

Measuring the Welfare Effects of Trade Policy Alternatives:  
The EU's Eastern Enlargement

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## **INTRODUCTION**

In the aftermath of the European Union's eastern enlargement many interesting issues concerning the effects of the enlargement have surfaced. These issues range from international and domestic politics to a host of economic concerns. Our interest in this paper rests with economics. What will be the impact on Spain if structural and regional funds are diverted to new member states? What impact will workers from the east have on Germany's labor market? How will the CAP be affected by the new members? Although, the issues concern both the old members and the new members, the focus here is on the impact of the enlargement on the new member states from an economic perspective.

This paper employs a particular economic methodology to evaluate the static welfare gains and losses from the trade policy options facing a nation. With relatively modest data requirements, the welfare effects of joining the EU will be measured for some of the many states that were part of the enlargement. The paper consists of three parts. The first presents a model of a small open economy and derives a measure to evaluate policy alternatives. The second part applies the framework developed to measure the impact of trade policy alternatives open to potential new member states of the European Union. This involves taking the model to the real world, using data to provide answers for policy makers. The third section summarizes the results and compares this method of investigating the welfare effects of economic integration with other studies.

Joining the union was an obvious outcome for many eastern European countries, but the circumstances surrounding the terms of membership are negotiable. In particular,

the allocation of funds in the EU budget is a contentious issue and how these funds are distributed will affect the welfare of the new member states, as well as the fifteen old member states. Providing policy makers with alternative welfare outcomes will enable them to evaluate policy alternatives more effectively.

## **THE MODEL**

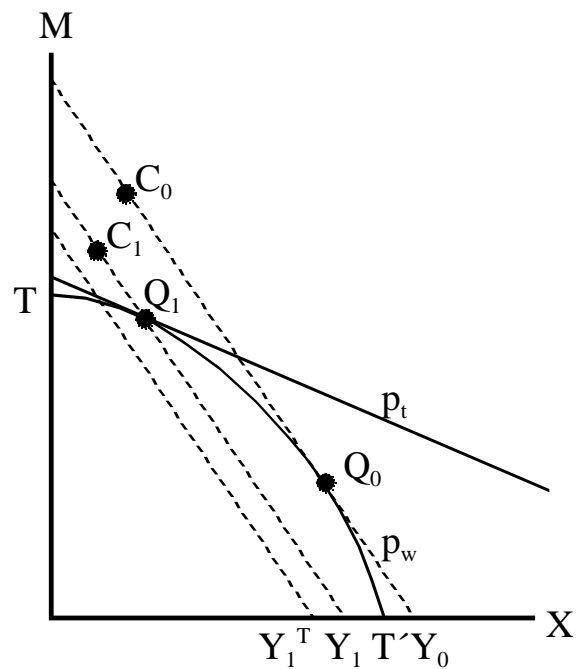
Today there exist many stages of economic and political integration and in the trade area; these take the form of different preferential trade agreements (PTAs). This has been a part of the decline in trade barriers and the rapid growth in international trade since the end of World War II. Part of the reduction in trade barriers has been a result of the multilateral talks sponsored by the GATT. But part of this change has been the agreements between various countries to lower barriers among themselves. Such agreements are known as preferential (or discriminatory) trade agreements. Today almost all of the member countries of the WTO participate in one of the 194 preferential agreements that have been officially recognized by the WTO (World Bank).

The two main types of PTAs are free trade areas (FTAs) and customs unions (CUs). The main difference between them is how the partners treat nonmember countries. In a customs union the association of countries eliminates barriers to trade among members but erects a common barrier against nonmembers. The best known example of a CU is the European Union. Countries that form a FTA also eliminate barriers among members, but maintain their own individual trade barriers against nonmembers. Also, sometimes a third type of agreement is often defined. A common market is a customs union that allows free movement of factors of production among member states.

