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**Trade Creation and Trade Diversion under MERCOSUR:
A Global Intertemporal General Equilibrium Analysis**

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ABSTRACT

A multi-region, multi-sector global intertemporal general equilibrium model is constructed to analyze dynamic adjustments following the establishment of the Southern Common Market (MERCOSUR). The study focuses on regional trade integration effects as well as third party spillover effects. By taking into account both transitional and steady state adjustments in consumption, production, and investments, we observe significant shifts of trade diversion away from the non-member trading partners to the member countries. We also find that, following the MERCOSUR's common external tariffication, growth of intra trade would likely be accompanied by increases in trade between Mercosur and other countries.

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Key Word: MERCOSUR, Dynamic Applied General Equilibrium, Trade, Trade Bloc

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Trade Creation and Trade Diversion of MERCOSUR: A Global Intertemporal General Equilibrium Analysis

There is a growing interest on the economics of formation of trade blocs, given the emergence of new trade centers since late 1980s. Most studies on regional integration have generally focused on the effects of trade reform and harmonization among the member countries. Examples are Francois and Shiells (1994) on NAFTA, Mercenier (1995) on EU, Adams and Park (1995) on ASEAN, Behar (1995) on MERCOSUR. It is to be expected, however, that trade effects of regional trading blocs will not be limited solely to trade-creation effects between member countries, but will also likely substantiate significant shifts of trade diversion away from the non-member trading partners. In this paper, we study regional trade integration effects, as well as third party spillover effects, in the context of a newly created trade bloc, the Southern Common Market (MERCOSUR), and its previous major trading partners using a global intertemporal general equilibrium model.

MERCOSUR was launched by the Treaty of Asuncion signed in March 1991, with the purpose of creating a free trade area and a custom union among Brazil, Argentina, Uruguay and Paraguay. Before that in 1960, countries in the South America established the Latin American Free Trade Association, the largest and most ambitious integration scheme. The failure of LAFTA to attain its main objective, namely, the complete elimination of trade barriers among the member countries, led to its reorganization into a more flexible scheme, the Latin American Integration Association (LAIA) in 1980. The LAIA agreements included provisions for negotiating reductions in tariffs on intra-regional trade on a global basis (the regional preferential tariff), but at the same time, they allowed the liberalization of tariff barriers among members on a

bilateral basis. An example of the bilateral basis of trade liberalization is provided by the 1988 economic cooperation agreement between the two largest South American countries, Argentina and Brazil, which stipulated the elimination of all barriers to reciprocal trade over a ten-year period. The advancements in economic integration made by these two countries, as well as the importance they have for the entire region compelled Uruguay and Paraguay to join the Argentine-Brazilian trade agreement in March 1991. The new cooperation treaty, the Treaty of Asuncion, was signed by the four countries, and the time schedule for achieving tariff-free trade established by Brazil and Argentina was maintained. At the same time, the countries committed themselves to initiating a process of tariff alignment. The objectives include to eliminate tariff and non-tariff barriers for trade among member countries and to converge toward a low common external tariff (CET) between zero and 20 percent for third-country imports with some exceptions.

MERCOSUR comprises 200 million people, who generated a GDP of US\$670 billion in 1996 and accounted for about 50 percent of Latin American industrial output and total exports. In the period of 1990-1994, the value of intra regional trade nearly tripled, from US\$4.1 billion to US\$10.7 billion. This growth partly reflects the progress made under the trade liberalization program, as well as the gradual elimination of non-tariff restraints to reciprocal trade and an increase in trade and production initiatives among entrepreneurs in the region. As the second largest trading bloc in the West hemisphere after NAFTA, MERCOSUR not only affects its member countries' economies, but also non-member countries which have high trade shares with it. In this paper we employ a global model including MERCOSUR member countries and main non-member trading countries/ regions to analyze the effects of MERCOSUR on the member

countries, and on the main third-party trading partners alike. We study these issues in the framework of dynamic applied general equilibrium (CGE) model. The model is in the Walrasian tradition in attaining intra temporal equilibrium in its factor and commodity markets. Dynamics are driven by intertemporal optimization behaviors under condition of exogenous economic growth, as studied and formulated by the neoclassical paradigm.

Previous CGE modeling work on regional integration and trade reform have been generally done within a static framework. However, such traditional CGE analyses could only account for the static, once-and-for-all effects, and were not able to capture the long run dynamic effects which involve intertemporal behavior such as saving and investment decisions. The incorporation of saving and investment decisions by way of “fixed” parameters and ad hoc “closure” rules in these approaches often led to non-robust policy results with arbitrary dependence on modeling specification (Devarajan and Go, 1996; Srinivasan, 1982). In the current model, we incorporate explicit intertemporal optimizing behavior on the part of rational agents, and thus, we are able to investigate dynamic gains or losses of production or welfare.

Our model draws in many ways upon the recent contributions of dynamic CGE modeling by Ho (1989), McKibbin (1993), Mercenier and Sampaio de Souza (1994) Mercenier (1995), and Go (1994). We utilize the model to simulate both the short-run (upon impact) and the long-run, inter-regional transitional dynamic effects of trade reforms in the context of a global economy. We base our simulation experiments on the recent version of Global Trade Analysis Project database (GTAP, Hertel and Tsigas, 1995). The paper is organized as follows: Section II presents the algebraic structure of the model and Section III discusses the data and the calibration strategy. In Section IV, we analyze trade creation and trade diversion adjustment processes in

response to alternative Mercosur tariff reform scenarios. Finally, the last section summarizes the conclusions.

II. The model

The model developed in this study is based on the neoclassical growth theory, and is a global dynamic CGE model with a multi-region specification. There are 8 regions, each of which produces 6 goods from the same number of production sectors. Home produced goods are consumed domestically, sold to foreigners, and used for home capital formation. Firms produce goods and install capital so as to maximize firm valuation. Infinitely-lived households consume home produced and imported goods to maximize an intertemporal utility function. Household income is consumed or saved in the form of equity in domestic firms or foreign bonds. Home firm equities and foreign bonds are assumed to be perfect substitutes. Through equity purchases by households, the world pool of savings is channeled to profitable investment projects without regard to the national origin of savings. The detailed description of the each agent within this framework and the dynamics of the model are as follows.

II.1 Firms and investment

The model distinguishes 6 production sectors, each of which produces a single output using inputs of labor, capital and intermediate goods. None of the primary inputs can move internationally. The value added function is of Cobb-Douglas form over labor and capital, while the intensities of intermediate goods are fixed.

We assume that the firms within a specific sector of each region can be aggregated into a representative firm. Also, we assume that the firm finances all its investment spending by retaining profits so that the number of equities issued by the private sector remains unchanged.

The fundamental assumption governing producer behavior is that managers seek to maximize the value of the firm. The managers' choice variables at each time period are the input levels of labor, intermediate goods and investment. The levels of labor and intermediate inputs are selected to minimize costs, while the level of investment is chosen in each period so as to approach optimally the long-run (profit-maximizing) capital intensity. The length of time necessary to attain the optimal capital intensity depends on the adjustment costs faced by the firm.

A starting point for specifying the firm's optimizing behavior is the condition of asset market equilibrium that risk-adjusted expected returns be the same across all assets. In particular, the expected returns from holding the equity in the firms must be in line with those from holding a 'safe' asset such as foreign bonds at any time period:

$$r = \frac{div_i}{V_i} + \frac{\Delta V_i}{V_i}, \quad (1)$$

where r is the world interest rate. Assuming an efficient world financial capital market, each region faces the same world interest rate. V_i is the market value of firm i , div_i is the current dividend payments, $\Delta V_i = V_{i,t} - V_{i,t-1}$ is the expected annual capital gain on the firm equity.

Assuming that agents rule out Ponzi schemes in forming their expectation, that is, imposing the following terminal condition:

$$\lim_{t \rightarrow \infty} R_t V_{i,t} = 0,$$

where $R_t = \prod_{s=1}^t 1/(1+r_s)$, represents the discount factor, r_s is interest rate at time s , the difference

equation (1) may be solved forward to yield:

$$V_{i,1} = \sum_{t=1}^{\infty} R_t \text{div}_{i,t},$$

which defines the market value of assets (at period one) in terms of expected future revenues.

The dividend payments is defined as follows:

$$\text{div}_{i,t} = P_{i,t} f_i(L_{i,t}, K_{i,t}) - w_t L_{i,t} - a_{i,t} - P I_{i,t} I_{i,t},$$

where P_i : price for i-th sector's output,

$f_i(\cdot)$: i-th sector's production function,

w : wage rate,

L_i and K_i : inputs of labor and capital,

PI_i : price of per unit quantity of investment,

I_i : quantity of investment,

a_i : capital installation/adjustment costs and $a_{i,t} = \phi \frac{P_{i,t} I_{i,t}^2}{K_{i,t}}$,

ϕ_i : a positive constant.

