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Resumen: Los mecanismos para asignar la renta arancelaria común en una unión aduanera han tenido poca atención en la literatura (Syropoulus, 2003). El análisis comparado permite identificar dos clases de mecanismos: reglas generales y fondos comunes. En este artículo, se desarrolla un nuevo mecanismo neutral desde el punto de vista fiscal, basado en el criterio del consumo final. La nueva metodología computa las exportaciones extrazona y la recaudación arancelaria común incorporada en el comercio intrazona, tanto de forma directa como indirecta. Se extiende la metodología de Lumega-Neso, Olarreaga y Schiff (2005) desarrollada en otro contexto (medir los efectos de la apertura comercial en el progreso tecnológico). La técnica desarrollada aquí emplea matrices insumo producto y datos de comercio, y es aplicada al caso del MERCOSUR. Esta metodología es útil no solo porque ofrece una nueva opción para los diseñadores de políticas sino que además lleva a una nueva forma de caracterizar los flujos de comercio intrazona, derivando interesantes resultados al respecto. El comercio intrarregional en el MERCOSUR comprende principalmente bienes producidos localmente con poco contenido de importaciones de extrazona, aunque hay diferencia entre los países del MERCOSUR. Las exportaciones brasileñas a la región incorporan la mayoría de la renta arancelaria de extrazona y por lo tanto este país debería ser el principal contribuyente neto a fondo de compensación creado por el mecanismo propuesto.

Palabras clave: renta arancelaria común; reglas generales; Unión Aduanera.

Abstract: Mechanisms for sharing the common tariff revenue in a customs union have received little attention in the literature (Syropoulus, 2003). Comparative analyses show that in past and current customs unions two main mechanisms are been used: generals rules and common funds. In this paper, a new mechanism which is fiscally neutral is developed, based on the final consumption criterion. The new methodology computes the extrazone imports and the common tariff revenue incorporated in intrazone trade both directly and indirectly. It extends the methodology of Lumega-Neso, Olarreaga and Schiff (2005) which was developed in a different context (measuring the effects of trade opening on technical progress). The technique developed here employs input-output tables together with observed trade flows, and is applied in the case of MERCOSUR. This methodology is useful not only because it offers a new option to policymakers but also because it leads to a new characterization of interregional trade flows. The paper derives interesting results in this respect. Intraregional trade in MERCOSUR comprises mainly locally produced goods with little extrazone import content, though there are important differences among MERCOSUR members. Brazil's intrazone exports incorporate the most extrazone imports and hence should be the main net contributor to the compensation fund created by the proposed mechanism.

JEL: F15; F13. Keywords: common tariff revenue; sharing rules; Customs Union.

Tariff revenue sharing rules in a customs union: a new methodology applied to the MERCOSUR case[A]

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1. INTRODUCTION

In the literature Customs Unions' (CU) sharing common tariff revenue mechanisms have been little revised (Syropoulus, 2003). Comparative analyses shows that in past and current CU two main mechanisms are been used. First are sharing rules depending on countries size measures (imports, consumption, and population) which also, in some cases, could be combined with members' per capita income levels deviations as it is the case of the South African Custom Union (SACU). The second mechanism is to build a common found to finance common policies as it is the case in the European Union (EU).

Each mechanism has advantages and disadvantages, considered both efficiency objectives and the particular political economy equilibrium of each experience. In the early stages of establishing the European Union, the creation of a common fund was considered an essential tool to reinforce the cohesion of the group of countries of Europe (Pelkman, 1997) through the development of a set of common policies. Moreover, the selected mechanism was one of the essential elements to empower the supranational technique represented by the institutional functions and attributes of the European Commission, in particular the common management of the Common Trade Policy (including the Common External Tariff). At the other extreme, in the SACU the common funds of the Common Trade Policy are pooled and distributed according to a general rule that combines the size of each country (measured in intraregional trade) and a development component corresponding to deviations from the average income level of the bloc (Kirk and Stern, 2003). In this case, from an institutional point of view there is a delegation from each of the members of the CU to the biggest and richest, South Africa, i.e. the country who defined the Common Trade Policy of the bloc.

In a recent paper the SACU formula was applied to the MERCOSUR case (Vaillant, 2005). The results obtained show that the main problem in adopting that formula is that in the South American trade bloc the big country is not the richest, unlike the case of the African trade bloc.

The final consumption criterion suggests that the CU tariff revenue should be shared among members according to the final destination of the revenue-generating import. In this paper, a new mechanism is developed, based on the final consumption criterion and, accordingly, the method aim to be neutral from a fiscal point of view. The properties of the method together with the fact that it is not too demanding from an institutional dimension fits well with the MERCOSUR bloc characterized by a strong intergovernmental approach.

In this sense, the new methodology measures the extrazone imports and the resulting common tariff revenue incorporated in intrazone trade. The approach captures

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not only direct import flows, but also indirect trade. It extends the methodology of Lumega-Neso, Olarreaga and Schiff (2005) which was developed in a different context (measuring the effects of trade opening on technical progress). The technique developed here employs input-output tables together with observed trade flows, and is applied in the case of MERCOSUR. This methodology is useful not only because it offers a new option to policymakers but also because it leads to a new characterization of interregional trade flows.

The paper is organized in this introduction and 4 further sections. The second section develops a methodology to measure the amount of the common import tariff revenue in intraregional trade. Two situations are distinguished, one where the discipline in the CU is total (complete case) and the other in which only a share of the imports from the rest of the world qualify for free circulation (incomplete case). In the third section results are presented for MERCOSUR in the alternatives cases. The fourth section develops a characterization of intraregional trade from this new perspective. The fifth and final section concludes, presenting the main findings of the paper.

2. MEASURING TARIFF REVENUE IN INTRAREGIONAL TRADE

2.1 The case of a complete Customs Union

Extrazone imports incorporated in intraregional trade

The final consumption criterion means that the country of consumption of an extrazone good should receive the tariff revenue collected through the Common External Tariff (CET), wherever it had been imported. If a good enters the CU via one country and then it, or a transformation of it, is exported to another CU member the revenue collected in the original country of importation must be transferred to CU member in which the final consumer resides.

An intermediate good imported from a non CU member and employed in another good can be consumed domestically, exported outside CU or exported to another CU member. The method developed here is aimed to deal with the last case, i.e. the imports and the tariff revenue incorporated in the intrazone exports.

The basic trade information required in the method is a sector-level import matrix. Imports of each CU member ($z=1,...Z$) in a period t are classed by its origin (intrazone or extrazone). Then:

$$M_t^{Tz} = M_t^{Iz} + M_t^{Ez} \tag{1}$$

Where M_t^{Tz} is a *Sx1* dimension vector of total imports of z in the period t and can be divided in intrazone imports (M_t^{Iz}) and extrazone imports (M_t^{Ez}). See that s=1,…,S is the index of sectors of the economy. Also, intrazone imports can be divided according to the CU member of origin.

$$M_t^{Iz} = M_t^{1z} + M_t^{2z} + ... + M_t^{Rz}$$

$$(2)$$

Where r= 1, 2,..,R are CU members as exporters $(Z = R)$; M_t^{rz} is a S-dimension vector showing the exports from *r* to *z*, both countries being CU members. Equation (2) shows the intrazone decomposition of country *z* imports. This information rearranged also shows each CU member intrazona exports.

To estimate the domestic production needed to achieve the final demand we make use of Leontieff inverse matrix.

$$x_t^{rz} = (I - A^r)^{-1} M_t^{rz}$$

$$(3)$$

Where x_t^{rz} is a *Sx1* dimension vector; I is the identity *SxS* dimension matrix; A^r is the input- output *SxS* matrix of domestic requirements of the *r*-CU member. Then, x_t^{rz} is the domestic output considered necessary to achieve the exports from *r* to *z* (M_t^{rz}). While x_t^{rz} and M_t^{rz} are employed in t-period, A^r is not period specific.