Our attention centers on the economic welfare associated with various trading arrangements. Our model concerns a small country. By small we mean that the country has no effect on either world prices or the prices of potential partner countries. It seems suitable for the countries we will study. It is well known that for a small country welfare is greatest when there is unilateral free trade. But welfare associated with alternative trading agreements depends on the terms of trade established and needs further study to rank the alternatives. A relative simple measure can be used to consider the relevant alternative trading scenarios. The benchmark for our analysis will be the case where a country sets its own tariffs.

Figure 1

Figure 1 shows a standard international trade model.  $TT'$  depicts the production possibilities curve for a small country producing goods  $X$  (the composite exportable good) and  $M$  (the composite importable good). When there is free trade production occurs at  $Q_0$  and consumption at  $C_0$ , so that the price line  $p_w$  represents the world trading price ratio. Real income in terms of the exportable is  $Y_0$ .



If the country levies an import tariff residents face a higher relative price for the import than the world price, but can trade with the rest of the world at world prices. So the price line becomes flatter at  $p_t$ , production is at  $Q_1$ , consumption at  $C_1$ , and real

income falls to  $Y_1$ . The tariff of  $Y_1^T - Y_1$  is redistributed to residents. Keeping with PTA theory literature this will be the base case.

Consider what happens if this country enters a CU. The price ratio faced by residents will most likely change for both domestic and international trade. Let's consider each composite good separately. The composite import good comes from three alternative sources: domestic producers, CU member producers, and non-member producers. The import good from all three sources will always sell for the world price plus the CU tariff.

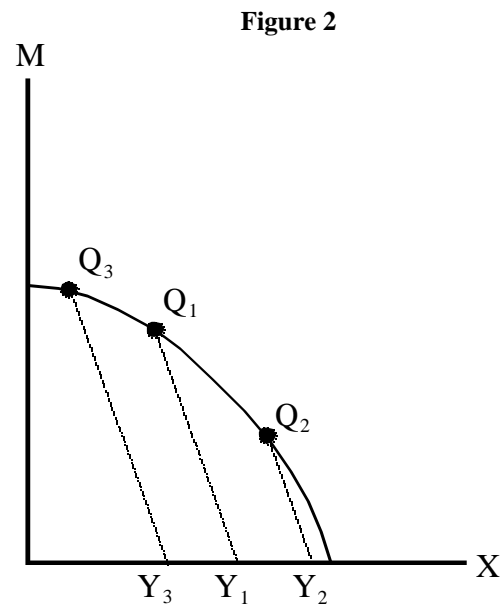
The composite export good sells in part to domestic consumers, in part to CU partners, and in part to the rest of the world. Exports to the rest of the world will be at world prices, since a small country cannot affect world prices. Exports to CU partners and trade within the domestic market can occur at higher prices because of the CU tariff. Therefore, the weighted average of sales to the rest of the world (at world prices) and within the CU (at world prices + CU tariff) determines the impact of CU membership on the price of the exportable good faced by domestic residents. Of course, if X were a homogeneous good, the higher price in the CU means that domestic producers would choose to sell all X output to the CU. But, the export is a composite of goods that sells to the rest of the world at world prices and within the CU at CU prices, so it will sell in all three markets.

By joining a CU the prices of both imports and exports can increase. Therefore, the relative price of the domestic country's exportables could either increase or decrease. To demonstrate this change and how it affects the decisions of domestic consumers and producers and therefore the economic welfare of the home country, the change is divided

into two distinct effects. Two things occur when a CU is formed. First the combination of goods X and M produced will change because the relative price ratio changed. Call this the domestic price effect. Second, the change in the relative prices is a change in terms of trade for the domestic residents when trading with the rest of the world and with CU partners. Call this the international trade or tradeables price effect. Figures 2 and 3 are used to demonstrate these effects.