Firm's intertemporal decision problem can be restated more rigorously as follows: in each region's sector i , $i = 1, 2, \dots, I$, the representative firm chooses the optimal investment and employment strategies, $\{I_{i,t}, L_{i,t}\}_{t=1, \dots, \infty}$, to maximize the present value of all future dividend payments, taking into account expected future prices, $\{P_{i,t}, PI_{i,t}, w_t\}_{t=1, \dots, \infty}$, and the capital

accumulation constraint. Formally:

$$\begin{aligned} \text{Max } V_i &= \sum_{t=1}^{\infty} R_t \text{div}_{i,t} \\ &= \sum_{t=1}^{\infty} R_t [P_{i,t} f_i(L_{i,t}, K_{i,t}) - w_t L_{i,t} - \phi \frac{P_{i,t} I_{i,t}^2}{K_{i,t}} - P I_{i,t} I_{i,t}] \end{aligned}$$

subject to:

$$K_{i,t+1} = (1 - \delta_i) K_{i,t} + I_{i,t}$$

where δ_i is a positive capital depreciation rate. Because of the presence of adjustment costs on capital, marginal products differ across sectors, resulting in unequal although optimal rates of investments. We assume that labor is perfectly mobile across sectors, and firms never face any quantity constraints. The Lagrangian of the problem is:

$$\begin{aligned} \mathcal{L}_i &= \sum_{t=1}^{\infty} R_t [P_{i,t} f_i(L_{i,t}, K_{i,t}) - w_t L_{i,t} - \phi \frac{P_{i,t} I_{i,t}^2}{K_{i,t}} - P I_{i,t} I_{i,t}] \\ &+ \sum_{t=1}^{\infty} R_t q_{i,t} [(1 - \delta_i) K_{i,t} + I_{i,t} - K_{i,t+1}] \end{aligned} \quad (2)$$

Differentiating (2) with respect to the control variable $I_{i,t}$ generates the shadow price of capital good, Tobin's $q_{i,t}$:

$$q_{i,t} = P I_{i,t} + 2 P_{i,t} \phi \frac{I_{i,t}}{K_{i,t}} \quad (3)$$

and differentiating (2) with respect to the state variable $K_{i,t}$ we obtain the no arbitrage condition:

$$wk_{i,t} + P_{i,t} \Phi\left(\frac{I_{i,t}}{K_{i,t}}\right)^2 + (1 - \delta_i)q_{i,t} - (1 + r_t)q_{i,t-1} = 0. \quad (4)$$

where $wk_{i,t} = \partial f_i(\cdot) / \partial K_{i,t}$. Equation (4) is identical to Equation (1) as the value of the firm is equal to the stock of capital multiplied by its shadow price, i.e., $V_i = q_i K_i$.

II.2 The households and consumption/savings

In each region the representative household owns labor and all financial wealth, and allocates income to consumption and savings to maximize an intertemporal utility function over an infinite horizon. We assume no independent government saving - investment behavior.

“Government” spends all its tax revenues on consumption or transfer to households and, hence, fiscal deficit is ignored². In each region household's discounted utility of the temporal sequence of aggregated consumption over an infinite time horizon is:

$$\text{Max } \sum_{t=0}^{\infty} \left(\frac{1}{1+\rho}\right)^t u(TC_t) \quad (5)$$

where ρ is the positive rate of time preference, $u(\cdot)$ is the instantaneous felicity at each time period. TC_t is the instantaneous aggregate consumption generated from final goods,

$$TC_t = \prod_i C_{i,t}^{b_i} \quad (6)$$

Where $C_{i,t}$ is final consumption good i , $0 < b_i < 1$, and $\sum_i b_i = 1$. The household in each region

² Government budget deficits in some countries of MERCOSUR, such as Brazil and Argentina, are high and drastic reduction of tariff protection will have important fiscal effects on their economies. Since we will focus our attention on the future borrowing behavior of the aggregation national economy as a whole, the behavior of the government and, hence, government budget deficit is ignored by the analysis.

maximizes (5) subject to an intertemporal budget constraint:

$$\sum_{t=1}^{\infty} R_t P_{tc} TC_t \leq \sum_{t=1}^{\infty} R_t (w_t L_t + TI_t) + \omega_1$$

P_{tc} is consumer price index such that $P_{tc} TC_t = \sum_i P_{i,t} C_{i,t}$, TI_t is the lump sum transfer of government revenues, and ω_1 is the value of the household's initial financial wealth, i.e., initial values of home firm equities plus foreign bonds. Flow of the current households' income includes the claims to dividends generated from the ownership rights on domestic equity - values of the domestic firms, and interest earnings on foreign assets. Thus, household budget constraint in each time period is:

$$SAV_t = w_t L_t + TI_t + div_t + r_t B_{t-1} - P_{tc} TC_t$$

where SAV_t is household savings, B_{t-1} is foreign assets, and $P_{tc} TC_t$ gives total consumption expenditures.

The Euler equation (derived from first order condition of utility maximization) implies that the marginal utility across two adjacent periods satisfies the following condition:

$$\frac{u'_{t+1} (1 + \rho)^{-1}}{u'_t} = \frac{P_{tc,t+1} (1 + r_{t+1})^{-1}}{P_{tc,t}} \quad (7)$$

where u'_t is the derivative of the utility at time t with respect to the aggregate consumption TC .

Equation (7) states that the marginal rate of substitution between consumption at time t and t+1 is equal to the ratio of consumption price index across the same time periods. Given the consumption aggregation function (6), the price index of overall consumption, P_{tc} , is determined

from the individual good prices, according to

$$Ptc = \prod_{i=1} \left(\frac{P_i}{b_i} \right)^{b_i}$$

II.3 Foreign sectors and foreign assets

Following the traditional CGE folklore, the model incorporates the Armingtonian composite good system for the determination of imports. In this structure, domestically produced and foreign goods are regarded as imperfect substitutes in aggregate demand, given a constant elasticity of substitution.

The flow savings, SAV_t , is the demand for foreign new bonds³, which, in the equilibrium, reflects current account imbalance, i.e.,

$$SAV_t = B_t - B_{t-1} = r_t B_{t-1} + FBOR_t \quad (8)$$

where a positive $FBOR_t$ implies a surplus in foreign trade.

II.4 Equilibrium

Intra temporal equilibrium requires that at each time period, (i) in each region demand for production factors equal their supply; (ii) in the world, total demand for each sectoral good equal to its total supply; (iii) in the world, the aggregate household savings equal zero.

Intertemporal equilibria are described mainly by the difference equations (1) (or (4)), (7) and (8), while for the steady state equilibrium path, the following constraints must also be

³ Since we assume that the number of equities remain constant.

satisfied for each region:

$$r_{ss} = \frac{div_{ss}}{V_{ss}} \quad (9)$$

$$I_{ss} = \delta K_{ss} \quad (10)$$

$$FBOR_{ss} + r_{ss} B_{ss} = 0. \quad (11)$$

Equation (9), which is derived from Equations (1) or (4) in the steady state, implies that in the steady state, the average returns to capital is constant and equal to the interest rate. Equation (10) implies that investment just covers the depreciated capital, hence, the stock of capital per labor remains constant. Equation (11) states that household savings are zero and hence foreign assets holding is constant. Furthermore, if the economy experiences debt in the steady state (i.e., B_{ss} is negative), it has to have trade surplus to pay the interest costs to foreigners, i.e., $FBOR_{ss}$ has to be positive.

III. Data and Calibration Strategy

The data where calibration and the base-run are initiated are drawn primarily from the Global Trade Analysis Project (GTAP) database which are aggregated into a 8 region, 6 sector data set. The 6 aggregate production sectors/commodities are: (1) agriculture, (2) processing food, (3) textile, (4) intermediates, (5) manufacturing, and (6) services; while the 8 aggregate countries/regions include: (1) the United States, (2) Argentina, (3) Brazil, (4) Chile, (5) the Rest of West Hemisphere countries, (6) European Union, (7) all Asian countries, and (8) the Rest of World. Due to data limitations for the other two member countries (Uruguay and Paraguay), MERCOSUR is represented approximately by the Argentine and Brazilian data, which, in terms

of national domestic product, comprises 97 percent of the total MERCOSUR's economy. All countries/regions, including the ROW, are fully specified, in the sense that production, consumption, investment, and trade decisions are the result of well-defined optimization problems.

