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AN ECONOMIC ASSESSMENT OF THE INTEGRATION OF CZECHOSLOVAKIA, HUNGARY, AND POLAND INTO THE EUROPEAN UNION

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Paper prepared for American Institute for Contemporary German Studies (AICGS), The John Hopkins University, Conference on "Europe's Economy Looks East," Washington, D.C., May 15-16, 1995.

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AN ECONOMIC ASSESSMENT OF THE INTEGRATION OF CZECHOSLOVAKIA, HUNGARY, AND POLAND INTO THE EUROPEAN UNION *

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I. Introduction

This paper is a study of the economic effects of the integration of the Central European Countries (CECs)[1] into the European Union (EU). Our analysis of EU-CEC integration is based on a specially constructed version of the University of Michigan Computational General Equilibrium (CGE) Trade Model. We use this model to calculate the economic effects of EU-CEC integration on the trade, output, and employment by sector as well as the real returns to capital and labor and the economic welfare of the CECs, the EU members, and the other major trading country aggregates included in the model.

Our study is distinctive in two respects. First, we bring together the elements of the EU assistance to the CECs and construct a Stylized European Agreement Package (SEAP), rather than analyzing them as separate initiatives for each CEC country. This provides a more synthesized account of the scope and magnitude of EU-CEC integration than has been previously available. Second, by using a CGE model to evaluate EU-CEC integration, our paper complements previous studies of the EU-CEC agreements that have considered: (1) the effects of the Europe agreements on EU-CEC trade (Winters and Wang, 1994); (2) the positive welfare effects of improved access to the EU markets for the CECs (Aghion *et al.*, 1992); (3) the reaction of the EU to changes in the trade policies of the CECs (Messerlin, 1992); and (4) the potential CEC trade patterns as reflected within a gravity model framework (Baldwin, 1994).

The paper is organized as follows. Section II discusses in broad terms the various sources of gain that might arise from integration of the CEC into the EU. Section III is a brief review of the existing literature on EU-CEC integration. Section IV examines the characteristics of the actual EU-CEC integration by describing a Stylized Europe

Agreement Package. Section V similarly describes the integration that has occurred among the CECs, that is, the Central European Free Trade Agreement (CEFTA). Turning to our formal analysis, Section VI outlines some of the essential features of the Michigan CGE trade model. The various scenarios investigated using the model are then presented in Section VII, together with the aggregate results of the model simulations. The sectoral results are presented in Section VIII. Section IX contains our conclusions and implications for further research and policy.

II. The Gains from Integration, Broadly Conceived

Before narrowing our focus to those aspects of economic integration that we have been able to include in our CGE model, it is useful to look first at integration in broad terms. We therefore begin here with an overview of the many effects that integration may be expected to have for the participating countries. These include both general effects that are likely to arise in any preferential trade arrangement, as well as effects that depend on the special circumstances of the CEC countries.

Integration with the EU creates both static and dynamic gains for the CECs. The static gains arise from increased efficiency of resource reallocation. The shift away from high-cost domestic producers to low-cost suppliers located in other European countries forces factors of production to undergo redeployment to sectors and firms that yield the highest returns. Structural market distortions (tariff barriers, subsidies, border formalities) are eliminated, further enhancing competition. Static gains also arise from product and process specialization of firms within the region, increased trade in intermediate products, and realization of economies of scale in imperfectly competitive industries.[2]

Dynamic gains from integration result in general from dynamic scale effects and easier transfer of technology, which increases the productive capabilities of member-country firms. Dynamic scale effects may in turn lead to factor pooling, which makes regional specialization self-reinforcing (Ethier, 1982). The flow of foreign direct investment (FDI) to the member countries may also increase, thus accelerating capital formation. In addition, there may be increased investment in human capital. Further, budgetary transfers from the structural funds of the EU may encourage additional investment. Lastly, integration enlarges the number of varieties of goods available in any CEC economy, and this may yield

considerably larger welfare gains as compared to conventional estimates (Romer, 1994; Aghion and Howitt, 1992; and Grossman and Helpman, 1991).

For the CECs in particular, there may be other benefits as well. Preferential access to EU markets may ease the process of trade reorientation, necessitated by the collapse of the Council for Mutual Economic Assistance (CMEA) and the loss of the former USSR and East German markets. Second, the CECs are joining a regional bloc based on democratic principles,[3] and this may reinforce democratization in the CECs. Worthy of note here is the ostensible success of the enlargement of the EU in enhancing democracy in Greece, Portugal, and Spain. Third, the PHARE[4] program and the loan activities of the European Investment Bank/European Bank for Reconstruction and Development (EIB/EBRD) may result especially in increased investment in infrastructural and telecommunications development in the CECs, thereby reducing real production costs of CEC firms (Krugman, 1991; Baldwin, 1994).

III. Literature Review of EU-CEC Integration

In this section, we briefly review a number of noteworthy studies of EU-CEC integration.

Messerlin (1992) analyzes the Europe Agreements (EAs) of the (then) three CECs. His study focuses on the lack of trade concessions in the sectors most vital for these economies: agriculture; iron and steel; and textiles and apparel. Excluded *de facto* from the EAs trade liberalization package is a fourth important sector - chemicals - by leaving unchanged the strict anti-dumping (AD) procedures against the CECs in this sector.

Aghion *et al*. (1992) argue that, as a result of unilateral steps taken prior to the EAs, the CECs now have lower, more uniform, and more transparent protection than most of the OECD countries. Unless there is a revision of the EAs to grant additional concessions to the CECs in some sensitive sectors, they suggest that a reversal of the trade liberalization stance towards a more protective regime is possible.

Winters and Wang (1994) discuss the principal components of the EAs and their economic effects. In their view, while it is constructive to establish an EU-CEC relationship in legal form, the EAs are disappointing in the degree

of support they guarantee to the CECs. Their paper includes a synopsis of the 1993 Copenhagen Summit changes to the agreements, with detailed tables on the timing of concessions and removal of non-tariff barriers (NTBs).

Most of the attempts at quantifying the expected results of the EAs have been undertaken in a partial equilibrium framework. Winters and Wang (1994) employ a common conceptual basis in their study of the iron and steel, clothing, and footwear industries, although their three simulation exercises differ in detail. In each case, a different grouping of countries-suppliers is used, to better reflect the comparative advantage in each sector. They assume that there is more direct competition, and hence greater substitutability, among suppliers within groups than between them. The standard Armington assumption is used, but in addition products are geographically disaggregated by place of sale. They conclude that the EU members have little to fear from opening up the sensitive sectors, while the CECs gains from such opening are substantial.

Winters (1994) focuses on the steel industry, making explicit allowance for the existence of excess capacity, non-marginal-cost pricing, and initial industry losses. He asks what would have happened if the EAs had existed in 1992 and allowed for complete steel liberalization. He shows that steel users everywhere would have gained substantially, with consumers inside the EU gaining 1.75 billion ECU as a result of the liberalization of steel trade.

Rollo and Smith (1993) use a CGE model to analyze the effects of the EAs, focusing on agriculture in particular. Their framework is based on an earlier study by Gasiorek, Smith, and Venables (1992) that models the "1992" completion of the EU internal market. They show that if the CECs were included in the Common Agricultural policy (CAP) of the EU, the net effects would be a 2 billion ECU sectoral gain for the CECs and an approximately equal welfare gain for EU consumers.

A number of recent studies have also looked at the effects of the Europe Agreements on individual EU members: Greece (Dimelis and Gatsios, 1994), France (Cadot and de Melo, 1994b), Portugal (Corado, 1994), and Spain (Martin and Gual, 1994). In each of these cases the effects on the EU members were insignificant.

Finally, Hoekman and Pohl (1995) use trade data to make some preliminary assessments of the extent, speed, and location of enterprise restructuring in the CECs. They conclude that there has been very significant reorientation

of the trade of the CECs towards the EU since 1989, with the most noteworthy changes evident for the Czech and Slovak Republics.[5]

IV. The Stylized Europe Agreement Package (SEAP)

The Stylized Europe Agreement (SEA)

While the EU has negotiated separate agreements with individual countries, these agreements have a number of features in common. It is useful accordingly to review some of their main features in what we will refer to as the Stylized Europe Agreement (SEA).[6]

The SEA consists of 124 Articles covering areas of both Community and Member State competence. The agreement is concluded for an unlimited period. It is intended to create a free trade area within a transitional period of ten years, with a shorter timetable of liberalization on the EU side (asymmetry of concessions). "The European vocation" of the applicant is explicitly recognized: the CECs are treated as potential members although no accession dates are specified. Under the SEA, EU trade barriers will be progressively abolished in five years except for textiles, where it will take six years. The elimination of quantitative restrictions is linked to the results of the Uruguay Round. Apart from a few exceptions, these objectives will be attained after seven years for Poland and after nine years for all other countries. Further concessions are applied on a reciprocal basis. A distinction is made between "general industrial goods" and "sensitive" sectors, such as agricultural products, steel, coal, textiles, clothing, and chemicals, where EU liberalization is limited during the transitional phase. Trade in processed agricultural products and in fishery products is governed by specific provisions. Thus, while the SEA eases access for CEC exports to the EU markets, this is done largely by consolidating previous concessions.

The SEA also includes common provisions such as a standstill clause prohibiting the introduction of new trade restrictions, a safeguard clause, anti-dumping provisions, and definitions of originating products. The CECs are allowed to derogate the standstill clause in exceptional cases in order to protect infant industries and industries under

restructuring. In the area of competition, EU rules apply. However, the associated countries are considered as low-income regions where, in accordance with the EU Treaty, development-oriented state aids may be authorized.

At the Copenhagen European Council Summit (June 22-23, 1993), the EU accelerated unilaterally the opening of its market to the signatories of the Europe Agreements. The five-year liberalization period for industrial products in the agreement was shortened by two years.[7] Concessions on agricultural products outlined in the Interim Agreements were pushed up by six months. The deadline for the abolition of duties on direct imports of textiles was shortened to five years instead of six and the remaining duties on steel are also to be eliminated sooner than originally planned (four years instead of five).