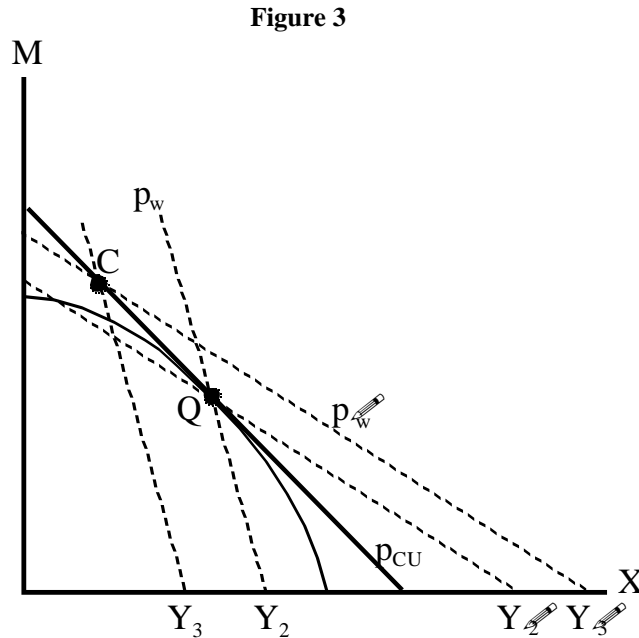
### Domestic Price Effect

Before joining the CU the home country produces at  $Q_1$ , so the base case relative price ratio is tangent at  $Q_1$ . It is not shown in Figure 2 in order to avoid cluttering the graph and focus on the domestic price effect. The dotted lines represent the relative price ratio for world prices. As we know, after joining a CU the domestic price of both imports and exports may increase. Therefore, the price ratio faced by domestic producers may increase or decrease as a result of membership. An increase in the relative domestic price of exportables will increase production in the direction of the nation's comparative advantage and result in production at  $Q_2$  and real income (at world prices) of  $Y_2$ . A decrease results in  $Q_3$  and  $Y_3$ . The production effect is positive ( $Y_2 - Y_1$ ) when the relative price ratio increases and negative ( $Y_3 - Y_1$ ) when the relative price ratio decreases.



## International Trade Price Effect

In Figure 3 point Q represents production equilibrium after joining the CU. The domestic price effect can be negative or positive, we cannot tell from the graph. The domestic price effect depends on the CU price ratio relative to the base case price ratio. The line



denoted by  $P_{CU}$  is the relative price ratio faced by domestic residents after joining the CU. Point C is equilibrium consumption after membership. In other words all decision makers now face CU prices and trade only takes place at CU price ratios. Therefore, the change called the international price effect depends on the difference between the terms of trade prior to membership and the terms of trade after membership. If the CU price line is steeper than the world price line then the international trade price effect is positive. In this case the world price ratio is denoted by  $p'_w$  and real income increases from  $Y'_2$  to  $Y'_3$ , because the new terms of trade now favor the home country. If joining the CU decreases the relative price of the exportable (CU price line is flatter than the world price line), the terms of trade turn against the home country and real income decreases from  $Y_2$  to  $Y_3$  after membership. This is a negative international trade price effect.

A third possible effect must be noted. The tariff revenues collected by the members of the CU or any other fiscal arrangement of the CU may result in transfers

among members. This compensation can be negative or positive depending upon the budget arrangements of the CU. This differs from the base case where the single country redistributes all tariff revenues to residents. A lump-sum transfer from the fiscal authority shifts the budget line right or left depending on whether the transfer is positive or negative. For example in Figure 3 a positive transfer would shift  $p_{CU}$  to the right which is welfare improving and a negative transfer would shift  $p_{CU}$  to the left, diminishing welfare for the home country.

The sum of the three changes will determine whether economic welfare increases or decreases due to CU membership. Since each of the terms can be either positive or negative it is necessary to pursue this further to see the impact of membership on net welfare. Therefore, it's necessary to be able to quantify these terms.

