries from the regional agreement and by increasing the tariffs charged on the exports of those countries. Kowalczyk (1996) studies the decision of a small country to participate in a free trade arrangement. He examines the gains and losses associated with terms of trade and volume of trade effects when the small country becomes a member of a free trade area. His results suggest that a small country enjoys gains through its access to the agreement, but a large trading partner might demand some transfer payments from the small country to establish free trade with it.

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[4] Results of the Kennan and Riezman study imply that if one of the countries in a natural trading region is substantially bigger than the others, then the big country can get large welfare gains by initiating a tariff war.

Whalley (1996) documents several objectives of small countries for becoming members of regional agreements. Apart from enjoying the welfare gains associated with free trade, these countries can harmonize their economic policies with those of larger economies and can gain momentum in reforming their economic systems. To illustrate, Mexico's membership to NAFTA, and the efforts of Eastern European countries to participate in the EC can be explained by their desire to speed up the economic reform process. Furthermore, becoming a member of a regional trading block subsequently increases bargaining power of the small economy in multilateral trade negotiations.

Despite the recent interest in these issues, our knowledge about the relation between the size of countries and welfare implications of regional agreements is far from perfect. First, the extent of "the innocent bystander problem," raised by Krugman (1991a), has not been thoroughly examined yet. For example, how does the relative size of the bystander affect the welfare gain or cost associated with regional agreements? Second, while some of the recent agreements take the form of FTAs, some are CUs arrangements. Existing studies do not investigate different types of agreements, such as FTAs and CUs, and, hence, are unable to document various implications of these agreements. In a recent paper, Kose and Riezman (1996) show that different types of free trade arrangements can have dramatically different effects on the member and nonmember countries. Third, the impact of changes in the size of member and nonmember countries on the inherent dynamics of model variables, such as terms of trade, domestic prices, and tariffs, have not been examined in the context of a general equilibrium model.

Our study extends the scope of the ongoing research program in three directions: first, we provide a fully specified, yet tractable, multi-country general equilibrium model that is well-suited to address the issues raised above. Second, our study of the relation between the size of the small country and the welfare costs of trading agreements in a natural region sheds light on the severity of the innocent bystander problem. Third, we examine the effects of changes in the relative sizes of countries in different equilibria, such as FTA and CU, and document regularities across different types of agreements.

The results of our study suggest that small economies can get very large welfare gains by participating in regional agreements. If they are left out of these agreements, they

might face very large losses in a possible trade war with the regional trading bloc. In other words, being an innocent bystander can be extremely costly for a small economy in a natural trading region. We also find that small economies might have to make large transfer payments to become members of regional agreements, if the big countries were unwilling to give up their power on their terms of trade unless such payments were made.

The organization of the paper is as follows: in section 2, we present the model, describe its calibration, and explain the numerical solution method. Section 3 discusses our welfare cost measure. We answer the questions posed above in section 4. We conclude with a brief summary of our findings and suggestions for future research in section 5.

## 2. The Model

We construct a general equilibrium model of a "natural trading region." Our model is sufficiently comprehensive to incorporate an arbitrary number of countries which are in close proximity to each other. In other words, we assume that natural trading costs are equal to zero in the model. However, transaction costs between the natural trading region and the rest of the world are assumed to be prohibitively high, i.e. there is no trade between the countries in the region and the rest of the world.

Countries set tariffs optimally and consider all possible trade agreements when they decide what to do. They can choose to not be part of any trade agreement and charge the optimal tariff or they could decide to join a coalition with other countries. They could be part of an FTA, a CU or an n country coalition—free trade. In the FTA member countries agree to free trade between themselves, but are allowed to set their external tariffs independently. A customs union is an FTA with the additional provision that the external tariff is set jointly by the members. A customs union (or FTA) of all countries is, of course, Free Trade.

### 2.1 The Environment

Consider a natural trading region of n countries. Each country is endowed with a fixed amount of each final commodity. Let $y_j^i$ be country i's endowment of good j. In each country, the agents derive utility by consuming m different goods. Assume that each

country consists of individuals with identical Cobb-Douglas preferences. Then the utility function of a representative agent is the same as the aggregate and is given by

$$(1) \qquad U^i = \sum_{j=1}^{m} b_j^i \ln x_j^i$$

where $U^i$ is the utility of country i, and $b_j^i$ is the weight trading block i puts on commodity j. $x_j^i$ denotes the aggregate consumption of good j in country i. While the assumption of a specific functional form is limiting, it results in a linear expenditure system which allows us to employ numerical methods to solve the model. Further, with this specification we do not have to specify elasticities, and can state our results in terms of more fundamental endowment parameters.

The volume of trade, $z_j^i$, is defined to be $z_j^i = x_j^i - y_j^i$. Positive values of $z_j^i$ indicate imports, negative values exports. As we have already stated above, countries charge optimal tariffs on imports. Denote the tariff charged by country i on imports of good j by $t_j^i$. Then if the world price for good j is $p_j$, then the domestic price of good j in country i is $p_j^i = (1 + t_j^i) p_j$.

Given that each trading block consists of identical individuals, aggregate demand is obtained from maximizing utility subject to the budget constraint

$$(2) \qquad \sum_{j=1}^{m} p_j (1 + t_j^i) x_j^i = I^i = \sum_{j=1}^{m} p_j (1 + t_j^i) y_j^i + p_j t_j^i z_j^i \qquad i = 1, 2, ..., n, \ j = 1, 2, ..., m$$

where $I^i$ is income of country i and consists of income from the endowment plus tariff revenue which is rebated to consumers lump sum.