The PHARE Program[8]

PHARE is the second integral part of the SEAP. It is the EU's aid program to support economic restructuring and democratic reform in the CECs. Assistance under PHARE is provided in the form of non-reimbursable grants. The PHARE funds are awarded through individual indicative programs under which each recipient country submits a proposal to the EU Commission for assistance on specific projects. In this way, the beneficiary countries decide on their own restructuring priorities. The 1991 Guidelines identify five core areas of assistance: (1) restructuring and privatization of state enterprises; (2) support for the private sector (notably to small and medium sized enterprises), investment promotion (15% of PHARE funds are devoted to infrastructural investment support), and tourist promotion; (3) modernization of the financial system, from fiscal policies to financial services; (4) development of an affordable social safety system from active employment policies to anti-poverty measures; and (5) support of the policy reforms, demonstrated through the establishment of regulatory and legislative frameworks.

PHARE also has sectoral objectives, concentrating on agriculture, infrastructural development, energy, and communications. It does not grant direct financial support to private business ventures. Instead, contracts funded by PHARE are awarded under public procurement procedures, either by the competent authorities of the recipient state or by the Europe Commission.

Besides national programs that meet each country's specific needs, there are also regional programs that involve transnational issues, such as environmental protection, education, and operation of joint ventures. Examples include public administration reform (SIGMA program), further education and training (TEMPUS), and economic and scientific research (ACE). In terms of framework and components, PHARE is similar to the Structural Funds within the EU, but an important difference is that funds are given prior to EU accession with the aim of assisting the CECs in fulfilling entrance requirements.

The European Investment Bank (EIB)[9]

As a main financial institution of the EU, the EIB has provided loans for the development of large public sector, infrastructural projects in the CECs. The EIB has also acted as a catalyst in forming the European Bank for Reconstruction and Development (EBRD) which aids the growth of the private sector in the CECs. Together, the EIB, the EU, and its member states are the largest shareholders in the EBRD, together holding more than 51% of the bank's assets. In addition to private sector lending, the EBRD and the EIB jointly finance several public projects in each CEC. Central among these projects are privatization of the national telecommunication systems and privatization and modernization of the banking sector.

V. CEC - CEC Integration[10]

Alongside the EAs with the EU, the CECs have concluded the Central European Free Trade Agreement (CEFTA). The CEFTA was a response to escalating import duties on products imported from other CECs. Signed bilaterally among the four countries in 1992, CEFTA envisages free trade among them by the year 2001. The agreement differs from the EAs in its symmetric tariff removal time-schedule, which was first implemented in March 1993. The trade liberalization includes:

Step 1: Immediate dismantling. This covers industrial raw materials (Polish copper, Hungarian aluminum, etc.) and some industrial manufactures (e.g., Polish agricultural machinery, Hungarian pharmaceuticals). Special tariff exemptions cover machinery imports subject to quota limits.

Step 2: Tariff elimination by the end of 1996. This includes most industrial products. Import duties are to be cut by one-third each year for three years, starting in January 1995. Trade liberalization in agricultural products falls into one of four categories. Some products receive a 20% total tariff reduction over two years. Others receive a 50% total tariff reduction over five years. In each of these two instances, the importer may levy quotas on a restricted number of products.

Step 3: Elimination by 2001. The list includes "sensitive industries" (e.g., motor industry in Poland, textile production in the Czech Republic and Slovakia, steel in Hungary). As CEFTA was concluded bilaterally, the list between any two of the four countries is longer and product-specific.

VI. The Michigan CGE Trade Model

Ideally there are four essential components that should be captured in a model of EU-CEC integration: (1) reduction or elimination of tariffs and NTBs; (2) rationalization of the production process by capturing scale economies and increasing product variety; (3) reduction in real transaction costs (e.g., reduced transportation and communication costs, simplified border formalities, harmonized product and safety standards); and (4) facilitation of technology transfers and new investment in physical and human capital.

Our CGE model captures the effects of only the first two components. It is an extension of the model first constructed by Brown and Stern (1989) to analyze the economic effects of the Canada-U.S. Trade Agreement (CUSTA), and later expanded by Brown et al. (1992a,b, 1994, 1995a,b) to analyze the NAFTA, the extension of the NAFTA to some major trading countries in South America, an East Asian trading bloc, and a free trade agreement between Tunisia and the EU. In its further elaboration for present purposes, we model the three CECs -- Czechoslovakia, Hungary, and Poland -- individually. The EU is divided into three groups: EU-North (Belgium-Luxembourg, Denmark, France, Germany, Ireland, Italy, Netherlands, and the United Kingdom); EU-South (Greece, Spain, and Portugal); and EU-EFTA (Austria, Finland, and Sweden). We also include the three NAFTA countries (Canada, Mexico, and the United States) and an aggregate of another 15 major industrialized and developing

countries. All remaining countries of the world are consigned to a residual rest-of-world to close the model. The sectoral coverage in each country/region includes 23 product categories covering agriculture and manufacturing and 6 categories covering services, including government, all of which are modeled as tradable.[11]

The agricultural sector in each country is characterized as being perfectly competitive, and it is assumed that the products of this sector are differentiated according to the place of production. The manufacturing and services sectors in each country are characterized as being monopolistically competitive with free entry, and the products that are produced and traded are assumed to be differentiated by firm.[12], [13]

The reference year for the data base of the model is 1992. The input-output relations used in the model refer to different years, depending on the availability of national input-output tables.[14] More complete technical details, including a full statement and description of the equations and parameters of the model, are available from the authors on request. The 1992 base data for the three CEC countries are provided in Tables 1-3. Data for the other countries and documentation for the model are also available from the authors.[15]

There are several important assumptions that either are built into the model or are implemented by the model for the present analysis. It is important that these be understood in interpreting the results to be reported below.

Full Employment -- The analysis assumes throughout that the aggregate, or economy-wide, level of employment is held constant in each country. The EU-CEC integration to be analyzed is therefore not permitted to change any country's overall rates of employment or unemployment. This assumption is made because overall employment is determined by macroeconomic forces and policies that are not contained in the model and are not themselves to be included in a negotiated agreement. The focus instead is on the composition of employment across sectors as determined by the microeconomic interactions of supply and demand with the sectoral trade policies that an EU-CEC agreement will alter.

Balanced Trade -- It is assumed that trade remains balanced for each country, or more accurately that any initial trade imbalance remains constant, as trade barriers are changed with an EU-CEC agreement. This assumption

is intended to reflect the reality of mostly flexible exchange rates among the countries involved. It also, like the full employment assumption, is appropriate as a way of abstracting from the macroeconomic forces and policies that are the main determinants of trade balances.[16]

Fixed Relative Wages -- While the economy-wide wage in each country is permitted to adjust so as to maintain full employment, the wages across sectors are held fixed relative to one another. This permits the analysis to focus on the labor-market adjustments that an EU-CEC agreement might require, independently of any relative wage changes that may facilitate those adjustments.[17]

Fixed Labor Supply -- The total labor supply in each country is assumed to be held fixed in the analysis. This is not to say that changes in labor supply will not occur in the course of a phase-in of an EU-CEC agreement, but only that such changes are assumed not to be the result of such an agreement.[18]

Role of Variety -- The Dixit-Stiglitz aggregation function in its usual form uses a single parameter, the elasticity of substitution, to determine both the degree of substitution among varieties of a good and the extent to which an increased number of varieties adds to welfare of consumers and reduces costs of intermediate inputs. This effect on welfare and cost could be quite important in an analysis of trade liberalization, since reduced trade barriers provide greater access to varieties produced abroad and could increase welfare on that account alone. In Section IX below we will explore the sensitivity of our results to this effect of variety.[19]

The policy inputs into the model are the tariffs and nontariff barriers (NTBs) that are currently (as of the early 1990s) applied to the bilateral trade of the CEC countries and EU-regions modeled explicitly with respect to each other and to the other two aggregated regions included in the model.[20] As will be noted below, in order to investigate the sectoral employment effects of an EU-CEC preferential trade agreement, it will be assumed that the existing bilateral tariffs will be removed and NTBs will be relaxed all at one time rather than in stages. NTBs are assumed to be binding over the fraction of the industry indicated by our NTB trade coverage data and to generate rents in the importing countries only.[21]

When the policy changes are introduced into the model, the method of solution yields percentage changes in sectoral employment and other variables of interest for each country/region. Multiplying the percentage changes by the actual (1992) levels given in the data base yields the absolute changes, positive or negative, that might result if the bilateral tariffs/NTBs were removed all at one time. More realistically, of course, the removal of tariffs (and NTBs) in an EU-CEC agreement would almost certainly be phased in over a period of years. If information were available for the different phases, the model could in principle be solved sequentially taking into account the barrier reductions in each time period.

In addition to the sectoral effects that are the primary focus of our analysis, the model yields results for changes in total exports, total imports, the terms of trade, the overall level of welfare in the economy measured by the equivalent variation, and the economy-wide changes in real wages and real returns to capital. Because both labor and capital are assumed to be homogeneous and intersectorally mobile in these scenarios, we cannot distinguish effects on factor prices by sector. Nor, as noted above, can we distinguish effects on different skill groups or other categories of labor. In particular we are unable to address the important question of how an EU-CEC agreement might affect the differential between the wages of skilled and unskilled workers.

While the bilateral removal of tariffs and NTBs constitute the main changes in trade policies that would occur with an EU-CEC agreement, there may be other changes as well. These relate especially to changes in FDI and to the cross-border movement of workers as the result of changes in the rate of return on capital and changes in real wages. Changes in FDI have indeed occurred, and more may occur in the future as a result of an agreement. However, the changes so far have been insignificant, and would not alter the basic results of our model. The Europe Agreements do not allow for free movement of labor between the EU and the CECs, and thus we abstract from migration issues.[22] Also, as already noted, we do not make any allowance for dynamic efficiency changes or capital accumulation.