### Quantifying

The gains or losses associated with alternative trade policies can be quantified (see Leith). The national budget for the base case, where a country sets its own tariff is expressed in terms of domestic prices. The value of spending equals the value of income from production plus the value of tariffs collected and rebated to domestic residents.

$$(1) \quad P \cdot C = P \cdot Q + (P - P^*) \cdot (C - Q)$$

where  $P$  = the vector of domestic relative prices

$P^*$  = the vector of world relative prices

$C$  = the vector of domestic consumption

$Q$  = the vector of domestic production

Now expand the budget constraint to focus on domestic prices, world prices, and the tariff which is the wedge between the two prices.

$$(2) \quad [P^* + (P - P^*)] \cdot C = [P^* + (P - P^*)] \cdot Q + (P - P^*) \cdot (C - Q)$$

After rearranging, this expression shows the value of real income (Y) in terms of world prices:

$$(3) \quad Y = P^* \cdot C = P^* \cdot Q - (P - P^*) \cdot (C - Q) + (P - P^*) \cdot (C - Q)$$

The last two terms on the right hand side of equation (3) clearly sum to zero. They represent the value of import duties collected and rebated to domestic residents.

However, under alternative trading arrangements the collection and rebating of duties may be treated in different ways, so we keep these terms in the expression for real income.

We are especially interested in real income under alternative trading arrangement, like a customs union or a free trade agreement. Under a CU the wedge between the domestic and world prices is the CU common external tariff. If the CU tariff differs from the home tariff than joining the CU would result in different domestic relative prices, and hence different vectors of production and consumption. And importantly while there may be some transfer from the CU, there is no automatic compensation to domestic residents as shown in equation (3). Therefore, equation (3) is revised to represent real income for the alternative trading arrangement.

$$(4) \quad Y' = P^* \cdot Q' - (P' - P^*) \cdot (C' - Q') + TR$$

where the primed values (') represent the alternative regime and TR is the net value of international transfers for the alternative trading arrangement. It is easy to compute by how much real income changes for various alternative trade policies, by comparing equation (4) with the base case represented in equation (3).

The change in real income from (3) to (4) is calculated as

$$(5) \quad \Delta Y = P^* \cdot \Delta Q - [(P' - P^*) \cdot (C' - Q')] + TR$$

The three terms on the right hand side of (5) correspond to the three different effects discussed in section 2 above.

The term  $P^* \cdot \Delta Q$  is the domestic price effect. It measures the change in real income caused by changes in domestic production responding to relative price changes resulting from CU membership. It can be positive or negative, depending on whether the price changes move production in the direction of the country's comparative advantage or away from it.

The term  $[(P' - P^*) \cdot (C' - Q')]$  is the international trade or tradeables price effect. It consists of the sum of the cost of higher prices paid on imports from all sources and the benefit of the higher prices received by exports to CU partners. This measures the change in real income produced by the terms of trade change that occurred after joining the CU. This term can be negative or positive depending upon whether the CU price ratio is greater or less than the world price ratio.

The last term, TR, the international transfer, could be either positive or negative depending on the CU fiscal arrangement.

## **CASE OF THE EASTERN ENLARGEMENT**

Now we can apply the framework developed in the sections above to evaluate trade policies for nations about to join the European Union. For all cases the basis of comparison is continuing the existing set of trade policies.

The first to consider are the cases where relative prices do not change. In both of these cases it will be assumed that the new entrant's tariffs will be the tariffs for the CU.

Simplest, is joining the EU and not changing the current tariff structure. The second case with no change in relative prices is to replace the customs union of the EU with a free trade area (FTA), with each of the existing members maintaining the current tariff as its own.

Next we will consider a case where some relative prices do change. The third case is like the first case, except the existing EU tariffs become the relevant tariff structure for the customs union. Of course, as is well known it would be optimal for a small country to eliminate all tariffs and adopt free trade. Since this is rarely seen in the real world, it will not be considered here. But it would yield the greatest net welfare.