## 2.2. The Equilibrium

The countries solve their optimization problems by maximizing (1) subject to (2). We do not allow trade deficits or surpluses. At the equilibrium, the aggregate expenditure in each country must equal the value of the endowment vector. In other words, the balance of payments constraint of each country i is given by

(3)
$$\sum_{j=1}^{m} p_j x_j^i = \sum_{j=1}^{m} p_j y_j^i$$

In addition to this constraint, the world demand for each good, should be equal to world supply, Y:

(4)
$$\sum_{i=1}^{n} x_j^i = \sum_{i=1}^{n} y_j^i = Y$$

## 2.3. The Numerical Solution Method

.          Because we cannot solve the model analytically, we use a recursive numerical solution method to find an approximate solution for equilibrium allocations, prices and tariffs. The intuition of our solution method is simple: for a given endowment matrix, we can compute the equilibrium with optimal tariffs. Thus, when a country considers changing its tariff it has to make this calculation for any proposed tariff change. Once a country changes its tariff we have to re-compute optimal tariffs for the other countries. This continues until no country wants to alter its tariff rate.[5]

We structure our simulations in such a way that in all the possible equilibria each country exports one good (country i exports good i) and imports all the other goods. Transfer payments between countries are not allowed. Kowalczyk and Sjostrom (1994) analyze a model of customs unions in which side payments are permitted, but their framework requires that there are no spillovers to non-members when a customs union forms. They find that the use of inter-block transfers can facilitate the attainment of free trade. We discuss this issue in section 4.4.

Operationally, FTAs and CUs put constraints on the feasible tariff matrix. For an FTA, tariffs between the member countries are set to zero, and external tariffs are set independently.[6] Alternatively, one might consider a more general case in which we let coalitions have tariffs between the member countries. We require that free trade be

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[5] See Kennan and Riezman (1990) for details of our solution method.
[6] As shown by Richardson (1993) there is a problem if two FTA members try and sustain different tariff rates on the same good. Even if rules of origin are strictly enforced it still may not be possible to sustain different tariff rates. However, for the purposes here we ignore this complication.

practiced within the coalition because article XXIV of the GATT requires this. This means to compute the equilibrium, the appropriate tariffs are constrained to be zero within the regional trading block. Computing customs unions equilibria is a bit more complicated: one can think of a CU as an FTA with the added feature that the external tariff is set jointly. In general, (except when the endowment pattern is symmetric) there will be a conflict of interest between the member trading blocks as to what the external tariff should be. Since we consider CUs between countries with symmetric endowments, this is not a problem here.[7]

## 2.4. Calibration

In order to utilize the solution algorithm, we specify the number of countries, the number of goods and endowment of each country. We assume that m=n=3 and $b^i_j$ =1/3 for all i,j=1,2,3. The assumptions on preferences are not as limiting as they seem: any variation in cross country preferences or preferences across commodities could be replicated by a suitable adjustment of endowments. Since our focus is on the relationship between size of countries and welfare gains associated with trade agreements, we concentrate on variation in the endowment matrix, but the results can apply to more general situations.

We calibrate our model for a trading region which contains one relatively small country and two symmetric big countries. The endowment matrix can be written as

$$E = \begin{bmatrix} 0.2 & 0.2 & 0.2 \\ 0.4 & e & 0.4 \\ 0.4 & 0.4 & e \end{bmatrix}$$

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[7] How potential customs union members resolve this conflict is a serious problem deserving of careful analysis. Gatsios and Karp (1991) addresses this issue directly. In their model, members sometimes have congruent interests and sometimes opposing interests. Here member's interests are always opposed in the sense that if their endowment structure is not symmetric they want different external tariffs. There is no simple or obvious solution to this problem. In a recent paper, Riezman (1996) assumes that members compromise on the external tariff by splitting the utility difference to resolve this problem.

where e denotes export good endowment of a big country. The endowment of the small country is more even, which gives her a better chance of benefiting from a tariff war. We let e vary from 0.6 to 100. In other words, we systematically change the size of big countries while keeping the size of the small one unchanged. This changes the distribution of endowments across countries, and also affects the size of endowments. For each e, we compute equilibrium allocations in CU, FTA, and FT. In CU and FTA equilibria, two big countries get together and leave the small country out. Since we limit our analysis with free trade agreements between the large countries, we do not have to model the choice of coalition partners. Riezman (1985) studies partner choice problem during customs union formation. Since big countries have symmetric endowments, the determination of tariff rates in the CU equilibrium does not lead to conflict of interest between the union members, i.e. the members agree on what the optimal tariff should be.