Domestic output requires imported inputs, which are registered in the total imported requirement coefficients tables. Then,

$$\overline{m}_t^{rz} = AI^r x_t^{rz}$$

$$(4)$$

Where $\overline{m}_t^{rz}$ is a *Sx1* dimension vector of total imports needed to produce the vector of production x_t^{rz}; AI^r is the input-output *SxS* matrix of imported requirements of the r-CU member. The vector $\overline{m}_t^{rz}$ measures all the imports needed to attain the intraregional flow M_t^{rz}. For convenience, we define the following transformation matrix that summarizes both effects:

$$\Omega^r = AI^r (I - A^r)^{-1}$$

$$(5)$$

Then, equation (4) can be written as

$$\overline{m}_t^{rz} = \Omega^r M_t^{rz}$$

$$(4')$$

In a CU only extrazone imports faces nonzero duties, so the only set of imports that cause customs revenue are extrazone ones. With equation (1) and (2) shares can be defined.

$$\alpha_{st}^{Er} = \frac{M_{st}^{Er}}{M_{st}^{Tr}} \tag{6}$$

Where α_{st}^{Er} is the share of the country r imports in sector s that came from extrazone in period t. Analogously, we can define the share of each CU member origin in country r imports.

$$\alpha_{st}^{zr} = \frac{M_{st}^{zr}}{M_{st}^{Tr}} \tag{7}$$

With each α_{st}^{Er} (α_{st}^{zr}) we can define an α_t^{Er} (α_t^{zr}) *Sx1* dimension vector and then we define the diagonal matrix associated with those vectors ($D_t^{Er} = diag(\alpha_t^{Er})$ and $D_t^{zr} = diag(\alpha_t^{zr})$). Those matrices achieve:

$$D_t^{Er} + D_t^{1r} + D_t^{2r} + ... + D_t^{zr} + ... + D_t^{Zr} = D_t^{Er} + \sum_{z=1,..,Z} D_t^{zr} = I \tag{8}$$

Where I is the *SxS* dimension identity matrix. With the diagonal matrix of extrazone imports share (D_t^{Er}) we define the vector of extrazone direct imports included in the exports from z to z (m_t^{rz}). Equation (9) measures the imports directly introduced from extrazone by country r and included as inputs in his exports to country z.

$$\underline{m}_t^{rz} = D_t^{Er}\overline{m}_t^{rz} = D_t^{Er}\Omega^r M_t^{rz} \tag{9}$$

The previous estimation assumes that only extrazone imports directly introduced include common tariff revenue. But there can be more circulations that are not included in this definition. To fulfill regional demand (M_t^{rz}), countries also import from another CU member. Such intrazone imports (export to the other country) also contain extrazone imports, which have to be included in the estimation. It is useful to show an example of indirect imports included in the intrazone trade. As noted earlier, M_t^{rz} is the vector of exports from r to z and $\Omega^r M_t^{rz}$ are total imports needed to fulfill this demand. $D_t^{Er}\Omega^r M_t^{rz}$ are directly imported from extrazone, and the remainder ($(I - D_t^{Er})\Omega^r M_t^{rz}$ see equation (8) is imported from the CU. This fraction also includes extrazone imports that are the second order extrazone imports included in *r* exports to *z*:

$$\underline{\underline{m}}^{rz} = D_t^{E1}\Omega^1 D_t^{1r}\Omega^r M_t^{rz} + D_t^{E2}\Omega^2 D_t^{2r}\Omega^r M_t^{rz} + ... =$$

$$= \left(\sum_{\tilde{z} \in Z} D_t^{E\tilde{z}}\Omega^{\tilde{z}} D_t^{\tilde{z}r} \right)\Omega^r M_t^{rz} \qquad (10)$$

This second order content are extrazone goods imported by a CU member ($D_t^{E\tilde{z}}$) included in a good ($D_t^{E\tilde{z}}\Omega^{\tilde{z}}$) which is exported to another CU member ($D_t^{E\tilde{z}}\Omega^{\tilde{z}}D_t^{\tilde{z}r}$) that also includes it as input to produce a good ($D_t^{E\tilde{z}}\Omega^{\tilde{z}}D_t^{\tilde{z}r}\Omega^r$) exported to another CU member ($D_t^{E\tilde{z}}\Omega^{\tilde{z}}D_t^{\tilde{z}r}\Omega^r M_t^{rz}$)[3]. It can be imagined higher order circulations, when a productive chain has stages in various countries and intermediate goods travel across CU internal frontier line many times. To get all the direct and indirect (second and higher orders) imports incorporated in intrazone exports we define the following equation.

$$m_t^{rz} = \Phi_t^r M_t^{rz} = (D_t^{Er}\Omega^r + \sum_z \Phi_t^z D_t^{zr}\Omega^r)M_t^{rz} \qquad (11)$$

Where Φ_t^r is an *SxS* matrix calculating the global content of extrazone imports by unit of intraregional trade. This multiplier depends on the $D_t^{E\tilde{z}}, D_t^{r\tilde{z}}$ and Ω^z of all the CU members and m_t^{rz} is an *Sx1* vector including all the direct and indirect extrazone imports incorporated in the exports from *r* to *z*.

Two effects are considered in this analysis, i.e. the direct and the indirect effect. The indirect effect depends on the global content of all the others trade flows (see Lumega-Neso, Olarreaga and Schiff, 2005)[4]. So the problem could be only solved if all the system and the interrelationships off the entire intraregional flows are specified To obtain the specific form of each Φ_t^r matrix is useful to build a more general notation. In Annex A we have the general specification of the problem. All the equations developed above can be written in a more general way without the supra indices *r* and *z*. With this general notation, equation (11) can be written for all CU members as:

$$m_t = \Phi_t M_t \qquad (12)$$

The matrix Φ_t contains two terms, the first is due to the direct extrazone imports and the second one encloses indirect ones:

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[3] Note that if $z = \tilde{z}$ we got the case of an input imported from extrazone and used in an intermediate good exported from *z* to *r* that also is used as input in an export from *r* to *z*. The extrazone good is imported by *z* and this country is his final consumer, but the productive process has an stage in country *r*.

[4] They develop a methodology to measure the direct and indirect contents of imports with OECD countries origin in imports of a particular developing country.

$$\Phi_t = D_t^E \Omega + \Phi_t D_t^I \Omega \tag{13}$$

Operating, we obtain:

$$\Phi_t = D_t^E \Omega (I - D_t^I \Omega)^{-1} \tag{14}$$

Where $(I - D_t^I \Omega)^{-1}$ can be thought as a matrix of coefficients of spreading out the direct imports. The larger intrazone imports of a CU member are the larger the expansion of direct effects is.

Common tariff revenue incorporated in intraregional trade and revenue transfers

The common tariff revenue of extrazone imports is estimated trough the CET, but has to be weighted by the imports. The weighted average of CET in each sector and each country is computed with:

$$t_{st}^{Er} = \sum_{i \in s} \frac{M_{it}^{Er} t_{it}^{CET}}{M_{st}^{Er}} \qquad\qquad i \in 1,...I \tag{15}$$

Where t_{it}^{CET} is CET in the tariff line i. With each t_{st}^{Er} we can define a t_t^{Er} s- dimension vector. Although the CET is not country specific, the weighted average by sector does is because of the different weight of tariff lines in each country. We define T_t^{Er}, the diagonal matrix associated with those vectors ($T_t^{Er} = diag\,(t_t^{Er})$). We define the tariff revenue of the direct extrazone imports incorporated in the exports from r to z:

$$\underline{r}_t^{rz} = T_t^{Er}\,\underline{m}_t^{rz} = T_t^{Er} D_t^{Er} \Omega^r M_t^{rz} \tag{16}$$

To estimate the tariff revenue of direct and indirect extrazone imports incorporated in the exports from r to z we have to define:

$$r_t^{rz} = \Psi_t^r M_t^{rz} = (T_t^{Er} D_t^{Er} \Omega^r + \sum_z \Psi_t^z D_t^{zr} \Omega^r) M_t^{rz} \tag{17}$$

Where r_t^{rz} is the *Sx1* dimension vector of the tariff revenue of direct and indirect extrazone imports incorporated in the exports from *r* to *z*; Ψ_t^r is an *SxS* matrix. As before, equation (17) can be rewritten in a general form (see annex A):

$$r_t = \Psi_t M_t \tag{18}$$

Ψ_t is a function of the CET, of the shares of extrazone and intrazone imports and of the domestic and foreign input-output tables (see TD_t^E definition in annex A).

$$\Psi_t = TD_t^E \Omega (I - D_t^I \Omega)^{-1}$$

(19)

Equation (18) shows the tariff revenue incorporated in each bilateral flow. r_t^{rz} is a credit to the importer, z, and a debit to the exporter, r. Each country is debtor in some bilateral flows and creditor in some others. To estimate the compensations, is useful to define the following equation:

$$\tau_t^r = \sum_z r_t^{rz} - \sum_z r_t^{zr}$$

(20)

Where τ_t^r is country r payment to the compensation fund. It is easy to show that the fund holds $\sum_r \tau_t^r = 0$.