Data on Tariffs and Nontariff Barriers

Average tariff levels and averages of the tariff equivalents of NTBs applying to the trade of the individual countries/regions in the model are summarized in Tables 4a and 4b. There we report the import-weighted average tariffs and simple average tariff equivalents applying to each pair of bilateral trade flows for the individual countries/regions of the model. The sectoral tariff rates and tariff equivalents are available from the authors on request.

The bilateral tariffs were constructed by weighting the pre-Uruguay Round, Most-Favored Nation (MFN) line-item tariffs by bilateral imports so as to calculate the tariffs that each country/region applied bilaterally to its trading partners.

Information on NTBs was collected in two forms. First, the percentage of trade subject to NTBs was calculated, based primarily on the NTB inventory data assembled by the United Nations Conference on Trade and Development (UNCTAD). These NTB measures are calculated by first making an inventory of existing NTBs classified by disaggregated import groupings, then determining the value of imports that are subject to any NTBs, and thereafter aggregating up to the sectoral level used in the model. Thus, a sector with a zero percent NTB trade coverage is taken to be completely exempt from NTBs, while, say, an NTB coverage of 25% is taken to mean that 25% of the imports in that sector are subject to one or more NTBs. It is important to emphasize that these measures of NTB trade coverage are *not* the same as the tariff equivalents of the NTBs. Nor are they used in the model in the same way as tariffs and tariff equivalents. Rather, they are used to dampen the quantity responses of sectoral imports, in response to changes in prices and other variable, below what would have occurred otherwise. For further discussion, see Deardorff and Stern (1990, pp. 23-25).

Tariff equivalents of NTBs were also assembled for the countries/regions of the model from a variety of sources. The principal source was Rollo and Smith (1992), who focused on the Common Agricultural Policy but calculated and reported tariff equivalents for a variety of sectors, including especially agriculture and food products. Tariff equivalents on steel came from Winters (1994) and for textiles from Halpern (1994). All of these estimates

were based on price comparisons. We also include some small tariff equivalents on trade among the CEC countries, taken from Bakos (1993).[23]

VII. Computational Results: Aggregate Effects

The Scenarios

It is possible to use our CGE model to analyze various combinations of country/region membership in a preferential trade agreement. What we did in our first scenario was to model the free trade agreement that the three CECs had already formed among themselves C the CEFTA. Secondly, we looked at the effects of complete tariff removal among the three CECs and the EU. In this scenario, existing NTBs were assumed to remain in effect. Their role in the model is to limit the responsiveness of trade to prices, this limitation being in proportion to the data on the trade coverage of NTBs. One question that therefore arises is how to handle any reduction or elimination of these NTBs that might occur between the CEC and the EU. Thus in our base case scenario we looked at a preferential arrangement involving tariff elimination among the three CEC countries and the EU, plus allowing tariff equivalents of NTBs to be removed, except in sensitive sectors (agriculture, textiles and apparel, chemicals, and iron and steel) where NTBs remained intact. In our fourth scenario, we examined a hypothetical and more extreme case of liberalization in which the tariff equivalents of all NTBs were removed.

The various scenarios that we ran were therefore as follows:

A. CEFTA: Bilateral removal of all tariffs on trade among Czechoslovakia, Hungary, and Poland. Bilateral NTB trade coverage ratios set to zero for the three CECs.

B. CEC-EU Free Trade Agreement: CEFTA plus bilateral removal of all tariffs between all three CECs and the EU. CEC-EU bilateral NTBs remain in place.

C. CEC-EU Free Trade Agreement plus Removal of Non-sensitive NTBs: Same as scenario B, but also eliminating tariff equivalents of CEC-EU bilateral NTBs on all trade except EU imports of agriculture, textiles and

apparel, chemicals, and iron and steel, where NTBs are assumed unchanged. This is our Base Case, coming the closest we can to the actual Europe Agreements.

D. CEC-EU Free Trade Agreement plus Removal of All NTBs: Same as scenario B, but also eliminating tariff equivalents of CEC-EU bilateral NTBs on all trade.

An overview of results on trade, terms of trade, welfare, and factor payments for each of the scenarios is reported in Table 5. Perhaps the single most important number to consider in evaluating EU-CEC integration is the impact on welfare, that is, the "equivalent variation" measure of the change in real gross domestic product (GDP).

Economic Welfare

In Scenario A, the Central European Free Trade Agreement (CEFTA) can be seen to increase economic welfare in the three CECs to a small extent and to reduce welfare in all other regions but by an insignificant amount.

With an EU-CEC FTA in Scenario B, the welfare of the three CECs is increased, while for the three EU regions, the welfare gains are noticeable, although as percentages of GDP the gains are still quite small. When the existing NTBs in non-sensitive sectors are eliminated in Scenario C, the welfare effects for the three CECs and the EU regions are larger still. Removal also of sensitive-sector NTBs in Scenario D creates the greatest gains for the CEC countries, and increases slightly the welfare gains for the EU. The negative effects for NAFTA and the Other Major Trading Nations persist but are minor throughout. Among the three EU regions, while there are small gains from integration with the CEC countries in all, these gains are noticeably smaller in the EU-South region (Greece, Portugal, and Spain) than in EU-North and EU-EFTA. This reflects the fact that the EU-South includes the poorest parts of the EU, which therefore are likely to compete most directly with the CEC countries in the EU markets for especially labor-intensive goods.

It should be noted that positive welfare gains are not inevitable when trade is liberalized on a preferential basis, although the presumption that each country will gain from joining an EU-CEC FTA is strong. Several different forces are at work determining the welfare effects of trade liberalization.

On the positive side, consumers are free to choose the least expensive source of goods from countries within the FTA. In addition, by expanding trading opportunities, each country has the option of specializing production in the range of goods in which it has a comparative advantage.

There are three other forces, however, that have an ambiguous effect on welfare. First, consumers are not able to choose freely among all foreign sources of goods because tariffs and NTBs are removed only on included partners. Hence, consumption choices may be distorted by the preferential nature of the trade liberalization.

Second, a country's terms of trade could improve or deteriorate as a result of trade liberalization. If import prices rise and export prices fall, welfare gains stemming from specialization and exchange could be reversed. However, in most cases we expect that the terms-of-trade effects following liberalization by a small country will be too small to reverse other sources of gain. This is the case with an EU-CEC FTA, as can be seen from column (4) of Table 5. There tend to be negative terms-of-trade effects for the CECs as long as sensitive-sector NTBs are excluded from the liberalization, but these negative effects are relatively small and have not led to a net fall in welfare in columns (5) and (6). It is interesting that removal of sensitive sector NTBs in the hypothetical Scenario D is enough to make the terms-of-trade effects positive for the CEC countries, indicating that it is precisely in these sensitive sectors that the CEC countries have a comparative advantage.

A third force determining the welfare effects of trade liberalization concerns the realization of economies of scale and pricing by imperfectly competitive firms. Tariff liberalization is expected to have a pro-competitive effect on import-competing firms in each country. Without tariff protection, domestic firms feel competitive pressure from imports and may charge a lower price in order to compete. This in turn causes expansion of output per firm and a lowering of average cost. In their export markets this lowering of cost and price contributes to a worsening of the country's terms of trade, although the net effect on welfare is almost certainly positive.

In industries where there are significant economies of scale and, thus, declining average costs, the firm that charges a lower price may also have to increase output in order to break even. As the firm moves down its average

total cost curve, the inputs required to produce a unit of output decline on average. If many of the firms in a country are forced by competitive pressure to economize on inputs in this way, then the country overall will be able to produce more than before the liberalization using the same inputs and technology. This gain from the realization of economies of scale enhances the more traditional gains from specialization and exchange.

However, scale gains, while likely, are not inevitable. Trade liberalization is pro-competitive for import-competing firms. However, curiously, export firms experience an anti-competitive effect. As the trade partner lowers its tariffs, export firms now have easier access to foreign markets and, therefore, compete less vigorously at home. Such firms may respond by raising price and cutting back production, with adverse consequences for the economy overall.

Scale economies will be discussed in more detail below. However, we find that for most countries firm output tends to rise, so that scale gains are generally positive though not large.

The complications that are introduced by the considerations just mentioned C trade diversion, terms of trade effects, and effects of changing competition, scale, and variety C could in principle dominate the results of the analysis. This does not appear to be the case, however, in our results. All of the participants in the free trade areas that we model here do experience increases in welfare, and this continues to be the case even when we take out the effects of variety and scale in two additional scenarios that we will report below. This is consistent with what we have found elsewhere in similar work on the NAFTA and other preferential trading arrangements. It appears that the fundamental driving force behind the welfare effects of such preferential arrangements is still the improvements in economic efficiency that are the basis for the classical gains from trade.[24]

Real Wages and Return to Capital

Having established that the welfare effects of an EU-CEC FTA are positive for all participants, we next turn to the distributional consequences. In particular, we are interested in which factors of production are likely to gain and which to lose with formation of an EU-CEC FTA. For this purpose, we have calculated changes in factor prices deflated by changes in a price index for consumption. These measures understate the true changes in real factor prices because the deflator is effectively a Laspeyres price index and does not take full account of the efficiency gains due to trade liberalization. For this reason, our changes in welfare reported above, which are based directly on the assumed utility functions of consumers, can report greater improvements in welfare than our reported increases in real factor prices. Since the size of this downward bias should be the same for both factors, however, the relative changes in factor prices are nonetheless accurate.

