Linkages and Interdependence in the Brazilian Economy: An Evaluation of the Inter-Regional Input-output System, 1985

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Resumo

Descreve a estrutura do sistema inter-regional de insumo-produto para o Brasil, que foi estimado pelo autor como parte do desenvolvimento de um modelo inter-regional de equilíbrio geral computável para o País. A agregação regional destaca as economias das regiões Norte, Nordeste e Centro-Sul. Métodos tradicionais de análise de insumo-produto são empregados para identificar semelhanças e diferenças entre as estruturas produtivas das economias consideradas. Ao explorar diferentes métodos de análise estrutural comparativa, espera que a complementaridade entre eles possa resultar em um melhor entendimento das relações intra e inter-regionais envolvendo as três regiões no período pré-liberalização.

Palavras- chave

Insumo-produto; Estrutura Econômica; Análise Regional; Brasil.

1-INTRODUCTION

This paper describes the structure of the inter-regional input-output system for Brazil, which has been compiled as part of the development of an inter-regional CGE model for Brazil (HADDAD, 1997). The regional setting is comprised of three regional economies: North, Northeast, and Center-South. In order to generate the inter-regional input-output table necessary to calibrate the model, published tables for the North (SUDAM, 1994), Northeast (BANCO DO NORDESTE, 1992) and Brazil (IBGE, 1995) were used; estimates refer to 1985, the year of the last economic censuses for the country. An attempt to reconcile the national and the regional tables in an integrated regional system was made, using a similar procedure to the one proposed by HULU & HEWINGS (1993), preserving the original properties of the data set. The basic procedure was to disaggregate the national tables using the published regional estimates as starting points. Data for a third region (Center-South) were estimated by residual, using the national tables as the desirable adding-up total. The structure of the derived input-output data base for the CGE core of the model is shown in FIGURE 1 (In ANNEX); the labels assigned for each block in the absorption matrix represent the corresponding matrix of the values of flows of commodities, margins, indirect taxes, and primary factors. For instance, BAS1 is a four-dimensional array showing the flows of 40 commodities, produced in 4 different regions, to be used as inputs in the production of 40 industries in each of the 3 Brazilian regions.

In the next section, the general structure of the absorption matrix is described in terms of summary indicators specifying agents' sales and purchases orientations, and output composition. An evaluation of the production linkages follows in Section 3, based on the intermediate demand flows, providing a comparative analysis of the economic structure of the three regions. Traditional input-output methods are used in an attempt to uncover similarities and differences in the structure of the regional economies. Final remarks follow.

2-THE STRUCTURE OF THE ABSORPTION MATRIX

In this section, some of the main structural features of the economy are revealed through the use of indicators derived from the absorption matrix. These indicators draw on the idea developed by CHENERY & WATANABE (1958), which states that a hierarchy of sectors can be proposed based on ratios of intermediate purchases to total input, and intermediate sales to total output. An analysis of output composition, and sales and purchases shares is presented, considering intermediate demand, final demand, and value added transactions.

2.1-Output Composition

TABLES 4, 8, and 12 (In ANNEX) present the output shares for the North, Northeast, and Center-South, respectively. The Center-South region dominates the national production, with a share of 83.32% in total output, followed by the Northeast (12.91%) and the North (3.78%). It is important to notice that, in the benchmark year, regional population shares estimates are the following: Center-South (65.58%); Northeast (28.77%); North (5.64%).

The relative distribution of output by sector for the three regions is shown in FIGURE 5 (In ANNEX). The dominant role of agriculture (1), mining (2), and electronic equipment (9) in the North stands out *vis-à-vis* the Northeast and Center-South, while Northeast's specialization in petroleum refining (15) and agriculturally-based production systems (like processed vegetables [23] and sugar [26]) is apparent. In the case of the Center-South, industrial production (3 to 29) is responsible for a higher share in total output. The remaining distributions of the services sectors are rather similar.

Moreover, the regional shares in the output by sector reveal the specialization of Brazil's North in electronic equipment (25.09% of the

national output), mining (11.48%), wood products and furniture (9.53%), and agriculture (9.14%). The Northeast specializes in sugar (29.25%), community services (26.78%), mining (23.00%), processed vegetables (21.85%), and personal services (21.37%). It is interesting to point out that the weight of community services is heavily influenced by the adoption of compensatory policies in the region, while personal services reflect the regional orientation to tourism activities. The concentration of industrial activities in the Center-South is evident from the results in TABLE 12 (In ANNEX). Leading sectors include transportation equipment (97.71%) and the heavy industry (like steel, other metal products, and machinery).

2.2-Sales Shares

For each sector, the distribution of sales was calculated based on the different destinations of output. Sales-orientation indicators are very important in the discussion of the CGE model results, since changes in different markets will have differential impact on producers' decisions. Thus, for instance, an export-oriented sector will be more affected by changes in external demands than a sector that sells all its production locally.

TABLES 1, 5, and 9 (In ANNEX) show the sales structure for each sector in the three regions. Regional aggregated results, presented at the bottom of each TABLE, reveal important features of the regional economies. For the Center-South, the high share of sales to intermediate production within the region suggests a high degree of intra-regional linkages, which might generate potentially higher internal multipliers. The lower values presented by the North and Northeast suggest a less integrated regional structure in those regions. The share of total extra-regional sales (intermediate, capital creation and household) reflects the degree of inter-regional dependency of each region, from the point of view of demand from the other regions. Thus, the values for the North (28.68%), Northeast (12.43%), and Center-South (3.73%) establish a hierarchy of inter-regional dependency within the country. However, when exports to other countries are considered, the Center-South reveals a greater orientation for its sales (Center-South, 6.95%; North, 5.36%; Northeast, 4.49%).

At the sectoral level, sales-orientation varies within the region. Extra-regional markets for inputs such as rubber, transportation equipment, mining, and agriculture, from the North, account for a large share of these sectors' sales. Inputs produced by the Northeastern transportation equipment industry and the nonmetallic minerals industry in the Center-South also find a considerable share of their demand outside the respective producing regions. Capital creation within the region is the main user of regional construction. Destination of the regional construction output for capital creation within the respective regions account for 67.80% in the North, 91.05% in the Northeast, and 87.68% in the Center-South. The main destination of electronic equipment produced in the North is outside the region, being for purposes of production (16.85%), capital creation (26.85%) or household consumption (33.91%). Regarding the sales to households within the regions, a common pattern appears in most goods for consumer's basic needs, such as clothing, dairy products, meat products, and pharmaceuticals, and services such as community services and real estate are produced for the consumption of local households. Export-oriented commodities in each region include mining, paper products and printing, vegetable oil mills, and footwear, in the North; sugar, processed vegetables, and steel, in the Northeast; and coffee, vegetable oil mills, footwear, and mining, in the Center-South.

2.3-Purchases Shares

The analysis of the cost structure of different industries and the consumption structure of households in the three regions is provided in this section, focusing on the regional sources of commodities (regional, rest of the country, rest of the world). These indicators are useful for the future analysis of regional substitution effects in the CGE model's results.

TABLES 2, 6, and 10 (In ANNEX) show the cost structure of intermediate inputs used in current production and capital creation. Again, an inter-regional dependency pattern appears in the analysis of the use of inputs from intra-regional and extra-regional sources. 88.63% of total intermediate inputs used by industries in the Center-South in current production are provided from regional industries, 3.60% come from the rest of the country, and 7.77% are imported. The situation changes completely for the North, whose industries consume only 54.10% of intermediate inputs from the region, and 40.61% and 5.29% from the rest of the country and from abroad, respectively. Even though the Northeast depends relatively less on foreign inputs (only 1.64% of expenditures on intermediate inputs), that region still has a considerable link with the rest of the country, from where 18.46% of the intermediate inputs are purchased. A similar situation appears in the case of the use of intermediate inputs for capital creation.

Some sectors in the North (steel, transportation equipment, plastics, construction, other chemicals, and other metal products) use more than 50% of their intermediate inputs from other parts of the country, while others (electrical equipment, petroleum refining, nonferrous metals, and electronic equipment) are heavily dependent on inputs from outside the country. In the Northeast, purchases by sectors such as electronic equipment, transportation equipment, pharmaceuticals and veterinary, machinery, footwear, and other metal products from the rest of the country represent more than 40% of sectors' total use of intermediate inputs in current production. The electronic equipment industry also depends heavily on foreign inputs. Finally, the results for the Center-South suggest that the regional production structure depends on primary inputs from outside the region for sectors like meat packing plants, and processed vegetables, on imported oil for the petroleum refining, and other chemicals sectors, as well as on foreign technological-intensive inputs for the transportation, and electronic equipment sectors.

TABLES 3, 7, and 11 (In ANNEX) show the regional composition of the consumption bundle of households, in each region, by commodity. The aggregated results, at the bottom of the TABLES, reveal a similar pattern of consumption for families at the less developed regions of the North and Northeast, in which commodities from the rest of the country have a considerable weight (28.23%, in the North, and 21.87% in the Northeast). Almost 95% of the goods consumed by households in the Center-South are produced in the region. However, commodity composition varies across regions, revealing region-specific preferences and regional availability of certain goods. For services in general and agriculture, a common pattern is observed; for these commodities over 90% of supply are from within the regions. Electronic equipment produced in Manaus (North) has an important participation in the consumption of this commodity in the three regions; the same happens with transportation equipment, footwear, pharmaceuticals and veterinary products produced in the Center-South. Foreign goods consumption does not reflect today's situation. In 1985, strong non-tariff barriers heavily restricted the consumption of imported commodities, such as transportation equipment and electronic equipment (it explains the respective low values in the data set). Therefore, the analysis of the results of the simulations should take this fact into account. This is of particular interest in tariff simulations, in which price-induced substitution between foreign and domestically produced goods is expected to occur (HADDAD & HEWINGS, 1998).

The sales and purchases relations in the data base, described above, suggest a large asymmetry of changes derived from inter-regional linkages. The relatively weak intraindustry effects imply that agglomeration economies are likely to be smaller in the North and Northeast.

2.4-Other Structural Indicators

Three other indicators were selected from the relationships presented in the absorption matrix.

The first one shows the share of capital and labor in total costs (excluding "other cost tickets") in each regional industry; the second specifies the capital-labor ratio in each sector; the third defines the destination of sectoral inter-regional exports (TABLES 4, 8, and 12, in ANNEX).

For the first indicator, there seems to be a technological pattern prevalent in the three regions: services sectors, such as community services, real estate, public administration, and financial institutions, present the highest value added share in total costs; agriculturally-based and mining-based industries are low value-added sectors. It is interesting to compare the classification based on value-added-cost shares, especially the top sectors in that hierarchy, to the respective sectoral capital-labor ratios; it gives a taste on the relative regional factor distribution of income, inherent to the model specification. Real estate is the most capital-intensive sector in the three regions. In the Center-South, it is followed by the coffee and vegetable oil mills sectors, which are also export-oriented sectors, as observed above. The former is also relatively more capital-intensive in the North and in the Northeast. Also generalized is the high labor intensity in the public administration and community services sectors. The mining sector in the North is a high-value-added capital-intensive sector, and as was seen, export-oriented as well.

The average share of capital and labor in total costs is lower in the Center-South than in the other regions. In other words, the share of processed intermediate inputs in the Center-South is higher, which might also suggest a more integrated industrial development in the region. Regarding the regional capital-labor ratios, the lower value presented for the Northeast might be an indicator of the lower marginal productivity of labor in that region, suggesting more use of the abundant factor.

Finally, the distribution of the inter-regional exports from the less developed regions of the North and Northeast reveals the Center-South as the main destination. When exports from the Center-South are considered, the North receives roughly one third of the inter-regional exports, leaving the Northeast with the other two thirds.

3-PRODUCTION LINKAGES

The indicators described above are based on interdependence ratios of the absorption matrix, which only measure the direct linkages among agents in the economy. In this section, a comparative analysis of regional economic structure is carried out. Production linkages between sectors are considered through the analysis of the intermediate inputs portion of the inter-regional input-output data base, which was transformed into a sector by sector matrix (MILLER & BLAIR, 1985). Both the direct and indirect production linkage effects of the economy are captured by the adoption of different methods based on the evaluation of the Leontief inverse matrix. The purpose remains the comparison of economic structures rather than an evaluation of the methods of analysis themselves.

3.1-Intra-regional Linkages and Key Sectors

An attempt to identify key sectors in the regional economies of the North, Northeast and Center-South is made in this section. Familiar complementary approaches are used in order to reveal particular regional production features. They include: Rasmussen-Hirschman indices, input-output Multiplier Product Matrix (MPM), field of influence, and pure linkage indices. The presentation of each of these techniques[1], accompanied by the empirical results, follows.

3.1.1-Rasmussen-Hirschman Indices

RASMUSSEN (1956) and HIRSCHMAN (1958) proposed the use of two indices to capture the effects of forward and backward linkages

[1] The presentation of the methodology draws on HADDAD (1995) and GUILHOTO et al. (1997).

in an economy, through the use of input-output tables. Let b_{ij} be a typical element in the Leontief inverse, *B*. Define $b._j$, $b_i.$, and $b..$ as the column, row, and total sums of *B*, respectively. Further, define $B^* = b../n^2$ as the average value of all elements in the same matrix. Then, the backward linkage index, U_j, and the forward linkage index, U_i, can be calculated by:

$$U_j = \frac{b._j/n}{B^*} \quad (1)$$

$$U_i = \frac{b_i./n}{B^*} \quad (2)$$

where *n* is the number of sectors. In U_j, the numerator is the average value of the elements in column *j*, while in U_i, the numerator is the average value of the elements in row *i*. Thus, interpretation of both indices is straightforward: $U_j > 1$ indicates that a unit change in final demand of sector *j* creates an above-average increase in the economy, i.e., sector *j* generates above-average response in other sectors; $U_i > 1$ indicates that a unit change in all sector's final demand creates an above-average increase in sector *i*, i.e., sector *i* displays above-average dependence on the output of other sectors. Sectors that have both $U_j > 1$ and $U_i > 1$ are considered key sectors in the economy.

Backward and forward linkage indices were calculated for the 40-sector regional tables of the three regions. TABLE 13 (In ANNEX) presents the classification of the sectors in the Brazilian regions based on the estimates of these indices. Key sectors for each region are shown at the upper right corner of the TABLE. In Brazil's North, six key sectors were identified: nonferrous metals (5), machinery (7), textiles (19), meat packing plants (24), electric, gas, and sanitary services (30), and construction (31). Both the nonferrous metals and the textiles sectors were also identified in the Northeast and Center-South as key sectors. Other key sectors in the Northeast are steel (4), paper products and printing (12), and petroleum refining (15). In the Center-South, key sectors are heavily associated with the heavy industry: steel (4), nonferrous metals (5), other metal products (6), machinery (7).

In addition to the estimates of U_j and U_i, TABLE 14, (In ANNEX) also shows the coefficients of variation of these indices[2]. They reveal comparative features related to the internal integration of the economies considered. For most of the sectors, the coefficients of variation are smaller in the Center-South, emphasizing the fact that the economic structure is more integrated at that region. The values for the Northeast, when compared to those for the North, also reveal a relatively more integrated economy.