Calibration of the model involves specifying values for certain parameters based on outside estimates, and deriving the remaining ones from restrictions posed by the equilibrium conditions. As in a static CGE model where calibration begins with the assumption that data obtained for the domestic economy reflect period-equilibrium, we assume that the world economy is evolving along a balanced (equilibrium) growth path⁴. Hence, some of the assumptions on the model calibration concerning the economy's exogenous environment are arbitrary. However, as we are interested in deviations with respect to a reference path in our counterfactual experiments, this specification can be regarded robust.

It is known that in the exogenous growth theory, upon which the current model is built, exogenous parameters, such as productivity coefficients or the rate of population growth, would generate growth along the steady state path. However, such parameters cannot be endogenously affected by the policy variables. For this reason, all exogenous steady-state growth factors are ignored in the current model. In contrast, the transitional growth, which is associated with dynamic adjustment in investment and capital accumulation caused by changes in the policy instruments, will constitute the major focus of the paper.

⁴ The steady-state assumption, though questionable for most developing economies, is systematically adopted in applied intertemporal general equilibrium models due to its extreme convenience for calibration. For example, Goulder and Summers (1989), Go (1994), and Mercenier and Yeldan (1996).

The method used to calibrate parameters or initial values of variables associated with intra temporal economic activities are quite standard as that used in most static CGE models. We only sketch the more subtle dynamic calibration. Starting from the steady state assumption, the household time discount rate, ρ , equals the world interest rate, r , which can be chosen from outside data. GTAP database further provides both the values of each region's stock of capital and the flows of capital. Thus, with the data of the value of total investment, it is easy to calculate the initial level of total dividend payments (*div = value of capital flows - value of total investment*). The aggregate steady state value of the firms, and hence the marginal value of capital, Tobin's q , are then obtained by employing Equation (9). The values of capital depreciation rate, δ , and the coefficient in the capital adjustment costs, ϕ , have to be chosen consistent with the steady state condition. We can first either choose δ or ϕ and then calculate the other one using Equation (4). If we choose ϕ first, then δ is calculated from the following equation derived from Equation (4):

$$\delta_i = \frac{q_i}{2P_i\phi_i} - \left[\frac{rq_i - wk_i}{P_i\phi_i} + \left(\frac{q_i}{2P_i\phi_i} \right)^{2/3} \right]$$

The quantity of total investment, I , can be determined via Equation (10), i.e., $I = \delta K$. The capital adjustment costs, a , and the price for investment, PI , can be easily obtained after we have I .

In a dynamic general equilibrium model the analyst is typically interested in the adjustments generated in the finite time periods in response to parametric changes of selected exogenous variables. Hence, imposition of a terminal condition becomes pertinent for a discrete time dynamic model when there are out-of-steady state transitional paths for the endogenous

variables. Since the so-called terminal conditions are, in fact, conditions for the steady state (see Equations (9) to (11)), an ideal terminal period should be chosen when a steady state is asymptotically approached. In administering the dynamic experiments, two criteria can be adhered to select the “convergence” of a steady state: the first is the time horizon when 99.99% of the transitional life of the main variables is realized; and the second is the time period when all endogenous variables cease to change by less than 0.000001%. However, for a large size global model, the computation ability of the software or computer used may restrict the application of these two criteria. Implementing the time-aggregation techniques à la Mercenier and Michel (1994) reduces required aggregate number of time periods and, hence, reduce the size of the numerical model. This method is applied in our simulation experiments.

IV. Analysis of Alternative Simulations

IV-1. An overview of MERCOSUR trade and protection in 1992

MERCOSUR has a comparative advantage in its agricultural and food processing trade. For example, 22.1, 17.7 and 12.6 percent of respective wheat, other grains and processing foods produced by MERCOSUR are exported. In addition, its exports of wheat, other grains, non-grain crops, meat and meat products and processing food products account for 6.2, 8.8, 7.5, 11.2, and 12.5 percent, respectively, of total world trade in these commodities. For imports, only manufacturing imports has a relatively large share (13.4 percent) in MERCOSUR’s absorption of this commodity. However, including manufacturing imports, MERCOSUR’s imports of each commodity only account for less than 2 percent of total world trade in these commodities.

The top two trading partners of MERCOSUR are U.S. and EU. 25 and 24 percent of MERCOSUR’s import goods come from U.S. and EU, respectively, while 16 and 31 percent of

MERCOSUR's exports go to U.S. and EU. Some Asian countries, such as Japan and China, are also important trading partners of MERCOSUR. Thus, 16 percent of MERCOSUR's exports go to Asia and 11 percent of imports come from Asia. The Rest of West Hemisphere as a region ranks at the fourth from MERCOSUR's export point of view, and the fifth for its import (see table 1 for detail).

Table 1 also presents MERCOSUR's import/export shares of each commodity from different countries/regions. With a share of 26 percent, the Rest of West Hemisphere countries are major suppliers of MERCOSUR's imports of agricultural and processing food products. EU is an important supplier for MERCOSUR in the imports of processing food and four non-agricultural goods. Asia, the Rest of West Hemisphere and U.S. also have relative large shares in MERCOSUR's textile imports. The Rest of World, U.S. and the Rest of West Hemisphere are also major suppliers of MERCOSUR's intermediate good imports, and U.S. and Asia are also major suppliers of manufacturing goods.

Similar as in aggregate export, EU is the largest demander for MERCOSUR's exports of the four commodities (agricultural, food processing, intermediate goods and services), and second largest demander for its textile exports. MERCOSUR agricultural and processing food exports to EU account for 45.3 and 43.4 percent of its total exports in these two commodities.

Intra trade in MERCOSUR can only be partially captured by the trade between Argentina and Brazil due to the data limitation mentioned above. In aggregate terms, intra trade accounts for 11.4 and 10 percent of MERCOSUR's total imports and exports, respectively. Shares of the intra trade vary by sectors. 38 percent of MERCOSUR agricultural imports are satisfied by its intra regional trade, the highest share among the six sectors. Except for the services, intra

regional imports in the other four sectors accounts more than 10 percent of the total sectoral imports. From export point of view, MERCOSUR mainly depends on trade with third-country partners. There are three sectors in which intra regional exports account for less than 10 percent of the total exports. Only for manufacturing intra regional exports are above 20 percent.

Even though Argentina and Brazil started their tariff reforms before the establishment of MERCOSUR, their 1992's tariff levels were still high compared with other countries/regions recognized in the model. For example, the 1992's weighted tariff rates⁵ of total imports in Argentina and Brazil were 21.3 and 19.2 percent, respectively, which are the highest two among the eight countries/regions. For the weighted average sectoral tariff rates, Argentina and Brazil had the highest tariff rates for textile and manufacturing imports, while their tariffs on intermediate good imports were higher than the other five countries/regions except for Chile, and their tariffs on processing food import were higher than the other four countries/regions, except for Asia and the Rest of World.

Following the formation of MERCOSUR, two important policies which would affect both the member countries and the third-party economies are: (a) elimination of all restrictions to the free trade among the member countries; (b) gradual specification of a common external tariff (CET) in the range of zero and 20 percent on imports from third countries. In this section, we turn to an analysis of MERCOSUR tariff reform policies from the point of view of adjustment processes of trade creation and trade diversion and welfare gains/losses of the countries inside

⁵ Each country/region's tariff rates on the goods imported from different countries are calculated from GTAP database. For the average sectoral or total import tariff rates, the weights used are the values of 1992's sectoral imports from different countries/regions.

and outside MERCOSUR. For this objective, we consider the following two alternative tariff reduction scenarios: under experiment EXP-1, we focus on the trade liberalization among MERCOSUR member countries by fully eliminating all internal tariffs of them; while under experiment EXP-2, we combine EXP-1 with MERCOSUR's external policy. Here, in addition to EXP-1, we harmonize MERCOSUR's external tariffs for the third-country imports, with the common external tariff rates lowered than the base levels, and are chosen roughly at the world average rates for comparable goods.

Our discussion strategy of the two experiments is as follows: We first analyze the adjustment processes of trade and production among MERCOSUR member countries in response to their tariff reforms; then we turn to an analysis of the spillover effects of MERCOSUR tariff reforms on its major non member trading partners. Facing a newly formed trade bloc, third countries' interests mainly reflect concern with potential trade and investment opportunities after MERCOSUR. Hence, our investigation will be focused on the effects on those countries' terms of trade, real exchange rates and sectoral exports.