The percent changes in the real returns to labor and capital are reported in columns (6) and (7) of Table 5. In most cases, real wages in the CEC countries rise and real returns to capital fall, with negligible changes in the other countries/regions of the model. These changes are therefore consistent with what one would expect from the Stolper-Samuelson Theorem of the Heckscher-Ohlin trade model. Presumably the SEC countries are relatively well endowed with labor, compared to capital, *is a is* the more advanced economies of Europe with which their trade is being liberalized. The Stolper-Samuelson Theorem predicts a rise in the real return to the abundant factor and a fall in the real return to the scarce factor, exactly as found by the model for Czechoslovakia and Poland.

However, the model includes features that are not part of the Heckscher-Ohlin framework and that can cause both real factor returns to rise. We have found this to happen repeatedly in other applications of the model, and we find it here, too, for Hungary in scenarios B and C. That is, when the SEC countries and Europe reduce only tariffs against each other, and also to a lesser extent when the tariff removal is accompanied by removal of non-sensitive NTBs, Hungary experiences a rise in both its real wage and its real return to capital. This is possible because, in the context of a differentiated-products model with increasing returns to scale like the one used for this study, other forces

may be at work undermining Stolper-Samuelson-type mechanics.[25] Note however that in both of these cases, labor gains more than capital, and this is consistent with Stolper-Samuelson.

Scale effects work very much like the relative price effects articulated in the Stolper-Samuelson theorem to determine the implications of trade liberalization for factor prices. Scale effects, like price effects, tend to accrue to one factor only. For example, it can be shown that an increase in output per firm in an industry raises the real return to the factor used intensively in that industry and lowers the return to the other factor. Price and scale effects differ, however, in one important regard. If scale gains emerge across the board in nearly all industries, then both factors may gain. This is apparently the case in the scenarios indicated for Poland.[26]

We turn next to consider the sectoral results.

VIII. Computational Results: Sectoral Effects

The sectoral results for the three CECs for our Base Case Scenario C are given in Tables 6-8. For each country/region, the percent changes in total exports and imports are reported in columns (2) and (3). Imports are decomposed by trade partner in columns (4)-(10). The percent changes in industry output and numbers of firms are listed in columns (11) and (12). The percent changes in output per firm, which can be used to determine the extent to which economies of scale may be realized, are calculated by subtracting column (12) from column (11). Finally, the percent and absolute changes in employment are listed in columns (13) and (14). The results for the three EU regions, NAFTA, and the Other Major Trading Countries, as well as for all countries/regions in the other scenarios, are available from the authors on request.

An EU-CEC FTA has substantial sectoral impacts on the three CECs, as is evident in Tables 6-8. For Czechoslovakia in Table 6, output increases in 26 of the 29 sectors, the exceptions being clothing and two of the services sectors. The largest absolute employment increases in Czechoslovakia are in agriculture, leather, metal products and mining. For Hungary in Table 7, there is slightly more specialization, with output expanding in 24 of the 29 sectors. The largest increases in Hungarian employment are in agriculture, food, and leather products. For Poland

in Table 8, output expands in 26 of the 29 sectors. There is a sizable increase in employment in the Polish agricultural sector, leather products, and metal products. In all three CEC countries, there are rather large absolute (but small percentage) declines in employment in community, personal, and social services, as well as smaller reductions in most other services, which lose employment to those sectors where trade barriers are being reduced.

Comparison of columns (11) and (12) for all three countries suggests that there are positive scale effects across all of the manufacturing and services sectors, reflecting especially the increased competition in larger markets and the consequent increase in elasticity of demand faced by firms. This induces surviving firms to expand and thus lowers their average costs. In addition, a technical feature of our assumed production structure also contributes to this result. While we have modeled the fixed and variable costs of monopolistically competitive firms as using the same proportions of direct capital and labor, we have allowed intermediate inputs to enter only into variable cost. As a result, when prices of intermediate inputs fall due to trade liberalization, marginal cost is reduced relative to average cost, and even without an increase in competition firms tend to expand in order to restore the optimal markup.

Although not reproduced here but available on request, the sectoral effects on the trade, output, and employment of the three regions of the EU are negligible. It appears therefore that it is the CECs themselves that are most affected by the reductions in tariffs and relaxation of NTBs that we have modeled in our various scenarios. It also appears, however, that if account were taken of the phasing in of the trade liberalization over a period of years, there would not be significant adjustment pressures experienced due to intersectoral shifts in labor and capital in the CECs and the EU. Even in the CECs, the negative sectoral changes in both employment and number of firms, both of which could be disruptive for the individuals involved, are no more than a few percent and could be accommodated easily within the normal turnover of workers and firms during a five or ten year period of implementation.

Scenario D

As mentioned earlier, the Europe Agreements have identified some sensitive sectors in the EU. These sectors, which are subject to NTB restrictions in the EU, include: agriculture, textiles and clothing, chemicals, and iron and steel. Having collected information on the tariff equivalents of the various NTBs, we decided to conduct a hypothetical scenario involving a complete elimination of existing EU NTBs, along with the CEC-EU FTA presented in the Base Case. To conserve space we do not present the detailed sectoral results for Scenario D, which are available on request, but we can report the major differences from the Base Case. As already noted, elimination of EU NTBs in these sensitive sectors was enough to reverse the deterioration of the terms of trade of the three CEC countries, and therefore to increase substantially the improvement in their welfare. At the sectoral level, this change was enough to cause notable improvements in employment in the sensitive sectors. In Czechoslovakia, for example, the additional hypothetical liberalization causes the employment increases to change from 1.4% to 13.1% in agriculture, from 0.2% to 6.9% in textiles, from 1.8% to 6.8% in chemicals, and from -1.7% to 12.1% in iron and steel. On the other hand, in the apparel sector, where employment declined by 2.7% in Table 6, additional liberalization of sensitive sectors including apparel caused Czechoslovakian employment to fall even more, by 6.8%. We presume that this result stems from the increased competitiveness of the EU clothing industries when given access to lower cost textile inputs. These results are typical of all three of the CEC countries modeled. These larger changes in employment in the sensitive sectors also lead to a larger number of sectors in which output declines, in contrast to the Base Case where output expanded in almost all of the sectors of the CECs.

IX. The Roles of Scale and Variety

As explained earlier, the industry structure in all but the agricultural sector of this version of the Michigan CGE model is patterned after the Dixit-Stiglitz (1977) model of monopolistic competition. As such, both economies of scale and variety play a role in determining both the positive effects of policy changes and the welfare effects. In this section we report on two additional scenarios that we ran in order to decompose the results of the Base Case, separating out the effects of variety and scale. Table 9 reports the summary results of this exercise, repeating the results of Table 5 for the Base Case Scenario C, along with the new Scenarios E and F.

Scenario E repeats the analysis of multilateral removal of tariffs and non-sensitive NTBs among the CEC and EU countries, but it removes any effects of product variety from both the demand functions and the resulting levels of welfare. This is done by incorporating the number of varieties separately into the product aggregation function that enters utility and production functions and setting its parameter so as to exactly offset the effect of variety in the Dixit-Stiglitz aggregator. The results in Table 9 indicate that removing variety causes a small dampening of most trade and welfare effects of CEC-EU integration. The welfare improvement in Czechoslovakia falls from 4.5% in Scenario C to 3.8% in Scenario E. The dampening is smaller in Hungary, and welfare actually rises somewhat more in Poland. In all three countries the expansions of exports and imports due to integration are reduced somewhat by the removal of variety. These results are to be expected, since when variety effects are included, they increase the benefits to demanders in sectors where the number of products increase, and therefore increase both demand and the welfare derived from it. However, these results also indicate that the role of variety in our results is not very large, and that the major effects that we have identified as arising from integration are not due to the particular way that variety enters the model through the Dixit-Stiglitz aggregators.

Economies of scale enter the model through the fixed and constant variable costs that are assumed for firms, following again the usual modeling of monopolistic competition in the new trade theory begun by Krugman (1979).[27] If output per firm rises, fixed costs are spread over more units of output and average costs decline. As already noted

in the sectoral results for Scenario C, our results indicate that integration will increase output per firm in most industries of the CEC countries, and therefore a portion of the effects that we have presented is due to such exploitation of economies of scale. To remove these effects, in Scenario F we have held output per firm constant, requiring therefore that changes in industry output occur only through entry and exit of firms. Once again, comparing Scenario F with Scenarios C and E in Table 9, it is clear that the removal of scale effects causes a further dampening of the welfare benefits of integration for all three of the CEC countries. Trade too expands by somewhat less for most of their exports and imports. Again, these results are to be expected, since scale economies increase both the incentives for and the returns to specialization and trade.

However, here again the dampening effects only partially reduce the effects that were observed in the Base Case of Scenario C, and the conclusions that we drew from the Base Case are largely unchanged. Thus we conclude that our results have not been particularly dependent on our modeling of the effects of scale and variety.

There is one place where the removal of scale effects has increased rather than decreased the response to integration: real factor prices. In Scenario C we reported increases in the real wage in the neighborhood of 3% for each of the CEC countries, and changes in the real returns to capital that were near zero, positive or negative. Thus the relative returns to labor increased about 3% compared to capital. In Scenario E, however, real wages rose by almost 5% or more in these countries, while real wages fell by 1% or more, for a relative change of around 6%. Thus it appears that removal of the scale and variety effects has made the model behave somewhat more like the conventional Heckscher-Ohlin-Stolper-Samuelson Model in terms of effects on factor prices.

We should mention however that even with the removal of both variety and scale, the Michigan CGE Model is not a completely neoclassical model. The model still includes markup pricing, and these markups change with changing market conditions, even when scale effects are absent. Indeed, other scenarios that we have run with this model but do not report here indicate that even in the absence of variety and scale effects it is possible for us to get wages and rents moving in the same direction, presumably due to this remaining element of imperfect competition.