2.2- The case of an incomplete Customs Union

Most CUs in the world are not fully completed. Among other things, there exist exceptions to the CET, non-harmonized special import regimes, free zones and unilateral trade agreements. A consequence of this is the coexistence of CET with rules of origin. Then, it is useful to consider a scheme of partial revenue sharing.

In the entire extrazone imports, we can distinguish the imports that fulfill CU rules (the importer pays the CET or the common preference), M_t^{Fr}, from those that do not (M_t^{NFr}), due to some non-harmonized measure[5].

$$M_t^{Er} = M_t^{Fr} + M_t^{NFr} \tag{21}$$

If the CU is incomplete there must be some imports not satisfying the common external policy, then $M_t^{NFr} > 0$. A method of revenue sharing in an incomplete CU must consider only imports fulfilling the common policy. Then, equations (6), (9), (11) and (13) to (20) must be reformulated. The share of extrazone imports fulfilling CU rules is

$$\alpha_{st}^{Fr} = \frac{M_{st}^{Fr}}{M_{st}^{Tr}} \tag{22}$$

We define D_t^F, the diagonal matrix associated to α_{st}^{Fr}. Direct extrazone fulfilling CU imports incorporated in exports from r to z are:

$$\underline{m}_t^{Frz} = D_t^{Fr} \Omega^r M_t^{rz} \tag{23}$$

The Φ_t^{rz} matrix also changes if only fulfilling CU imports are included:

$$m_t^{Frz} = \Phi_t^{Fr} M_t^{rz} \tag{24}$$

$$\Phi_t^F = D_t^F \Omega (I - D_t^I \Omega)^{-1} \tag{25}$$

The weighted average CET has to be recalculated:

$$t_{st}^{Fr} = \sum_{i \in s} \frac{M_{it}^{Fr} t_{it}^{CET}}{M_{st}^{Fr}} \qquad i = 1,...,I_s \tag{26}$$

The diagonal sxs matrix associated to t_{st}^{Fr} is T_t^{Fr}. Equation (16), (17), (19) and (20) are reformulated:

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[5] In the CU terminology the imports that fulfill CU rules are in free practice so circulate in a similar way that a native product.

$$\underline{r}_t^{Frz} = T_t^{Fr} D_t^{Fr} \Omega^r M_t^{rz} \tag{27}$$

$$r_t^{Frz} = \Psi_t^{Fr} M_t^{rz} \tag{28}$$

$$\Psi_t^{F} = T D_t^{F} \Omega (I - D_t^{I} \Omega)^{-1} \tag{29}$$

$$\tau_t^{Fr} = \sum_z r_t^{Frz} - \sum_z r_t^{Fzr} \tag{30}$$

3. **RESULTS IN THE MERCOSUR CASE**

3.1. Benchmark case: MERCOSUR sharing all tariff revenue (as a complete CU)

As it is establish in SACU and the EU, MERCOSUR has to define a revenue sharing rule. The evolution of the political economy discussion over the topic of rules of circulation in intraregional trade and rules of distribution of common tariff revenue is discussed in Vaillant (2005). Here, we show how the final consumption criterion developed in the previous section can be applied to MERCOSUR case.

The Global Trade Analysis Project (GTAP) has domestic and import demand input output (i-o) tables from MERCOSUR[6] countries with the same aggregation level, 57 sectors[7]. The year of reference for i-o tables is 1997. Common External Nomenclature of MERCOSUR is based on Harmonized System (HS). A correlation table between HS and GTAP classification was obtained from GTAP web site. Data from MERCOSUR imports, tariffs and accomplishing of common policy in tariff line level was taken from databases developed in a MERCOSUR Secretariat/ Inter-American Development Bank Project[8]. The year of reference is 2004.

Equations developed in section 2 are expressed in *Sx1* dimension vector notation. This is essential to formulate the operation but not very helpful for showing results. Thus here results are shown as total sector sums. Annex C shows most important results by vectors and section 3.3 uses this information to get results by sector. Table 1 shows the beginning of the process, i.e. the intrazone trade flows M_t^{rz}.

Table 1- **Intrazone exports in MERCOSUR. Year 2004**
(in million dollars)

exporter \ importer	Argentina	Brazil	Paraguay	Uruguay	TOTAL
Argentina	---	5904	668	691	7263
Brazil	7561	---	868	676	9105
Paraguay	380	305	---	16	702
Uruguay	226	542	64	---	832
TOTAL	8168	6751	1601	1383	17903

Source: Own elaboration using LAIA and MS information.

The main flow is between Argentina and Brazil, principally with Brazil as exporter. Small countries are net importers in the bloc intra-trade commodity flow. MERCOSUR total intrazone trade was almost 18 billion dollars in 2004.

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[6] The MERCOSUR members are Argentina, Brazil, Paraguay and Uruguay.
[7] Annex B contains a description of GTAP sectors.
[8] "Consolidation of the Regional Market of MERCOSUR", Project Number ATN/SF-9014-RG- IADB-MS. The Databases of reference are "BADAM" and "POLCOM2004". BADAM includes the imports and revenue by MERCOSUR member discriminated by item, country of origin, country of "procedence", in 1999-2004 period. POLCOM2004 includes the CET, the national tariff line and other trade policy information at a tariff line level in 2004. Arimón (2006) present the database and asses tariff revenue to MERCOSUR.

Considering domestic output necessary to produce this intrazone trade as developed in Equation (3) yields results shown in table 2. Brazil is the country that has the biggest increase as exporter (r) and Argentina as importer (z). This is probably due to the greater integration of Brazilian industry and because of the composition of their exports.

Table 2- **Output needed to achieve intrazone exports in MERCOSUR. Year 2004**
(in million dollars)

exporter \ importer	Argentina	Brazil	Paraguay	Uruguay	TOTAL
Argentina	---	9953	1185	1193	12330
Brazil	17711	---	1939	1524	21174
Paraguay	559	514	---	31	1104
Uruguay	347	860	101	---	1308
TOTAL	18618	11327	3224	2748	35916

Source: Own elaboration using table 1 and GTAP information.

The third step in the method is to calculate the total imports necessary to achieve the domestic output shown in table 2. Equation (4) is outlined in table 3. The importance of Uruguay as an exporter grows, since it has an import requirement in the i-o table that expresses a high foreign input dependence. The bilateral relationship between Argentina and Uruguay is balanced, both countries "exporting" and "importing" 79 million dollars of extrazone imports incorporated in the bilateral trade, even though Argentinean exports to Uruguay are three times the inverse flow.

Table 3- **Imports needed to achieve intrazone exports in MERCOSUR. Year 2004**
(in million dollars)

exporter \ importer	Argentina	Brazil	Paraguay	Uruguay	TOTAL
Argentina	---	788	49	79	916
Brazil	1293	---	128	97	1519
Paraguay	58	55	---	4	117
Uruguay	79	165	19	---	263
TOTAL	1431	1007	196	180	2814

Source: Own elaboration using table 2 and GTAP information.

To estimate the total direct extrazone imports incorporated in intrazone trade we use Equation (9); the results are shown in table 4. The importance of Brazil as a country of origin further increases, due to its low use of regional supplies. The more a country uses regional supplies, the more the difference between table 3 and 4. The total direct extrazone imports incorporated in intrazone trade amount to less than 2 million dollars; most of it is due to Brazilian exports to Argentina.

Table 4- **Direct extrazone imports needed to achieve intrazone exports in MERCOSUR. Year 2004**

(in million dollars)

exporter \ importer	Argentina	Brazil	Paraguay	Uruguay	TOTAL
Argentina	---	446	34	47	528
Brazil	1007	---	100	73	1180
Paraguay	24	20	---	1	46
Uruguay	38	86	9	---	132
TOTAL	1068	553	144	121	1886

Source: Own elaboration using table 3 and LAIA-MS data base.