IV-2. Effects on MERCOSUR member countries

In general, a trade union in which tariffs are lowered or eliminated among its member countries creates trade opportunity for the members. Our simulation for "zero-tariff" among MERCOSUR member countries does capture this result. We observe that upon impact (the first year in the simulation) adjustment of the aggregate exports (in 1992 price) is an increase of 33 percent from its base-run level in Argentina and 9 percent in Brazil. When the new steady state is approached, the aggregate exports rise by 39 and 12 percent in Argentina and Brazil, respectively. In the second experiment where not only tariff is eliminated among the member

countries, but also MERCOSUR's external trade policy (common external tariff) is fully implemented, aggregate exports grow more in the member countries (40 and 20 percent in year 1, and 50 and 30 percent in the steady state for Argentina and Brazil, respectively).

In the conventional static approach, increase in the member countries' trade is generated from a once-and-for-all reallocation of factors of production. As tariff elimination among the member countries correct price distortion partially, current production factors start to be reallocated relatively more efficiently. However, the process of resource reallocation continues over time, i.e., new trade policy would also affect firms' investment decision through its effects on the firms' expected returns of capital investments. The intertemporal property of our model directly capture such capital accumulation effects. Lowered tariffs stimulate investment, and with a perfect world financial capital market, capital flows into MERCOSUR countries. Thus, the regional economy experiences growth along the transition path. Of course, if MERCOSUR's tariffs on the non-member countries are reduced (as in EXP-2), growth of the regional economy will be more pronounced. We document part of our simulation results in table 2, in which changes in MERCOSUR member countries macro economic indicators are presented for both year 1 and the steady state. Real GNP and aggregate trade are reported in the base year (1992) prices. Equivalent variation is used to measure both transitional and long term effects of the policy on the household's well-being (see for instance Mercenier, 1995, for detail).

MERCOSUR significantly expands trade among its member countries. In our simulations, increase in trade between Argentina and Brazil is observed to be higher than two countries' total trade. Under EXP-1, Argentine exports to Brazil increase by less than 200 percent in the first year and more than 200 percent in the new steady state, while exports from

Brazil to Argentina doubles. As intra regional trade grows faster than the total trade, shares of intra trade in MERCOSUR's total trade increase significantly. Compared with the shares presented in table 1, shares of intra regional exports/imports in MERCOSUR total exports and imports rise from 10 and 11 percent in the base year (1992) to 30 and 33 percent in the new steady state, respectively.

When the lowered common external tariff rates are implemented as in EXP-2, MERCOSUR's total exports rise more than that in EXP-1 (see table 2). However, its intra regional trade rises less than that in EXP-1, i.e., compared with 200 and 100 percent increases in EXP-1, in EXP-2, exports from Argentina to Brazil and from Brazil to Argentina rise by 130 and 70 percent, respectively, 70 and 30 percent lower than that in EXP-1. This causes the share of intra trade in MERCOSUR's total exports to fall from 30 percent in EXP-1 to 20 percent in EXP-2. The comparison of simulation results suggests that, if MERCOSUR's both internal and external trade policies are fully implemented, trade opportunity for MERCOSUR member countries enlarges more, and increased exports from MERCOSUR member countries will not be limited only to the rise in intra regional trade.

IV-3. Spillover effects on non-MERCOSUR member countries

Regional trading bloc will not be limited solely to the trade creation effects between member countries, but also leads to spillover effects over the third-party trading countries as well. During these processes of gradual transition, the impact of initial adjustment on all parties involved may give rise to international retaliation by those stayed outside the group, but nevertheless affected. The possible counteractions may even be strong enough to halt the future of the bloc. In this sub-section, we focus our study on the effects of MERCOSUR tariff reforms

on its major trading partners.

An important phenomenon observed from our simulations is that spillover effects are quite different under the different scenarios. We use changes in non-member countries/regions' consumer welfare index, total consumption and real GDP to illustrate this, as presented in table 3. As the regions included in our model are highly aggregated, and U.S. as a country is much larger than MERCOSUR, trade between them and MERCOSUR only accounts for less than one percent of their total trade (except for Chile). Thus, the aggregate effects on the non-member countries/regions, no matter positive or negative, cannot be expected to be large. If MERCOSUR only eliminates tariffs among its member countries, the aggregate effects of MERCOSUR on the other countries/regions are mainly negative, i.e., total consumption and real GDP fall, and consumer welfare deteriorates. If MERCOSUR eliminates internal tariffs together with the reductions of its common external tariffs on all imports from non-member countries, consumer welfare improves, total consumption and real GDP rise in the new steady state in the five non member countries/regions, except for the Rest of World.

Reasons used to explain the difference in the spillover effects on the third country can be mainly drawn on the dynamic changes in these countries' terms of trade. In general, a country's terms of trade are defined as the price of its exports in terms of its imports. Simulation results indicate that terms of trade deteriorate in EXP-1 and improve in EXP-2 for all non-MERCOSUR countries along the transitional paths (see figures 1-4). Similarly, these countries' real exchange rates (price index of import goods in terms of home produced commodities) appreciate in EXP-1, and depreciate in EXP-2. In response to the different changes in terms of trade and real change rates, firms in the countries/regions where terms of trade deteriorate (improve) decide to reduce

(increase) their investment. Simulation results do show that investments slightly fall in EXP-1 and rise in EXP-2 for most non MERCOSUR countries.

In response to the deteriorated terms of trade in EXP-1, third countries' trade situation worsens, i.e., if only eliminating tariffs among MERCOSUR member countries, non-member countries's exports fall. We observe that all six non-member countries/regions' aggregate exports fall, ranking from 0.01 percent in the Rest of World to 0.1 percent in EU. Drastic declines in the exports to MERCOSUR are the main reason to cause the non-member countries' total exports to fall (table 4a, Experiment 1, and figures 1-2). Under scenario EXP-1, exports from U.S., Chile, the Rest of West Hemisphere, EU, and Asia to Argentina fall as much as between 15 and 22 percent. To compensate the losses in MERCOSUR markets, these countries raise trade among themselves. However, increases in exports to the non-member countries are smaller than the decreases in the exports to MERCOSUR and, hence, we observe that total exports fall in the non-member countries.

In contrast, if MERCOSUR combines its common external tariff policy with its internal trade policy, terms of trade improve in the non-member countries in the case of EXP-2. Thus, there are four non-MERCOSUR countries/regions which raise their aggregate exports either along the transition or in the new steady state. Besides these four countries/regions, U.S. and Rest of World raise their exports during first few years after tariff reductions in MERCOSUR. Also, we observe that exports from non-member countries to MERCOSUR rise (table 4a). For example, exports from EU and U.S. to Brazil increase by 40 and 20 percent, respectively; while exports from the Rest of West Hemisphere and Asia to Argentina rise by 13 and 15 percent, respectively.

Now we turn to analyze MERCOSUR effects on third country's sectoral trade. We first calculate changes in sectoral exports of the non-MERCOSUR countries as a group, and report the results in the first columns of table 4b. We notice that under EXP-1, sectoral exports of all non-MERCOSUR countries as a group fall between 0.1 and 0.4 percent, except for services. Declines in sectoral exports are caused by the significant decreases in the exports to MERCOSUR. Non-member countries' total exports to MERCOSUR fall as high as 40 percent in textile sector to as low as 2 percent in intermediate sector. However, if MERCOSUR implements its lower common external tariff policy, sectoral exports of non-MERCOSUR countries as a group rise from 0.2 percent in agriculture to almost 1 percent in processing foods. Service sector is an exception again, where exports fall slightly. Increases in the exports of textile, intermediates and manufacturing can be explained by the increases in the trade with MERCOSUR. We observe that in table 4b exports from non-MERCOSUR countries as a group to MERCOSUR significantly rise in these three sectors (52 percent in textile, 30 percent in manufacturing and 4 percent in intermediates). However, exports of agriculture and processing foods from non-MERCOSUR countries as a group to MERCOSUR fall by 19 and 0.14 percent, respectively. Thus, the increases in these two sectors' total exports are the results of trade expansion among the non-member countries.

It is easy to notice from table 4b that, spillover effects of MERCOSUR vary across sectors. In some sectors, for example textile and manufacturing, the magnitude of changes in exports from non-MERCOSUR countries to MERCOSUR are large, regardless of such effects being positive or negative, while for other sectors, such changes are small. Such differences can be explained by the difference in the magnitudes of trade protection across sectors. We observe

that from pre-MERCOSUR's data (1992), the average tariff rates on textile and manufacturing imports are almost 100 percent higher than those on the other sectors' imports in both Argentina and Brazil. Thus, simulated internal zero tariff inside MERCOSUR and lowered common external tariff on third-country affect trade in the textile and manufacturing more than that in the other sectors. Similarly, as there was no tariff distortion in service sector before MERCOSUR, once other sectors' tariffs are reduced due to MERCOSUR, changes in the non-member countries' service exports would be in the opposite direction as that in the other sectors' exports. A similar result is observed in the changes in each country's trade with MERCOSUR, i.e., exports of textile and manufacturing from each of non-MERCOSUR countries to MERCOSUR are affected more than those of other sectors (see table 4b). Thus, we can conclude that for the sectors with relatively high level of protection in MERCOSUR countries, trade-diverting effects are relatively large when MERCOSUR only eliminates its internal tariffs, i.e., the replacement of non-member countries's exports by the member countries's exports is relatively large. On the other hand, if MERCOSUR reduces its external tariffs, it would create relatively large opportunity for the non-member countries to raise their exports to MERCOSUR in these sectors.