3.1.2-Multiplier Product Matrix (MPM)

The concept of the multiplier product matrix (MPM) was developed by SONIS, GUO & HEWINGS (1994) as an alternative approach to the Rasmussen-Hirschman indices. The definition of the MPM is as follows: given the Leontief inverse, *B*, let $b._j$ and $b_i.$ be the column and row multipliers of the Leontief inverse, as above. Further, let $V = b..$ be the global intensity of the Leontief inverse. Then, the input-output MPM is defined as:

[2] The coefficients of variation show how the linkage effects spread over the other sectors and are defined by:

$$V._j = \frac{\sqrt{\frac{1}{n-1}\sum_i \left[b_{ij} - \left(b._j/n\right)\right]^2}}{b._j/n} \quad \text{and}$$

$$V_i. = \frac{\sqrt{\frac{1}{n-1}\sum_j \left[b_{ij} - \left(b_i./n\right)\right]^2}}{b_i./n}$$

The lower the value of $V._j$, the larger the number of sectors related to the intermediate demand induced by *j*; and the lower the value of $V_i.$, the more sectors are supplied by sector *i*, within the region.

$$M = \frac{1}{V}\left\|b_i.b._j\right\| = \frac{1}{V}\begin{pmatrix} b_1. \\ b_2. \\ \vdots \\ b_n. \end{pmatrix}\left(b._1 \quad b._2 \ \ldots \ b._n\right) \qquad (3)$$

It can be shown that the MPM has a cross structure; this cross structure can be exploited to reveal a hierarchy of transactions such that there is a cross (one row and column) in which the elements of this row (column) are larger than the corresponding elements of every other row (column). If this cross is now excluded, another cross with the same properties can be identified and the procedure repeated until all the rows and columns have been arranged. This new arrangement will be conducted in such a way that the centers of subsequent crosses will appear on the main diagonal, thereby providing a descending economic landscape.

An attempt was made to compare the economic structure of the Brazilian regions, by considering the hierarchy of backward and forward linkages – related to the column and row multipliers, respectively – and their economic landscape associated with the cross structure of the MPM. The results, depicted in GRAPH 1, in ANNEX 6, reveal the cross structure for the country and its three regions; the rows represent the hierarchy of forward linkages while the columns provide similar detail for the backward linkages. For purposes of comparison, the sectors in the regional economic landscapes were arranged in the same order as that for Brazil. Hence, the sectors with the higher backward linkages in the Brazilian economy as a whole are those that appear in the first columns of the matrix, while sectors with higher forward linkages occupy the first rows. If all the three regional economies had identical interindustry structures, then the regional economic landscapes would be as smooth as the one shown for Brazil. With the Brazilian sectoral hierarchy imposed on the regional economies, it can be seen that these economies do not have exactly the same linkage structure as the nation. However, for the Center-South, GRAPH 4, in ANNEX shows that three is a good fit between the imposed hierarchy of Brazil on the regional economy. A slight difference appears and shows that the sectoral connections are smoother in the country, suggesting that in the Center-South there are more dominant sectors than in the country as a whole. Sectoral dominance in the North and Northeast is even stronger, as it is apparent from the peaks in the respective landscapes. The visual impression obtained from these landscapes is that the regional economies appear to be rather more different in structure than the Rasmussen-Hirschman indices would lead one to suggest.

3.1.3 - Field of influence

The concept of field of influence was introduced and elaborated by SONIS & HEWINGS (1989 e 1993). It is mainly concerned with the problem of coefficient change, namely the influence of a change in one or more direct coefficients on the associated Leontief inverse. Since, given an economic system, some coefficients are more "influential" than others, the sector responsible for the greater changes in the economy can be determined. In the simplest case, i.e., the case in which a small enough change, e, occurs in only one input parameter, a_{ij}, the basic solution of the coefficient change problem may be presented as follows. Define:

$A = \left\|a_{ij}\right\|$ is the matrix of direct input coefficients;

$E = \left\|\varepsilon_{ij}\right\|$ is the matrix of incremental changes in the direct input coefficients;

$B = (I - A)^{-1} = \left\|b_{ij}\right\|$ is the Leontief inverse before changes;

$B(\varepsilon) = (I - A - E)^{-1} = \left\|b_{ij}(\varepsilon)\right\|$ is the Leontief inverse after changes.

Using the notion of inverse-important input coefficients, which is based on the conception of the field of influence associated with the change in only one input coefficient, assume that this change occurs in location (i_1, j_1), that is,

$$\varepsilon_{ij} = \begin{cases} \varepsilon & i = i_1, j = j_1 \\ 0 & i \neq i_1, j \neq j_1 \end{cases} \quad (4)$$

The field of influence can be derived from the approximate relation:

$$\varepsilon_{ij} = \begin{cases} \varepsilon & i = i_1, j = j_1 \\ 0 & i \neq i_1, j \neq j_1 \end{cases} \quad (5)$$

where $F(\mathrm{e}_{ij})$ is the matrix of the field of influence of the change on the input coefficient, a_{ij}. For every coefficient, a_{ij}, there will be an associated field of influence matrix. In order to determine which coefficients have the greater field of influence, reference is made to the rank-size ordering of the elements, S_{ij}, from the largest to the smallest ones. Therefore, for every matrix $F(\mathrm{e}_{ij})$, there will be an associated value given by:

$$S_{ij} = \sum_{k=1}^{n} \sum_{l=1}^{n} \left[f_{kl} \left(\varepsilon_{ij} \right) \right] \quad (6)$$

Thus, from the values of S_{ij}, a hierarchy can be developed of the direct coefficients based on their field of influence, i.e., ranking sectoral relations in terms of their sensitivity to changes, in a sense that they will be responsible for more significant impacts on the economy.

The estimates of the field of influence for the Brazilian regions show that the sectors which have the greatest values are agriculture (1) and textiles (19), in the North; agriculture (1) and meat packing plants (24), in the Northeast; and agriculture (1) and steel (4), in the Center-South. Textiles, in the North, and steel, in the Center-South, are also characterized as key sectors in the RASMUSSEN (1956) and HIRSCHMAN (1958) approach; agriculture presented the greatest forward linkage in the three regions, and meat packing plants presented the greatest backward linkage in the Northeast. Again, the field of influence approach reinforces the notion of the North as an economy with a more limited structure; the concentration of coefficients with highest field of influence presents a less dispersed pattern (FIGURES 2, 3, and 4 in ANNEX).

3.1.4-Pure linkage indices

The pure linkage approach was introduced by SONIS et al. (1995) as a refinement of the work of Cella-Clements for backward and forward linkages.[3] In contrast to the Rasmussen-Hirschman, and to the field of influence approaches, it does take into consideration the level of production in each sector, complementing, in a sense, the analysis of key sector determination in an economy.

The pure linkage approach may be summarized as follows. Consider the direct input coefficient matrix, A:

$$A = \begin{bmatrix} A_{jj} & A_{jr} \\ A_{rj} & A_{rr} \end{bmatrix} \quad (7)$$

where A_{jj} and A_{rr} are square matrices of direct inputs, respectively, within sector j and within the rest of the economy (economy less sector j); A_{jr} and A_{rj} are rectangular matrices showing , respectively, the direct inputs purchased by sector j from the rest of the economy, and the direct inputs purchased by the rest of the economy from sector j. Define the Leontief inverse as

$$B = (I - A)^{-1}, \quad (8)$$

and the internal Leontief inverse for the rest of the economy as

[3] See CELLA (1984) and CLEMENTS (1990) for a formal treatment of the subject, and CLEMENTS & Rossi (1990 e 1992) for an application to the Brazilian economy.

$$\Delta_r = \left(I - A_{rr}\right)^{-1} . \quad (9)$$

The Pure Backward Linkage (PBL) can be defined as

$$PBL = i'_{rr} \Delta_r A_{rj} q_j \quad (10)$$

where i'_{rr} is a unit row vector of the appropriate dimension, and q_j is the value of total production in sector *j*. The pure forward linkage can be defined as

$$PFL = A_{jr} \Delta_r q_r \quad (11)$$

where q_r is a column vector of total production in each sector in the rest of the economy.

The following interpretation of the indices may be provided: the PBL will give the pure impact on the economy of the value of the total production in sector *j*, i.e., the impact that is free from the demand of inputs that sector *j* makes from sector *j*, and the feedback from the economy to sector *j*, and *vice-versa*; the PFL will give the pure impact on sector *j* of the total production in the rest of the economy. Furthermore, the definition of (PTL) is given by the addition of the PBL to the PFL. Hence, in this approach, key sectors are considered as those with the largest values of PTL.

In the computation of pure linkage indices, the input coefficient matrix and the sectoral output vector for the respective economies were used. The output values are given in Cr$1 billion of 1985. Both the PBL and the PFL were estimated, which provided an estimate for the PTL (TABLE 15 in ANNEX). From the values obtained for the PTL, a hierarchy of the sectors was established for each region, from which the key sectors were selected.

Agriculture (1) and construction (31) were selected for the three regions, while petroleum refining (15) was selected for both the Northeast and the Center-South. Other sectors with high PTL include trade (32), business services (37), and transportation (33), in the North; mining (2), personal services (36), and meat packing plants (24), in the Northeast; other metal products (6), personal services (36), and transportation (33), in the Center-South. Services sectors in general presented above-average PTL in the three regions. These are the dominant sectors in the sense that they contribute significantly to changes in the level of the Gross Regional Product (GRP) and other macro-level measures of the respective economies.

3.2-Inter-regional Linkages

In this section, interdependence among sectors in different regions is considered through the analysis of the complete intermediate input portion of the inter-regional input-output table.[4] The direct input coefficient matrix considered is of the form:

$$A = \begin{bmatrix} A_{NN} & A_{NNE} & A_{NCS} \\ A_{NEN} & A_{NENE} & A_{NECS} \\ A_{CSN} & A_{CSNE} & A_{CSCS} \end{bmatrix} \quad (12)$$

where A_{NN}, A_{NENE}, and A_{CSCS} correspond to the intra-regional (domestic) inputs in the North, Northeast and Center-South, respectively; and A_{NNE}, A_{NCS}, A_{NEN}, A_{NECS}, A_{CSN}, and A_{CSNE} capture the system of inter-regional inputs.

The Leontief inverse matrix, $B = (I - A)^{-1}$, based on the system (12), will be considered, and some summary interpretations of the structure of the economy derived from it will be provided.

3.2.1-Multiplier analysis

The column multipliers derived from *B* were computed (MILLER & BLAIR, 1985). An output multiplier is defined for each sector *j*, in each region *r*, as the total value of production in all sectors and in all regions of the economy that is necessary in order to satisfy a dollar's worth of final demand for sector *j*'s output. The multiplier effect

[4] Foreign inputs are disregarded.

can be decomposed into intra-regional (internal multiplier) and inter-regional (external multiplier) effects, the former representing the impacts on the outputs of sectors within the region where the final demand change was generated, and the latter showing the impacts on the other regions of the system (inter-regional spillover effects).

TABLE 16, in ANNEX shows the direct and indirect effects of a unit change in final demand in each sector in each region net of the initial injection, i.e., the output multiplier effect net of the initial change. The entries are shown in percentage terms, providing insights into the degree of dependence of each sector in each region on the other regions. The Center-South is by far the most self-sufficient region; the flow-on effects from a unit change in sectoral final demand are always in excess of 85.0%. For the Northeast, there is a lower degree of intra-regional self-sufficiency, and the dominant inter-regional flows generated by the region usually end up in the Center-South. In the North, the degree of regional self-sufficiency is much lower, and the intra-regional flow-on effects, on the average, are lower than the total inter-regional effects. Again, the latter is largely directed to the Center-South, showing a large dependency of the North upon the more developed part of the country.

3.2.2-Output decomposition

A complementary analysis to the multiplier approach is presented in this section. Sectoral output in each region is decomposed, by taking into account not only the multiplier structure, but also the structure of final demand in the three regions (SONIS, HEWINGS & GUO, 1996).

In the inter-regional input-output model, output, X, is defined by $B \cdot f = X$, where f is the final demand vector. In the Brazilian table,

$$\begin{bmatrix} B_{NN} & B_{NNE} & B_{NCS} \\ B_{NEN} & B_{NENE} & B_{NECS} \\ B_{CSN} & B_{CSNE} & B_{CSCS} \end{bmatrix} \begin{bmatrix} f_N \\ f_{NE} \\ f_{CS} \end{bmatrix} = \begin{bmatrix} X_N \\ X_{NE} \\ X_{CS} \end{bmatrix} \quad (13)$$

which can be rewritten as

$$A = \begin{bmatrix} A_{NN} & A_{NNE} & A_{NCS} \\ A_{NEN} & A_{NENE} & A_{NECS} \\ A_{CSN} & A_{CSNE} & A_{CSCS} \end{bmatrix} \quad (14)$$

Define:

$$p_i = \frac{\alpha_i}{x_i}$$
$$q_i = \frac{\beta_i}{x_i} \quad (15)$$
$$r_i = \frac{\gamma_i}{x_i}$$

Each of these three components, p_i, q_i and r_i, defines the contribution of final demand from the North, Northeast, and Center-South, respectively, to the actual level of output in region i. Notice that $p_i + q_i + r_i = 1$.

Output for all the sectors in the three regions was decomposed, and the components p_i, q_i and r_i were calculated. The results are presented in TABLE 17, in ANNEX. On the average, the self-generated component of output in each region, i.e., the share of output generated by demand within the region, is lower in the North (78.32%) and higher in the Center-South (95.56%), reinforcing the previous conjecture of the higher dependency of the North upon the rest of the country (the value of the self-generated component for the Northeast was 87.86%). A sectoral pattern appears in which "local" goods, such as services in general, clothing, dairy products, and other consumer goods present a higher share of the self-generated component, in the three regions. For the North, the leading sectors, like agriculture and mining, are heavily dependent on demands from the Center-South. The same phenomenon occurs in the Northeast, in the petroleum refining and textiles sectors, for instance.

4-FINAL REMARKS

The focus of attention in the analysis performed thus far has been on comparisons of internal and external regional economic structures. The understanding of the functioning of the Brazilian regional economies within an integrated system is one of the main goals of this paper. By exploring different methods of comparative structure analysis, it is hoped that the complementarity among them might result in a better appreciation of the full dimensions of differences and similarities that exist among the three regions considered in this study.

The analysis provided for the North, Northeast, and Center-South suggests that there are some important differences in the internal structure of the regional economies and the external interactions among their different agents. As the absorption matrix used throughout the structural analysis serves as the basis for the calibration of the inter-regional CGE model, the understanding of the relationships underlying it is fundamental for a better understanding of the model's results. It is now important to verify the changes over time of this integrated system considering the impacts of the open policies of the 1990's.

Abstract

This paper describes the structure of the inter-regional input-output system for Brazil, which has been compiled as part of the development of an inter-regional Computable General Equilibrium (CGE) model for the country (HADDAD, 1997). The regional setting is comprised of three regional economies: North, Northeast, and Center-South. Traditional input-output methods are used in an attempt to uncover similarities and differences in the structure of the regional economies. By exploring different methods of comparative structure analysis, it is hoped that the complementarity among them might result in a better appreciation of the full dimensions of differences and similarities that exist among the three regions considered in this study in the pre-liberalization period.

Key-words

Regional Economies; Input-output, Economic Structure, Regional Analysis, Brazil.

5-CONSULTED BIBLIOGRAPHY

BNB. **Matriz de insumo-produto do Nordeste 1980 e 1985:** metodologia e resultados. Fortaleza, 1992.