Table 5 includes total direct and indirect extrazone imports, calculated from Equation (11). As the share of intrazone supply is high in the small countries, their importance as exporters is increased.

Table 5- **Direct and indirect extrazone imports needed to achieve intrazone exports in MERCOSUR. Year 2004**

(in million dollars)

exporter \ importer	Argentina	Brazil	Paraguay	Uruguay	TOTAL
Argentina	---	492	36	51	578
Brazil	1028	---	102	74	1204
Paraguay	27	23	---	2	52
Uruguay	42	93	10	---	145
TOTAL	1098	608	147	126	1979

Source: Own elaboration using table 3 and LAIA-MS data base.

The last step to achieve the benchmark result is to estimate the tariff revenue included in intrazone trade. Table 6 contains the estimate based on Equation (17). All the tariff revenue incorporated in intrazone trade reaches 212.6 million dollars. Arimón (2006) reports that in 2004 total tariff revenue in MERCOSUR was more than 4 billion dollars. Then, the tariff revenue that circulates in the bloc is only 5% of all the MERCOSUR tariff revenue. Brazil in the main origin of the flow with 132 million dollars, and Argentina is the main destination (123.5 million dollars). Paraguay is a net destination of the tariff revenue and Uruguay is almost balanced.

Table 6- **Tariff revenue incorporated in intrazone trade in MERCOSUR. Year 2004**

(in million dollars)

debit \credit	Argentina	Brazil	Paraguay	Uruguay	TOTAL
Argentina	---	56.1	2.5	4.9	63.4
Brazil	116.2	---	8.6	6.9	131.7
Paraguay	2.8	2.4	---	0.2	5.4
Uruguay	4.5	6.7	0.9	---	12.1
TOTAL	123.5	65.2	11.9	11.9	212.6

Source: Own elaboration using table 3 and LAIA-MS data base.

Equation (20) merely shows the difference between countries' total magnitude as exporter and as importer (e.g. in Argentina is 63.4-123.5=-60.1). Table 7 shows the result for each country.

Table 7- **Transferences in MERCOSUR tariff revenue compensation fund. Year 2004**
(in million dollars)

Country	Transference
Argentina	-60.1
Brazil	66.5
Paraguay	-6.5
Uruguay	0.2

Source: Own elaboration using table 6.

Brazil is the main contributor to the fund and Argentina and Paraguay are the receivers. It can be said that part of Brazil's tariff revenue is subsequently "exported" to the other MERCOSUR countries. As a small landlocked country, Paraguay is a net "importer" of tariff revenue in each bilateral flow. Uruguay is a net "importer" in the trade with his big neighbors, but compensates for this in its relationship with Paraguay.

3.2. The case of MERCOSUR as an incomplete custom union

MERCOSUR is considered to be a CU in the WTO according to GATT Article XXIV, but it is not a complete CU, since there is no universal appliance of the CET, there are non-harmonized special imports regimes, the free trade zone is only partial, among other things. A key MERCOSUR Common Council Decision[9] set up the principle of free practice rule, so changes in the rules have been made, influencing the pattern of commodity flows. The free practice rule states that every commodity imported to the CU fulfilling the common external policy can circulate freely within the bloc and should be considered as having originating status in relation to MERCOSUR's circulations rules (tariff preferences and origin).

In this paper we will consider an extrazone import as fulfilling the free circulation rule if at the level of the tariff line it accomplishes two conditions: the applied tariff must be the CET, and no country must deviate upward[10]. Only tariff revenue from imports fulfilling free practice is included in the calculation. Table 8 is based on equation 28 and shows that the total direct and indirect tariff revenues incorporated in the intrazone flows are substantially less than in the previous estimates (table 6).

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[9] Decision Nº 54/04.

[10] The applied tariff is built as the ratio between revenue and imports in this flow. In order to make the criterion useful, a small deviation of the applied tariff to the CET is allowed.

Table 8- **Tariff revenue incorporated in intrazone trade in MERCOSUR. Only imports in free practice. Year 2004**

(in million dollars)

exporter \ importer	Argentina	Brazil	Paraguay	Uruguay	TOTAL
Argentina	---	3.8	0.3	0.5	4.6
Brazil	8.7	---	1.1	0.8	10.6
Paraguay	0.5	0.4	---	0.0	0.9
Uruguay	0.5	0.9	0.1	---	1.5
TOTAL	9.6	5.1	1.5	1.3	17.6

Source: Own elaboration using LAIA-SM data base and GTAP matrices.

If only the tariff revenue for goods fulfilling free practice rule is shared, the transfers are considerably less. Again, Brazil is the net debtor and Argentina and Paraguay the creditors. In comparison to the benchmark case, the transfer for Uruguay is the same in absolute values but higher in relative terms.

Table 9- **Transferences to MERCOSUR tariff revenue compensation fund. Only imports in free practice. Year 2004.**

(in million dollars)

Country	Transference
Argentina	-5.0
Brazil	5.5
Paraguay	-0.6
Uruguay	0.2

Source: Own elaboration using table 8.

3.3- <u>A comparison amongs methods: final consumption destination and conventionals revenue-sharing rules.</u>

As mentioned before, the method developed is this paper is aimed to create a new revenue-sharing method based on the final consumption criterion. Vaillant (2005) discusses some properties of alternative methods. Table 10 shows a comparison between the method of final consumption destination (MFCD) developed in this paper and others conventionales sharing rules. In particular, extrazone imports revenue of 2004 (4032 million dollars) are allocated depending on the method developed here (MFCD), the share of GDP (as a proxy of consumption), the share of imports (intrazone, extrazone and total) and MERCOSUR caused tariff revenue renounce[11] compensation presented and estimated in Arimón (2006). In the last method countries are compensated according to their revenue renounce. Each country share of the fund is the result of the sum of actual revenue and revenue renounce due to MERCOSUR tariff preference.

Each one of the simple rules of distribution builds a compensation fund larger than the one created by the method developed here. The small magnitude of compensation in approximated method results from both the low circulation of foreign

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[11] We will name MERCOSUR caused revenue fiscal renounce to the amount of tariff revenue that is lost due to the preference. It corresponds to the difference between the theoretical revenue (CET times imports) and the effective revenue in all the products with negotiated preference in trade among members.

intermediate goods in the bloc, and the dominance of originating products in intrazone trade.

Table 10- **Allocation of extrazone imports revenue with several sharing rules**

a) Allocation (in million dollars)

	Actual revenue	MFCD	GDP	Imports			Revenue Renounce Compensation
				Intrazone	Extrazone	Total	
Argentina	970	1030	787	1839	737	945	1461
Brazil	2879	2813	3147	1520	3125	2823	2291
Paraguay	124	131	36	361	78	132	156
Uruguay	59	59	62	312	91	132	124

b) Allocation (as shares of total –in percentages)

	Actual revenue	MFCD	GDP	Imports			Revenue Renounce Compensation
				Intrazone	Extrazone	Total	
Argentina	24.1	25.5	19.5	45.6	18.3	23.4	36.2
Brazil	71.4	69.8	78.0	37.7	77.5	70.0	56.8
Paraguay	3.1	3.2	0.9	8.9	1.9	3.3	3.9
Uruguay	1.5	1.5	1.5	7.7	2.3	3.3	3.1

c) Compensation: difference between method and actual revenue (in million dollars)

	Actual revenue	MFCD	GDP	Imports			Revenue Renounce Compensation
				Intrazone	Extrazone	Total	
Argentina	--	60.1	-183.0	869.5	-232.6	-24.7	491.1
Brazil	--	-66.5	267.9	-1358.8	246.4	-56.4	-587.7
Paraguay	--	6.6	-87.6	236.7	-45.7	7.6	31.7
Uruguay	--	-0.2	2.7	252.6	31.8	73.5	64.9

Source: Own elaboration using LAIA-SM database

Every method generates different compensation flows, in magnitude and in the direction of the flow. In all cases, Uruguay is a net recipient of tariff revenue, except in the approximated method which is almost neutral. This result is due to the low share of Uruguay in tariff revenue; this share is less than that in any other reference variable. Paraguay is a net debtor of the fund using the GDP and extrazone imports criteria and a creditor according to the total and intrazone imports and in revenue renounce compensation criteria. Argentina and Brazil have the opposite positions in almost all of the methods. Argentina is a debtor in GDP and extrazone imports and Brazil in the approximated method, intrazone imports and revenue renounce. The total imports method produces similar results in magnitude and direction of compensation as the approximate method, except to the extent that Argentina is a net debtor (in 24 millions) and Uruguay is the main creditor. The intraregional imports share criterion creates the biggest fund and as a result of this criterion Argentina receives more tariff revenue than Brazil, since its share of intraregional imports is bigger than Brazil's.