X. Conclusions and Implications for Research and Policy

Our purpose in this paper has been to analyze the possible economic consequences of CEC-EU integration, using for this purpose the Michigan CGE Trade Model. To provide background for our analysis, we first reviewed briefly some of the important sources of potential benefits of EU-CEC integration, as well as some of the existing literature pertaining to EU-CEC integration. Since the EU has already negotiated a series of bilateral Europe Agreements with individual CECs, we then sought to provide a synthesis of the main features of these agreements. We also discussed briefly the important features of the CEFTA that the CECs had negotiated among themselves. Most of the rest of the paper was devoted to a description of some important characteristics and assumptions of the Michigan CGE Trade Model, laying out our computational scenarios, and presenting and discussing the main aggregate and sectoral results.

The version of the Michigan Model that we used has eight countries/regions and 29 sectors. The sources of welfare improvement identifiable by the model include the traditional effects of changes in terms of trade and gains from specialization and exchange. They also include the effects of labor moving between sectors of different productivity. In addition, the presence of economies of scale, product differentiation, and imperfect competition among firms allows us to identify the contribution to economic well-being due to the pro-competitive effects of trade liberalization, together with the effects of increased scale and variety.

Four liberalization scenarios were performed. The first scenario examined the formation of the CEFTA.. The second scenario modeled a CEC-EU free trade arrangement, eliminating tariffs both among the CEC countries and between them and the EU. In our final two scenarios, we made allowance for changes in NTBs as well as the removal of tariffs.

The results suggest that the economic welfare of the CECs would be increased by the CEFTA, and that integration with the EU would bring even greater welfare benefits. The EU regions also gain from CEC-EU integration, but the gains are quite small as a percent of EU GDP. The effects on regions outside of Europe are

negligible. Within the individual countries/regions, the distributional consequences are relatively small. It is interesting that the real returns to labor and capital rise in every country/region. The reason for this result is that there are large enough gains from the realization of economies of scale that accrue to both labor and capital so as to offset the negative effects that would otherwise be expected from Stolper-Samuelson logic.[28]

At the sectoral level, there are rather small effects on trade, output, and employment for the CECs associated with the CEFTA. The effects are more sizable when there is CEC-EU integration in the form of tariff removal and still larger when NTBs are relaxed to permit greater imports. In Czechoslovakia and Poland, output and employment tend to expand across virtually all sectors, whereas Hungary exhibited a greater degree of specialization with some sectors expanding and others contracting. In our modeling, we assumed that the tariffs and NTBs would be changed at a single point in time. If allowance were to be made for the phasing in of the changes, it is unlikely that there would be any serious adjustment pressures felt in the CECs in connection with the integration process. It is especially noteworthy that the sectoral impacts of EU-CEC integration on the EU regions specified in the model appear to be negligible, and, consequently, adjustment pressures in the EU would be unlikely to be experienced.

Our research on EU-CEC integration is by no means the last word on the subject. We have abstracted from the changes that CEC-EU integration might have on foreign direct investment and have not made any allowance for dynamic changes in efficiency and capital accumulation. Further, we have not included other aspects of the European Agreements besides tariffs and NTBs. Granting these limitations, our research provides some insights into the economic consequences of EU-CEC integration and confirms the conclusions of previous studies on EU-CEC integration that the EU has little to fear while the CECs stand to gain significantly.

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Table 1

Czechoslovakia: Basic Data, 1992

Sector	Output (Mill. $)	Labor (000)	Imports (Mill. $)	Exports (Mill. $)
1 Agriculture	4744.5	795.43	651.49	925.17
310 Food	4762.1	253.39	706.81	562.90
321 Textiles	1832.2	164.47	276.71	459.75
322 Clothing	875.2	58.74	164.83	235.75
323 Leather Products	934.1	72.60	164.47	238.42
324 Footwear	658.7	33.37	71.74	149.62
331 Wood Products	1118.6	107.25	328.80	405.98
332 Furniture, Fixtures	979.9	88.96	540.13	327.16
341 Paper Products	1032.8	57.80	144.62	278.68
342 Printing, Publishing	687.0	56.63	246.72	214.74
35A Chemicals	2197.0	152.24	701.81	718.66
35B Petroleum Products	2408.4	82.20	380.82	518.16
355 Rubber Products	2304.0	50.75	941.37	672.22
36A Nonmetal Min. Prod.	1285.7	82.18	602.97	396.95
362 Glass Products	1655.5	101.51	645.71	359.79
371 Iron, Steel	4275.5	247.61	722.30	1238.96
372 Nonferrous Metals	1538.5	133.14	313.83	253.03
381 Metal Products	4913.2	263.77	941.34	1384.72
382 Nonelec. Machinery	3725.9	363.22	809.73	424.36
383 Electrical Machinery	3222.8	184.70	709.74	378.21
384 Transport Equipment	2148.4	184.34	434.19	233.66
38A Misc. Mfrs.	3823.7	233.40	1360.02	1042.25
2 Mining, Quarrying	2857.2	201.48	551.45	296.18
4 Utilities	8078.5	297.64	332.01	1249.37
5 Construction	5452.3	702.91	362.15	194.00
6 Wholesale Trade	7171.4	690.09	832.90	875.33
7 Transportation	11021.7	726.23	1490.26	1857.81
8 Financial Services	1655.7	293.44	1105.02	143.33
9 Personal Services	14985.0	1350.35	588.25	578.92
Total	102345.5	8029.84	17122.19	16614.08

Source: CEC data base.

Table 2

Hungary: Basic Data, 1992

Sector	Output (Mill. $)	Labor (000)	Imports (Mill. $)	Exports (Mill. $)
1 Agriculture	4717.3	459.90	855.26	1129.99
310 Food	6540.8	274.92	716.47	1016.17
321 Textiles	1440.3	69.01	311.97	370.99
322 Clothing	856.1	98.34	188.58	216.36
323 Leather Products	767.4	34.31	168.01	275.42
324 Footwear	356.1	26.36	82.94	90.49
331 Wood Products	741.8	69.31	309.47	241.46
332 Furniture, Fixtures	726.4	51.65	327.47	197.93
341 Paper Products	789.8	26.21	196.83	82.00
342 Printing, Publishing	1177.8	73.26	233.88	81.96
35A Chemicals	2283.4	101.15	901.28	559.45
35B Petroleum Products	3100.7	88.86	696.43	240.42
355 Rubber Products	2254.0	65.27	677.62	511.25
36A Nonmetal Min. Prod.	790.7	40.21	371.24	213.07
362 Glass Products	971.0	64.07	367.28	194.11
371 Iron, Steel	2129.5	46.08	695.85	430.58
372 Nonferrous Metals	1517.3	37.62	274.57	223.12
381 Metal Products	2198.2	107.16	804.51	707.90
382 Nonelec. Machinery	2228.6	125.89	471.79	268.23
383 Electrical Machinery	2701.3	131.39	423.28	235.11
384 Transport Equipment	1188.9	80.64	261.70	151.15
38A Misc. Mfrs.	3182.4	147.63	1096.33	863.51
2 Mining, Quarrying	1066.4	95.04	530.87	110.49
4 Utilities	3181.4	108.22	447.28	410.91
5 Construction	1940.3	216.71	332.03	205.81
6 Wholesale Trade	2499.9	597.21	802.07	236.39
7 Transportation	2593.5	346.48	1410.27	418.97
8 Financial Services	1141.4	210.63	1731.83	126.75
9 Personal Services	8619.6	984.34	601.99	632.42
Total	63702.3	4777.87	16289.1	10442.41

Source: CEC data base.

Table 3

Poland: Basic Data, 1992

Sector	Output (Mill. $)	Labor (000)	Imports (Mill. $)	Exports (Mill. $)
1 Agriculture	12403.9	4027.88	1650.46	1380.22
310 Food	9319.9	511.00	1746.16	911.52
321 Textiles	1735.3	245.00	322.42	551.18
322 Clothing	947.2	178.00	168.98	308.18
323 Leather Products	964.6	93.52	146.22	379.07
324 Footwear	856.6	61.33	62.32	105.36
331 Wood Products	1793.4	168.11	286.01	370.11
332 Furniture, Fixtures	1544.1	126.32	456.39	311.43
341 Paper Products	829.2	36.54	229.09	185.96
342 Printing, Publishing	442.5	37.84	290.71	134.13
35A Chemicals	1952.5	236.25	1512.89	564.86
35B Petroleum Products	4381.5	183.50	907.02	701.86
355 Rubber Products	5881.5	238.41	792.91	595.17
36A Nonmetal Min. Prod.	893.1	33.48	547.47	297.62
362 Glass Products	596.5	62.58	552.68	205.69
371 Iron, Steel	3863.8	120.00	762.29	1227.51
372 Nonferrous Metals	1844.7	78.47	269.85	572.76
381 Metal Products	3931.5	182.50	869.54	1513.27
382 Nonelec. Machinery	1355.1	286.49	703.57	320.24
383 Electrical Machinery	2222.9	201.20	638.95	337.20
384 Transport Equipment	904.2	129.48	398.80	181.74
38A Misc. Mfrs.	3176.6	247.42	1508.24	959.60
2 Mining, Quarrying	4260.8	407.50	741.13	549.33
4 Utilities	5096.6	436.42	470.82	605.90
5 Construction	7949.1	1242.00	468.08	124.61
6 Wholesale Trade	9198.3	1658.20	1009.69	269.54
7 Transportation	11475.8	1736.12	2314.85	857.13
8 Financial Services	4343.6	213.48	1714.58	287.70
9 Personal Services	31796.5	3743.47	739.65	438.12
Total	135961.3	16922.51	22281.77	15247.01

Source: CEC data base.