CELLA, G. The input-output measurement of interindustry linkages. **Oxford Bulletin of Economics and Statistics**, v. 70, p. 705-712, 1984.

CHENERY, H. B., WATANABE, T. International comparisons of the structure of production. **Econometrica**, v. 26, n., p. 487-521, 958.

CLEMENTS, B. J. On the decomposition and normalization of interindustry linkages. **Economic Letters**, v. 33, n., p. 337-340, 1990.

CLEMENTS, B. J, Rossi, J. W. Interindustry linkages and economic development: the case of Brazil reconsidered. **The Developing Economies**, v. 29, n., p. 166-187, 1990.

CLEMENTS, B. J., ROSSI, J. W. Ligações interindustriais e setores-chave na economia brasileira. **Pesquisa e Planejamento Econômico**, v. 22, n., p. 101-124, 1992.

IBGE. **Matriz de insumo-produto Brasil - 1985**. Rio de Janeiro, 1995.

GUILHOTO, J. J. M. et al. **Comparative analysis of Brazilian regional economic structure**. Illinois: University of Illinois at Urban-Champaign, 1997. (Mimeog.).

HADDAD, E. A. **The economic structure of Minas Gerais:** an input-output approach. Illinois: University of Illinois at Urban-Champaign, 1995. Thesis.

HADDAD, E. A. **Regional inequality and structural changes in the Brazilian economy**. Illinois: University of Illinois at Urban-Champaign,. 1997. Dissertation.

HADDAD, E. A., HEWINGS, G. J. D. Trade Liberalization and regional competitiveness in the brazilian economy. In: ADVANCED STUDIES INSTITUTE IN REGIONAL SCIENCE, 11, 1998, München. **Anais...** München: Summer Institute, 1998.

HIRSCHMAN, A. O. **The strategy of economic development**. New Haven: Yale University Press,. 1958.

HULU, Edison, HEWINGS, Geoffrey J. D. The development and use of interregional input-output models for Indonesia under conditions of limited information. **Review of Urban and Regional Development Studies**, v. 5, n. 2, p. 135-153, 1993.

MILLER, R. E., BLAIR, P. D. **Input-output analysis:** foundations and extensions. Prentice Hall: Englewood Cliffs, 1985.

PETER, M. W. et al. **The theoretical structure of MONASH-MRF**. Clayton: Monash University, 1996. (Preliminary Working Paper, OP-85).

RASMUSSEN, P. N. **Studies in inter-sectoral relations**. Amsterdam: North Holland, 1956.

SONIS, M. et al. Linkages, key sectors and structural change: some new perspectives. **Developing Economies**, v. 33, n. 3, p. 233-270, 1995.

SONIS, M., GUO, J., HEWINGS, G. J. D. **Comparative analysis of China's metropolitan economies:** an input-output perspective. Illinois: University of Illinois at Urban-Champaign, 1994. (Discussion Paper REAL, 94-P-3).

SONIS, M., HEWINGS, G. J. D. Error and sensitivity input-output analysis: a new approach. In: MILLER, R. E. (Ed.),. POLENSKE, K. R. (Ed.),. ROSE, A. Z (Ed.). **Frontiers of input-output analysis**. New York: Oxford University Press, 1989.

SONIS, M., HEWINGS, G. J. D. Hierarchies of regional sub-structures and their multipliers within input-output systems: miyazawa revisited. **Hitotsubashi Journal of Economics**, v. 34, n. , p. 33-44, 1993

SONIS, M., HEWINGS, G. J. D., GUO, J. Sources of structural change in input-output systems: a field of influence approach. **Economic Systems Research**, v. 8, n. 1, p. 15-32, 1996.

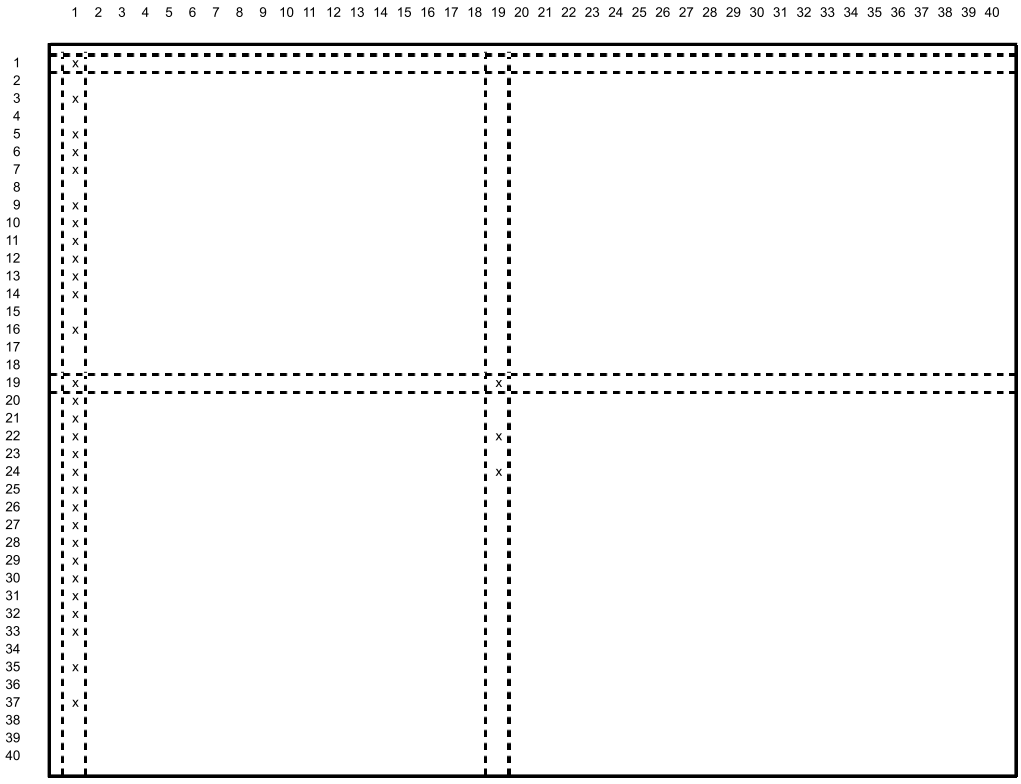
SUDAM. **Matriz de insumo-produto do Norte 1980 e 1985:** metodologia e resultados. Belém, 1994.

FIGURE 1
THE CGE CORE INPUT-OUTPUT DATA BASE: ABSORPTION MATRIX

			ABSORPTION MATRIX															
			1			**2**			**3**			**4**	**5**			**6**		
			Producers			Investors			Household			X	Regional Govt.			Federal Govt.		
		Size	40	40	40	40	40	40	1	1	1	1	1	1	1	1	1	1
	Size	Source	N	NE	CS	N	NE	CS	N	NE	CS		N	NE	CS	N	NE	CS
Basic Flows	40	N	BAS1			BAS2			BAS3			BAS4	BAS5			BAS6		
	40	NE																
	40	CS																
	40	IM																
Margins (Trade)	40	N	MAR1			MAR2			MAR3			MAR4	MAR5			MAR6		
	40	NE																
	40	CS																
	40	IM																
Margins (Trans.)	40	N	MAR1			MAR2			MAR3			MAR4	MAR5			MAR6		
	40	NE																
	40	CS																
	40	IM																
Taxes	40	N	TAX1			TAX2			TAX3			TAX4	TAX5			TAX6		
	40	NE																
	40	CS																
	40	IM																
Labor	3		LABR															
Capital	1		CPTL															
Land	1		LAND															
OCT	1		OCTS															

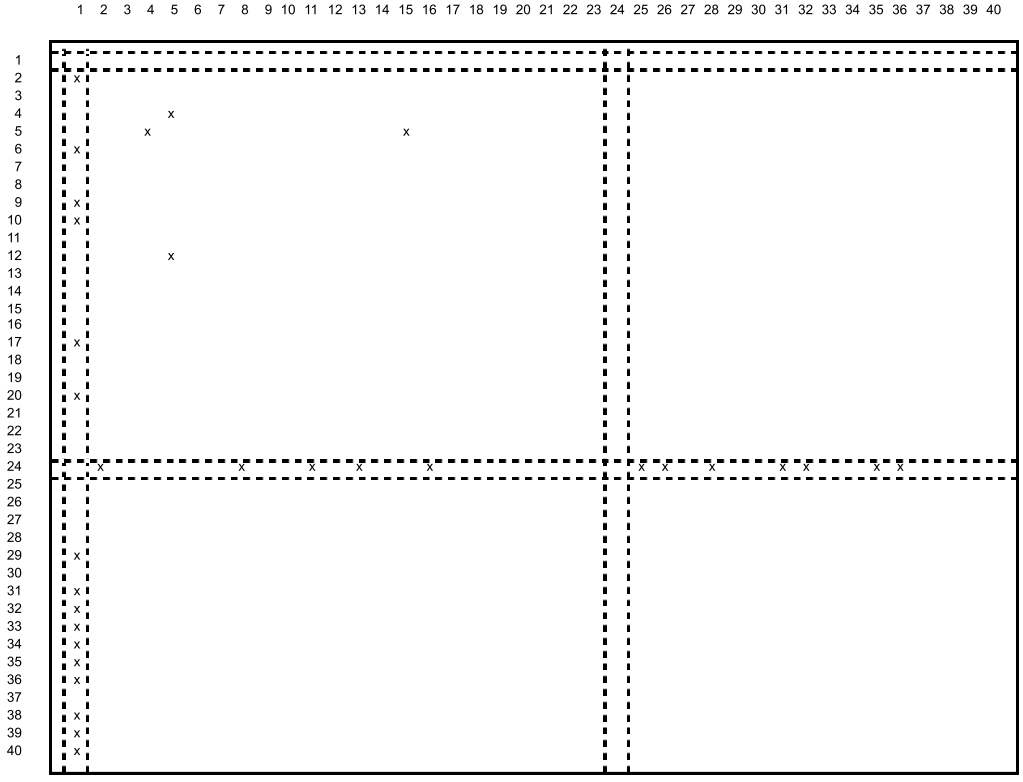
SOURCE: Elaboration of the Authors.
OCT = other cost “tickets”
Note: Adapted from PETER et al. (1996).