4. Characterization of intraregional trade

4.1 A comparison between intraregional and global trade patterns

The methodology developed here is not only useful for developing a revenue-sharing criterion, but it is also an original way to compare intraregional patterns with global ones. Table 11 contains all the main steps in the calculations made before, from the perspective of each CU member's exports to intrazone (panel a) in comparison to their exports outside LAIA (panel b). Also, table 11 shows a set of ratios which describe the interaction between trade patterns and input output structure. Outside LAIA exports hardly face preferential tariffs, so this structure can be labeled as the efficient pattern.

Table 11- Steps of the calculation of the direct and indirect extrazone imports. Year 2004. (in million dollars and ratios)

a) Exports to MERCOSUR for each member

REFERENCE	VARIABLE	ARGENTINA	BRAZIL	PARAGUAY	URUGUAY
(1)	$\sum_z M^{rz}$	7.263	9.105	702	832
(2)	$\sum_z x^{rz}$	12.330	21.174	1.104	1.308
(3)	$\sum_z \overline{m}^{rz}$	916	1.519	117	263
(4)	$\sum_z \underline{m}^{rz}$	528	1.180	46	132
(5)	$\sum_z m^{rz}$	578	1.204	52	145
(2)/(1)		1.698	2.325	1.573	1.571
(3)/(1)		0.126	0.167	0.166	0.316
(4)/(1)		0.073	0.130	0.065	0.159
(5)/(1)		0.080	0.132	0.074	0.174

b) Non LAIA exports of each MERCOSUR member.

REFERENCE	VARIABLE	ARGENTINA	BRAZIL	PARAGUAY	URUGUAY
(1)	M^{ry}	20.704	75.317	666	1.893
(2)	x^{ry}	35.929	171.714	1.116	3.363
(3)	$\overline{m}^{ry}$	1.216	8.549	112	407
(4)	$\underline{m}^{ry}$	661	6.071	44	200
(5)	m^{ry}	718	6.159	51	216
(2)/(1)		1.735	2.280	1.676	1.777
(3)/(1)		0.059	0.114	0.168	0.215
(4)/(1)		0.032	0.081	0.067	0.106
(5)/(1)		0.035	0.082	0.076	0.114

Note: y labels all non LAIA countries as a whole.
Source: Own elaboration using LAIA-SM database and GTAP matrices.

Results show that Argentina, Brazil and Uruguay have more direct and indirect extrazone imports for each dollar exported inside the CU than the same ratio estimated for their exports outside LAIA. Paraguay has roughly the same ratio in their extrazone

imports than in their intrazone. Perhaps surprisingly, the main difference between intrazone and outside LAIA imports arise in the calculation of total imports, namely using equation 4, instead of having differences in the domestic output step (equation 3). A comparison between ratios (2)/(1) and (3)/(1) in both panels sketches these differences. In both cases Uruguay is the country that incorporates more extrazone imports in its exports and Brazil the second. Paraguay is the country that incorporates less extrazone imports in its intrazone exports (panel a) and if we look at outside LAIA exports (panel b) Argentina has the lowest extrazone imports / exports ratio. Table 11 also shows that the quality of exports from the point of view of the domestic linkages is different among MERCOSUR countries. The main impact on production of a US$ of exports is obtained in the case of Brazil. Also this amount is a bit larger in the case of Brazilian exports to MERCOSUR compared with exports to non LAIA countries. For the other three countries, the quality of intraregional trade measured by this indicator is smaller compared with the rest of the world pattern.

4.2. An analysis by big sectors

Table 11 presents the results by aggregated sectors[12]. The table has three panels with information of intraregional exports, impact on production and contents of extrazone imports (direct & indirect). From the point of view of the intraregional trade (panel a) the main sectors with a coverage of more than three quarters of total exports are: chemical industry (22%); car industry (18%); high technological content industry (13%); energy intensive in natural resources (oil, gas, electric energy, etc)(13%); agriculture (13%). In these sectors, Argentina's intraregional exports are specialized in agriculture and the energy sectors (oil and petroleum industry). Brazil is specialized mainly in industries with a high technological content, and also in car manufacturing. Paraguay is specialized in agriculture and the energy sector (electric energy), Uruguay in chemical and agro industries.

Considering the impact on production (see panel b) table 11) there is more variation compared with the export pattern, and also the order of importance by sectors is different. The main ones are: chemical industry (21%); energy sectors (14%); car industries (14%); metal-engineering (13%); high technological content (12%). The results by country shows that in Argentina and Paraguay the impact on production is in the same sectors where exports are specialized. In the case of Brazil, the main sectors are high technological contents and metal-engineering industries. In Uruguay the main impact is in chemicals industry. Finally, the extrazone import content of intraregional trade (see panel c) table 11) is more concentrated (the five largest are more than 92%) and the order of importance is different in comparison with the original export pattern. The most extrazone import intensive sectors are: the chemicals industry (31%); high technological content industries (22%); car industry (20%); energy sectors (12%); and metal-engineering (7%). Brazil is specialized in car and metal-engineering industries and the rest is specialized in imports from the chemical industry.

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[12] Big sectors arise as an aggregation of GTAP sectors (see Annex B), defined in the following way: Agriculture: 1-12/14; Agro industries 19-26; Forestry, wood and paper 13/30-31; textiles and apparel 27-29; energy intensive in natural resources 15-18/32/43-44; chemical 33-34; metal-mechanic 35-37; 38-39 car industry; high technology content 40-42. The rest of GTAP sector are non tradable.

Table 11- **Specialization ratio[13] exports, impact on production and extrazone imports contents** (ratio, % and millions dollars)

a) Exports (table 1)

Big Sector/Country	Argentina	Brazil	Paraguay	Uruguay	Pattern by sector	
					Millions US$	%
Chemical	1.0	1.0	0.2	1.3	4022	22
Car	0.7	1.4	0.0	0.3	3228	18
High technological content	0.4	1.6	0.0	0.2	2408	13
Energy intensive natural resources	1.8	0.3	2.1	0.4	2373	13
Agriculture	1.7	0.2	4.4	1.1	1720	10
Agro industries	1.2	0.5	1.7	4.1	1374	8
Metal-mechanic	0.5	1.5	0.5	0.5	1190	7
Textile & apparel	0.6	1.3	1.1	1.3	921	5
Forestry, Wood products & Paper & Publishing	0.8	1.1	0.8	1.5	670	4
Country structure (%)	41	51	4	5	17905	

b) Production impact (table 2)

Big Sector/Country	Argentina	Brazil	Paraguay	Uruguay	Pattern by sector	
					Millions US$	%
Chemical	1.1	1.0	0.3	1.2	6709	21
Energy intensive natural resources	1.8	0.5	1.6	0.4	4495	14
Car	0.7	1.3	0.0	0.3	4441	14
Metal-mechanic	0.5	1.4	0.3	0.4	4243	13
High technological content	0.4	1.5	0.1	0.3	3690	12
Agriculture	1.4	0.5	4.4	1.8	2958	9
Agro industries	1.2	0.6	2.0	4.2	2000	6
Textile & apparel	0.7	1.2	1.2	1.2	1533	5
Forestry, Wood products & Paper & Publishing	0.9	1.1	1.1	1.5	1415	4
Country structure exports (%)	37	57	3	3	31485	

c) Contents extra Zone Imports (direct&indirect, table 5)

Big Sector/Country	Argentina	Brazil	Paraguay	Uruguay	Pattern by sector	
					Millions US$	%
Chemical	1.2	0.9	1.4	1.3	624	31
High technological content	0.8	1.1	1.5	0.3	427	22
Car	0.8	1.2	0.0	0.5	403	20
Energy intensive natural resources	1.0	0.9	0.8	1.8	233	12
Metal mechanic	0.9	1.2	0.3	0.3	129	7
Forestry, Wood products & Paper & Publishing	1.6	0.6	0.9	1.7	55	3
Textile & apparel	0.6	1.0	1.6	2.6	53	3
Agro industries	1.6	0.6	1.4	1.4	31	2
Agriculture	1.4	0.6	2.8	2.0	27	1
Pattern by country (%)	29	61	3	7	1983	

Source: Own elaboration using LAIA-SM database and GTAP matrices.