Even though the sectoral exports fall in the non-member countries as a group under the scenario EXP-1, changes in their sectoral exports vary across regions. Table 4b also presents changes in each of non-MERCOSUR countries/regions total exports and exports to MERCOSUR at their sectoral levels and such variation can be easily observed.

V. Conclusions

In this paper we employ a dynamic general equilibrium model to analyze the trade effects and welfare effects of MERCOSUR on both the member countries and the non-member trading

countries/regions. The model is global in the sense that all countries/regions, including the Rest of World, are fully endogenous. The model is a global one in the sense that all countries/regions, including the rest of world, are fully endogenous. The model is characterized by the nature of dynamics in the sense that we incorporate explicit intertemporal optimizing behavior of consumptions, savings and investment for the agents in each region.

MERCOSUR raises its member countries' welfare by stimulating their investment, production and consumption. Growth of intra regional trade is much faster than that of the total trade, which indicates a typical regional integration outcome. Lowering MERCOSUR common external tariff for third-country import allows MERCOSUR member countries benefit more from their trade bloc. Their total exports increases more and fast growth of intra regional trade is accompanied by the increases in trade with their major third-country trading partners.

The negative spillover effects on the third-country trading partners are observed if MERCOSUR only carries out internal trade reforms. As trade with MERCOSUR has relative small share with respect to the large third country or region's total trade, the possibility of retaliation from other large countries or blocs may be small. However, for a large trade bloc such as NAFTA or EU, we can expect relatively greater negative spillover effects on third-party if a trade agreement between its member countries only involves trade liberalization among themselves. Considering perspectives of emerging large trade blocs or regional integration agreements such as APEC or WHFTA, then the simulation results obtained from MERCOSUR internal zero-tariff policy might have important policy implication.

Third-country major trading partners get benefits from MERCOSUR's external trade policy if MERCOSUR reduces its common external tariff rates. Production, consumption and

trade opportunity rise and consumer welfare improves in the non-member countries. Further reductions of MERCOSUR's external tariffs would benefit its trading partners more but it recalls a reciprocal action between MERCOSUR and its trading partners. Hence, regional integration and trade reforms among member countries are not enough. Further international cooperation and trade liberalization between trading blocs are necessary to bring a more conducive economic environment for all countries.

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Appendix I: Equations and Variables in the Dynamic CGE Model

A.1. List of equations

The time-discrete intertemporal utility

$$U_{n,1} = \sum_{t=1}^{\infty} \left(\frac{1}{1+\rho} \right)^t \ln(\text{TC}_{n,t})$$

$$\text{TC}_n = \prod_i \text{CD}_{n,i}^{b_{n,i}}$$

Intertemporal value of firms in region n

$$V_{i,1} = \sum_{t=1}^{\infty} \frac{1}{\prod_{s=t}^{\infty} (1+r_s)^t} [\text{PX}_{i,t} \min \langle L_{i,t}^{\alpha_i} K_{i,t}^{1-\alpha_i}; \langle \text{INTD}_{j,i} \rangle_{j=1,\dots,6} \rangle - w_l L_{i,t} - \phi_i \frac{\text{PVA}_{i,t} I_{i,t}^2}{K_{i,t}} - \text{PI}_{i,t} I_{i,t}]$$

$$\text{and: } K_{i,t+1} = (1 - \delta_i) K_{i,t} + I_{i,t}$$

Within period equations (time subscript t is skipped)

A.1.1 Price system

$$PM_{s,n,i} = (1 + tm_{s,n,i})PWM_{s,n,i}$$

$$PX_{n,i} = (1 - te_{n,s,i})PWM_{n,s,i}$$

$$PMM_{n,i} = \frac{1}{\Upsilon_{n,i}} [\sum_s \theta_{s,n,i}^{\sigma_{m,n,i}} PM_{s,n,i}^{1-\sigma_{m,n,i}}] \frac{1}{(1-\sigma_{m,n,i})}$$

$$PC_{n,i} = \frac{1}{\Lambda_{n,i}} [\beta_{n,i}^{\sigma_{mm,n,i}} PMM_{n,i}^{1-\sigma_{mm,n,i}} + (1 - \beta_{n,i})^{\sigma_{mm,n,i}} PX_{n,i}^{1-\sigma_{mm,n,i}}] \frac{1}{(1-\sigma_{mm,n,i})}$$

$$PI_{n,i} = \frac{1}{A_{n,i,k} \prod_j v_{n,j,i}^{1-\alpha_{n,i}}} \prod_j PC_{n,j}$$

$$PVA_{n,i} = \frac{1}{A_{n,i} \alpha_{n,i}^{\alpha_{n,i}} (1 - \alpha_{n,i})^{1-\alpha_{n,i}}} w l_n^{\alpha_{n,i}} w k_{n,i}^{1-\alpha_{n,i}}$$

$$PVA_{n,i} = PX_{n,i} - \sum_j PC_{n,j} IO_{n,i,j}$$

A.1.2 Armington functions

$$M_{s,n,i} = \Upsilon_{n,i}^{1+\sigma_{m,n,i}} [\theta_{s,n,i} \frac{PMM_{n,i}}{PM_{s,n,i}}]^{\sigma_{m,n,i}} MM_{n,i}$$

$$MM_{n,i} = \Lambda_{n,i}^{1+\sigma_{mm,n,i}} [\beta_{n,i} \frac{PC_{n,i}}{PMM_{n,i}}]^{\sigma_{mm,n,i}} C_{n,i}$$

$$D_{n,i} = \Lambda_{n,i}^{1+\sigma_{mm,n,i}} [(1 - \beta_{n,i}) \frac{PC_{n,i}}{PX_{n,i}}]^{\sigma_{mm,n,i}} C_{n,i}$$

A.1.3. Labor market equilibrium

$$\sum_i \alpha_{n,i} PVA_{n,i} X_{n,i} = w l_n LB_n$$

A.1.4. Demand system

$$CD_{n,i} = \frac{b_{n,i} (Y_n - SAV_n)}{PC_{n,i}}$$

$$GD_{n,i} = \frac{c_{n,i} (\sum_{is} te_{n,s,i} PWM_{n,s,i} M_{n,s,i} + \sum_{is} tm_{s,n,i} PWM_{s,n,i} M_{s,n,i})}{PC_{n,i}}$$

$$INTD_{n,j,i} = IO_{n,j,i} X_{n,i}$$

$$INVD_{n,i,j} = \frac{v_{n,i,j} PI_{n,j} I_{n,j}}{PC_{n,i}}$$

$$K_{n,i} = \frac{(1 - \alpha_{n,i}) PVA_{n,i} X_{n,i}}{wk_{n,i}}$$

A.1.5. Household income

$$Y_n = wl_n LB_n + \sum_i div_{n,i} + rB_n$$

$$div_{n,i} = wk_{n,i} K_{n,i} - PVA_{n,i} \phi_{n,i} \frac{I_{n,i}^2}{K_{n,i}} - PI_{n,i} I_{n,i}$$

A.1.6. Commodity market equilibrium

$$C_{n,i} = CD_{n,i} + GD_{n,i} + \sum_j INVD_{n,i,j} + \sum_j INTD_{n,i,j}$$

A.1.7. Trade surplus

$$FB_n = \sum_s \sum_i (PWM_{n,s,i} M_{n,s,i} - PWM_{s,n,i} M_{s,n,i})$$

Dynamic difference equations

A.1.8. Euler equation for consumption

$$\frac{Y_{n,t+1} - SAV_{n,t+1}}{Y_{n,t} - SAV_{n,t}} = \frac{1 + r_{t+1}}{1 + \rho}$$

A.1.9. No-arbitrage condition for investment

$$q_{n,i,t} = PI_{n,i,t} + 2PVA_{n,i,t} \phi_{n,i} \frac{I_{n,i,t}}{K_{n,i,t}}$$

$$(1 + r_t)q_{n,i,t-1} = wk_{n,i,t} + PVA_{n,i,t} \phi_{n,i} \left(\frac{I_{n,i,t}}{K_{n,i,t}}\right)^2 + (1 - \delta_{n,i})q_{n,i,t}$$

A.1.10. Capital accumulation

$$K_{n,i,t+1} = (1 - \delta_{n,i})K_{n,i,t} + I_{n,i,t}$$

A.1.11. Foreign assets

$$B_{n,t+1} = (1 + r_t)B_{n,t} + FB_{n,t}$$

A.1.12. Terminal conditions (steady state constraints)

$$\delta_{n,i} K_{n,i,ss} = I_{n,i,ss}$$

$$r_{ss} V_{n,i,ss} = div_{n,i,ss}$$

$$r_{ss} B_{n,ss} + FB_{n,ss} = 0$$

$$r_{ss} = \rho$$

A.1.13. Welfare evaluation (Equivalent variation index)

$$\sum_{t=0}^{\infty} \left(\frac{1}{1+\rho}\right)^t \ln(\hat{TC}_n(1 + \varphi_n)) = \sum_{t=0}^{\infty} \left(\frac{1}{1+\rho}\right)^t \ln(TC_{nt})$$

where \hat{TC}_n is base year total consumption. That is welfare gain resulting from the policy change is equivalent from the perspective of the representative household to increasing the reference consumption profile by φ_n percent.