## 3. Welfare Cost Calculations

The measure of the welfare cost we use is the fraction $\delta$ by which the consumption allocations should be decreased in the free trade equilibrium to keep the representative agent with the same utility as the one in an equilibrium with tariffs. We use the measure of compensating variation in consumption to evaluate the welfare costs associated bilateral agreements.[8] The welfare cost $\delta$ is calculated as

$$U^N(x_1, x_2, x_3) = U^F((1-\boldsymbol{d})x_1, (1-\boldsymbol{d})x_2, (1-\boldsymbol{d})x_3)$$

$U^N$: utility under an equilibrium with positive tariffs
$U^F$: utility under a free trade agreement

## 4. Small Countries and Regional Trade Agreements

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[8] This measure is slightly different than the Equivalent Income Variation measure which basically looks at the change in income at constant prices. The measure of compensating variation in consumption is widely used in macroeconomics and finance literature to evaluate the costs of business cycles and

We first establish the relationship between the endowment of countries and their size distribution. In table 1, we present the changes in e, that is the export good endowment of a big country, and its impact on the relative size of countries in the region. Since the world prices are endogenously determined in our model, we should decide which price vector is going to be used to compute the size of the countries at an equilibrium. We use the price vector associated with free trade equilibrium to examine the relationship between export good endowment of countries, and their relative size. As table 1 indicates, when a big country is endowed 0.8 units of export good, the value of its total endowment is 2.59 times is larger than that of the small country. It is important to stress that the relation between export good endowment and the relative size is not linear. If a big country has export good endowment of 100 units, this means that it is 6.85 times larger than the small country. In other words, if the endowment ratio of export goods increase by 125 times, the relative size ratio rises almost 3 times only. An increase in the export good endowment of big countries does not linearly reflect itself in the relative size, since this increase results in a decrease in the equilibrium price of the export good of the big country.

### 4.1. Size of regional bloc and the tariff rates

In this section, we analyze the effect of an increase in the size of regional bloc on tariff rates. We present the impact of the size of regional bloc on tariff rates in figure 1. First, as shown in figures 1a and 1c, the external tariff of the regional block increases as it becomes larger in its export good in both equilibria. This result can be interpreted as that the rise in the size of the regional bloc results in increased market power. In a recent paper, Bond and Syropoulos (1996) reach the same result: as a trading bloc expands by increasing the number of its members its external tariff rate also rises.

When the regional trading arrangement between big countries take the form of CU, the joint tariff rate of the union is higher than that of the nonmember country (see figures 1a and 1b). Interestingly, this regularity is reversed if the big countries form an

international risk sharing. See Lucas (1987), Cole and Obstfeld (1991) for the use of this measure in different contexts.

FTA: the small country charges higher tariff rates then the big ones. This can be explained with the following intuition: when the big countries form a CU, they internalize the tariff externality. This leads to the higher CU tariff and lower small country tariff. Members of an FTA cannot internalize this externality, since they do not jointly determine tariff rates. In a recent paper, Kose and Riezman (1996) show that this result is also valid when countries have symmetric endowment distributions. In particular they find that in an FTA (CU) equilibrium, the nonmember (member) country charges higher tariffs on imports from the member (nonmember) country.

As the member countries of the regional trading bloc gets larger, the tariff rate charged by the trading bloc increases more rapidly in a CU equilibrium than it does in an FTA equilibrium (see figures 1a and 1b). For example, an increase in the endowment of export good of a big country from 3 to 40 results in a five fold increase in the tariff rate of the CU (see figure 1c). The same change in the size of endowment leads to much less than two fold increase in the tariff rates charged by the member countries of the FTA (see figure 1a).

Interestingly, our simulations suggest that the tariff charged by the small nonmember country increases, as the relative size of it becomes smaller. We present this result in figure 1d. Bond and Syropoulos find the opposite: as relative size of a trading bloc gets smaller, it initially decreases its tariff rate, and then increases it. The difference between our finding and theirs is due to different endowment structures we employ. In our model, as the regional trading block gets larger, its dependency to trade also increases since the endowment structure of member countries becomes more uneven. On the other hand, the small country does not have this problem, it can still manipulate the tariff rate by using its power in its export good market.

The magnitude of tariff rates we report are consistent with those of earlier studies which employ general equilibrium models (see Perroni and Whalley (1994)). For example, when the big country has an endowment of 10 units of its export good, it charges approximately 16 (220) percent tariffs on the exports of the small country in an FTA (CU) equilibrium. These very high tariff rates signal that being a bystander in a natural trading region can be extremely painful especially if the big countries establish a CU arrangement.

### 4.2. Prices

Next, we examine the changes in terms of trade and domestic prices in response to the changes in the size of regional trading bloc. Our results are presented in figure 2. Figures 2a and 2b show the percentage change in the terms of trade, when countries move a CU or FTA equilibrium to free trade. As the relative size of regional trading bloc becomes bigger, the small country gets higher improvement in its terms of trade by becoming a member of the regional agreement. For example, consider the following regime change: the members of the CU and the small country get together and establish free trade in the region. As a result of this change, the terms of trade of the small country improves by more than 100 percent, when e is 5.

Since member countries are unable to coordinate the tariff rates in an FTA equilibrium, moving from the FTA agreement to FT deteriorates the terms of trade of the big country less than that if they were in a CU. This result is shown in figure 2a.

Moving from CU (FTA) to FT results in lower prices in the region. As figures 2c and 2d indicate, the decrease in domestic prices as a result of moving from CU to FT equilibrium is much higher than that of moving from FTA to FT equilibrium. To illustrate, when the big country has an endowment of 10 units of its export good, establishing free trade in the region, instead of CU (FTA), leads to approximately 28 (7) percent fall in the prices of import goods coming from the small country in the big countries' domestic markets. Similarly, consumers in the small country pay almost 30 (20) percent less to the goods imported from big countries when the small country signs a free trade agreement with the members of the regional CU (FTA).