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[13] The ratios are $r_t^z = \dfrac{y_{bs}^z / y_{bg}^{\cdot}}{y_{\cdot}^z / y_{\cdot}^{\cdot}}$. Where y- variable considered in each table; z- is the index of the

country of the region; bg- big sectors index; and the period note the sum over this index.

5. CONCLUSIONS

The formation of a CU has three set of effects on tariff revenues. First, there is loss of tariff revenue on existing intrazone trade. Second, there are fewer imports from the rest of the world (trade diversion). Finally, the tariff revenue is now collected at point of entry rather than in country of consumption.

This article presents a method devoted to deal with the third problem. The method estimates the portion of the tariff revenue collected on extrazone imports that circulates in intrazone trade. This tariff revenue is collected by one CU member but the final destination of the product that generated the revenue could be another CU member. It is proposed that the collector of the revenue must transfer this amount to the country in which the final consumer resides. The method can be slightly modified to deal with incomplete CUs, based on the free circulation concept.

Rules for sharing tariff revenue in a CU require different levels of common institutions and coordination of policies among members. The approximated method based on the final consumption criterion does not require an extensive development of common institutions, because all that CU members must do is to share information about trade, harmonize their input output tables and manage a common fund to perform compensations among countries. Furthermore, the method is useful to describe the characteristics of intraregional trade from the point of view of the extrazone import intensity.

The approximated method of revenue sharing measures the extrazone imports and the resulting common tariff revenue incorporated in intrazone trade. The approach captures not only direct import flows, but also indirect trade.

Using MERCOSUR data for 2004, the total direct and indirect extrazone imports incorporated in intrazone trade amount to roughly 2 billion dollars. The tariff revenue associated with this flow is 212 million dollars, 5% of total tariff revenue collected in this year. Brazil is the main collector of the tariff revenue and hence would be the main contributor to the customs union fund, with 66.5 millions dollars. Argentina and Paraguay would receive most of the revenue transfers; Uruguay's receipts and payments would approximately balance. These outcomes reflect the importance of Brazil as an exporter, its high industrial linkages (in relative terms) and the high share of its import supplies from extrazone. Although it is a net importer in intrazone trade, Uruguay is roughly balanced in the fund because of the importance of foreign inputs in its industry. Uruguayan exports to the CU are intensive in extrazone inputs, basically in the chemical industry.

The most striking feature of the MERCOSUR case is the low magnitude of the total tariff revenue borne by intrazone trade. The member countries' participation as final consumers of extrazone imports is very similar to the participation of each country as the point of entry of goods in the CU. Almost all of the extrazone imports are consumed in the importing country. Most of intrazone trade is in natural resource based products; when there is more industrial transformation it is carried out in the biggest country.

We conclude that intraregional trade in MERCOSUR occurs mainly in goods produced with little or no extrazone import content. There are clear differences among MERCOSUR members. Brazil's intrazone exports incorporate the most extrazone imports and thus it would be the main net contributor to the compensation fund created

by the proposed mechanism. In a CU with symmetrical countries the receipts and payments they do are balanced, so the result showed here is another way to illustrate the asymmetries of the bloc.

The fact that actually there is little extrazone content on goods circulating in MERCOSUR does not imply that revenue sharing issues are not crucial to the building of a complete CU. Intrazone flows are endogenous to rules. Changes in rules such as Decision 54/04 in MERCOSUR should lead to changes in the location of production. Generalization of the free circulation rule would make rules of origin easy to fulfill, mainly for small countries. Also, generalized free circulation may tend to concentrate the imports into a few hubs, leading to a disruption between import patterns and the pattern of destination of extrazone goods The landlocked territory in MERCOSUR, Paraguay, possibly will reduce its exports within the bloc and hence will become a bigger beneficiary of the fund. Uruguay, as a natural MERCOSUR hub, could increase its exports and thereby become a net contributor in the fund.

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ANNEX A

All the Φ_t^r matrices can be written in a general way, in a *SxSR* matrix:

$$\Phi_t = \begin{bmatrix} \Phi_t^1 & \Phi_t^2 & ... & \Phi_t^r & ... & \Phi_t^R \end{bmatrix} \qquad (A1)$$

The extrazone share, D_t^{Er}, can be written in a *SxSR* matrix and the intrazone shares, D_t^{zr}, in a *SRxSR* matrix:

$$D_t^E = \begin{bmatrix} D_t^{E1} & D_t^{E2} & ... & D_t^{Er} & ... & D_t^{ER} \end{bmatrix} \qquad (A2)$$

$$D_t^I = \begin{bmatrix} 0 & D_t^{12} ... & D_t^{1r} ... & D_t^{1R} \\ D_t^{21} & 0 & & D_t^{2R} \\ \vdots & & 0 & \\ D_t^{R1} & D_t^{R3} ... & D_t^{Rr} ... & 0 \end{bmatrix} \qquad (A3)$$

All the Ω^r form a diagonal *SRxSR* matrix:

$$\Omega = \begin{bmatrix} \Omega^1 & 0 & ... & & & 0 \\ 0 & \Omega^2 & & & & 0 \\ \vdots & & \ddots & & & \vdots \\ & & & \Omega^r & & \\ & & & & \ddots & \\ 0 & 0 & ... & & & \Omega^R \end{bmatrix} \qquad (A4)$$

All the *Sx1* dimension intrazone exports vector, M_t^{rz}, are expressed in a convenient way, arising a $SRxR^2$ matrix[14]:

$$M_t = \begin{bmatrix} M_t^{11} & M_t^{12}... & M_t^{1R} & 0 & 0... & 0... & 0 & 0... & 0 \\ 0 & 0... & 0 & M_t^{21} & M_t^{22}... & M_t^{2R}... & & & \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & & & \\ 0 & 0... & 0 & 0 & 0 & 0... & M_t^{R1} & M_t^{R2}... & M_t^{RR} \end{bmatrix} \qquad (A5)$$

Each direct and indirect extrazone imports component, m_t^{rz}, is arranged in a general formulation as an SxR^2 matrix:

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[14] Note that the M_t^{rr} vector is the null one, since there is no exports to the own country.

$$m_t = \begin{bmatrix} m_t^{11} & m_t^{12} .. & m_t^{1R} & m_t^{21} & m_t^{22} ... & m_t^{2R} ... & m_t^{R1} & m_t^{R2} ... & m_t^{RR} \end{bmatrix} \quad \text{(A6)}$$

Analogously at Φ_t^r, all the Ψ_t^r matrices can be written in a general way, in an *SxSR* matrix:

$$\Psi_t = \begin{bmatrix} \Psi_t^1 & \Psi_t^2 & ... & \Psi_t^r & ... & \Psi_t^R \end{bmatrix} \quad \text{(A7)}$$

Each vector r_t^{rz} can be rewritten in a general SxR^2 matrix:

$$r = \begin{bmatrix} r^{11} & r^{12} .. & r^{1R} & r^{21} & r^{22} ... & r^{2R} ... & r^{R1} & r^{R2} ... & r^{RR} \end{bmatrix} \quad \text{(A8)}$$

Then, all calculus can be rewritten in a general specification:

$$\overline{m_t} = \Omega M_t \quad \text{(A9)}$$

$$\underline{m}_t = D_t^E \Omega M_t \quad \text{(A10)}$$

$$m_t = \Phi_t M_t = \left(D_t^E \Omega + \Phi_t D_t^I \Omega \right) M_t = D_t^E \Omega \left(I - D_t^I \Omega \right)^{-1} M_t \quad \text{(A11)}$$