A.2. Glossary

A.2.1 Parameters

Υ_{ni} shift parameter in Armington import function for i imported from different regions

Λ_{ni} shift parameter in Armington composite function for i in region n

A_{ni} shift parameter in value added function for i in region n

A_{nik}	shift parameter in capital good production function for sector i in region n
b_{ni}	share parameter in household demand function for i in region n
c_{ni}	share parameter in government demand function for i in region n
α_{ni}	share parameter in value added function of sector i for labor in region n
θ_{sni}	share parameter in Armington import function for i in region n imported from s
β_{ni}	share parameter in Armington function for composite good i imported to n
τ_{nij}	share parameter in capital good production function for input i in sector j region n
$\sigma_{m_{ni}}$	elasticity of substitution in Armington import function for i in region n
$\sigma_{mm_{ni}}$	elasticity of substitution in Armington composite function for i in region n
IO_{nij}	input-output coefficient for i used in sector j in region n
ρ	rate of consumer time preference
δ_{ni}	capital depreciation rate in sector i region n
ϕ_{ni}	a constant in capital adjustment function in sector i

A.2.2. Exogenous variables

LB_n	labor supply in region n
tm_{sni}	tariff rate for i imported from region s to n
te_{nsi}	export tax rate for i in region n exporting to s

A.2.3. Endogenous variables

PWM_{nsi}	world price for good i exported from region n to s
PM_{nsi}	Import price for good i imported from region s to n
PMM_{ni}	composite import price for i in region n
PX_{ni}	producer price for i in region n
PC_{ni}	composite good price for i in region n
PVA_{ni}	price of value added for i in region n
PI_{ni}	unit price of investment quantity in sector i region n
q_{ni}	shadow price of capital in sector i region n
div_{ni}	dividend in sector i region n
wl_n	wage in region n
wk_{ni}	capital rental price in sector i region n

r_t	world interest rate
X_{ni}	output of good i in region n
C_{ni}	total absorption of composite good i in region n
D_{ni}	own good i in region n
M_{nsi}	import good i imported from region s to region n
MM_{ni}	composite import good i in region n
TC_n	household aggregate consumption in region n
CD_{ni}	household demand for composite good i in region n
GD_{ni}	government demand for composite good i in region n
$INVD_{nji}$	investment demand for composite good j in sector i region n
$INTD_{nji}$	intermediate demand for composite good j in sector i region n
Y_n	household income in region n
SAV_n	household savings in region n
K_{ni}	capital stock in sector i region n
I_{ni}	investment quantity in sector i region n
FB_n	trade surplus of region n
B_n	foreign assets in region n

Appendix II. Tables

Table 1a. Mercosur sectoral import and export shares (Total sectoral imports/exports are 100, 1992)

1. Mercosur import shares by countries						
Exporting countries	Agriculture	Food processing	Textile	Intermediates	Manufacturing	services
USA	7.9	8.4	14.6	19.8	33.4	26.5
ARG	31.5	9.1	9.0	1.9	2.1	2.9
BRA	6.5	8.1	11.7	8.1	8.9	4.3
CHL	3.0	7.2	3.9	4.2	1.2	2.5
RWH	26.3	26.3	17.5	12.5	3.8	8.8
E_U	9.8	26.1	16.7	18.5	29.4	26.8
ASA	6.7	3.5	24.4	3.4	16.8	12.7
ROW	8.3	11.2	2.2	31.7	4.3	15.5
2. Mercosur export shares by countries						
Importing countries	Agriculture	Food processing	Textile	Intermediates	Manufacturing	services
USA	9.7	11.8	40.4	14.8	19.8	12.4
ARG	1.8	1.1	3.8	6.6	16.6	6.6
BRA	8.6	1.2	2.9	1.5	4.0	4.5
CHL	1.5	1.3	2.6	3.4	6.0	3.2
RWH	6.6	7.5	11.7	13.7	24.6	8.9
E_U	45.3	43.4	26.0	25.8	16.5	31.6
ASA	12.6	10.9	7.1	23.9	5.6	20.5
ROW	14.1	22.9	5.5	10.3	7.0	12.2

Table 1b. Mercosur total import and export shares by countries (Total imports/exports are 100, 1992)

	USA	ARG	BRA	CHL	RWH	E_U	ASA	ROW
Imports	25.1	4	7.4	2.7	9.7	24.1	11.1	15.9
Exports	15.8	6.4	3.5	3.1	12.5	30.8	15.7	12.2

Table 1c. Mercosur market shares in the world (Total exports/imports in the world are 100, 1992)

	Agriculture	Food processing	Textile	Intermediates	Manufacturing	services
Imports	1.7	1.3	0.7	1.9	1.7	1.8
Exports	6.3	10.1	2.2	2.3	0.9	1.2

Table 2. Dynamic Results of Alternative Mercosur Tariff Policies on the Member Countries
(% Changes from Base-Run Steady State)

	Experiment 1		Experiment 2	
	Year 1	New Steady State	Year 1	New Steady State
Argentina				
Consumer Welfare (Equivalent Variation)		0.318		0.171
Gross Domestic Product	0.000	1.357	-0.002	2.098
Private Consumption	0.792	1.996	0.255	2.099
Aggregate Investment	3.928	2.754	6.017	4.275
Aggregate Exports	32.741	39.319	39.757	50.426
Aggregate Imports	27.824	26.403	32.071	30.413
Foreign Trade Deficit	10.638	-14.090	15.728	-21.352
Brazil				
Consumer Welfare (Equivalent Variation)		0.311		0.406
Gross Domestic Product	0.000	0.759	0.000	2.259
Private Consumption	0.838	1.501	0.940	2.662
Aggregate Investment	1.663	1.409	5.278	4.213
Aggregate Exports	9.222	12.129	21.099	31.039
Aggregate Imports	18.000	17.820	34.366	32.427
Foreign Trade Surplus	-4.147	4.563	-15.447	16.195

Table 3. Aggregate Spillover Effects of Mercosur on Third-Country Trading Partners
in the New Steady States (% Changes from Base-Run Steady State)

	Consumer Welfare (EV)		Total Consumption		Gross Domestic Product	
	EXP-1	EXP-2	EXP-1	EXP-2	EXP-1	EXP-2
USA	-0.0043	0.0006	-0.0034	0.0348	-0.0014	0.0016
CHL	-0.0487	0.0596	-0.1439	0.4389	-0.1799	0.3786
RWH	-0.0065	0.0024	-0.0074	0.0678	-0.0101	0.0224
E_U	-0.0066	0.0064	-0.0095	0.0563	-0.0012	0.0075
ASA	-0.0032	0.0017	-0.0011	0.0460	-0.0046	0.0143
ROW	-0.0016	-0.0071	0.0104	0.0125	0.0035	-0.0171

Table 4a. Spillover Effects of Mercosur on Third-Country Total Exports
(% Changes from base-run steady state)

	Experiment 1				Experiment 2			
	Year 1		Steady State		Year 1		Steady State	
	Total	to Merc.	Total	to Merc.	Total	to Merc.	Total	to Merc.
USA	-0.0237	-8.8232	-0.1017	-9.5381	0.1547	11.9044	-0.0429	8.1022
CHL	-0.1412	-7.3707	-0.5522	-9.1522	0.3208	9.8441	1.0418	7.2425
RWH	-0.0217	-6.5350	-0.0862	-8.0585	0.1127	7.8240	0.0593	4.3334
E_U	-0.0475	-9.0253	-0.1049	-10.7865	0.1961	22.2101	0.0580	17.9868
ASA	-0.0089	-13.0058	-0.0708	-14.9397	0.1446	46.5588	0.0405	40.7200
ROW	0.0126	-0.2077	-0.0180	-1.3488	0.0458	-9.4897	-0.1281	-11.6674