### 4.3. Export Share

We present the results of our simulations associated with export share of member and nonmember countries in figure 3. As figures 3a and 3b show, a member country of a regional agreement can have a larger or smaller export share than the nonmember small country depending on the size of its export good endowment. Figure 3e demonstrates that this is also true when there is free trade in the region. Since our endowment specification

makes the big country more dependent on imported goods as it becomes larger in its export good endowment, the price of export good of the small economy increases as its relative size gets smaller.

Figures 3c and 3d reveal a couple of interesting regularities pertaining to export share of member and nonmember countries in a natural trading bloc. First, member countries of the regional bloc export a larger fraction of their GDP to the small country in a CU equilibrium than an FTA equilibrium. In contrast, the small nonmember country has larger export share with the regional FTA than with the regional CU. Second, member countries have the smallest export share when there is free trade in the region. The nonmember country, in contrast, reaches its largest export share when there is free trade in the region. In figure 3f, we examine the trade between member countries of the regional bloc. The move from FTA to CU improves the terms of trade of the member countries, and increases the intra-bloc trade.

### 4.4. Welfare gains

In sections 4.2 and 4.3, we show that the small nonmember country can improve its terms of trade and increase its volume of trade by becoming a member of the regional agreement. Do these positive effects generate large welfare gains? If they do, then we can easily answer the question we have asked at the beginning of the paper. In this section, we study the size of welfare gains using the welfare cost measure which is explained in section 3. Figure 4 presents our findings: As figure 4a and 4b show, becoming a member of the regional agreement leads to very large welfare gains for the small economy. For example, if the big countries are endowed with 30 units of export good, consumers in the small country can increase their consumption by approximately 8 (60) percent, when it is accepted to the regional FTA (CU) agreement. This result explains the main incentive of small economies to become members of regional agreements: these agreements result in very large welfare gains for the small economies. Furthermore, if they are left out of these agreements, in other words if they become innocent bystanders, they might pay very high costs. Figure 4d suggests that the innocent bystander problem can be very severe for small economies: when the two big countries, each of which has an export good endowment of

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100 units, establish a CU arrangement, the small country in the region can face up to 75 percent of consumption loss during a potential tariff war with the members of the union.

We also noted that relatively small countries compromise on several dimensions to have regional agreements with larger countries. The results of our simulations provide a simple, yet very powerful explanation to this observation: establishing free trade in the region by accepting the small country to the regional bloc results in lower consumption in the member countries (see figure 4c). Hence, the small nonmember country might have to make transfer payments to become a member of the regional trading bloc. The size of these payments depends on the type of the regional agreement between the big countries. If the agreement takes the form of CU, the small country might have to make larger transfer payments to become a member.

How large are these transfer payments? To answer this question, we provide the following rough calculation: As a point of departure assume that the payment from the small country to big countries should be at least as large as the lost tariff revenue of the big ones due to regional free trade agreement.[9] In our example, when the size of the regional trading bloc is roughly 11 times larger than the small country, i.e. when the big countries are endowed with 8 units of export good, the lost tariff revenue of the regional customs union is approximately equal to 7.3 percent of the small country's endowment. This means that the small country has to transfer almost 7.3 percent of its national product to the big countries to participate in the trade union.

Surprisingly, the result of our simple calculation is consistent with those of Perroni and Whalley (1994): they also discuss the possibility that small countries might have to make side payments to participate in regional trading arrangements. Their findings indicate that the regional agreement between Canada and the U.S. would not be signed if Canada did not make some transfer payments to the U.S. since the agreement resulted in large welfare gains for Canada, but the U.S. gave up its retaliatory power against Canada. Employing a cooperative solution they calculate the size of these size payments which support Pareto improvements for both economies. In particular, the outcome of their study suggests that depending on the coefficient of relative risk aversion and subjective

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[9] See Kowalczyk (1996) for a similar argument about the transfer payments.

probability of a potential trade war, the size of transfer payments, made by Canada to the U.S., ranges from 0.64 percent to 13 percent of its gross national product.

## 5. Summary and Concluding Comments

The number of regional agreements has nearly doubled in the last four years. Two major characteristics of these recent agreements are particularly interesting: first, relatively small countries have generally initiated the negotiation process and formed regional agreements with big countries. Second, the small countries have compromised on several dimensions to have regional agreements with larger countries or with existing regional trading blocs. In this paper, we provide some simple explanations for these recent developments using a general equilibrium model in which countries behave optimally.

We first provide an extensive review of the related literature. This review suggests that our knowledge about the relation between the size distribution of countries and welfare implications of regional agreements is far from perfect. Then, we construct a general equilibrium model of a natural trading region. In this model, there are three countries: two of which are relatively big and have a symmetric endowment distribution. The third country is small with an important advantage over the big countries: it has a more even endowment distribution than the big ones. Using this model, we examine the welfare implications of a variety of regional trade agreements between large and small countries. We simulate the model and calculate consumption allocations, prices, trade volume, and tariffs under three different equilibria: Free Trade, Free Trade Association, and Customs Union.

The results of our study indicate that small economies can get very large welfare gains by participating in regional agreements. If they are left out of these agreements, they might face very large losses in a possible trade war with the regional trading bloc. In other words, being an innocent bystander can be extremely costly for a small economy in a natural trading region. We also find that small economies might have to make large transfer payments to become members of regional agreements, if the big countries were not willing to give up their power on their terms of trade unless such payments were made.