Also, we must define the matrices of $T_t^{Er} D_t^{Er}$ and $T_t^{Fr} D_t^{Fr}$ in the same way, as *SxSR* matrices:

$$TD_t^E = \begin{bmatrix} T_t^{E1} D_t^{E1} & T_t^{E2} D_t^{E2} & ... & T_t^{Er} D_t^{Er} & ... & T_t^{ER} D_t^{ER} \end{bmatrix} \quad \text{(A12)}$$

$$TD_t^F = \begin{bmatrix} T_t^{F1} D_t^{F1} & T_t^{F2} D_t^{F2} & ... & T_t^{Fr} D_t^{Fr} & ... & T_t^{FR} D_t^{FR} \end{bmatrix} \quad \text{(A13)}$$

Then, total revenue incorporated has the following form:

$$r_t = \Psi_t M_t = TD_t^E \Omega \left(I - D_t^I \Omega \right)^{-1} M_t \quad \text{(A14)}$$

ANNEX B

Global Trade Analysis Project nomenclature

Nº	Description	Nº	Description
1	Paddy rice	31	Paper products, publishing
2	Wheat	32	Petroleum, coal products
3	Cereal grains nec	33	Chemical, rubber, plastic products
4	Vegetables, fruit, nuts	34	Mineral products nec
5	Oil seeds	35	Ferrous metals
6	Sugar cane, sugar beet	36	Metals nec
7	Plant-based fibers	37	Metal products
8	Crops nec	38	Motor vehicles and parts
9	Cattle, sheep, goats, horses	39	Transport equipment nec
10	Animal products nec	40	Electronic equipment
11	Raw milk	41	Machinery and equipment nec
12	Wool, silk-worm cocoons	42	Manufactures nec
13	Forestry	43	Electricity
14	Fishing	44	Gas manufacture, distribution
15	Coal	45	Water
16	Oil	46	Construction
17	Gas	47	Trade
18	Minerals nec	48	Transport nec
19	Meat: cattle, sheep, goats, horse	49	Sea transport
20	Meat products nec	50	Air transport
21	Vegetable oils and fats	51	Communication
22	Dairy products	52	Financial services nec
23	Processed rice	53	Insurance
24	Sugar	54	Business services nec
25	Food products nec	55	Recreation and other services
26	Beverages and tobacco products	56	Public Administration, Defense, Health, Education
27	Textiles	57	Dwellings
28	Wearing apparel		
29	Leather products		
30	Wood products		

ANNEX C

Main variables by sector: contents of tables 1-6 and 8.

Table C.1 - **Argentina exports to MERCOSUR** (CIF values in thousands dollars)
Table C.2- **Brazil exports to MERCOSUR** (CIF values in thousands dollars)
Table C.3- **Paraguay exports to MERCOSUR** (CIF values in thousands dollars)
Table C.4- **Uruguay exports to MERCOSUR** (CIF values in thousands dollars)

NOTE: Tables are: 1-Total intrazone exports; 2- Output needed to achieve intrazone exports; 3- Imports needed to achieve intrazone exports; 4- Direct extrazone imports needed to achieve intrazone exports; 5- Direct and indirect extrazone imports needed to achieve intrazone exports; 6- Tariff revenue incorporated in intrazone trade; 8- Tariff revenue incorporated in intrazone trade, only imports in free practice.

Table C.1 - **Argentina exports to MERCOSUR**
(CIF values in thousands dollars)

SECTOR\TABLE	1	2	3	4	5	6	8
1	34218	54212	6	3	6	0	0
2	824539	944969	49	46	49	0	0
3	50922	76705	1468	1231	1239	22	1
4	177819	225211	4300	3349	3432	387	32
5	10481	62344	2858	347	354	26	1
6	0	6986	5	5	5	0	0
7	3069	15128	135	0	112	11	0
8	36338	44017	8788	4951	5010	202	36
9	932	15254	207	197	219	1	0
10	6662	12721	525	265	286	13	2
11	0	84368	12	0	0	0	0
12	9650	14329	12	12	17	2	0
13	47	34198	159	107	111	7	1
14	9627	13645	2	2	11	1	0
15	2542	2839	1326	1323	2164	0	0
16	137088	1129032	36597	36597	38618	0	0
17	65348	66517	3619	3619	3621	0	0
18	81182	131172	7091	1285	2141	61	19
19	29005	79616	572	104	104	10	2
20	2476	23960	8149	860	874	99	3
21	67684	104134	4047	3389	3625	424	112
22	59339	70508	1602	419	433	74	11
23	40657	40694	30	1	2	0	0
24	3586	32413	345	6	7	1	0
25	349122	411242	16643	8622	8784	1263	273
26	124405	151440	871	518	579	110	11
27	143572	289863	15577	7260	7959	1422	126
28	10520	11420	285	142	156	33	3
29	83045	98240	3299	1282	1387	266	19
30	70082	99805	6197	3551	3590	212	34
31	140947	318269	35203	20572	21474	2267	199
32	1396167	1507603	19359	18058	18955	55	16
33	1615719	2611480	270423	195858	208125	18775	2528
34	30516	95749	11701	6770	7394	880	225
35	131902	494696	23809	9229	10097	1169	146
36	58596	190443	13487	5642	7292	633	48
37	48332	169707	20516	14277	15300	2467	305
38	955306	1204944	228337	78766	96904	21498	6
39	4401	9710	2114	2024	2511	90	5
40	23328	35147	26643	21211	22866	2644	13
41	368181	468853	101368	74660	80455	7903	364
42	9857	13173	2127	1678	2065	411	57
43	45902	105364	2104	0	0	0	0
44	0	48567	8	0	1	0	0
TRADABLES	7263112	11620684	881972	528239	578335	63439	4598
NON-TRAD.	0	709571	33574	0	0	0	0
TOTAL	7263112	12330255	915546	528239	578335	63439	4598

Table C.2- **Brazil exports to MERCOSUR**
(CIF values in thousands dollars)

SECTOR\TABLE	1	2	3	4	5	6	8
1	318	23677	526	69	69	7	0
2	7	20208	5650	85	85	9	0
3	13581	44674	1028	189	200	12	8
4	26465	304100	5354	2170	2228	258	80
5	11298	67369	4167	167	179	11	10
6	0	36287	3	3	3	0	0
7	39512	64648	6666	4651	4655	458	0
8	61557	147204	1169	1124	1266	99	11
9	478	19673	626	578	584	1	1
10	8555	77653	781	716	725	33	29
11	0	12319	5	0	0	0	0
12	5544	5628	175	155	161	13	12
13	2865	18378	99	95	97	5	3
14	95	5235	289	266	266	23	0
15	240	2132	23833	23780	23856	0	0
16	29462	128744	60594	59539	60133	0	0
17	0	7030	4	4	35	0	0
18	271321	491582	25345	23822	23910	391	61
19	6447	28491	312	3	5	1	0
20	63424	85154	202	139	156	14	6
21	15731	46162	10161	6253	6322	634	475
22	6375	14814	999	267	275	52	18
23	655	4445	115	33	33	4	3
24	17117	43450	31	30	30	5	1
25	211919	410008	5413	3341	3488	333	148
26	21647	44346	2936	1590	1618	322	22
27	387892	758160	26754	23561	23818	3874	1611
28	36888	45974	225	213	222	44	25
29	163210	210396	8989	6819	6871	1020	337
30	65830	133943	2330	877	971	101	57
31	322445	694262	22334	19750	20228	1679	370
32	58436	210772	34462	24185	24476	35	19
33	1956804	3358351	335551	305868	311216	21171	3916
34	146668	299260	13003	12571	12973	1230	476
35	444073	1805986	23499	20766	21197	2308	560
36	255006	668328	47578	45707	45960	3218	233
37	201519	830715	24881	24205	25086	4034	717
38	2196265	3132911	356792	275244	283470	54407	2
39	27534	46761	3825	3818	4039	107	7
40	505551	585138	63637	63481	65088	6372	29
41	1407162	2144517	220569	214703	218843	27798	867
42	67991	399032	9035	8902	9006	1615	490
43	47582	371308	24366	0	0	0	0
44	0	13189	22	22	22	0	0
TRADABLES	9105470	17862414	1374337	1179758	1203866	131696	10603
NON-TRAD.	0	3311945	144315	0	0	0	0
TOTAL	9105470	21174358	1518653	1179758	1203866	131696	10603

Table C.3- **Paraguay exports to MERCOSUR**
(CIF values in thousands dollars)