Table 4b. Spillover Effects of Mercosur on Third-Country Sectoral Exports in the New Steady States
(% Changes from base-run steady state)

	All non-Mercosur countries				U.S.			
	EXP-1		EXP-2		EXP-1		EXP-2	
	Total	to Merc.	Total	to Merc.	Total	to Merc.	Total	to Merc.
Agriculture	-0.35	-17.14	0.19	-19.23	0.09	-17.10	-0.51	-30.44
Processing food	-0.35	-7.89	0.92	-0.14	0.27	-8.97	-1.01	-12.44
Textile	-0.30	-38.96	0.55	51.81	-0.44	-39.08	0.12	36.16
Intermediates	-0.11	-2.22	0.28	4.23	0.07	-2.86	0.03	15.13
Manufacturing	-0.37	-22.38	0.56	31.09	-0.32	-20.05	0.15	13.36
Services	0.03	3.48	-0.01	-5.27	0.13	3.55	-0.18	-5.22
	Chile				the Rest of West Hemisphere			
	EXP-1		EXP-2		EXP-1		EXP-2	
	Total	to Merc.	Total	to Merc.	Total	to Merc.	Total	to Merc.
Agriculture	0.22	-12.50	-0.65	-8.50	-0.27	-18.20	-0.74	-14.02
Processing food	0.00	-6.53	1.76	30.06	0.04	-7.39	0.97	32.55
Textile	-8.52	-36.56	6.21	23.45	-0.85	-38.99	1.12	53.28
Intermediates	-0.17	-4.55	-0.17	-8.66	0.07	2.80	-0.18	-5.85
Manufacturing	-19.37	-35.43	37.11	66.48	-0.21	-23.50	0.51	39.41
Services	0.67	3.74	-0.22	-5.01	0.11	3.29	-0.18	-5.53
	European Union				Asia			
	EXP-1		EXP-2		EXP-1		EXP-2	
	Total	to Merc.	Total	to Merc.	Total	to Merc.	Total	to Merc.
Agriculture	-0.01	-16.02	-0.69	-25.57	0.06	-17.65	-0.98	-23.22
Processing food	0.15	-8.04	-1.09	-26.74	0.34	-7.80	-1.17	8.38
Textile	-0.13	-40.24	0.18	88.90	-0.02	-38.29	-0.37	43.80
Intermediates	0.08	-4.74	0.29	38.66	0.06	-4.17	-0.08	40.10
Manufacturing	-0.40	-22.94	0.31	24.88	-0.19	-25.24	0.37	72.15
Services	0.09	3.31	-0.21	-5.64	0.10	3.55	-0.26	-5.27
	the Rest of World							
	EXP-1		EXP-2					
	Total	to Merc.	Total	to Merc.				
Agriculture	0.08	-16.46	-0.41	-18.35				
Processing food	0.24	-7.67	-1.27	-27.78				
Textile	-0.04	-40.13	-0.04	1.14				
Intermediates	0.02	0.39	-0.35	-20.83				
Manufacturing	-0.26	-20.50	0.49	33.17				
Services	0.01	3.69	0.08	-4.60				

Terms of Trade Ratios to base-run steady state

Figure 1

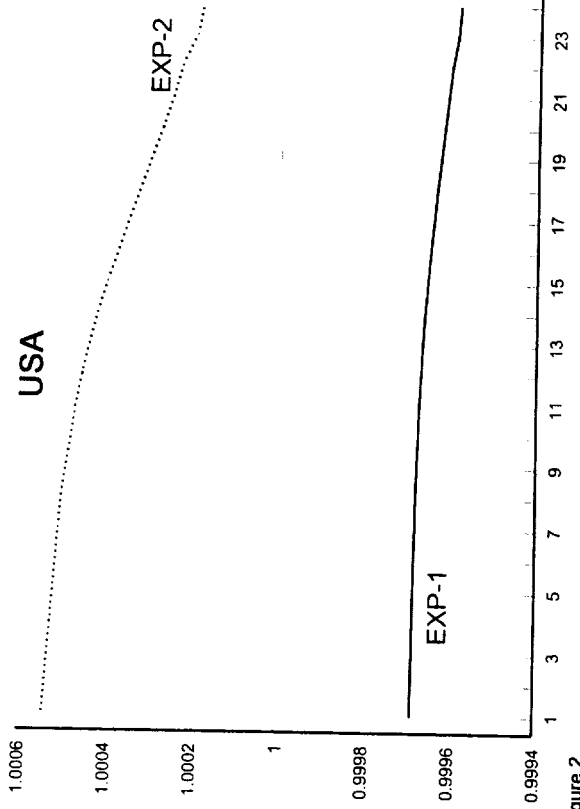


Figure 3

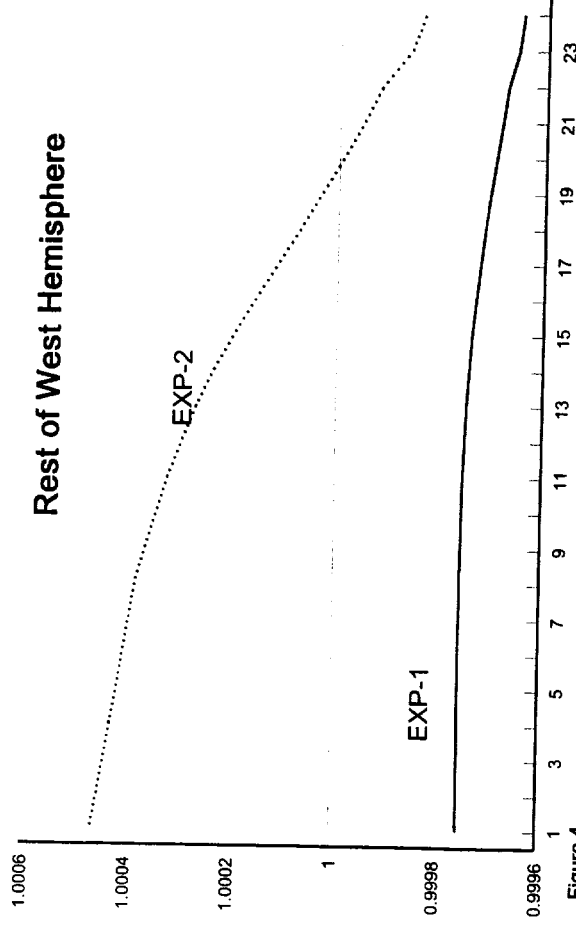


Figure 2

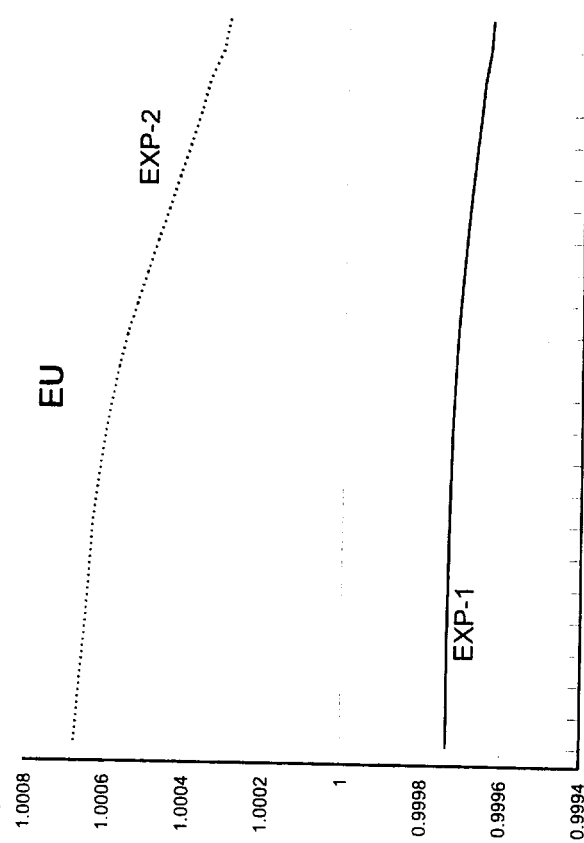
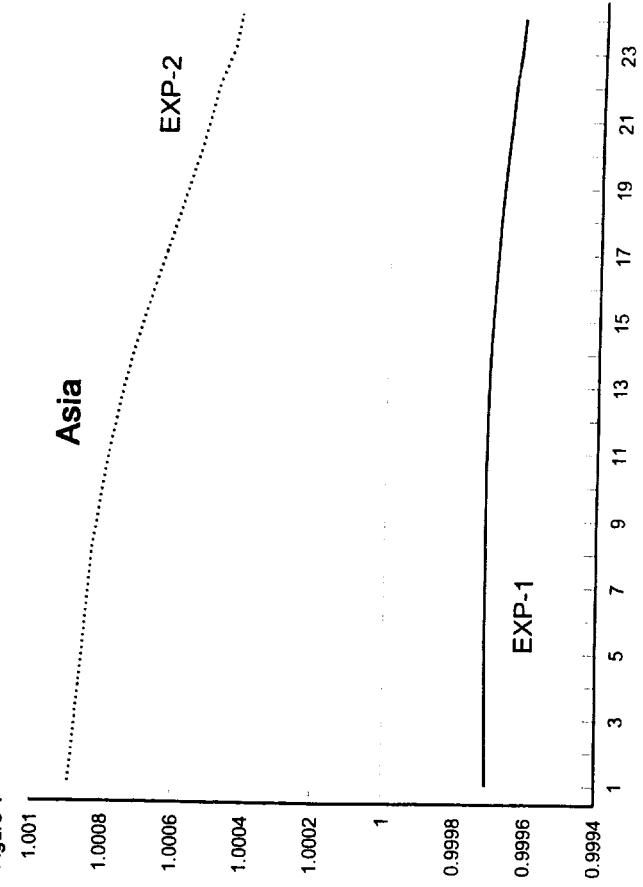