Considering that recent wave of regional trade agreements has received widespread attention in policy circles, it is particularly important to understand various implications of these agreements on small countries. While shedding light some interesting issues, our study also indicates some future research directions: first, we need to develop better measures of transfer payments. Here we provide a very simple calculation to show that small economies might have to make large transfer payments to participate in regional agreements. Understanding the magnitude of these payments can result in better evaluation of relative merits of these agreements for small countries. Second, our welfare gain calculations associated with regional agreements should also be extended. In particular, determination of those gains associated with terms of trade and volume of trade effects employing a disaggregated welfare measure can advance our knowledge about the welfare issues associated with these agreements while providing a useful instrument for empirical research. Finally, our study does not consider the strategic aspects of the regional agreements. For example, the small country can sign an agreement with one of the big countries and try to leave the other big country out of this agreement. This possibility can result in complex strategic interactions when the size difference between the economies in the region gets smaller. We plan to extend our research program to examine these issues.

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**Table 1**
**Size Distribution of Countries**

| e | end. ratio | size$_1$ | size$_2$ |
|---|---|---|---|
| 0.6 | 3 | 2.31 | 4.63 |
| 0.8 | 4 | 2.59 | 5.18 |
| 1 | 5 | 2.83 | 5.67 |
| 5 | 25 | 5.03 | 10.05 |
| 8 | 40 | 5.58 | 11.17 |
| 10 | 50 | 5.81 | 11.62 |
| 30 | 150 | 6.54 | 13.08 |
| 50 | 250 | 6.71 | 13.43 |
| 70 | 350 | 6.79 | 13.59 |
| 100 | 500 | 6.85 | 13.71 |

e= export good endowment of a big country

end. ratio= ratio of export good endowment of a big country to that of small country= e/0.2

size$_1$= size ratio of the wealth of a big country to that of small one in free trade. This ratio is calculated with the following formula

$$size_1 = \sum_{j=1}^{3} p_j y_j^2 \Big/ \sum_{j=1}^{3} p_j y_j^1$$

size$_2$= 2* size$_1$. This measures the size ratio of the wealth of a regional trading block formed by the big countries to that of the small country. To compute this measure, we use free trade prices.

**Fig. 1: Tariff Rates**



**Fig. 1a**
**Free Trade Association**

**Fig. 1b**
**Customs Unions**

**Fig. 1c**
**Member Country**

**Fig. 1d**
**Nonmember Country**
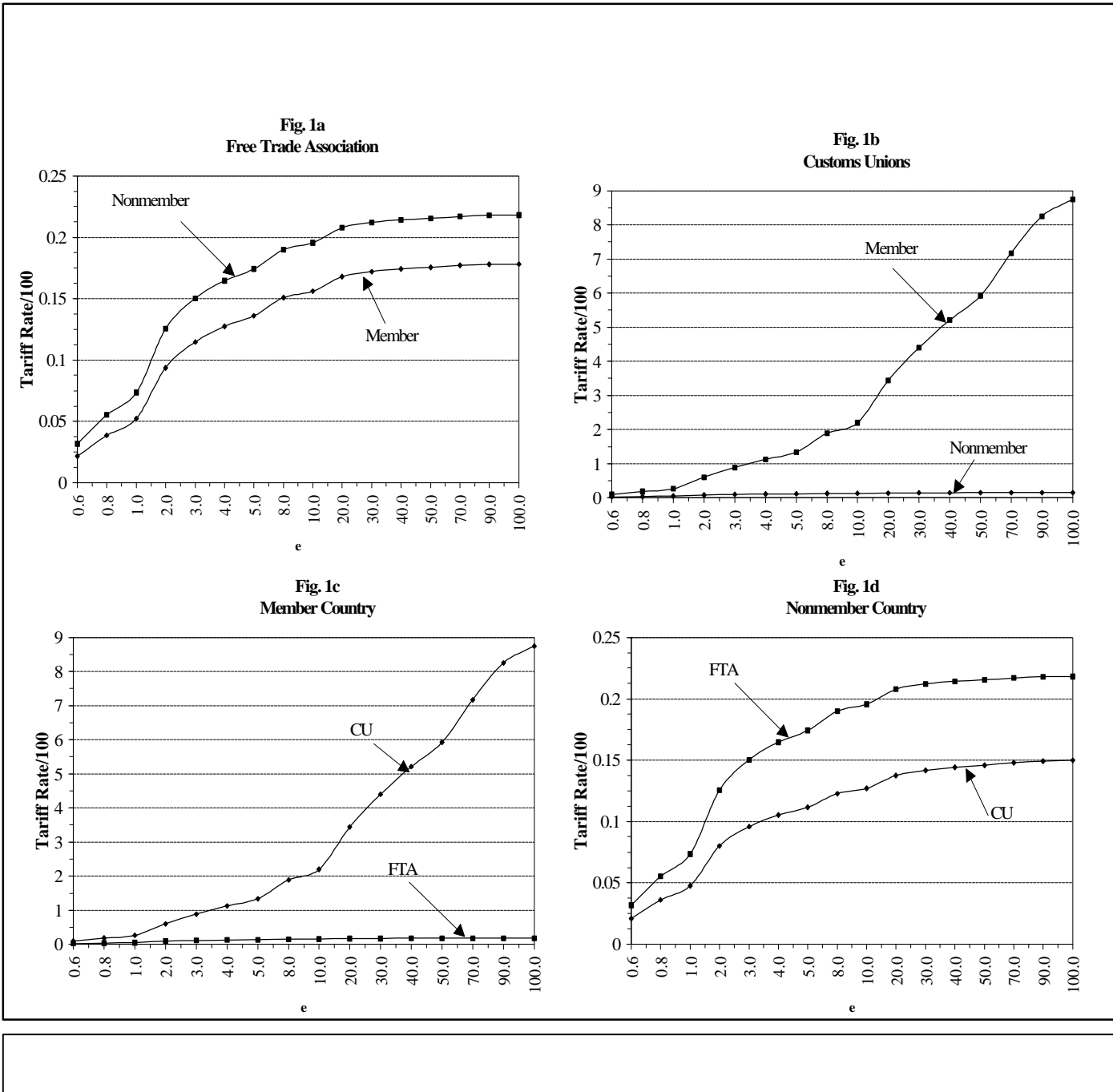
e is the export good endowment of the big country. On the vertical axis, tariff rates, divided by 100, are reported. CU refers to Customs Union and FTA refers to Free Trade Association. See text for details.