FIGURE 2
NORTH, 1985: COEFFICIENTS WITH THE LARGEST FIELD OF INFLUENCE



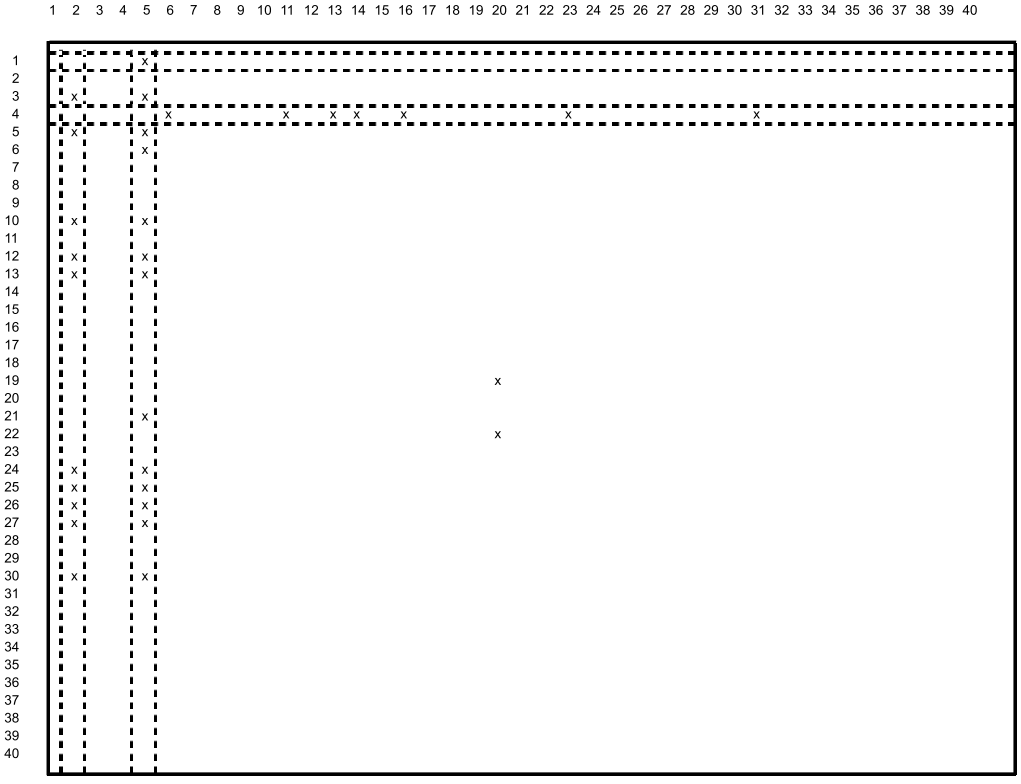
SOURTH: Elaboration of the Authors

FIGURE 3
NORTHEAST, 1985; COEFFICIENTS WITH THE LARGEST FIELD OF INFLUENCE



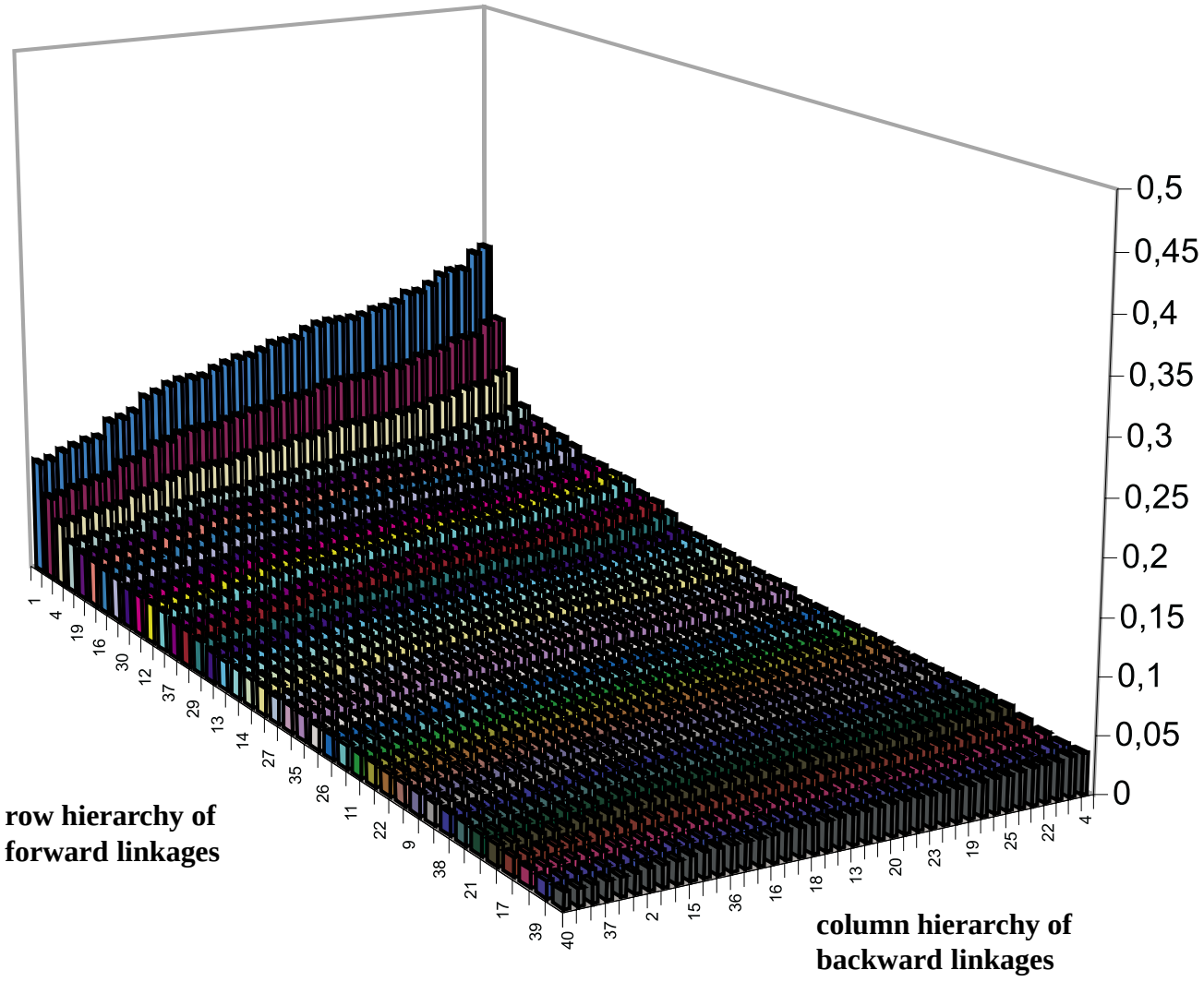
SOURTH: Elaboration of the Authors

FIGURE 4
CENTER-SOUTH, 1985: COEFFICIENTS WITH THE LARGEST FIELD OF INFLUENCE



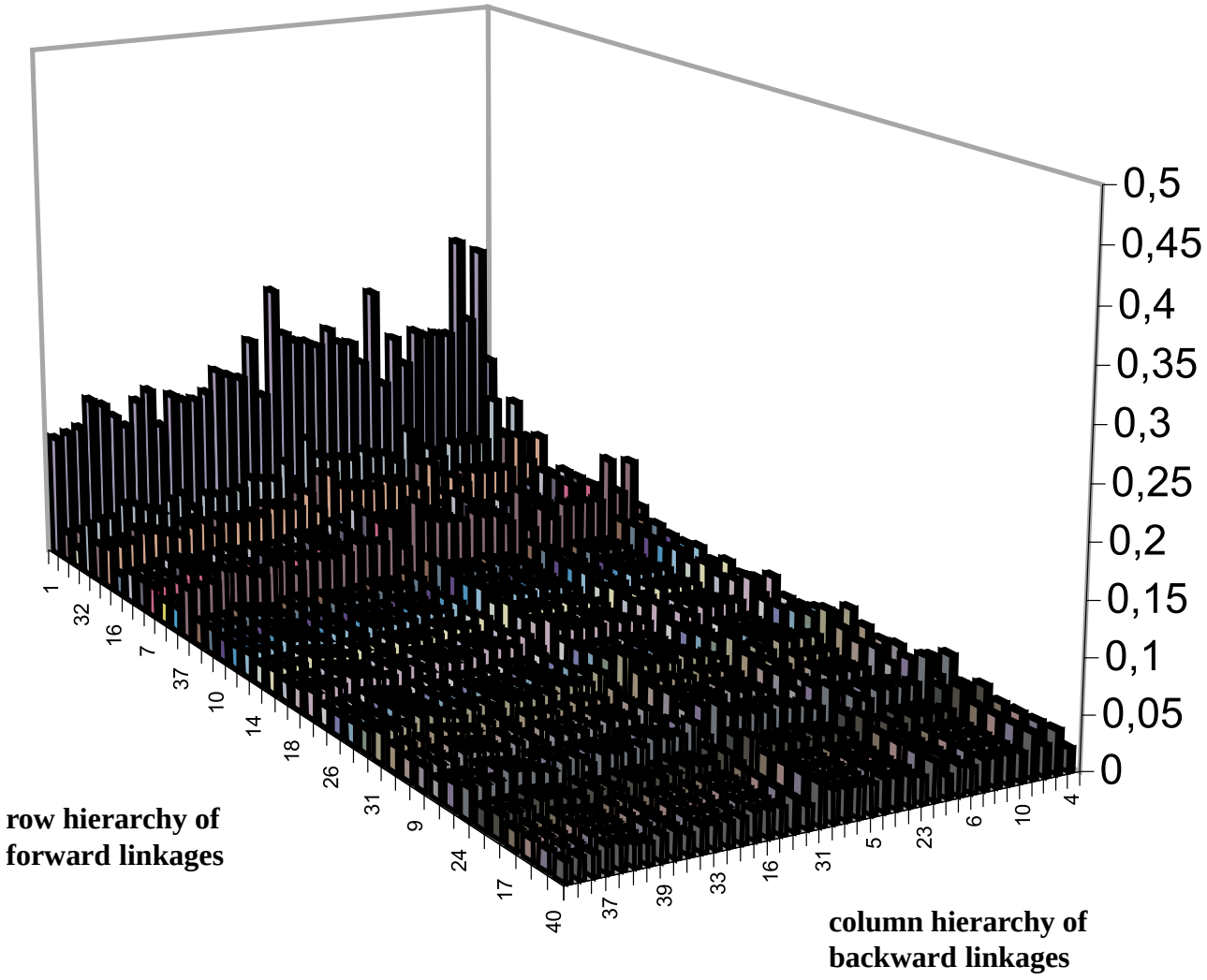
SOURTH: Elaboration of the Authors

GRAPH 1
BRAZIL, 1985: CROSS - STRUCTURE "LANDSCAPE" FOR FIRST ORDEM MPM



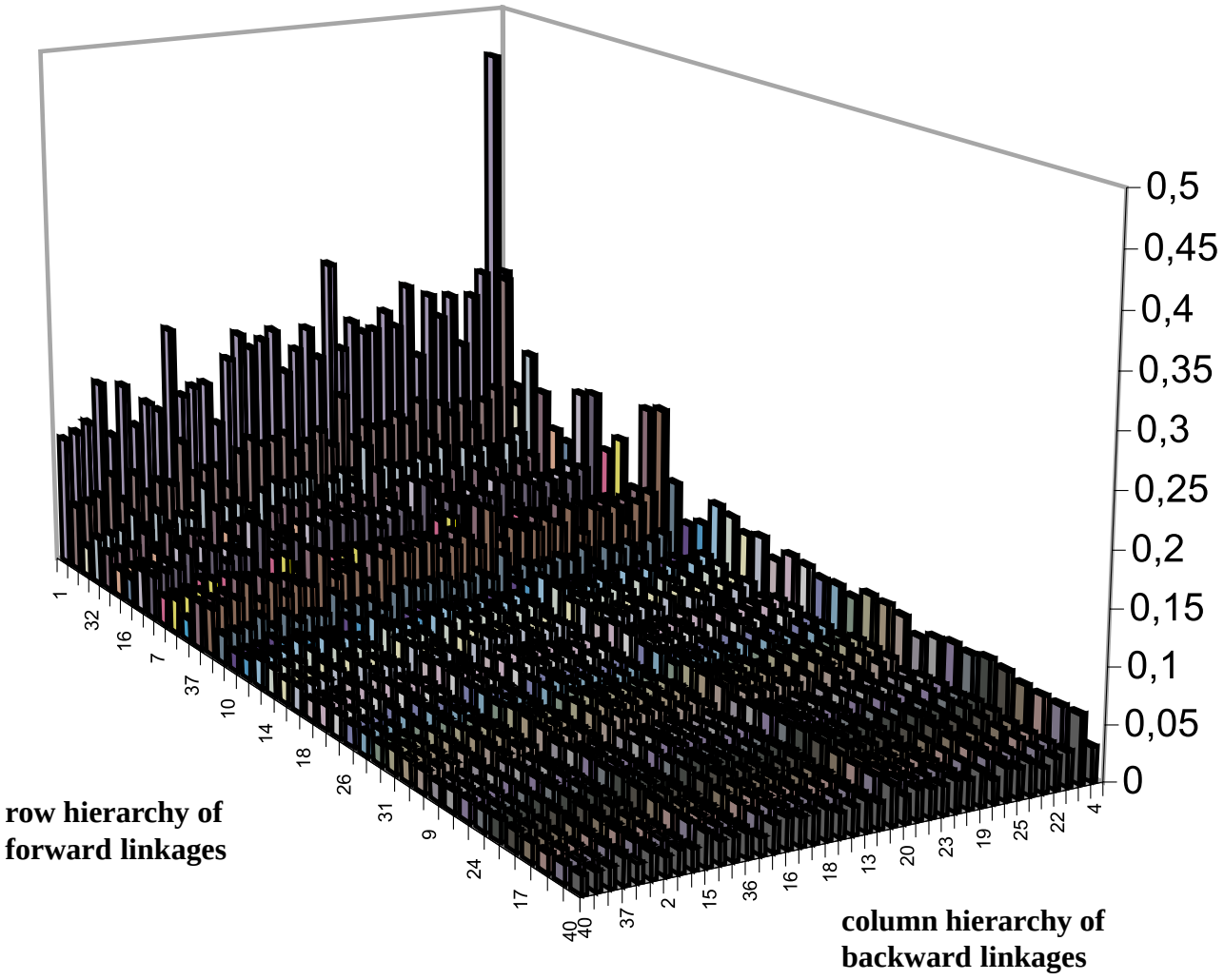
SOURTH: Elaboration of the Authors

GRAPH 2
NORTH, 1985: CROSS - STRUCTURE “LANDSCAPE” USING BRAZIL IMPOSED HIERARCHY



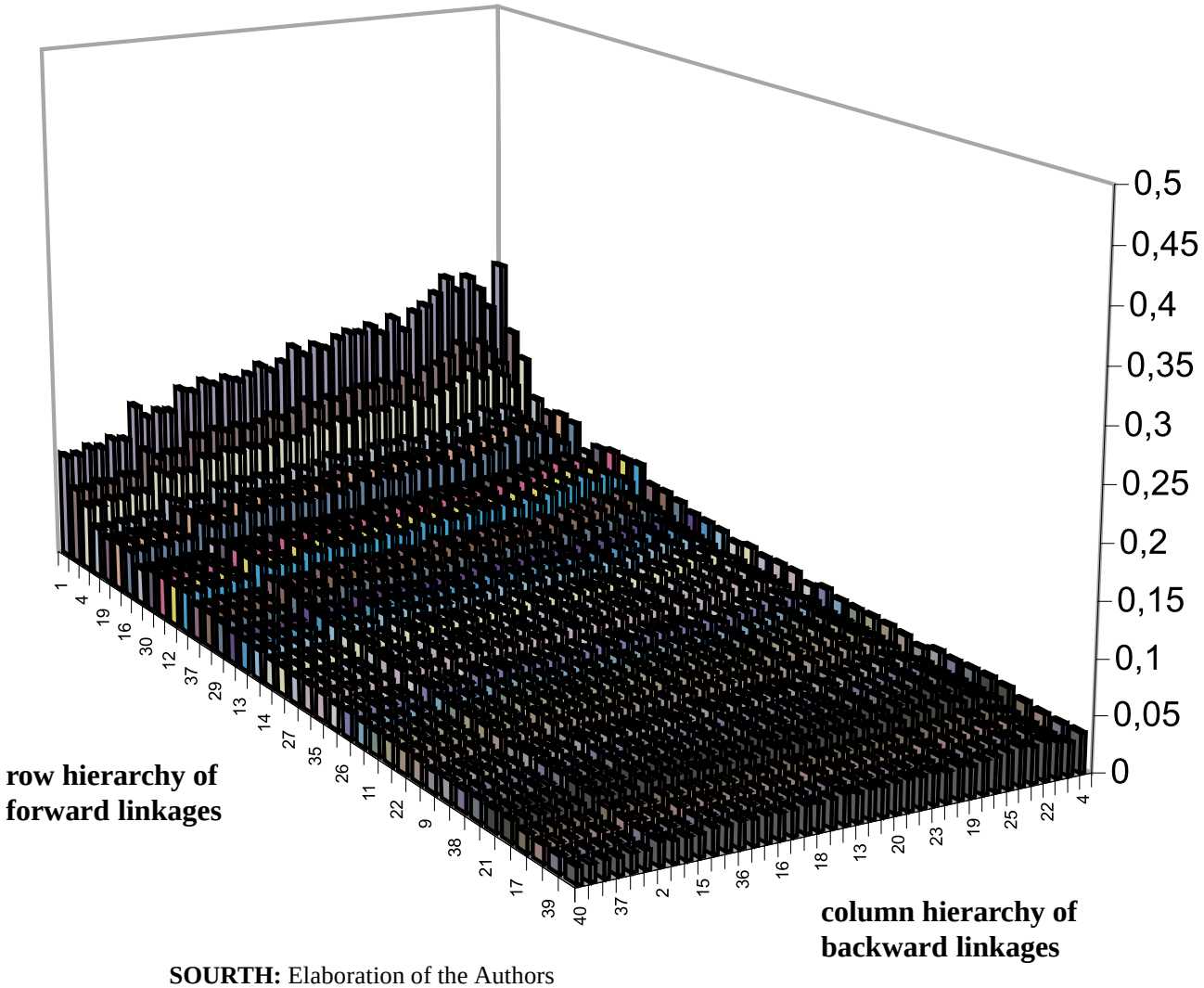
SOURTH: Elaboration of the Authors

GRAPH 3
NORTHEAST, 1985: CROSS - STRUCTURE "LANDSCAPE" USING BRAZIL IMPOSED HIERARCHY



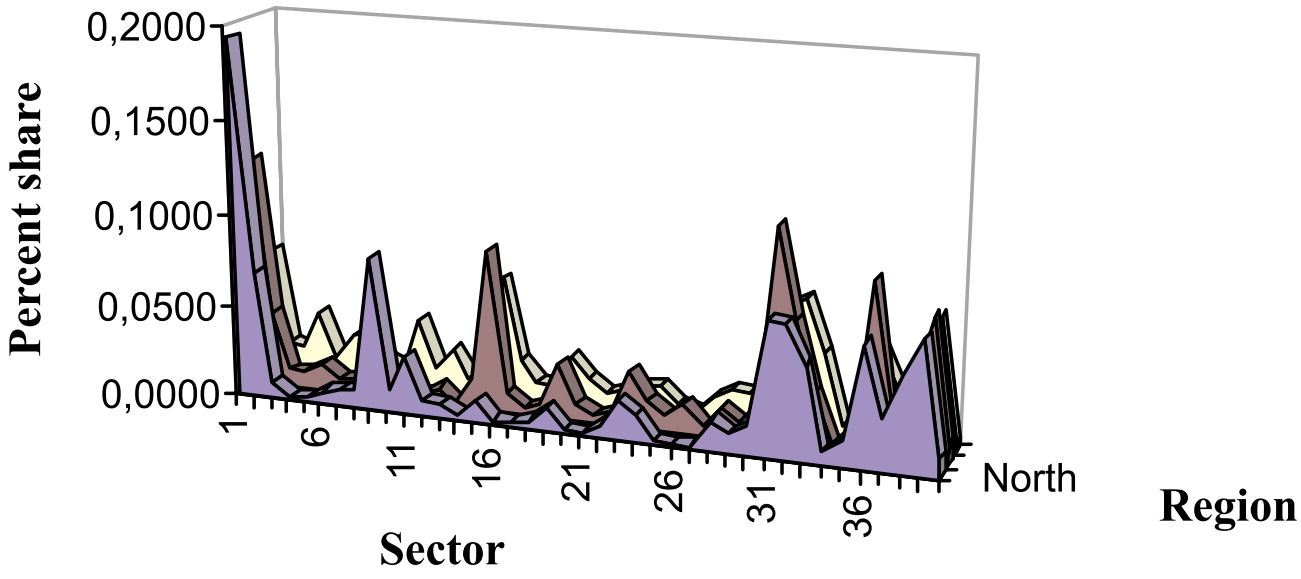
SOURTH: Elaboration of the Authors

GRAPH 4
CENTER - SOUTH, 1985: CROSS - STRUCTURE “LANDSCAPE” USING BRAZIL IMPOSED HIERARCHY



SOURTH: Elaboration of the Authors

GRAPH 5
SECTORAL SHARE OF CROSS OUTPUT, BY REGION, 1985



SOURTH: Elaboration of the Authors

TABLE 1

SALES STRUCTURE, BY USER AND DESTINATION: NORTH

COMMODITIES	SALES								
	Intermediate		Capital Creation		Household		Exports	Govermment	
	Regional	Rest of Brazil	Regional	Rest of Brazil	Regional	Rest of Brazil		Regional	Federal
S1 Agriculture	0,2864	0,4457	0,0324	0,0102	0,1034	0,0866	0,0353	0,0000	0,0000
S2 Mining	0,0948	0,5026	0,0000	0,0000	0,0000	0,0000	0,4026	0,0000	0,0000
S3 Nonmetallic Minerals	0,9049	0,0000	0,0000	0,0000	0,0951	0,0000	0,0000	0,0000	0,0000
S4 Steel	1,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
S5 Nonferrous Metals	0,7704	0,1106	0,0000	0,0000	0,1187	0,0003	0,0000	0,0000	0,0000
S6 Other Metal Products	0,7441	0,0000	0,0393	0,0000	0,1981	0,0000	0,0185	0,0000	0,0000
S7 Machinery	0,7036	0,0600	0,1376	0,0941	0,0000	0,0009	0,0038	0,0000	0,0000
S8 Electrical Equipment	0,1592	0,3157	0,0433	0,0914	0,2155	0,1705	0,0045	0,0000	0,0000
S9 Electronic Equipment	0,1487	0,1685	0,0138	0,2685	0,0608	0,3391	0,0005	0,0000	0,0000
S10 Transportation Equipment	0,2069	0,5600	0,0446	0,0321	0,0709	0,0609	0,0245	0,0000	0,0000
S11 Wood Products and Furniture	0,2430	0,2208	0,0182	0,0728	0,0665	0,1988	0,1799	0,0000	0,0000
S12 Paper Products and Printing	0,2088	0,1669	0,0029	0,0005	0,2577	0,0343	0,3288	0,0000	0,0000
S13 Rubber	0,3648	0,5921	0,0000	0,0000	0,0359	0,0072	0,0000	0,0000	0,0000
S14 Chemicals	0,3920	0,0000	0,0000	0,0000	0,6080	0,0000	0,0000	0,0000	0,0000
S15 Petroleum Refining	0,7341	0,0000	0,0000	0,0000	0,2622	0,0000	0,0037	0,0000	0,0000
S16 Other Chemicals	0,8516	0,0000	0,0000	0,0000	0,0625	0,0000	0,0859	0,0000	0,0000
S17 Pharmaceuticals and Veterinary	0,0748	0,0000	0,0000	0,0000	0,9252	0,0000	0,0000	0,0000	0,0000
S18 Plastics	0,8777	0,0000	0,0000	0,0000	0,1223	0,0000	0,0000	0,0000	0,0000
S19 Textiles	0,4678	0,0040	0,0000	0,0000	0,5027	0,0047	0,0208	0,0000	0,0000
S20 Clothing	0,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000
S21 Footwear	0,1745	0,0000	0,0000	0,0000	0,6024	0,0000	0,2231	0,0000	0,0000
S22 Coffee	0,2628	0,0416	0,0000	0,0000	0,5801	0,0326	0,0829	0,0000	0,0000
S23 Processed Vegetables	0,1077	0,1031	0,0000	0,0000	0,4686	0,2730	0,0476	0,0000	0,0000
S24 Meat Packing Plants	0,1729	0,0045	0,0000	0,0000	0,7433	0,0092	0,0701	0,0000	0,0000
S25 Dairy Products	0,0100	0,0000	0,0000	0,0000	0,9900	0,0000	0,0000	0,0000	0,0000
S26 Sugar	0,1445	0,0000	0,0000	0,0000	0,8555	0,0000	0,0000	0,0000	0,0000
S27 Vegetable Oil Mills	0,2211	0,2763	0,0000	0,0000	0,2585	0,0000	0,2441	0,0000	0,0000
S28 Other Food Products	0,2683	0,0650	0,0000	0,0000	0,5203	0,0780	0,0684	0,0000	0,0000
S29 Other Manufacturing	0,2791	0,2804	0,0034	0,0196	0,2897	0,1153	0,0124	0,0000	0,0000
S30 Electric, Gas, and Sanitary Services	0,6591	0,0000	0,0000	0,0000	0,3409	0,0000	0,0000	0,0000	0,0000
S31 Construction	0,3220	0,0000	0,6780	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
S32 Trade	0,3873	0,1199	0,0361	0,0124	0,2450	0,1643	0,0350	0,0000	0,0000
S33 Transportation	0,4424	0,1362	0,0043	0,0018	0,2919	0,0707	0,0527	0,0000	0,0000
S34 Communication	0,6342	0,0000	0,0000	0,0000	0,3594	0,0000	0,0064	0,0000	0,0000
S35 Financial Institutions	0,6013	0,0000	0,0000	0,0000	0,3938	0,0000	0,0049	0,0000	0,0000
S36 Personal Services	0,1051	0,0000	0,0000	0,0000	0,8949	0,0000	0,0000	0,0000	0,0000
S37 Business Services	0,8312	0,0000	0,1310	0,0000	0,0280	0,0000	0,0097	0,0000	0,0000
S38 Real Estate	0,1535	0,0000	0,0000	0,0000	0,8465	0,0000	0,0000	0,0000	0,0000
S39 Public Administration	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,6941	0,3059
S40 Community Services	0,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000
TOTAL	**0,2783**	**0,1796**	**0,0657**	**0,0297**	**0,2454**	**0,0775**	**0,0536**	**0,0487**	**0,0215**

SOURTH: Elaboration of the Authors

TABLE 2

COST STRUCTURE, BY USER AND SOURCE: NORTH

SECTORS	PURCHASES					
	Intermediate			Capital Creation		
	Regional	Rest of Brazil	Rest of the World	Regional	Rest of Brazil	Rest of the World
S1 Agriculture	0,6530	0,3432	0,0038	0,7590	0,2056	0,0354
S2 Mining	0,7223	0,2777	0,0000	0,5674	0,3542	0,0784
S3 Nonmetallic Minerals	0,7843	0,1951	0,0206	0,5239	0,3951	0,0811