Figure 4



Aggregate Investment Ratios to base-run steady state

Figure 5

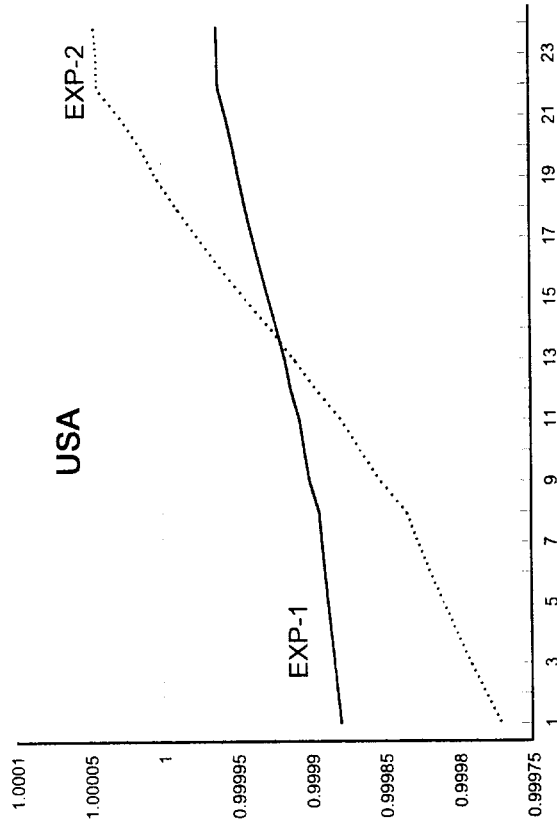


Figure 7

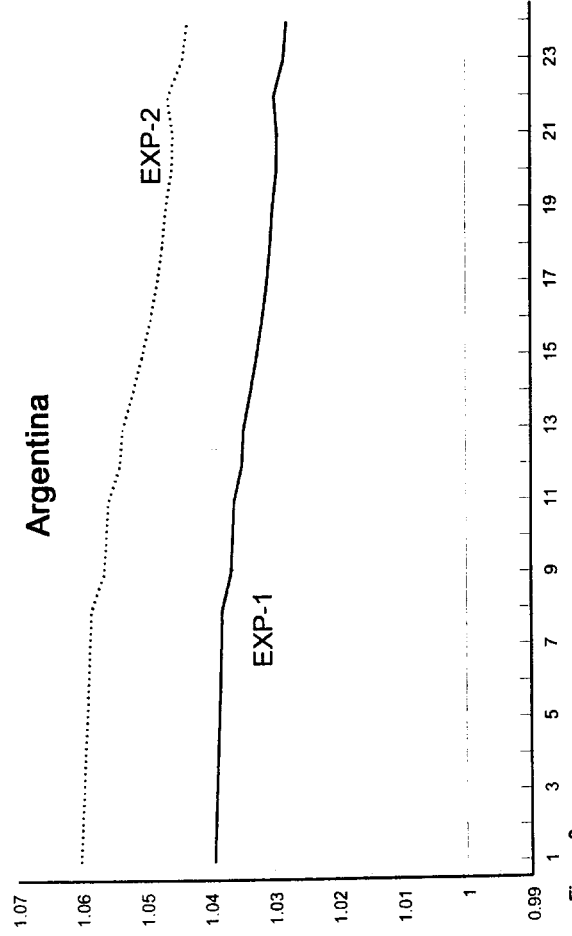


Figure 6

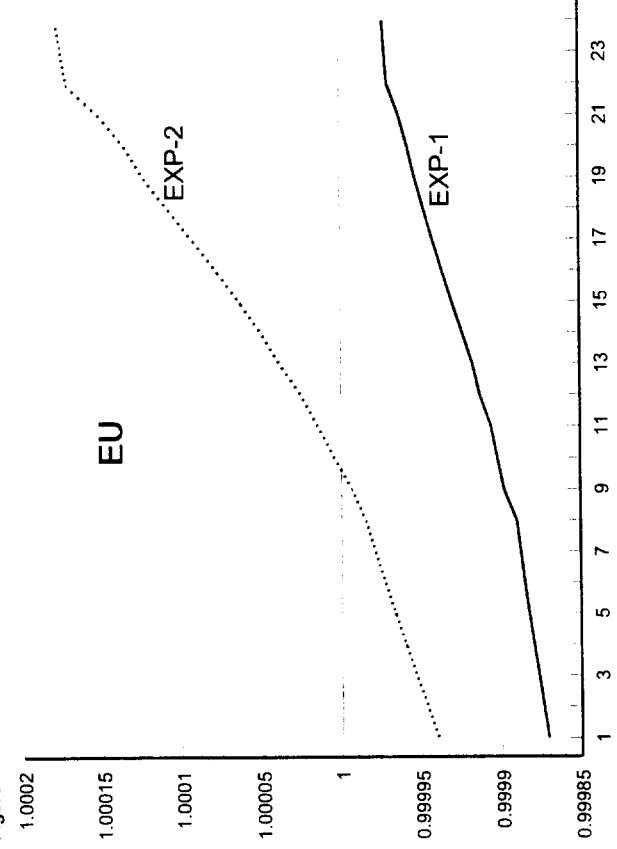
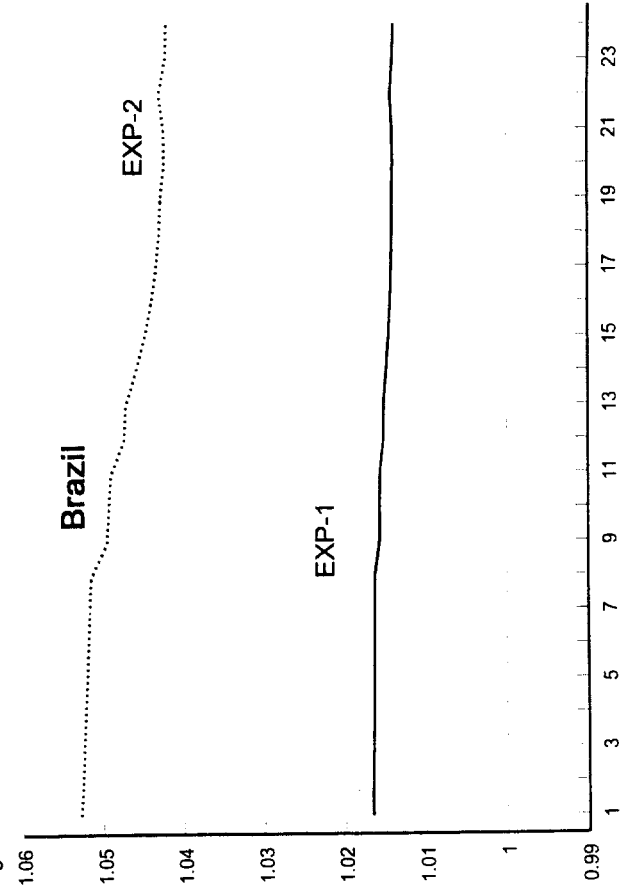


Figure 8



Total Exports Ratios to base-run steady state