**Fig. 2: Change in Prices**
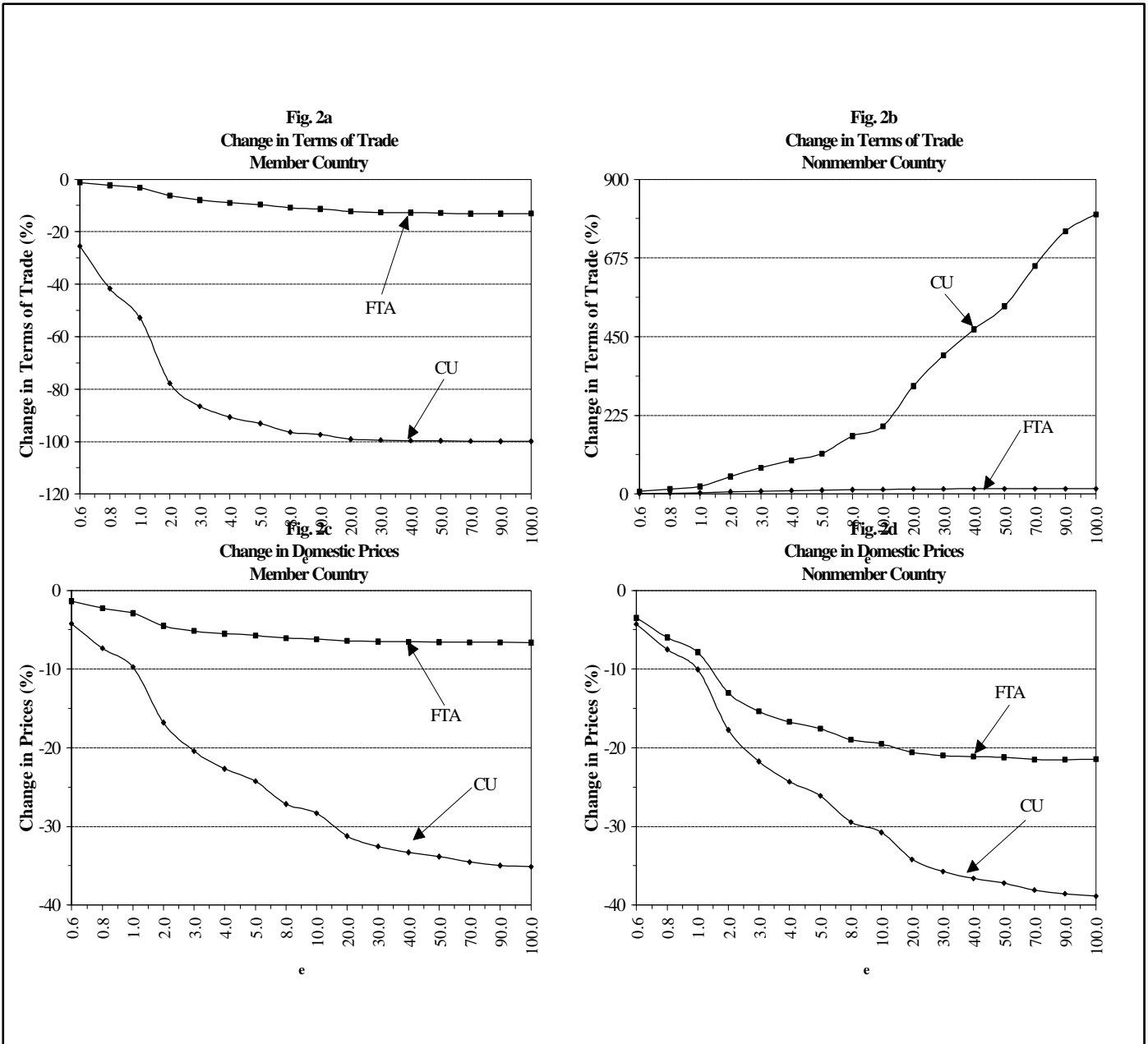


**Fig. 2a**
**Change in Terms of Trade**
**Member Country**

**Fig. 2b**
**Change in Terms of Trade**
**Nonmember Country**

**Fig. 2c**
**Change in Domestic Prices**
**Member Country**

**Fig. 2d**
**Change in Domestic Prices**
**Nonmember Country**

e is the export good endowment of the big country. CU refers to Customs Union and FTA refers to Free Trade Association.

On the vertical axis, change in prices and terms of trade are reported. For example, in figure 2a, changes in terms of trade when moving from a CU or FTA equilibrium to Free Trade are reported. See text for details.