S4 Steel	0,1868	0,8132	0,0000	0,0437	0,7962	0,1601
S5 Nonferrous Metals	0,5753	0,1171	0,3076	0,0392	0,7958	0,1650
S6 Other Metal Products	0,4243	0,5407	0,0350	0,1640	0,6995	0,1364
S7 Machinery	0,4994	0,4355	0,0651	0,0734	0,7704	0,1567
S8 Electrical Equipment	0,1848	0,0902	0,7250	0,5650	0,3547	0,0802
S9 Electronic Equipment	0,3649	0,3785	0,2566	0,6808	0,2578	0,0615
S10 Transportation Equipment	0,4744	0,4684	0,0572	0,9912	0,0072	0,0016
S11 Wood Products and Furniture	0,9116	0,0848	0,0036	0,7707	0,1873	0,0421
S12 Paper Products and Printing	0,7431	0,2389	0,0180	0,8138	0,1507	0,0355
S13 Rubber	0,8964	0,0493	0,0544	0,4022	0,4839	0,1139
S14 Chemicals	0,9065	0,0768	0,0167	0,7082	0,2501	0,0413
S15 Petroleum Refining	0,0976	0,4039	0,4984	0,7083	0,2501	0,0415
S16 Other Chemicals	0,3902	0,5970	0,0128	0,0487	0,7897	0,1607
S17 Pharmaceuticals and Veterinary	0,4442	0,4592	0,0966	0,4866	0,4210	0,0924
S18 Plastics	0,2920	0,6539	0,0541	0,4329	0,4627	0,1044
S19 Textiles	0,7750	0,2015	0,0235	0,0650	0,7757	0,1593
S20 Clothing	0,7294	0,2550	0,0155	0,1962	0,6730	0,1310
S21 Footwear	0,7777	0,2044	0,0179	0,3124	0,5758	0,1118
S22 Coffee	0,9843	0,0157	0,0000	0,3944	0,5172	0,0885
S23 Processed Vegetables	0,7603	0,1119	0,1278	0,6558	0,2849	0,0593
S24 Meat Packing Plants	0,9929	0,0071	0,0000	0,6578	0,2792	0,0630
S25 Dairy Products	1,0000	0,0000	0,0000	0,2280	0,6493	0,1227
S26 Sugar	0,7427	0,2573	0,0000	0,7084	0,2504	0,0416
S27 Vegetable Oil Mills	1,0000	0,0000	0,0000	0,2383	0,6365	0,1252
S28 Other Food Products	0,7061	0,2857	0,0082	0,5076	0,4107	0,0817
S29 Other Manufacturing	0,5748	0,3297	0,0955	0,6154	0,3125	0,0721
S30 Electric, Gas, and Sanitary Services	0,5760	0,4202	0,0037	0,5041	0,4236	0,0723
S31 Construction	0,3471	0,6411	0,0118	0,3761	0,5171	0,1068
S32 Trade	0,7279	0,2652	0,0069	0,6776	0,2910	0,0314
S33 Transportation	0,3137	0,6603	0,0260	0,1323	0,7986	0,0692
S34 Communication	0,5469	0,4407	0,0124	0,2790	0,6086	0,1123
S35 Financial Institutions	0,8388	0,1612	0,0000	0,9774	0,0185	0,0041
S36 Personal Services	0,6156	0,3612	0,0232	0,5844	0,3754	0,0401
S37 Business Services	0,6944	0,2545	0,0511	0,1283	0,7339	0,1380
S38 Real Estate	0,9562	0,0438	0,0000	0,1713	0,7405	0,0880
S39 Public Administration	0,7155	0,2713	0,0132	0,8591	0,1252	0,0157
S40 Community Services	0,6998	0,2806	0,0196	0,7083	0,2501	0,0415
TOTAL	**0,5410**	**0,4061**	**0,0529**	**0,7177**	**0,2419**	**0,0404**

SOURTH: Elaboration of the Authors

TABLE 3

HOUSEHOLD CONSUMPTION AND TOTAL CONSUMPTION OF COMMODITIES, BY SOURCES: NORTH

COMMODITIES	PURCHASES					
	Household			Total		
	Regional	Rest of Brazil	Rest of the World	Regional	Rest of Brazil	Rest of the World
S1 Agriculture	0,9155	0,0794	0,0052	0,9636	0,0232	0,0132
S2 Mining	0,0000	0,0000	0,0000	0,5904	0,2422	0,1674
S3 Nonmetallic Minerals	0,7374	0,1717	0,0909	0,1890	0,8007	0,0103
S4 Steel	0,0000	0,0000	0,0000	0,0784	0,8883	0,0334
S5 Nonferrous Metals	0,5379	0,2968	0,1653	0,5202	0,2717	0,2081
S6 Other Metal Products	0,3690	0,6103	0,0207	0,2368	0,7496	0,0136
S7 Machinery	0,0000	1,0000	0,0000	0,3104	0,6324	0,0572
S8 Electrical Equipment	0,4772	0,1449	0,3778	0,1613	0,5460	0,2928
S9 Electronic Equipment	0,8991	0,0020	0,0989	0,4252	0,3003	0,2744
S10 Transportation Equipment	0,1191	0,8550	0,0260	0,1447	0,7951	0,0602
S11 Wood Products and Furniture	0,4391	0,5586	0,0023	0,6859	0,3126	0,0015
S12 Paper Products and Printing	0,3973	0,5969	0,0059	0,4064	0,5881	0,0055
S13 Rubber	0,8000	0,0000	0,2000	0,4743	0,4684	0,0573
S14 Chemicals	0,4102	0,5898	0,0000	0,3222	0,6034	0,0745
S15 Petroleum Refining	0,4581	0,5419	0,0000	0,3199	0,6730	0,0071
S16 Other Chemicals	0,0699	0,9001	0,0300	0,0675	0,9274	0,0051
S17 Pharmaceuticals and Veterinary	0,2373	0,7520	0,0107	0,1554	0,8372	0,0074
S18 Plastics	0,4665	0,5007	0,0328	0,3369	0,6390	0,0241
S19 Textiles	0,7582	0,2245	0,0173	0,7620	0,2224	0,0156
S20 Clothing	0,0665	0,9198	0,0138	0,0663	0,9200	0,0137
S21 Footwear	0,0802	0,9079	0,0119	0,1010	0,8874	0,0116
S22 Coffee	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S23 Processed Vegetables	0,7796	0,2204	0,0000	0,8051	0,1949	0,0000
S24 Meat Packing Plants	0,8966	0,1006	0,0028	0,9005	0,0973	0,0023
S25 Dairy Products	0,1992	0,7928	0,0080	0,1922	0,8001	0,0077
S26 Sugar	0,1881	0,8119	0,0000	0,1811	0,8189	0,0000
S27 Vegetable Oil Mills	0,0446	0,9554	0,0000	0,0570	0,9430	0,0000
S28 Other Food Products	0,6209	0,3686	0,0105	0,6694	0,3212	0,0094
S29 Other Manufacturing	0,6154	0,1082	0,2764	0,5667	0,2623	0,1710
S30 Electric, Gas, and Sanitary Services	0,6482	0,3518	0,0000	0,5893	0,4107	0,0000
S31 Construction	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S32 Trade	0,9992	0,0008	0,0000	0,9868	0,0057	0,0075
S33 Transportation	0,9058	0,0000	0,0942	0,9194	0,0000	0,0806
S34 Communication	1,0000	0,0000	0,0000	0,9482	0,0503	0,0015
S35 Financial Institutions	0,9898	0,0000	0,0102	0,9919	0,0000	0,0081
S36 Personal Services	0,8123	0,1868	0,0009	0,7992	0,2000	0,0008
S37 Business Services	0,9231	0,0641	0,0128	0,7725	0,2206	0,0069
S38 Real Estate	0,9826	0,0174	0,0000	0,9447	0,0553	0,0000
S39 Public Administration	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S40 Community Services	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
TOTAL	**0,6996**	**0,2823**	**0,0182**	**0,6474**	**0,3170**	**0,0356**