SECTOR\TABLE	1	2	3	4	5	6	8
1	2077	2720	0	0	1	0	0
2	15496	16848	242	0	1	0	0
3	25907	29207	86	0	3	0	0
4	1305	13617	152	9	40	4	1
5	198791	223437	1223	97	99	0	0
6	0	951	0	0	0	0	0
7	50620	59308	40	0	20	2	0
8	3328	6492	3203	1628	1666	188	38
9	0	13257	15	3	7	0	0
10	2171	9908	386	268	272	10	10
11	0	487	0	0	0	0	0
12	0	0	0	0	1	0	0
13	538	13758	10	9	10	1	0
14	0	134	0	0	2	0	0
15	0	0	0	0	86	0	0
16	0	0	374	16	476	0	0
17	0	0	0	0	3	0	0
18	650	950	119	7	122	2	0
19	35065	38576	16	0	0	0	0
20	627	1641	18	0	4	0	0
21	44942	48865	261	20	87	9	6
22	48	208	31	0	3	1	0
23	1225	1419	138	0	0	0	0
24	0	1158	17	0	0	0	0
25	11870	17910	3696	624	676	90	21
26	31	5366	1264	443	464	88	6
27	15101	21324	1860	1001	1117	178	38
28	9099	11597	633	513	515	107	66
29	16873	19495	1193	757	779	140	7
30	18257	22099	362	76	87	11	3
31	1756	6875	4069	1123	1351	125	41
32	0	551	5576	1060	1296	2	1
33	22466	45467	48324	20216	23540	2439	289
34	4045	15854	1999	228	281	33	9
35	19213	26577	3790	144	249	30	7
36	2153	3203	1144	275	427	34	2
37	334	1675	595	157	234	37	9
38	48	92	78	69	184	34	0
39	0	2	13	12	23	2	0
40	22	1556	9892	9189	9338	630	17
41	628	2228	9975	4567	5255	598	231
42	1712	7140	3893	3309	3352	583	58
43	195629	202834	0	0	0	0	0
44	0	8	0	0	0	0	0
TRADABLE	703738	901929	108581	49128	55424	5960	922
NON-TRAD.	0	209479	12042	0	0	0	0
TOTAL	703738	1111408	120623	49128	55424	5960	922

Table C.4- **Uruguay exports to the MERCOSUR**
(CIF values in thousands dollars)

SECTOR\TABLE	1	2	3	4	5	6	8
1	51971	71293	99	84	85	0	0
2	11	2872	25	0	1	0	0
3	5063	7256	556	37	49	2	0
4	2044	11033	487	212	261	23	12
5	15556	17275	856	53	58	3	2
6	0	1047	0	0	0	0	0
7	0	3	467	15	46	4	0
8	2556	4995	7932	2521	2594	72	25
9	522	15370	76	50	58	0	0
10	6912	12412	373	291	308	7	1
11	0	22108	7	0	0	0	0
12	216	11590	974	505	509	41	0
13	85	1558	11	6	7	0	0
14	3361	5522	6	0	2	0	0
15	0	0	0	0	139	0	0
16	0	0	29012	27599	28355	0	0
17	0	0	0	0	15	0	0
18	2614	3448	1497	744	912	17	2
19	30306	37144	135	30	31	2	0
20	1470	1767	405	54	68	6	1
21	1521	2738	1122	63	163	17	9
22	31812	32721	374	148	155	24	2
23	68349	71846	14	4	4	0	0
24	0	5681	343	1	1	0	0
25	22212	33608	709	173	292	38	13
26	104550	108445	5346	2296	2318	395	25
27	23638	32867	15266	8127	8476	1377	315
28	12424	13049	47	21	28	6	3
29	18715	20970	4725	1296	1402	226	75
30	873	3575	815	120	141	18	13
31	45825	68602	17240	5927	6663	589	114
32	36727	44910	5076	400	765	9	7
33	231862	263713	97662	54178	59571	5063	511
34	14016	18935	5200	1112	1267	148	97
35	18759	27097	6097	1239	1436	115	27
36	6399	7867	2294	588	866	66	5
37	3636	17167	1803	775	996	153	39
38	43640	45663	23280	7666	9552	1710	0
39	658	809	7361	6538	6597	1109	50
40	3162	6023	2582	2428	2691	148	4
41	13489	18072	10392	6230	7277	565	113
42	7405	8988	1193	849	935	178	52
43	104	19758	267	0	0	0	0
44	0	1	1	0	0	0	0
TRADABLES	832461	1099796	252127	132378	145096	12131	1517
NON-TRAD.	0	207811	11178	0	0	0	0
TOTAL	832461	1307607	263305	132378	145096	12131	1517

ANNEX D

Table D1- **Production variation for an increment of US$ 1: exports to MERCOSUR** (thousands of US$)

sector\table	Argentina	Brasil	Paraguay	Uruguay
1	7	3	4	86
2	130	2	24	3
3	11	5	42	9
4	31	33	19	13
5	9	7	318	21
6	1	4	1	1
7	2	7	84	0
8	6	16	9	6
9	2	2	19	18
10	2	9	14	15
11	12	1	1	27
12	2	1	0	14
13	5	2	20	2
14	2	1	0	7
15	0	0	0	0
16	155	14	0	0
17	9	1	0	0
18	18	54	1	4
19	11	3	55	45
20	3	9	2	2
21	14	5	69	3
22	10	2	0	39
23	6	0	2	86
24	4	5	2	7
25	57	45	25	40
26	21	5	8	130
27	40	83	30	39
28	2	5	16	16
29	14	23	28	25
30	14	15	31	4
31	44	76	10	82
32	208	23	1	54
33	360	369	65	317
34	13	33	23	23
35	68	198	38	33
36	26	73	5	9
37	23	91	2	21
38	166	344	0	55
39	1	5	0	1
40	5	64	2	7
41	65	236	3	22
42	2	44	10	11
43	15	41	288	24
44	7	1	10	0
TRADABLES	1600	1962	1282	1321
NON-TRAD.	98	364	298	250
TOTAL	1698	2325	1579	1571

Table D2- **Direct and indirect extra zone imports variation by increment of US$ 1: exports to MERCOSUR** (thousands of US$)

sector\table	Argentina	Brasil	Paraguay	Uruguay
1	0,0	0,0	0,0	0,1
2	0,0	0,0	0,0	0,0
3	0,2	0,0	0,0	0,1
4	0,5	0,2	0,1	0,3
5	0,0	0,0	0,1	0,1
6	0,0	0,0	0,0	0,0
7	0,0	0,5	0,0	0,1
8	0,7	0,1	2,4	3,1
9	0,0	0,1	0,0	0,1
10	0,0	0,1	0,4	0,4
11	0,0	0,0	0,0	0,0
12	0,0	0,0	0,0	0,6
13	0,0	0,0	0,0	0,0
14	0,0	0,0	0,0	0,0
15	0,3	2,6	0,1	0,2
16	5,3	6,6	0,7	34,1
17	0,5	0,0	0,0	0,0
18	0,3	2,6	0,2	1,1
19	0,0	0,0	0,0	0,0
20	0,1	0,0	0,0	0,1
21	0,5	0,7	0,1	0,2
22	0,1	0,0	0,0	0,2
23	0,0	0,0	0,0	0,0
24	0,0	0,0	0,0	0,0
25	1,2	0,4	1,0	0,4
26	0,1	0,2	0,7	2,8
27	1,1	2,6	1,6	10,2
28	0,0	0,0	0,7	0,0
29	0,2	0,8	1,1	1,7
30	0,5	0,1	0,1	0,2
31	3,0	2,2	1,9	8,0
32	2,6	2,7	1,8	0,9
33	28,7	34,2	33,4	71,6
34	1,0	1,4	0,4	1,5
35	1,4	2,3	0,4	1,7
36	1,0	5,0	0,6	1,0
37	2,1	2,8	0,3	1,2
38	13,3	31,1	0,3	11,5
39	0,3	0,4	0,0	7,9
40	3,1	7,1	13,3	3,2
41	11,1	24,0	7,5	8,7
42	0,3	1,0	4,8	1,1
43	0,0	0,0	0,0	0,0
44	0,0	0,0	4,8	0,0
TRADABLES	79,6	132,2	78,8	174,3