### Fig. 3a
### Free Trade Association
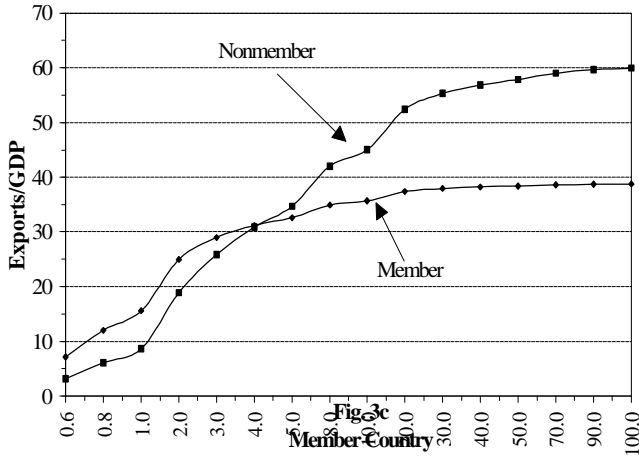
### Fig. 3b
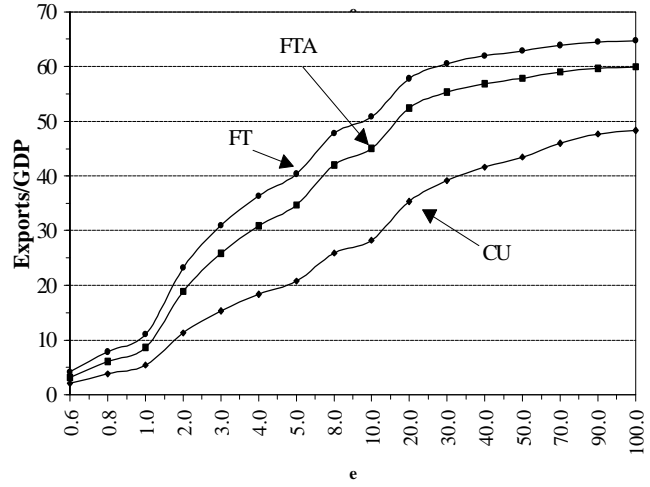### Customs Unions

### Fig. 3c
### Member Country
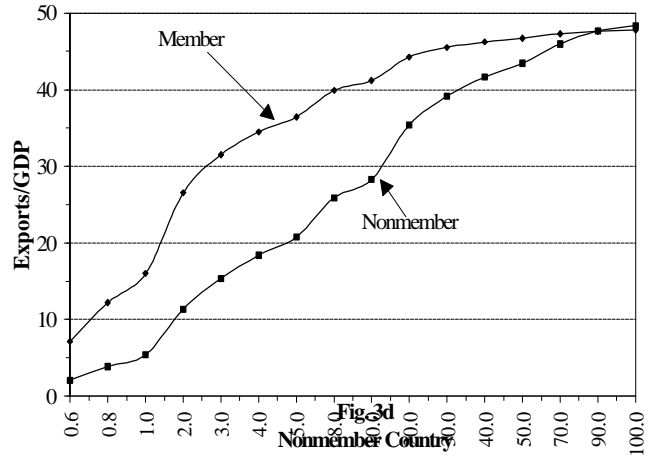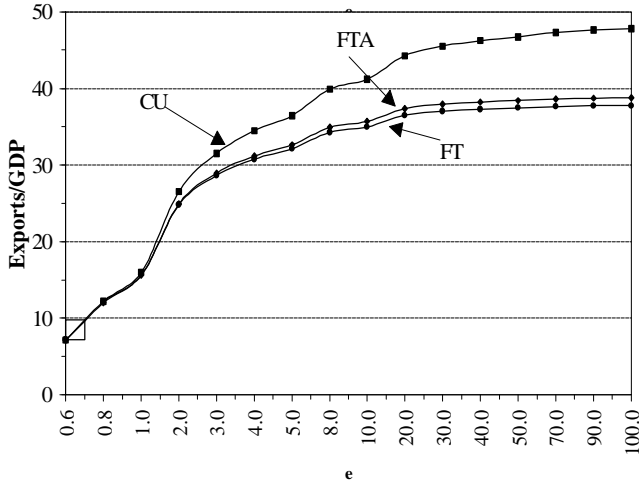
### Fig. 3d
### Nonmember Country