SOURTH: Elaboration of the Authors

TABLE 4
SELECTED STRUCTURAL INDICATORS: NORTH

SECTORS	Capital + Labor/ Total Costs*	Capital + Labor Ratio	OUTPUT SHARE			INTERREGIONAL EXPORTS	
			Regional	National	Sectoral	Northeast	Center-South
S1 Agriculture	0,2876	0,7657	0,1946	0,0074	0,0914	0,0209	0,9791
S2 Mining	0,5953	1,5939	0,0686	0,0026	0,1148	0,0020	0,9980
S3 Nonmetallic Minerals	0,4496	0,5320	0,0084	0,0003	0,0225	0,0000	0,0000
S4 Steel	0,1777	0,6234	0,0005	0,0000	0,0006	0,0000	0,0000
S5 Nonferrous Metals	0,1044	0,7064	0,0027	0,0001	0,0088	0,0032	0,9968
S6 Other Metal Products	0,3345	0,2050	0,0059	0,0002	0,0102	0,0000	0,0000
S7 Machinery	0,2117	0,2597	0,0087	0,0003	0,0132	1,0000	0,0000
S8 Electrical Equipment	0,3291	0,1568	0,0097	0,0004	0,0308	0,0729	0,9271
S9 Electronic Equipment	0,2114	0,7118	0,0826	0,0031	0,2509	0,0074	0,9926
S10 Transportation Equipment	0,2251	0,8879	0,0121	0,0005	0,0140	0,0197	0,9803
S11 Wood Products and Furniture	0,4037	0,1122	0,0315	0,0012	0,0953	0,0573	0,9427
S12 Paper Products and Printing	0,3440	0,4249	0,0086	0,0003	0,0151	0,0637	0,9363
S13 Rubber	0,2530	1,8115	0,0061	0,0002	0,0307	0,0738	0,9262
S14 Chemicals	0,2507	0,1563	0,0022	0,0001	0,0064	0,0000	0,0000
S15 Petroleum Refining	0,1433	0,6684	0,0119	0,0004	0,0067	0,0000	0,0000
S16 Other Chemicals	0,1937	0,2578	0,0014	0,0001	0,0028	0,0000	0,0000
S17 Pharmaceuticals and Veterinary	0,2340	0,1652	0,0016	0,0001	0,0061	0,0000	0,0000
S18 Plastics	0,4284	0,9517	0,0037	0,0001	0,0160	0,0000	0,0000
S19 Textiles	0,2882	0,5156	0,0127	0,0005	0,0174	0,8751	0,1249
S20 Clothing	0,2914	0,3584	0,0012	0,0000	0,0031	0,0000	0,0000
S21 Footwear	0,2564	0,4662	0,0010	0,0000	0,0042	0,0000	0,0000
S22 Coffee	0,1058	1,6489	0,0068	0,0003	0,0229	0,0020	0,9980
S23 Processed Vegetables	0,1983	0,5411	0,0210	0,0008	0,0434	0,0125	0,9875
S24 Meat Packing Plants	0,1186	0,7575	0,0141	0,0005	0,0321	0,7835	0,2165
S25 Dairy Products	0,2418	0,4091	0,0011	0,0000	0,0055	0,0000	0,0000
S26 Sugar	0,1833	0,6121	0,0011	0,0000	0,0060	0,0000	0,0000
S27 Vegetable Oil Mills	0,4036	0,1620	0,0008	0,0000	0,0024	1,0000	0,0000
S28 Other Food Products	0,3028	0,3282	0,0159	0,0006	0,0320	0,0288	0,9712
S29 Other Manufacturing	0,2822	0,9625	0,0097	0,0004	0,0218	0,1040	0,8960
S30 Electric, Gas, and Sanitary Services	0,4315	0,8158	0,0151	0,0006	0,0267	0,0000	0,0000
S31 Construction	0,1560	0,2381	0,0719	0,0027	0,0367	0,0000	0,0000
S32 Trade	0,4445	0,1351	0,0703	0,0027	0,0369	0,0000	1,0000
S33 Transportation	0,3814	0,5321	0,0504	0,0019	0,0437	0,0143	0,9857
S34 Communication	0,6659	1,0934	0,0069	0,0003	0,0395	0,0000	0,0000
S35 Financial Institutions	0,7375	0,2792	0,0135	0,0005	0,0325	0,0000	0,0000
S36 Personal Services	0,5483	0,3772	0,0650	0,0025	0,0440	0,0000	0,0000
S37 Business Services	0,3350	0,6701	0,0282	0,0011	0,0379	0,0000	0,0000
S38 Real Estate	0,9395	36,9059	0,0521	0,0020	0,0845	0,0000	0,0000
S39 Public Administration	0,7694	0,1629	0,0702	0,0027	0,0373	0,0000	0,0000
S40 Community Services	0,9457	0,1139	0,0105	0,0004	0,0787	0,0000	0,0000
TOTAL	**0,4032**	**0,5827**	**1,0000**	**0,0378**	**0,0378**	**0,0249**	**0,9751**

SOURTH: Elaboration of the Authors

TABLE 5

SALES STRUCTURE, BY USER AND DESTINATION: NORTHEAST

COMMODITIES	SALES								
	Intermediate		Capital Creation		Household		Exports	Govermment	
	Regional	Rest of Brazil	Regional	Rest of Brazil	Regional	Rest of Brazil		Regional	Federal
S1 Agriculture	0,6863	0,0356	0,0248	0,0017	0,2054	0,0166	0,0297	0,0000	0,0000
S2 Mining	0,6501	0,3279	0,0000	0,0000	0,0000	0,0000	0,0221	0,0000	0,0000
S3 Nonmetallic Minerals	0,9265	0,0173	0,0190	0,0000	0,0361	0,0000	0,0011	0,0000	0,0000
S4 Steel	0,4528	0,3143	0,0000	0,0000	0,0000	0,0000	0,2329	0,0000	0,0000
S5 Nonferrous Metals	0,7555	0,0467	0,0000	0,0000	0,1397	0,0010	0,0572	0,0000	0,0000
S6 Other Metal Products	0,3917	0,3186	0,0214	0,0074	0,2208	0,0376	0,0025	0,0000	0,0000
S7 Machinery	0,7321	0,0137	0,1726	0,0673	0,0086	0,0001	0,0057	0,0000	0,0000
S8 Electrical Equipment	0,3709	0,1521	0,0186	0,0487	0,3539	0,0427	0,0131	0,0000	0,0000
S9 Electronic Equipment	0,0318	0,0434	0,8469	0,0000	0,0779	0,0000	0,0000	0,0000	0,0000
S10 Transportation Equipment	0,3838	0,3892	0,0000	0,0443	0,1132	0,0523	0,0172	0,0000	0,0000
S11 Wood Products and Furniture	0,4416	0,0105	0,0000	0,0064	0,5187	0,0222	0,0006	0,0000	0,0000
S12 Paper Products and Printing	0,8483	0,0056	0,0000	0,0000	0,1420	0,0000	0,0041	0,0000	0,0000
S13 Rubber	0,6114	0,2042	0,0000	0,0000	0,1829	0,0016	0,0000	0,0000	0,0000
S14 Chemicals	0,3890	0,2418	0,0000	0,0000	0,3500	0,0000	0,0191	0,0000	0,0000
S15 Petroleum Refining	0,5005	0,2695	0,0000	0,0000	0,1209	0,0048	0,1043	0,0000	0,0000
S16 Other Chemicals	0,6311	0,1909	0,0000	0,0000	0,0368	0,0182	0,1231	0,0000	0,0000
S17 Pharmaceuticals and Veterinary	0,1432	0,0308	0,0000	0,0000	0,6980	0,1271	0,0008	0,0000	0,0000
S18 Plastics	0,5747	0,1959	0,0000	0,0000	0,1337	0,0232	0,0726	0,0000	0,0000
S19 Textiles	0,4692	0,2645	0,0000	0,0000	0,1518	0,0252	0,0892	0,0000	0,0000
S20 Clothing	0,0261	0,0003	0,0000	0,0000	0,9162	0,0541	0,0034	0,0000	0,0000
S21 Footwear	0,1911	0,0164	0,0000	0,0000	0,5368	0,1305	0,1251	0,0000	0,0000
S22 Coffee	0,2521	0,0000	0,0000	0,0000	0,7479	0,0000	0,0000	0,0000	0,0000
S23 Processed Vegetables	0,1143	0,0467	0,0000	0,0000	0,5466	0,0506	0,2419	0,0000	0,0000
S24 Meat Packing Plants	0,0850	0,0053	0,0000	0,0000	0,8997	0,0096	0,0004	0,0000	0,0000
S25 Dairy Products	0,1399	0,0634	0,0000	0,0000	0,6764	0,1202	0,0000	0,0000	0,0000
S26 Sugar	0,1895	0,0018	0,0000	0,0000	0,1561	0,0072	0,6455	0,0000	0,0000
S27 Vegetable Oil Mills	0,4495	0,1277	0,0000	0,0000	0,2126	0,0846	0,1256	0,0000	0,0000
S28 Other Food Products	0,2705	0,0163	0,0000	0,0000	0,6166	0,0400	0,0566	0,0000	0,0000
S29 Other Manufacturing	0,8538	0,0410	0,0000	0,0130	0,0666	0,0203	0,0052	0,0000	0,0000
S30 Electric, Gas, and Sanitary Services	0,7766	0,0000	0,0000	0,0000	0,2234	0,0000	0,0000	0,0000	0,0000
S31 Construction	0,0895	0,0000	0,9105	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
S32 Trade	0,3989	0,1383	0,0259	0,0167	0,1225	0,2494	0,0484	0,0000	0,0000
S33 Transportation	0,4163	0,0520	0,0070	0,0007	0,3680	0,1342	0,0218	0,0000	0,0000
S34 Communication	0,8094	0,0000	0,0000	0,0000	0,1906	0,0000	0,0000	0,0000	0,0000
S35 Financial Institutions	0,8298	0,0000	0,0000	0,0000	0,1702	0,0000	0,0000	0,0000	0,0000
S36 Personal Services	0,1297	0,0348	0,0000	0,0000	0,7183	0,1173	0,0000	0,0000	0,0000
S37 Business Services	0,9690	0,0000	0,0000	0,0000	0,0310	0,0000	0,0000	0,0000	0,0000
S38 Real Estate	0,1186	0,0000	0,0000	0,0000	0,8814	0,0000	0,0000	0,0000	0,0000
S39 Public Administration	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,6929	0,3071
S40 Community Services	0,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000
TOTAL	**0,3756**	**0,0816**	**0,1134**	**0,0024**	**0,2640**	**0,0403**	**0,0449**	**0,0538**	**0,0239**

SOURTH: Elaboration of the Authors

TABLE 6

COST STRUCTURE, BY USER AND SOURCE: NORTHEAST

COMMODITIES	PURCHASES					
	Intermediate			Capital Creation		
	Regional	Rest of Brazil	Rest of the World	Regional	Rest of Brazil	Rest of the World
S1 Agriculture	0,7996	0,1941	0,0064	0,9446	0,0530	0,0024
S2 Mining	0,8148	0,0749	0,1103	0,9695	0,0282	0,0023
S3 Nonmetallic Minerals	0,9034	0,0937	0,0029	0,9448	0,0523	0,0029
S4 Steel	0,7438	0,2293	0,0269	0,9695	0,0288	0,0017
S5 Nonferrous Metals	0,7812	0,1829	0,0359	0,9738	0,0245	0,0017
S6 Other Metal Products	0,5980	0,4004	0,0016	0,3951	0,5807	0,0242
S7 Machinery	0,4487	0,4724	0,0789	0,8223	0,1685	0,0092
S8 Electrical Equipment	0,7830	0,1799	0,0370	0,9724	0,0258	0,0018
S9 Electronic Equipment	0,1306	0,5976	0,2717	0,0322	0,9067	0,0612
S10 Transportation Equipment	0,4456	0,5324	0,0220	0,6274	0,3532	0,0195
S11 Wood Products and Furniture	0,7002	0,2998	0,0000	0,6643	0,3175	0,0182
S12 Paper Products and Printing	0,7544	0,2294	0,0162	0,4076	0,5594	0,0330
S13 Rubber	0,6752	0,2550	0,0698	0,6693	0,3055	0,0252
S14 Chemicals	0,7766	0,2144	0,0090	0,9545	0,0416	0,0040
S15 Petroleum Refining	0,8731	0,1039	0,0230	0,9402	0,0555	0,0043
S16 Other Chemicals	0,6535	0,2634	0,0832	0,9532	0,0442	0,0026
S17 Pharmaceuticals and Veterinary	0,4889	0,4814	0,0298	0,9238	0,0710	0,0052
S18 Plastics	0,8646	0,1222	0,0132	0,9744	0,0240	0,0017
S19 Textiles	0,8497	0,1496	0,0006	0,9032	0,0911	0,0057
S20 Clothing	0,6894	0,3106	0,0000	0,9075	0,0880	0,0045
S21 Footwear	0,5337	0,4615	0,0048	0,9221	0,0742	0,0038
S22 Coffee	0,7689	0,2311	0,0000	0,8295	0,1661	0,0044
S23 Processed Vegetables	0,6903	0,2050	0,1046	0,9120	0,0830	0,0051
S24 Meat Packing Plants	0,9621	0,0379	0,0000	0,9236	0,0728	0,0037
S25 Dairy Products	0,9182	0,0818	0,0000	0,8010	0,1903	0,0086
S26 Sugar	0,9719	0,0281	0,0000	0,9431	0,0540	0,0028
S27 Vegetable Oil Mills	0,7371	0,2601	0,0028	0,9486	0,0489	0,0025
S28 Other Food Products	0,8814	0,1042	0,0144	0,9080	0,0881	0,0039
S29 Other Manufacturing	0,9274	0,0726	0,0000	0,8586	0,1326	0,0088
S30 Electric, Gas, and Sanitary Services	0,9330	0,0640	0,0030	0,9559	0,0407	0,0035
S31 Construction	0,7067	0,2886	0,0047	0,9414	0,0555	0,0031
S32 Trade	0,6889	0,3109	0,0002	0,7884	0,2094	0,0022
S33 Transportation	0,6587	0,3387	0,0026	0,8307	0,1678	0,0015
S34 Communication	0,8042	0,1887	0,0071	0,8060	0,1781	0,0159
S35 Financial Institutions	0,9167	0,0833	0,0000	0,9912	0,0083	0,0005
S36 Personal Services	0,6920	0,3060	0,0019	0,9520	0,0475	0,0005
S37 Business Services	0,8795	0,1202	0,0003	0,6418	0,3454	0,0129
S38 Real Estate	0,9933	0,0056	0,0011	0,9979	0,0021	0,0000
S39 Public Administration	0,8782	0,1204	0,0014	0,9826	0,0166	0,0008
S40 Community Services	0,8508	0,1448	0,0044	0,9367	0,0611	0,0022
TOTAL	**0,7991**	**0,1846**	**0,0164**	**0,9375**	**0,0603**	**0,0022**