Table 4a

Average Tariff Rates for CECs, European Union, NAFTA,

and Other Trading Nations, 1992

(Percentage)

Importing Country	Exporting Country								
	Czechoslovakia	Hungary	Poland	EFTA	EU-3	EU-9	NAFTA	OTH	ROW
Czechoslovakia	0.0	7.1	7.1	5.2	6.5	6.5	3.6	5.8	5.2
Hungary	8.1	0.0	7.6	6.3	8.5	8.5	6.3	7.6	6.9
Poland	7.5	7.9	0.0	6.9	7.1	7.1	6.1	8.3	8.3
EFTA	7.6	6.7	5.7	0.0	0.0	0.0	4.3	5.7	7.2
EU-3	6.4	6.2	6.9	0.0	0.0	0.0	3.5	4.5	4.4
EU-9	6.4	6.2	6.9	0.0	0.0	0.0	3.5	4.5	4.4
NAFTA	8.2	7.8	7.6	3.8	3.6	3.6	0.0	4.4	4.4
Other	17.9	17.0	18.3	10.3	13.4	13.4	8.8	9.3	6.9

Source: CEC data base. The bilateral tariffs are own-country, import-weighted averages of pre-Uruguay Round MFN tariff rates, using 1992 imports for weighting purposes. The tariff rates are from the Uruguay Round Model data base; see Brown, Deardorff Fox, and Stern (1995) for further details.

Table 4b

Average Tariff Equivalents of NTBs for CECs
and European Union, 1992

(Percentage)

Importing Country	Exporting Country							
	Czechoslovakia	Hungary	Poland	NAFTA	EFTA	EU-3	EU-9	OTH
Czechoslovakia	0.0	1.0	1.1	3.6	4.4	3.9	3.9	2.6
Hungary	1.8	0.0	1.7	1.5	2.9	2.6	2.6	1.1
Poland	0.4	1.2	0.0	2.4	3.0	2.4	2.4	1.8
EFTA	9.9	9.9	9.9	4.8	0.0	0.0	0.0	2.4
EU-3	11.5	11.4	11.9	0.0	0.0	0.0	0.0	1.3
EU-9	11.3	11.4	11.9	0.0	0.0	0.0	0.0	2.4

Source: Simple averages of tariff equivalents obtained from a variety of sources. See text.

Table 5

Summary Results of CEC and CEC-EU Integration:

Changes in Country Imports, Exports, Terms of Trade, Welfare

and Real Returns to Labor and Capital

Country/Region	Imports	Exports	Terms of Trade	Equivalent Variation		Wage Rate	Ret. to Capital
	$ Mill.	$ Mill.	Pct. Change	Pct. Change	$ Millions	Pct. Change	Pct. Change
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Intra-CEC Free Trade Area (CEFTA)							
Czechoslovakia	199.5	198.2	0.0	0.6	330.8	0.4	-0.1
Hungary	106.7	117.0	-0.1	0.4	152.1	0.3	0.0
Poland	147.2	168.6	-0.1	0.4	343.7	0.3	0.0
NAFTA	1.0	-0.3	0.0	0.0	-20.7	0.0	0.0
EFTA	8.8	2.7	0.0	0.0	-31.4	0.0	0.0
EU - South	4.2	2.6	0.0	0.0	-8.9	0.0	0.0
EU - North	46.0	24.4	0.0	0.0	-48.9	0.0	0.0
Other	5.1	2.1	0.0	0.0	-28.9	0.0	0.0
B. CEC-EU Free Trade Area, NTBs in Place							
Czechoslovakia	1772.9	1876.3	-0.6	4.0	2227.8	3.3	-0.1
Hungary	1356.2	1404.6	-0.5	4.0	1424.2	2.7	0.4
Poland	1985.3	2114.4	-0.9	3.1	2491.9	2.9	-0.1
NAFTA	-10.9	-10.5	0.0	0.0	-277.1	0.0	0.0
EFTA	1096.1	970.9	0.0	0.2	2036.0	0.1	0.0
EU - South	137.4	140.9	0.0	0.0	283.6	0.0	0.0
EU - North	3612.9	3370.9	0.0	0.1	6604.0	0.0	0.0
Other	23.1	-0.7	0.0	0.0	-332.1	0.0	0.0
C. CEC-EU Free Trade Area, Non-Sensitive NTBs Removed							
Czechoslovakia	2008.1	2076.7	-0.4	4.5	2513.9	3.6	-0.3
Hungary	1596.8	1616.0	-0.2	4.7	1662.7	3.0	0.1
Poland	2368.2	2443.9	-0.5	3.8	3025.8	3.3	-0.4
NAFTA	-8.5	-8.0	0.0	0.0	-377.6	0.0	0.0
EFTA	1230.3	1100.3	0.0	0.3	2352.4	0.1	0.0
EU - South	151.3	158.7	0.0	0.0	321.5	0.0	0.0
EU - North	4061.5	3927.4	0.0	0.1	8032.2	0.0	0.0
Other	15.6	-10.6	0.0	0.0	-450.8	0.0	0.0
D. CEC-EU FTA, All NTBs Removed							
Czechoslovakia	3307.8	3181.9	0.8	7.3	4128.4	5.5	-2.1
Hungary	2858.9	2689.3	1.7	6.8	2437.4	2.9	-1.7
Poland	4242.4	4057.7	1.3	5.6	4403.3	4.3	-2.8
NAFTA	69.2	73.9	0.0	0.0	-933.0	0.0	0.0
EFTA	2007.8	1882.6	0.0	0.5	4224.3	0.1	-0.1
EU - South	248.1	295.6	0.0	0.1	1035.8	0.1	0.0
EU - North	6362.3	6826.7	0.0	0.2	16115.1	0.1	0.0
Other	98.1	27.2	0.0	0.0	-591.7	0.0	0.0

Table 6

Scenario C: CEC-EU Free Trade Area, Tariffs and Non-Sensitive NTBs

Sectoral Effects on Czechoslovakia of CEC-EU Integration

Percent Change

Sector	Exports	Imports	Bilateral Imports							Output	No. Firms	Change in Employment	
			HUN	POL	NAFTA	EFTA	EU3	EU9	OTH			Percent	1000s
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1 Agriculture	6.4	15.2	30.4	32.4	5.5	13.7	16.8	16.8	5.5	1.3	0.0	1.4	11.5
310 Food	21.3	17.5	38.7	29.5	2.7	26.7	18.0	18.0	2.7	2.8	-0.8	-0.1	-0.2
321 Textiles	9.1	14.1	21.9	18.4	1.2	15.1	16.5	16.6	1.2	4.1	-0.7	0.2	0.3
322 Clothing	4.1	24.1	20.0	11.8	8.8	29.9	27.4	27.6	8.8	-2.8	-2.8	-2.7	-1.6
323 Leather Products	39.9	10.4	36.0	27.8	-7.2	13.7	12.6	12.3	-7.2	16.8	10.6	10.9	7.9
324 Footwear	48.5	13.5	29.6	21.4	-7.1	15.0	15.4	15.4	-7.1	13.0	8.0	9.6	3.2
331 Wood Products	19.5	18.6	25.4	21.5	-3.7	22.2	21.9	22.0	-3.7	5.1	0.9	1.2	1.3
332 Furniture, Fixtures	11.9	16.1	12.8	8.6	0.7	18.7	18.5	18.6	0.7	0.9	-2.2	-1.0	-0.9
341 Paper Products	31.6	11.5	14.5	22.0	-6.6	17.3	10.0	10.0	-6.6	11.3	5.0	5.9	3.4
342 Printing, Publishing	15.7	17.8	4.3	3.5	-0.3	19.4	21.5	21.6	-0.3	1.5	-1.8	-0.2	-0.1
35A Chemicals	13.6	7.7	18.2	5.4	-1.2	9.9	8.1	8.2	-1.2	6.1	0.9	1.8	2.7
35B Petroleum Products	29.0	12.7	9.4	22.1	-7.7	13.9	11.9	11.9	-7.7	8.3	0.6	-9.0	-7.4
355 Rubber Products	17.8	11.6	20.1	17.2	-3.5	15.3	13.8	13.7	-3.5	5.1	-0.5	0.7	0.4
36A Nonmetal Min. Prod.	27.8	9.6	11.8	22.7	-8.3	10.7	12.0	12.0	-8.3	9.1	2.4	3.8	3.1
362 Glass Products	25.0	16.0	12.9	23.4	-4.0	19.0	18.9	18.9	-4.0	4.8	-0.9	0.1	0.1
371 Iron, Steel	2.0	13.6	17.1	22.6	1.6	12.5	14.2	14.2	1.6	2.5	-2.9	-1.7	-4.3
372 Nonferrous Metals	23.7	19.6	17.7	24.9	2.4	21.5	21.0	21.0	2.4	4.1	1.0	2.6	3.5
381 Metal Products	21.5	13.6	14.7	21.5	-2.2	14.2	15.3	15.3	-2.2	6.6	1.9	3.1	8.3
382 Nonelec. Machinery	14.6	19.2	17.7	22.2	3.0	21.7	21.6	21.7	3.0	1.5	-2.4	-1.1	-4.0
383 Electrical Machinery	17.5	19.0	14.2	18.2	1.0	21.9	21.7	21.8	1.0	2.2	-2.6	-1.5	-2.9
384 Transport Equipment	19.5	16.1	18.5	17.7	-0.3	20.2	18.7	18.8	-0.3	3.4	-1.9	-1.2	-2.2
38A Misc. Mfrs.	20.0	14.1	23.1	25.1	-3.4	17.8	15.7	15.8	-3.4	5.7	0.2	1.2	2.9
2 Mining, Quarrying	37.7	0.3	19.1	16.6	-4.2	12.5	14.7	14.6	-4.2	10.5	3.5	4.8	9.6
4 Utilities	6.5	1.7	1.2	2.1	0.2	3.5	3.7	3.7	0.2	5.4	-0.7	0.0	0.0
5 Construction	3.1	1.1	3.2	5.3	1.0	0.8	1.0	1.0	1.0	3.9	-1.7	-0.8	-5.6
6 Wholesale Trade	-5.7	7.9	0.1	0.9	8.4	8.2	8.4	8.3	8.4	-0.3	-2.7	-1.3	-8.7
7 Transportation	-0.1	4.1	2.3	3.1	4.3	4.1	4.3	4.3	4.3	2.6	-1.7	-0.3	-2.4
8 Financial Services	-4.1	6.5	-1.1	-0.3	6.4	6.7	6.9	6.8	6.4	0.3	-2.7	-2.0	-5.9
9 Personal Services	-6.3	8.2	1.2	0.6	9.1	8.9	9.1	9.0	9.1	-0.2	-1.9	-0.9	-12.2
Total	12.5	11.7	16.7	15.2	-1.2	13.0	10.0	13.9	0.3	3.4	-0.4	0.0	0.0