### Fig. 3e
### Free Trade
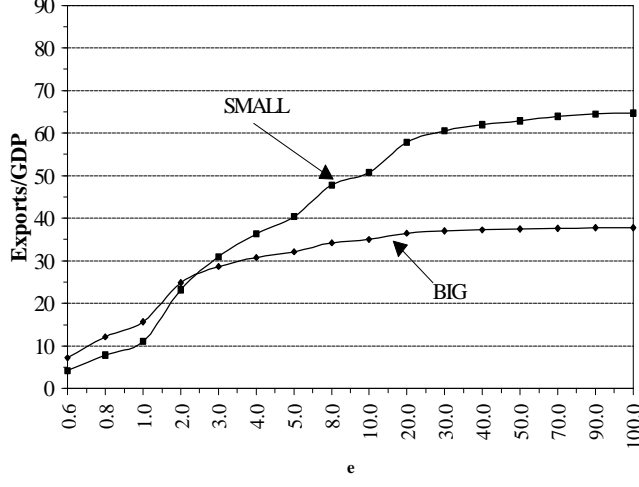
### Fig. 3f
### Intrablock Trade
### (Trade Between Big Countries)
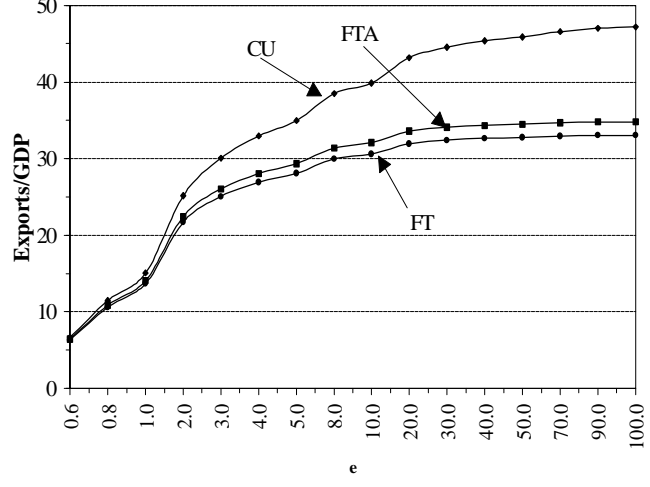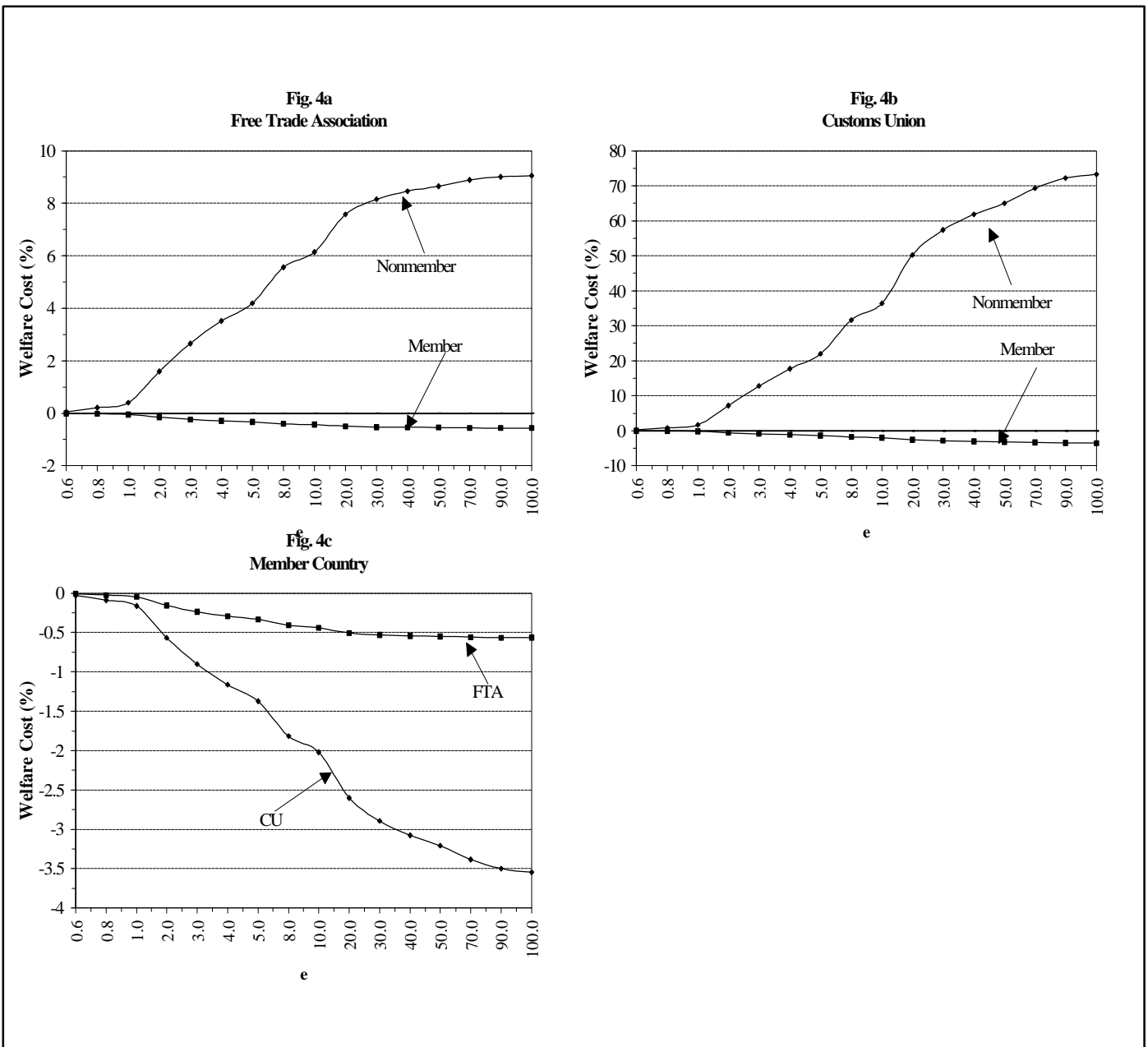
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**Fig. 4: Welfare Cost**

Fig. 4a
Free Trade Association

Fig. 4b
Customs Union

Fig. 4c
Member Country

e is the export good endowment of the big country. CU refers to Customs Union and FTA refers to Free Trade Association.

On the vertical axis, welfare costs ( in percent) associated with free trade agreements are reported. For example, in figure 4a,

welfare costs moving from an FTA equilibrium to Free Trade are reported. See text for details.