SOURTH: Elaboration of the Authors

TABLE 7

HOUSEHOLD CONSUMPTION AND TOTAL CONSUMPTION OF COMMODITIES, BY SOURCE: NORTHEASTZ

COMMODITIES	PURCHASES					
	Household			Total		
	Regional	Rest of Brazil	Rest of the World	Regional	Rest of Brazil	Rest of the World
S1 Agriculture	0,9184	0,0810	0,0006	0,9095	0,0731	0,0174
S2 Mining	0,0000	0,0000	0,0000	0,9115	0,0239	0,0646
S3 Nonmetallic Minerals	0,3513	0,6380	0,0108	0,5728	0,4265	0,0006
S4 Steel	0,0000	0,0000	0,0000	0,5143	0,4829	0,0027
S5 Nonferrous Metals	1,0000	0,0000	0,0000	0,9974	0,0008	0,0018
S6 Other Metal Products	0,9821	0,0179	0,0000	0,6201	0,3647	0,0153
S7 Machinery	0,0781	0,3086	0,6134	0,5127	0,3995	0,0878
S8 Electrical Equipment	0,3876	0,4882	0,1242	0,4704	0,4255	0,1042
S9 Electronic Equipment	0,0282	0,9707	0,0010	0,2104	0,7694	0,0203
S10 Transportation Equipment	0,0357	0,9612	0,0032	0,0799	0,9130	0,0071
S11 Wood Products and Furniture	0,4458	0,5542	0,0000	0,5019	0,4981	0,0000
S12 Paper Products and Printing	0,5046	0,4954	0,0000	0,6881	0,3034	0,0086
S13 Rubber	0,5035	0,4965	0,0000	0,2659	0,7146	0,0196
S14 Chemicals	1,0000	0,0000	0,0000	0,7857	0,1674	0,0469
S15 Petroleum Refining	0,6595	0,3405	0,0000	0,7015	0,2912	0,0073
S16 Other Chemicals	0,4772	0,5228	0,0000	0,5292	0,4351	0,0357
S17 Pharmaceuticals and Veterinary	0,3363	0,6614	0,0023	0,2879	0,7069	0,0052
S18 Plastics	0,6427	0,3407	0,0166	0,5642	0,4317	0,0041
S19 Textiles	0,4500	0,5500	0,0000	0,6053	0,3939	0,0009
S20 Clothing	0,5793	0,4201	0,0006	0,5860	0,4134	0,0006
S21 Footwear	0,4524	0,5446	0,0030	0,5126	0,4849	0,0025
S22 Coffee	1,0000	0,0000	0,0000	0,9839	0,0161	0,0000
S23 Processed Vegetables	0,7580	0,2413	0,0007	0,7711	0,2282	0,0007
S24 Meat Packing Plants	0,7134	0,2864	0,0002	0,6790	0,3208	0,0001
S25 Dairy Products	0,6939	0,3061	0,0000	0,6976	0,3024	0,0000
S26 Sugar	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S27 Vegetable Oil Mills	0,6660	0,3340	0,0000	0,6384	0,3559	0,0057
S28 Other Food Products	0,4921	0,4975	0,0104	0,5250	0,4643	0,0107
S29 Other Manufacturing	0,2186	0,7814	0,0000	0,6582	0,3418	0,0000
S30 Electric, Gas, and Sanitary Services	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S31 Construction	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S32 Trade	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S33 Transportation	0,9767	0,0233	0,0000	0,9467	0,0533	0,0000
S34 Communication	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S35 Financial Institutions	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S36 Personal Services	1,0000	0,0000	0,0000	0,9936	0,0064	0,0000
S37 Business Services	1,0000	0,0000	0,0000	0,9578	0,0422	0,0000
S38 Real Estate	1,0000	0,0000	0,0000	0,9951	0,0049	0,0000
S39 Public Administration	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S40 Community Services	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
TOTAL	**0,7768**	**0,2187**	**0,0044**	**0,8241**	**0,1667**	**0,0092**

SOURTH: Elaboration of the Authors

TABLE 8
SELECTED STRUCTURAL INDICATORS: NORTHEAS

SECTORS	Capital + Labor/ Total Costs*	Capital + Labor Ratio	OUTPUT SHARE			INTERREGIONAL EXPORTS	
			Regional	National	Sectoral	North	Center-South
S1 Agriculture	0,3953	0,4354	0,1246	0,0161	0,1998	0,0171	0,9829
S2 Mining	0,5866	0,7361	0,0402	0,0052	0,2300	0,0033	0,9967
S3 Nonmetallic Minerals	0,3260	0,7690	0,0087	0,0011	0,0797	1,0000	0,0000
S4 Steel	0,1268	1,1395	0,0093	0,0012	0,0375	0,0958	0,9042
S5 Nonferrous Metals	0,0793	1,0161	0,0137	0,0018	0,1540	0,0744	0,9256
S6 Other Metal Products	0,2454	0,3183	0,0064	0,0008	0,0374	0,3496	0,6504
S7 Machinery	0,1977	0,2091	0,0079	0,0010	0,0410	1,0000	0,0000
S8 Electrical Equipment	0,2013	0,2913	0,0054	0,0007	0,0582	0,5019	0,4981
S9 Electronic Equipment	0,3280	0,6226	0,0011	0,0001	0,0116	1,0000	0,0000
S10 Transportation Equipment	0,3720	0,3994	0,0022	0,0003	0,0089	0,5107	0,4893
S11 Wood Products and Furniture	0,3032	0,2007	0,0053	0,0007	0,0542	1,0000	0,0000
S12 Paper Products and Printing	0,2475	1,1562	0,0086	0,0011	0,0512	1,0000	0,0000
S13 Rubber	0,1970	1,7408	0,0013	0,0002	0,0217	0,2666	0,7334
S14 Chemicals	0,1288	0,4802	0,0166	0,0021	0,1658	0,0010	0,9990
S15 Petroleum Refining	0,0836	0,9988	0,0871	0,0112	0,1664	0,0260	0,9740
S16 Other Chemicals	0,0921	0,5838	0,0100	0,0013	0,0677	0,1491	0,8509
S17 Pharmaceuticals and Veterinary	0,1159	0,2872	0,0040	0,0005	0,0521	0,6183	0,3817
S18 Plastics	0,3189	2,6927	0,0056	0,0007	0,0829	0,2476	0,7524
S19 Textiles	0,1625	0,9139	0,0295	0,0038	0,1385	0,0227	0,9773
S20 Clothing	0,3312	0,4716	0,0095	0,0012	0,0828	1,0000	0,0000
S21 Footwear	0,1855	0,7033	0,0045	0,0006	0,0663	0,6620	0,3380
S22 Coffee	0,0964	1,7484	0,0073	0,0009	0,0845	0,0000	0,0000
S23 Processed Vegetables	0,1490	0,9527	0,0309	0,0040	0,2185	0,0252	0,9748
S24 Meat Packing Plants	0,0272	3,2600	0,0150	0,0019	0,1168	0,0144	0,9856
S25 Dairy Products	0,1916	0,7358	0,0090	0,0012	0,1546	0,1790	0,8210
S26 Sugar	0,2200	0,4694	0,0150	0,0019	0,2925	1,0000	0,0000
S27 Vegetable Oil Mills	0,0981	1,5693	0,0054	0,0007	0,0569	0,2728	0,7272
S28 Other Food Products	0,2110	0,5036	0,0165	0,0021	0,1137	0,3888	0,6112
S29 Other Manufacturing	0,4894	2,6945	0,0100	0,0013	0,0765	0,1873	0,8127
S30 Electric, Gas, and Sanitary Services	0,4791	1,0110	0,0201	0,0026	0,1218	0,0000	0,0000
S31 Construction	0,4375	0,0744	0,1149	0,0148	0,2003	0,0000	0,0000
S32 Trade	0,6187	0,1191	0,0680	0,0088	0,1218	0,1014	0,8986
S33 Transportation	0,4813	0,4938	0,0301	0,0039	0,0891	0,3914	0,6086
S34 Communication	0,5398	1,1833	0,0043	0,0006	0,0844	0,0000	0,0000
S35 Financial Institutions	0,6474	0,3327	0,0118	0,0015	0,0972	0,0000	0,0000
S36 Personal Services	0,4778	0,3960	0,0924	0,0119	0,2137	0,0292	0,9708
S37 Business Services	0,4945	0,5797	0,0245	0,0032	0,1123	0,0000	0,0000
S38 Real Estate	0,8478	80,9788	0,0361	0,0047	0,1997	0,0000	0,0000
S39 Public Administration	0,7681	0,1633	0,0769	0,0099	0,1395	0,0000	0,0000
S40 Community Services	0,9261	0,1166	0,0104	0,0013	0,2678	0,0000	0,0000
TOTAL	**0,4132**	**0,4568**	**1,0000**	**0,1291**	**0,1291**	**0,1021**	**0,8979**

SOURTH: Elaboration of the Authors

TABLE 9

SALES STRUCTURE, BY USER AND DESTINATION: CENTER-SOUTH

COMMODITIES	SALES								
	Intermediate		Capital Creation		Household		Exports	Govermment	
	Regional	Rest of Brazil	Regional	Rest of Brazil	Regional	Rest of Brazil		Regional	Federal
S1 Agriculture	0,7683	0,0144	0,0176	0,0000	0,1733	0,0060	0,0205	0,0000	0,0000
S2 Mining	0,7708	0,0122	0,0000	0,0000	0,0000	0,0000	0,2169	0,0000	0,0000
S3 Nonmetallic Minerals	0,7612	0,1613	0,0000	0,0019	0,0465	0,0064	0,0226	0,0000	0,0000
S4 Steel	0,8289	0,0225	0,0000	0,0000	0,0000	0,0000	0,1486	0,0000	0,0000
S5 Nonferrous Metals	0,8182	0,0038	0,0000	0,0000	0,0015	0,0005	0,1759	0,0000	0,0000
S6 Other Metal Products	0,8425	0,0394	0,0146	0,0006	0,0660	0,0029	0,0341	0,0000	0,0000
S7 Machinery	0,5699	0,0227	0,2950	0,0250	0,0034	0,0015	0,0826	0,0000	0,0000
S8 Electrical Equipment	0,5179	0,0434	0,0978	0,0083	0,2407	0,0299	0,0620	0,0000	0,0000
S9 Electronic Equipment	0,1806	0,0572	0,2582	0,0071	0,3246	0,0415	0,1308	0,0000	0,0000
S10 Transportation Equipment	0,4608	0,0253	0,1081	0,0147	0,1933	0,0347	0,1631	0,0000	0,0000
S11 Wood Products and Furniture	0,4589	0,0038	0,0747	0,0193	0,3535	0,0487	0,0409	0,0000	0,0000
S12 Paper Products and Printing	0,7826	0,0205	0,0019	0,0001	0,1248	0,0138	0,0563	0,0000	0,0000
S13 Rubber	0,8736	0,0549	0,0000	0,0000	0,0052	0,0041	0,0622	0,0000	0,0000
S14 Chemicals	0,5784	0,0392	0,0000	0,0000	0,3246	0,0067	0,0510	0,0000	0,0000
S15 Petroleum Refining	0,6658	0,0524	0,0000	0,0000	0,1408	0,0149	0,1261	0,0000	0,0000
S16 Other Chemicals	0,8555	0,0703	0,0000	0,0000	0,0351	0,0048	0,0343	0,0000	0,0000
S17 Pharmaceuticals and Veterinary	0,1593	0,0531	0,0000	0,0000	0,6778	0,0907	0,0191	0,0000	0,0000
S18 Plastics	0,8063	0,0703	0,0000	0,0000	0,0836	0,0083	0,0316	0,0000	0,0000
S19 Textiles	0,7428	0,0382	0,0000	0,0000	0,1268	0,0327	0,0595	0,0000	0,0000
S20 Clothing	0,0247	0,0002	0,0000	0,0000	0,8540	0,1022	0,0189	0,0000	0,0000
S21 Footwear	0,2403	0,0031	0,0000	0,0000	0,4184	0,0701	0,2681	0,0000	0,0000
S22 Coffee	0,3079	0,0015	0,0000	0,0000	0,1988	0,0000	0,4917	0,0000	0,0000
S23 Processed Vegetables	0,2693	0,0067	0,0000	0,0000	0,5140	0,0584	0,1517	0,0000	0,0000
S24 Meat Packing Plants	0,2345	0,0147	0,0000	0,0000	0,5755	0,0524	0,1227	0,0000	0,0000
S25 Dairy Products	0,3224	0,0115	0,0000	0,0000	0,5908	0,0750	0,0004	0,0000	0,0000
S26 Sugar	0,6254	0,0063	0,0000	0,0000	0,3398	0,0285	0,0000	0,0000	0,0000
S27 Vegetable Oil Mills	0,4484	0,0208	0,0000	0,0000	0,1839	0,0172	0,3296	0,0000	0,0000
S28 Other Food Products	0,3219	0,0237	0,0000	0,0000	0,5301	0,0919	0,0324	0,0000	0,0000
S29 Other Manufacturing	0,6259	0,0203	0,0529	0,0035	0,2480	0,0209	0,0284	0,0000	0,0000
S30 Electric, Gas, and Sanitary Services	0,7232	0,0161	0,0000	0,0000	0,2550	0,0058	0,0000	0,0000	0,0000
S31 Construction	0,1229	0,0000	0,8768	0,0000	0,0000	0,0000	0,0003	0,0000	0,0000
S32 Trade	0,3956	0,0006	0,0374	0,0000	0,5415	0,0003	0,0245	0,0000	0,0000
S33 Transportation	0,5266	0,0042	0,0058	0,0000	0,2713	0,0041	0,1880	0,0000	0,0000
S34 Communication	0,5979	0,0024	0,0000	0,0000	0,3862	0,0000	0,0135	0,0000	0,0000
S35 Financial Institutions	0,4927	0,0000	0,0000	0,0000	0,5032	0,0000	0,0041	0,0000	0,0000
S36 Personal Services	0,3112	0,0041	0,0000	0,0000	0,6737	0,0110	0,0000	0,0000	0,0000
S37 Business Services	0,8864	0,0175	0,0519	0,0008	0,0174	0,0001	0,0259	0,0000	0,0000
S38 Real Estate	0,2525	0,0065	0,0000	0,0000	0,7392	0,0018	0,0000	0,0000	0,0000
S39 Public Administration	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,4558	0,5442
S40 Community Services	0,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000
TOTAL	**0,4937**	**0,0203**	**0,0840**	**0,0018**	**0,2452**	**0,0152**	**0,0695**	**0,0320**	**0,0382**