Table 7

Scenario C: CEC-EU Free Trade Area, Tariffs and Non-Sensitive NTBs

Sectoral Effects on Hungary of CEC-EU Integration

Percent Change

Sector	Exports	Imports	Bilateral Imports							Output	No. Firms	Change in Employment	
			CZ	POL	NAFTA	EFTA	EU3	EU9	OTH			Percent	1000s
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1 Agriculture	8.9	14.9	21.4	21.1	4.4	30.9	30.3	30.3	4.4	2.3	0.0	2.7	12.6
310 Food	28.2	15.3	20.1	22.1	-0.4	34.2	37.5	37.4	-0.5	5.0	1.5	3.0	8.2
321 Textiles	11.6	13.9	19.7	18.9	-1.7	16.9	18.8	18.9	-1.7	4.5	-0.2	0.8	0.6
322 Clothing	3.8	16.9	14.7	4.7	6.6	19.3	20.1	20.2	6.6	-2.9	-2.9	-2.7	-2.6
323 Leather Products	59.5	-1.2	18.8	36.3	-17.1	0.5	0.7	0.4	-17.1	33.1	26.2	26.9	9.2
324 Footwear	52.3	9.1	22.3	18.1	-12.2	12.9	12.3	12.3	-12.2	14.8	9.3	11.5	3.0
331 Wood Products	23.3	9.5	11.9	9.0	-4.6	11.8	13.7	13.8	-4.6	7.0	3.3	3.9	2.7
332 Furniture, Fixtures	13.4	14.7	14.5	10.8	-0.2	19.0	19.8	19.9	-0.2	0.6	-2.0	-0.8	-0.4
341 Paper Products	23.1	12.6	14.1	7.1	-0.4	16.3	16.0	16.0	-0.4	2.9	-1.5	-0.1	0.0
342 Printing, Publishing	13.4	16.0	13.0	14.3	4.7	19.7	19.8	19.8	4.7	-0.8	-3.0	-1.6	-1.2
35A Chemicals	12.5	12.8	24.5	16.8	-1.5	21.0	20.0	20.1	-1.5	3.4	-1.1	-0.1	-0.1
35B Petroleum Products	21.7	7.3	27.0	23.5	-1.8	15.9	15.7	15.6	-1.8	3.9	-1.5	-7.9	-7.0
355 Rubber Products	24.0	11.9	14.9	17.5	-4.8	16.4	16.4	16.3	-4.8	5.8	0.7	2.4	1.6
36A Nonmetal Min. Prod.	28.7	7.6	19.3	17.7	-6.5	8.3	12.1	12.0	-6.5	8.1	3.1	4.6	1.8
362 Glass Products	28.6	13.3	17.8	23.2	-3.9	15.8	18.9	18.9	-3.9	5.3	1.0	2.0	1.3
371 Iron, Steel	0.9	7.7	11.6	10.5	1.7	11.9	10.4	10.5	1.7	1.4	-2.5	-1.5	-0.7
372 Nonferrous Metals	20.7	15.5	16.1	16.4	2.4	22.3	23.5	23.6	2.4	3.2	0.9	2.4	0.9
381 Metal Products	22.1	12.3	20.1	25.1	-4.0	15.8	17.3	17.3	-4.0	5.5	2.0	3.2	3.4
382 Nonelec. Machinery	13.9	19.5	21.7	23.7	2.1	23.6	25.2	25.2	2.1	0.1	-2.8	-1.7	-2.1
383 Electrical Machinery	18.9	18.3	23.7	16.9	1.1	23.9	22.6	22.6	1.1	1.2	-2.5	-1.5	-2.0
384 Transport Equipment	23.2	12.4	27.1	27.7	-2.1	15.1	18.0	18.0	-2.1	3.6	-0.9	-0.2	-0.2
38A Misc. Mfrs.	21.7	13.2	19.0	18.5	-4.8	17.1	16.8	16.8	-4.8	6.5	1.6	2.9	4.2
2 Mining, Quarrying	30.9	4.0	33.8	25.6	-2.3	20.6	20.9	20.7	-2.3	6.4	1.4	2.9	2.7
4 Utilities	2.5	4.5	7.1	4.0	2.0	5.1	3.9	3.8	2.0	3.0	-1.2	0.1	0.1
5 Construction	2.2	0.4	3.5	4.8	0.5	0.3	0.5	0.5	0.5	2.6	-2.0	-1.0	-2.1
6 Wholesale Trade	-5.8	5.6	-0.9	-0.6	7.0	6.8	7.0	6.9	7.0	-1.8	-3.8	-1.5	-9.1
7 Transportation	-1.1	4.0	3.1	3.0	4.2	4.0	4.3	4.2	4.2	1.7	-1.3	-0.1	-0.4
8 Financial Services	-6.1	5.7	-0.1	-1.1	5.5	5.9	6.0	6.0	5.5	-2.5	-4.8	-3.6	-7.6
9 Personal Services	-6.4	5.0	-1.9	-1.3	7.1	7.0	7.1	7.1	7.1	-1.3	-2.6	-1.7	-17.1
Total	15.5	9.8	10.0	10.5	-0.4	12.9	10.2	14.4	-0.8	2.9	1.7	0.0	-0.1

Table 8
Scenario C: CEC-EU Free Trade Area, Tariffs and Non-Sensitive NTBs
Sectoral Effects on Poland of CEC-EU Integration
Percent Change

Sector	Exports	Imports	Bilateral Imports							Output	No. Firms	Change in Employment	
			CZ	HUN	NAFTA	EFTA	EU3	EU9	OTH			Percent	1000s
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1 Agriculture	2.7	9.3	22.4	11.9	5.8	19.6	9.4	9.4	5.8	0.7	0.0	0.8	32.5
310 Food	27.7	16.0	22.9	25.0	2.7	27.4	26.3	26.2	2.7	2.4	-1.1	-0.3	-1.6
321 Textiles	6.6	11.7	28.6	29.1	1.5	26.1	15.8	15.9	1.5	3.5	-1.3	-0.4	-0.9
322 Clothing	3.8	15.2	12.6	10.8	8.6	20.2	21.4	21.5	8.6	-1.7	-1.7	-1.6	-2.8
323 Leather Products	55.1	-1.8	20.2	40.2	-17.5	3.2	5.7	5.4	-17.5	29.0	21.8	22.2	20.8
324 Footwear	44.1	15.3	23.7	28.7	-3.3	23.1	23.3	23.3	-3.3	8.3	2.7	4.5	2.7
331 Wood Products	19.3	15.3	23.8	28.3	1.2	25.3	20.1	20.2	1.2	4.8	1.1	1.5	2.5
332 Furniture, Fixtures	11.5	19.5	19.1	24.2	3.7	28.5	23.3	23.5	3.7	0.0	-2.7	-1.6	-2.1
341 Paper Products	27.9	15.1	24.4	12.6	-4.9	20.6	18.9	18.8	-4.9	6.3	0.4	1.2	0.5
342 Printing, Publishing	12.2	15.6	19.1	8.0	0.2	22.9	19.0	19.1	0.2	-1.7	-4.9	-3.3	-1.2
35A Chemicals	7.8	13.3	27.1	25.3	-1.4	21.1	20.4	20.5	-1.4	0.0	-5.5	-4.6	-10.8
35B Petroleum Products	28.6	8.2	22.6	22.4	-5.3	19.4	19.5	19.5	-5.3	7.0	-0.1	-8.9	-16.4
355 Rubber Products	25.0	20.0	32.7	33.4	-1.7	30.0	27.7	27.6	-1.7	4.2	-1.8	-0.5	-1.1
36A Nonmetal Min. Prod.	27.7	10.5	24.7	21.8	-9.1	13.0	16.6	16.5	-9.2	8.5	2.0	3.4	1.1
362 Glass Products	33.0	7.8	13.4	17.2	-9.9	11.1	12.9	12.9	-9.9	9.7	3.8	4.9	3.1
371 Iron, Steel	3.8	14.5	25.6	24.3	1.2	18.2	21.8	21.9	1.2	4.5	-1.2	0.0	0.1
372 Nonferrous Metals	30.3	12.5	19.5	-4.3	-2.2	17.8	18.8	18.9	-2.2	11.2	8.1	9.8	7.7
381 Metal Products	26.6	11.6	22.3	23.3	-6.6	14.7	18.3	18.3	-6.6	10.3	5.1	6.5	11.8
382 Nonelec. Machinery	17.7	12.8	17.5	14.5	-0.8	23.7	16.3	16.4	-0.8	3.3	-1.2	0.3	0.9
383 Electrical Machinery	23.0	13.9	14.3	10.6	-1.3	20.6	19.2	19.2	-1.3	4.4	-0.9	0.3	0.6
384 Transport Equipment	26.9	14.2	21.1	20.5	-5.9	21.8	22.7	22.8	-5.9	6.1	-0.9	0.1	0.1
38A Misc. Mfrs.	25.1	13.0	22.5	16.0	-6.5	15.4	19.4	19.5	-6.5	7.5	1.4	2.6	6.5
2 Mining, Quarrying	21.1	8.7	31.2	24.2	-2.4	29.7	28.2	28.1	-2.4	7.6	1.1	2.3	9.3
4 Utilities	2.5	8.3	6.7	2.7	1.6	10.2	21.9	21.8	1.6	3.4	-2.1	-1.4	-6.2
5 Construction	3.4	0.1	3.0	2.2	0.0	-0.2	0.0	0.0	0.0	4.2	-2.0	-0.9	-10.8
6 Wholesale Trade	-3.5	6.9	-0.1	-0.4	7.9	7.7	7.8	7.8	7.9	0.2	-2.3	-0.7	-11.1
7 Transportation	-0.7	4.0	3.1	2.2	4.2	4.0	4.2	4.2	4.2	2.7	-1.5	-0.1	-2.2
8 Financial Services	-4.6	7.1	1.2	-0.6	6.6	7.2	7.4	7.3	6.6	-0.1	-2.8	-2.0	-4.3
9 Personal Services	-4.9	7.1	-0.4	0.6	8.6	8.4	8.6	8.5	8.6	0.0	-1.9	-0.8	-28.8
Total	16.0	10.6	12.2	10.6	-0.8	14.2	11.2	15.5	-1.4	2.9	0.2	0.0	-0.2