We will consider these alternative policies for data from Poland. The trade statistics are classified by 13 broad industrial product categories tabulated by the GATT's Integrated Data Base (Finger, Ingco, and Reineke).

#### Case 1 – Join EU, but Continue with Existing Tariffs

This compares the present tariff arrangement for Poland, assuming that upon joining the EU, the EU adopts the Polish tariff schedule. Neglecting any costs in moving between the two states the effect of continuing as is versus joining the EU would be:

- (i) The domestic price effect on production would be zero, because the tariff rate in both states would be the same.
- (ii) The tradeables price effect  $((P' - P^*) \cdot (C' - Q'))$  consists of two parts. One, the cost of the higher prices paid on Polish imports from all sources. Two, the gains from higher prices received on Polish exports to EU partners.
- (iii) The international transfer effect, which is uncertain. It is not clear what the value of this transfer will be for Poland. One possible avenue to consider is the size of

structural funds for Spain, Greece, Portugal, and Ireland. In 1995 they ranged from roughly \$8200 million to \$1400 million. In population Poland is more like Spain, but its economy measured in terms of GDP is about one quarter the size of Spain's. Exactly what the transfer to Poland will be after joining is difficult to predict. The average for the four countries will be used for now.

These effects were calculated for 1995 and presented in Table 1, Case 1.

The results are interesting. Ignoring any transitional cost, participating in a CU with the EU countries, but maintaining its existing tariffs, the real national income would be higher by \$2390 million or about 2.0 percent of Poland's GDP for 1995 (1995 GDP is \$119,052 million). This depends greatly on the amount of the transfer, and if the transfer were closer to the \$1400 million amount, Poland would be better off not joining the CU.

#### Case 2 – FTA with current EU members

If Poland were to consider a less restrictive trade policy option with the members of the EU one alternative to consider is an FTA with current EU members. This is similar to the existing relationship between the EU and the European Free Trade Association. To evaluate the gains and losses associated with such an arrangement we will assume that each member maintains the existing Polish tariff as their own. Hence, there would be no domestic price effect and domestic production, consumption, and trade patterns would remain the same. With an FTA there is no international transfer, which is a major difference between the two regimes. Of course, in this case Poland would collect the tariff revenues on the 40% of imports that come from outside the FTA. These changes, reported in Table 1, Case 2, add up to less than 1 percent of Poland's GDP.

### Case 3 – Join EU with existing EU tariff

The more realistic case to consider, but substantially more difficult to analyze is full membership in the EU and changing the tariff structure to match the common external tariff (CET) of the EU. In this case the relative prices will change and there will be a domestic price effect as well as a tradeables price effect. Again assuming away any costs associated in moving from the base case to EU membership the effects would be:

- (i) The two part tradeables price effects. One, the price of imports would now be the world price plus the EU CET. For some goods the price would increase and for others the price would decrease, plus imports will change in response to the price changes. This impact could be negative or positive depending on the various directions of changes across commodity classes. Two, the price of exports to partners would now be the world price plus the CET, which represents a gain. Exports to the rest of the world would still be at world prices, so this would not change.
- (ii) Measuring the impact of price changes on domestic production requires additional assumptions. As a first approximation it is assumed that the elasticity of the transformation function is unity. Hence, the change in prices from pre- to post-EU membership gives rise to changes in production. In this case most tariff rates will fall, shifting production in the direction of Poland's comparative advantage and increasing income.
- (iii) As discussed in case 1 above, the international transfer effect is very important but its value is uncertain. The number suggested above will be used.

The results of these changes are reported in Table 1, Case 3. Again, abstracting from any of the costs associated with joining the EU, real national income would be higher by \$4975 million, just over 4 percent of 1995 GDP. The transfer continues to play an important role in measuring the welfare effects of the trade policy change. However, the other effects are both interesting and important is the domestic price effect. Switching from Poland's existing tariff structure to the EU tariffs would positively affect the relative domestic price of exportables, this shifts production in the direction of the country's comparative advantage, and adds to the benefits received by Poland both through the tradeables price effect on exports and the domestic price effect.