Table 9
Summary Results of CEC-EU Integration in the Base Case:
CEC-EU FTA, Tariffs and Non-Sensitive NTBs Removed
Decomposition of Scale and Variety Effects

Country/Region	Imports	Exports	Terms of Trade	Equivalent Variation		Wage Rate	Ret. to Capital
	$ Mill.	$ Mill.	Pct. Change	Pct. Change	$ Millions	Pct. Change	Pct. Change
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C. CEC-EU Free Trade Area, Non-Sensitive NTBs Removed							
Czechoslovakia	2008.1	2076.7	-0.4	4.5	2513.9	3.6	-0.3
Hungary	1596.8	1616.0	-0.2	4.7	1662.7	3.0	0.1
Poland	2368.2	2443.9	-0.5	3.8	3025.8	3.3	-0.4
NAFTA	-8.5	-8.0	0.0	0.0	-377.6	0.0	0.0
EFTA	1230.3	1100.3	0.0	0.3	2352.4	0.1	0.0
EU - South	151.3	158.7	0.0	0.0	321.5	0.0	0.0
EU - North	4061.5	3927.4	0.0	0.1	8032.2	0.0	0.0
Other	15.6	-10.6	0.0	0.0	-450.8	0.0	0.0
E. CEC-EU FTA, Tariffs & Non-Sensitive NTBs, with Scale Only							
Czechoslovakia	1935.7	1956.4	-0.1	3.8	2148.6	3.3	0.1
Hungary	1570.7	1591.6	-0.2	4.6	1649.8	3.4	0.4
Poland	2348.7	2427.8	-0.5	3.9	3061.9	3.8	-0.1
NAFTA	9.1	5.1	0.0	0.0	-320.4	0.0	0.0
EFTA	1213.6	1099.0	0.0	0.3	2379.3	0.1	0.0
EU - South	157.1	174.0	0.0	0.1	444.3	0.1	0.0
EU - North	4002.9	3889.9	0.0	0.1	8226.9	0.0	0.0
Other	29.2	-2.3	0.0	0.0	-332.2	0.0	0.0
F. CEC-EU FTA, Tariffs & Non-Sensitive NTBs, with neither Scale nor Variety							
Czechoslovakia	1863.4	1708.4	0.9	3.0	1702.9	4.9	-1.1
Hungary	1543.6	1445.0	1.0	4.2	1492.6	5.3	-0.8
Poland	2390.4	2240.1	1.0	3.3	2605.9	5.9	-1.8
NAFTA	-85.8	-35.4	0.0	0.0	-615.4	0.0	0.0
EFTA	1081.7	1001.1	0.0	0.2	1800.4	0.1	0.0
EU - South	123.8	145.8	0.0	0.0	203.7	0.1	0.0
EU - North	3553.2	3723.9	0.0	0.1	5895.4	0.0	0.0
Other	-80.4	-39.9	0.0	0.0	-837.2	0.0	0.0

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FOOTNOTES

[*] We have benefited greatly from numerous comments of participants in both the AICGS Conference and a conference at Tilburg University in the Netherlands.

[1]The CECs include the Czech Republic, Hungary, Poland, and Slovakia. Prior to 1993, the term referred to Czechoslovakia, Hungary and Poland..•

[2]Note in this connection that the overall static effects of the "1992" completion of the internal EU market were estimated at 2.5% to 6.6% of the EU's GDP (Cecchini, 1988).•

[3]For a similar argument for the NAFTA, see Krugman (1993). •

[4]Poland and Hungary Assistance for Restructuring the Economy.•

[5] Other recent studies pertinent to EU-CEC trade and investment relations include Cadot and de Melo (1994a), Halpern (1994), and Neven (1994).•

[6]The main elements of the SEA are treated in detail in Winters and Wang (1994, esp. pp. 32-52).•

[7] This gives free access by January 1, 1995 instead of January 1, 1997 for the CECs.•

[8]For more detail, see European Commission (1994b).•

[9]See European Commission (1994a).•

[10]Based on Bakos (1993).•

[11]We have recently constructed a bilateral matrix of international trade in services for the 34 countries in the model's data base so as to be able to treat all 29 sectors as tradable and to analyze the effects and interaction of liberalization of both merchandise trade and services in our model countries/regions. For some preliminary analysis along these lines for the Uruguay Round negotiations, see Brown, Deardorff, Fox, and Stern (1995).

[12]It is thus being assumed that there are constant returns to scale in the agricultural sector and increasing returns to scale in the manufacturing and services sectors. The assumption of national product differentiation for agriculture

means that the so-called Armington assumption is being applied and that nations will have some degree of monopoly power in trade in this sector. For the manufacturing and services sectors, product differentiation by firm dispenses with the Armington assumption so that the potentially strong terms-of-trade effects associated with national monopoly power will be greatly diminished. But, as will be noted below, the realization of increasing returns may result in substantial scale effects.•

[13]Issues of the modeling of market structure are discussed in Brown and Stern (1989), where a variety of different imperfectly competitive market structures are used in analyzing the economic effects of the CUSTA. For the current model, as noted, we use a structure of monopolistic competition, following Helpman and Krugman (1985), for all of the manufacturing and service industries. There is free entry of firms, each producing a different variety of a good, and producing it with a fixed cost and constant marginal cost in terms of primary and intermediate inputs. Varieties enter via a Dixit-Stiglitz (1977) aggregation function into both utility and production functions, with the implication that greater variety reduces cost and increases utility.

[14]It is always a problem to use completely up-to-date input-output tables because of ongoing changes in technology and productivity that would alter the input-output coefficients for particular sectors. This applies especially to the CEC countries which have been undergoing considerable restructuring. In the absence of current input-output tables for these countries, we decided to use the 1980 input-output table for Portugal as a proxy for the economic structure of the individual CECs. Once we are able to obtain more appropriate input-output tables for the CEC countries, we would then be able to revise our model simulations to see what difference it makes in having used the Portugal table. There is some concern that particular sectors of the CEC economies, such as energy or services, may be particularly inefficient compared to their Portuguese counterparts. In the absence of more information on the extent of such differences, however, we have not attempted to correct for such possibilities.

[15]The main data used cover trade, production, and employment, and these data come primarily from United Nations sources and to a lesser extent from national sources. The model parameters are constructed from the trade and input-output data for the countries included in the model and from published studies of trade and capital/labor substitution elasticities. For a comprehensive discussion of the data and parameters, see Deardorff and Stern (1990, pp. 37-45).

[16]The results reported below for changes in total exports and imports may appear to contradict this assumption of balanced trade. This is because what are reported are measures of the changes in quantities traded, which are relevant for output and employment changes. They are not the values of trade, which undergo additional change due to changing relative prices. It is the values of exports relative to imports that are held fixed by the balanced trade assumption.

[17]In effect then, we do not distinguish workers according to their skill characteristics and therefore how the wages and employment of different skill groups may be affected by an EU-CEC arrangement. In Stern, Deardorff, and Brown (1992), the U.S. employment changes that might result from the NAFTA were decomposed by sector, occupation, and geographic location.•

[18]See Stern, Deardorff, and Brown (1992) for analysis of the cross-border movement of labor between the United States and Mexico that may occur as a result of the NAFTA.

[19]In earlier work we have noticed that the effect of variety in lowering costs can introduce an instability into the model, because an increase in demand for an industry can lead to entry, additional variety, lower costs to users, and hence additional demand. To avoid this happening in our model we therefore depart slightly from the Dixit-Stiglitz formulation, using an additional parameter to control these variety effects. In the results reported here, the effect of variety on welfare has been set to one half of what would occur in the Dixit-Stiglitz model.•

[20]The data on tariffs and NTBs will be discussed further below.

[21]NTBs are assumed to apply at the level of the industry, not the firm, so that the pricing behavior of perfectly competitive and monopolistically competitive firms is unaffected.•

[22]We recognize, however, that the large differences in per capita income that exist between the CECs and the EU create great incentives for such movement, and that reduction of trade barriers and increased economic interaction may well cause migration to increase.•

[23]There also exist some NTBs with small positive tariff equivalents focused on agriculture between EFTA and the EU that are not included here. These resulted from the exclusion of the EFTA countries from the EU's Common Agricultural Policy.•

[24]We are indebted to J. David Richardson for noting and stressing this point.•

[25]For a further discussion of factor prices in a differentiated products model see Brown, Deardorff, and Stern (1993).

[26]As already mentioned, we do not distinguish workers according to skill groups, so that we cannot determine if skilled and unskilled workers will be affected differently.•

[27]With more than one factor, in contrast to Krugman (1979), the factor intensities of fixed and variable costs could be different, leading to factor market effects from changes in scale. In our model, however, partly because we lack the data to make this distinction, fixed and variable factors of production are assumed to be used in the same proportions within an industry.•

[28]This does not mean that the scale effects themselves are particularly large in absolute terms, but only relative to the Stolper-Samuelson effects, which are also rather small.•