Table 1:  
Alternative Trade Policy Options  
(millions of US dollars)

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**No Relative Price Change Cases**

Case 1: EU Membership with existing Polish tariff

Tradeables price effect on imports from all sources	-1918
Tradeables price effect on exports to partners	+308
Domestic price effect on production	0
International transfer effect	+4000
<i>Net gain (+) or loss (-) versus base case</i>	+2390

Case 2: FTA with current EU Members with existing Polish tariff

Tradeables price effect on imports from all sources	-767
Tradeables price effect on exports to partners	+308
Domestic price effect on production	0
International transfer effect	0
<i>Net gain (+) or loss (-) versus base case</i>	-459

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**Relative Price Change Case**

Case 3: EU Membership with existing EU tariff

Tradeables price effect on imports from all source	-855
Tradeables price effect on exports to partners	+180
Domestic price effect on production	+1650
International transfer effect	+4000
<i>Net gain (+) or loss (-) versus base case</i>	+4975

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## **SUMMARY AND CONCLUSIONS**

A major advantage of the approach presented and applied above is that it can be utilized with modest data requirements and used to evaluate trade policy options. Of course there are limitations and simplifications that should be mentioned.

First, the costs associated in moving from one equilibrium state to another equilibrium are ignored. And these costs can be quite substantial. Even continuing to ignore the costs associated with political change upon joining the EU, the economic costs of the transition in changing production and trade patterns in response to a new set of relative prices is costly. These are one time costs and must be measured against the flow of future gains that a policy change may bring about.

Second, still looking only at economic relations, PTAs effects are not confined only to tariff issues, but may include provisions which are beneficial to members. For example, part of a preferential trade agreement may include dispute resolution mechanisms, transit rights, and exemption from non-tariff barriers.

Third, this paper relied on comparative static welfare economics, but ignored growth effects in considering the alternatives. Usually though, trade policy and growth policy point in the same direction.

Fourth, in calculating the gains and losses, aggregates of importables, exportables, and domestic production were used. If the data were disaggregated more, perhaps the changes would be different. This is an issue that needs to be resolved in subsequent work.

Finally, the results for Poland provide some insights for policy makers. It is clear that the issue of the international transfer is an important point in discussions between the old member states and new member states.

## BIBLIOGRAPHY

- Bhagwati Jagdish, David Greenaway, and Arvind Panagariya, "Trading Preferentially: Theory and Policy," *Economic Journal*, Volume 108, (1998).
- Bhagwati Jagdish, Krishna P., and Panagariya, A, *Trading Blocs: Alternative Approaches to Analyzing Preferential Trade Agreements*, Cambridge, Mass. MIT Press, (1999).
- Finger, J. Michael, Merlinda D. Ingco, and Ulrich Reineke, *Statistics on Tariff Concessions Given and Received*, World Bank, Washington D.C. (1996).
- Frankel, Jeffrey, Ernesto Stein, and Shang-Jin Wei, "Regional Trading Arrangements: Natural or Supernatural?" *American Economic Review*, Volume 86, Issue 2, (1996).
- Jones, Ronald W., *International Trade: Essays in Theory*, North-Holland Publishing Co., (1979).
- Leith, C.: "A Simple Measure for Evaluation of Trade Policy Options with Application to Botswana," *Journal of African Economies*, Volume 4, Number 2 (1995)
- Markusen, James R., James R. Melvin, William H. Kaempfer, and Keith E. Maskus, *International Trade: Theory and Evidence*, McGraw-Hill (1995).
- World Bank: *Trade Blocs*. World Bank policy research report. New York: Oxford University Press, 2000
- World Trade Organization, *Trade Policy Review - Poland 2000*, Press Release (June 2000).