SOURTH: Elaboration of the Authors

TABLE 10

COST STRUCTURE, BY USER SOURCE: CENTER-SOUTH

COMMODITIES	PURCHASES					
	Intermediate			Capital Creation		
	Regional	Rest of Brazil	Rest of the World	Regional	Rest of Brazil	Rest of the World
S1 Agriculture	0,9549	0,0372	0,0079	0,8979	0,0601	0,0421
S2 Mining	0,8977	0,0166	0,0858	0,9531	0,0110	0,0359
S3 Nonmetallic Minerals	0,9237	0,0565	0,0198	0,9426	0,0146	0,0428
S4 Steel	0,9096	0,0211	0,0693	0,9711	0,0007	0,0282
S5 Nonferrous Metals	0,8378	0,0553	0,1070	0,9712	0,0006	0,0282
S6 Other Metal Products	0,9608	0,0163	0,0229	0,8602	0,0318	0,1080
S7 Machinery	0,9466	0,0154	0,0379	0,9066	0,0110	0,0825
S8 Electrical Equipment	0,9255	0,0229	0,0517	0,9579	0,0124	0,0297
S9 Electronic Equipment	0,7636	0,0853	0,1511	0,7819	0,0888	0,1293
S10 Transportation Equipment	0,9271	0,0176	0,0552	0,8401	0,0485	0,1114
S11 Wood Products and Furniture	0,9335	0,0430	0,0235	0,8364	0,0572	0,1064
S12 Paper Products and Printing	0,9521	0,0191	0,0288	0,7984	0,0810	0,1207
S13 Rubber	0,8673	0,0480	0,0847	0,8294	0,0567	0,1138
S14 Chemicals	0,8845	0,0255	0,0900	0,9457	0,0008	0,0535
S15 Petroleum Refining	0,5126	0,0670	0,4205	0,9419	0,0011	0,0571
S16 Other Chemicals	0,7641	0,0589	0,1769	0,9551	0,0041	0,0408
S17 Pharmaceuticals and Veterinary	0,8558	0,0371	0,1072	0,9236	0,0146	0,0618
S18 Plastics	0,8834	0,0939	0,0227	0,9608	0,0106	0,0285
S19 Textiles	0,9049	0,0743	0,0208	0,9321	0,0020	0,0659
S20 Clothing	0,9743	0,0200	0,0057	0,9403	0,0016	0,0582
S21 Footwear	0,9272	0,0186	0,0542	0,9459	0,0014	0,0527
S22 Coffee	0,9965	0,0026	0,0009	0,9206	0,0215	0,0579
S23 Processed Vegetables	0,8832	0,0987	0,0181	0,9295	0,0081	0,0625
S24 Meat Packing Plants	0,8439	0,1438	0,0123	0,9130	0,0353	0,0517
S25 Dairy Products	0,9780	0,0165	0,0055	0,9164	0,0024	0,0812
S26 Sugar	0,9799	0,0060	0,0142	0,9552	0,0011	0,0437
S27 Vegetable Oil Mills	0,8997	0,0599	0,0404	0,9608	0,0010	0,0382
S28 Other Food Products	0,9173	0,0422	0,0405	0,9320	0,0150	0,0530
S29 Other Manufacturing	0,8462	0,0615	0,0923	0,8732	0,0460	0,0807
S30 Electric, Gas, and Sanitary Services	0,9806	0,0046	0,0147	0,9320	0,0176	0,0504
S31 Construction	0,9580	0,0217	0,0202	0,9411	0,0098	0,0492
S32 Trade	0,9755	0,0102	0,0143	0,9419	0,0176	0,0404
S33 Transportation	0,8241	0,0198	0,1560	0,9361	0,0044	0,0595
S34 Communication	0,9033	0,0257	0,0709	0,8538	0,0365	0,1097
S35 Financial Institutions	0,9692	0,0038	0,0269	0,9888	0,0010	0,0101
S36 Personal Services	0,9398	0,0327	0,0275	0,9814	0,0042	0,0144
S37 Business Services	0,9654	0,0086	0,0260	0,8949	0,0090	0,0962
S38 Real Estate	0,9955	0,0008	0,0037	0,9985	0,0003	0,0012
S39 Public Administration	0,9546	0,0175	0,0279	0,9722	0,0107	0,0171
S40 Community Services	0,9758	0,0129	0,0113	0,9525	0,0123	0,0352
TOTAL	**0,8863**	**0,0360**	**0,0777**	**0,9478**	**0,0164**	**0,0358**

SOURTH: Elaboration of the Authors

TABLE 11

HOUSEHOLD CONSUMPTION AND TOTAL CONSUMPTION OF COMMODITIES, BY SOURCE: CENTER-SOUTH

COMMODITIES	PURCHASES					
	Household			Total		
	Regional	Rest of Brazil	Rest of the World	Regional	Rest of Brazil	Rest of the World
S1 Agriculture	0,8981	0,0804	0,0214	0,9089	0,0790	0,0121
S2 Mining	0,0000	0,0000	0,0000	0,3707	0,0975	0,5318
S3 Nonmetallic Minerals	0,9906	0,0000	0,0094	0,9905	0,0000	0,0095
S4 Steel	0,0000	0,0000	0,0000	0,9743	0,0130	0,0127
S5 Nonferrous Metals	0,9838	0,0162	0,0000	0,9243	0,0105	0,0653
S6 Other Metal Products	0,9741	0,0103	0,0156	0,9804	0,0099	0,0097
S7 Machinery	1,0000	0,0000	0,0000	0,9125	0,0000	0,0875
S8 Electrical Equipment	0,7561	0,0241	0,2198	0,8323	0,0251	0,1426
S9 Electronic Equipment	0,7385	0,2615	0,0000	0,6635	0,2278	0,1086
S10 Transportation Equipment	0,9756	0,0049	0,0194	0,9150	0,0136	0,0714
S11 Wood Products and Furniture	0,9401	0,0581	0,0019	0,9391	0,0551	0,0059
S12 Paper Products and Printing	0,9381	0,0035	0,0584	0,9778	0,0033	0,0190
S13 Rubber	0,7614	0,0325	0,2060	0,9440	0,0230	0,0330
S14 Chemicals	1,0000	0,0000	0,0000	0,8384	0,0449	0,1167
S15 Petroleum Refining	0,9546	0,0055	0,0399	0,8816	0,0588	0,0596
S16 Other Chemicals	0,8855	0,0201	0,0944	0,9154	0,0133	0,0712
S17 Pharmaceuticals and Veterinary	0,9956	0,0041	0,0004	0,9518	0,0038	0,0444
S18 Plastics	0,9779	0,0189	0,0032	0,9649	0,0164	0,0187
S19 Textiles	0,9666	0,0263	0,0070	0,9413	0,0503	0,0083
S20 Clothing	0,9991	0,0000	0,0009	0,9991	0,0000	0,0009
S21 Footwear	0,9934	0,0056	0,0009	0,9594	0,0052	0,0354
S22 Coffee	0,9958	0,0042	0,0000	0,9963	0,0037	0,0000
S23 Processed Vegetables	0,8982	0,0526	0,0492	0,9033	0,0575	0,0392
S24 Meat Packing Plants	0,9870	0,0024	0,0106	0,9837	0,0026	0,0137
S25 Dairy Products	0,9562	0,0264	0,0174	0,9559	0,0290	0,0151
S26 Sugar	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S27 Vegetable Oil Mills	0,9892	0,0108	0,0000	0,9610	0,0142	0,0248
S28 Other Food Products	0,9704	0,0101	0,0195	0,9653	0,0111	0,0236
S29 Other Manufacturing	0,9476	0,0153	0,0371	0,9404	0,0143	0,0453
S30 Electric, Gas, and Sanitary Services	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S31 Construction	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S32 Trade	0,0000	1,0000	0,0000	0,5911	0,2612	0,1477
S33 Transportation	0,9269	0,0070	0,0661	0,8749	0,0082	0,1169
S34 Communication	1,0000	0,0000	0,0000	0,9959	0,0000	0,0041
S35 Financial Institutions	0,9793	0,0000	0,0207	0,9804	0,0000	0,0196
S36 Personal Services	0,9519	0,0461	0,0020	0,9568	0,0413	0,0020
S37 Business Services	0,9195	0,0000	0,0805	0,9381	0,0000	0,0619
S38 Real Estate	0,9976	0,0000	0,0024	0,9970	0,0000	0,0030
S39 Public Administration	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000
S40 Community Services	1,0000	0,0000	0,0000	1,0000	0,0000	0,0000
TOTAL	**0,9477**	**0,0329**	**0,0194**	**0,9160**	**0,0305**	**0,0535**

SOURTH: Elaboration of the Authors

TABLE 12
SELECTED STRUCTURAL INDICATORS: CENTER-SOUTH

SECTORS	Capital + Labor/ Total Costs*	Capital + Labor Ratio	OUTPUT SHARE			INTERREGIONAL EXPORTS	
			Regional	National	Sectoral	North	Center-South
S1 Agriculture	0,2938	0,4250	0,0685	0,0570	0,7088	0,0516	0,9484
S2 Mining	0,2911	0,5902	0,0177	0,0148	0,6551	0,5259	0,4741
S3 Nonmetallic Minerals	0,2749	0,9005	0,0152	0,0127	0,8978	0,6174	0,3826
S4 Steel	0,1367	0,9660	0,0371	0,0309	0,9619	0,2648	0,7352
S5 Nonferrous Metals	0,1458	0,4263	0,0115	0,0096	0,8372	0,9711	0,0289
S6 Other Metal Products	0,2837	0,1614	0,0252	0,0210	0,9524	0,6579	0,3421
S7 Machinery	0,3520	0,1519	0,0281	0,0234	0,9458	0,4163	0,5837
S8 Electrical Equipment	0,2144	0,1688	0,0130	0,0109	0,9110	0,4906	0,5094
S9 Electronic Equipment	0,2778	0,3911	0,0110	0,0092	0,7375	0,5007	0,4993
S10 Transportation Equipment	0,2575	0,6649	0,0382	0,0318	0,9771	0,3101	0,6899
S11 Wood Products and Furniture	0,2192	0,2352	0,0128	0,0106	0,8504	0,1983	0,8017
S12 Paper Products and Printing	0,2779	0,7894	0,0243	0,0202	0,9337	0,3098	0,6902
S13 Rubber	0,2742	0,9709	0,0086	0,0071	0,9476	0,1961	0,8039
S14 Chemicals	0,1482	0,3093	0,0129	0,0107	0,8278	0,3132	0,6868
S15 Petroleum Refining	0,0968	0,7545	0,0670	0,0558	0,8269	0,2290	0,7710
S16 Other Chemicals	0,1976	0,2107	0,0214	0,0178	0,9296	0,4679	0,5321
S17 Pharmaceuticals and Veterinary	0,2006	0,1697	0,0113	0,0094	0,9418	0,2059	0,7941
S18 Plastics	0,3382	1,3261	0,0094	0,0078	0,9011	0,3655	0,6345
S19 Textiles	0,2017	0,6624	0,0278	0,0232	0,8441	0,0674	0,9326
S20 Clothing	0,2413	0,5607	0,0163	0,0136	0,9141	0,4121	0,5879
S21 Footwear	0,2785	0,3782	0,0098	0,0082	0,9295	0,3292	0,6708
S22 Coffee	0,0948	1,8820	0,0119	0,0099	0,8925	0,0000	1,0000
S23 Processed Vegetables	0,1705	0,6584	0,0162	0,0135	0,7381	0,1149	0,8851
S24 Meat Packing Plants	0,1136	0,9981	0,0170	0,0141	0,8511	0,0551	0,9449
S25 Dairy Products	0,1204	1,0414	0,0076	0,0063	0,8399	0,2469	0,7531
S26 Sugar	0,1225	1,0513	0,0056	0,0047	0,7015	1,0000	0,0000
S27 Vegetable Oil Mills	0,0995	1,7254	0,0138	0,0115	0,9407	0,4313	0,5687
S28 Other Food Products	0,1897	0,4954	0,0192	0,0160	0,8542	0,0975	0,9025
S29 Other Manufacturing	0,3139	0,4638	0,0182	0,0152	0,9018	0,1165	0,8835
S30 Electric, Gas, and Sanitary Services	0,4326	1,1158	0,0218	0,0182	0,8515	1,0000	0,0000
S31 Construction	0,1595	0,1978	0,0678	0,0565	0,7631	0,0000	1,0000
S32 Trade	0,4257	0,1658	0,0727	0,0606	0,8413	1,0000	0,0000
S33 Transportation	0,3535	0,7268	0,0453	0,0377	0,8671	0,0000	1,0000
S34 Communication	0,7371	0,8066	0,0069	0,0058	0,8760	1,0000	0,0000
S35 Financial Institutions	0,6582	0,2253	0,0164	0,0136	0,8702	0,0000	0,0000
S36 Personal Services	0,3256	0,5656	0,0497	0,0414	0,7423	0,8966	0,1034
S37 Business Services	0,6706	0,7272	0,0287	0,0239	0,8499	0,6840	0,3160
S38 Real Estate	0,8571	11,1759	0,0200	0,0167	0,7158	0,8348	0,1652
S39 Public Administration	0,6906	0,1847	0,0703	0,0585	0,8232	0,0000	0,0000
S40 Community Services	0,8736	0,1257	0,0039	0,0033	0,6536	0,0000	0,0000
TOTAL	**0,3394**	**0,4604**	**1,0000**	**0,8332**	**0,8332**	**0,3299**	**0,6701**

SOURTH: Elaboration of the Authors

TABLE 13

SECTOR CLASSIFICATION IN THE BRAZILIAN REGIONS, 1985

Center-South	3, 8, 10, 11, 13, 14, 20, 21, 22, 23, 24, 25, 26, 27, 28	4, 5, 6, 7, 19
	Less Important Sectors	Forward-Linkage-Oriented Sectors
North	4, 6, 8, 9, 16, 17, 18, 23, 29, 34, 35, 36, 38, 39, 40	1, 2, 15, 32, 33, 37
Northeast	6, 9, 10, 11, 14, 20, 29, 31, 33, 34, 35, 36, 38, 39, 40	1, 2, 30, 32, 37
Center-South	9, 17, 18, 29, 31, 34, 35, 36, 38, 39, 40	1, 2, 12, 15, 16, 30, 32, 33, 37

SOURTH: Elaboration of the Authors

TABLE 14

RASMUSSEN - HIRSCHMAN BACKWARD AND FOWARD LINKAGES

SECTOR	North						Northeast						Center-South					
	BL	Rank	$V_{.j}$	FL	Rank	$V_{i.}$	BL	Rank	$V_{.j}$	FL	Rank	$V_{i.}$	BL	Rank	$V_{.j}$	FL	Rank	$V_{i.}$
S1 Agriculture	0,891	26	5,426	4,434	1	1,662	0,806	32	5,235	4,428	1	2,364	0,912	29	4,231	3,251	1	1,742
S2 Mining	0,737	38	5,875	1,064	6	4,170	0,678	37	5,564	1,421	7	2,746	0,850	31	3,835	1,088	12	2,979
S3 Nonmetallic Minerals	1,076	12	4,247	0,841	18	5,458	1,079	13	4,015	0,791	19	5,489	1,120	12	3,522	0,839	19	4,703
S4 Steel	0,822	32	5,244	0,706	35	6,108	1,242	4	4,506	1,030	10	5,435	1,415	1	4,337	2,029	3	3,123
S5 Nonferrous Metals	1,071	13	4,932	0,864	16	6,024	1,408	2	5,168	1,605	3	4,561	1,036	19	4,006	1,046	14	3,997
S6 Other Metal Products	0,876	29	5,008	0,838	19	5,243	0,837	31	4,551	0,729	23	5,221	1,192	8	3,212	1,255	9	2,770
S7 Machinery	1,062	14	4,458	1,055	8	4,467	1,014	19	4,307	0,975	11	4,456	1,110	13	3,321	1,262	8	2,831
S8 Electrical Equipment	0,766	36	5,640	0,707	34	6,110	1,019	17	4,073	0,765	21	5,284	1,174	9	3,001	0,711	25	4,904
S9 Electronic Equipment	0,877	28	5,666	0,813	23	6,117	0,627	40	6,056	0,603	37	6,298	0,913	28	3,833	0,593	36	5,951
S10 Transportation Equipment	1,031	18	4,929	0,819	22	6,204	0,869	27	4,414	0,627	35	6,142	1,291	4	3,398	0,925	16	4,707
S11 Wood Products and Furniture	1,111	9	4,255	0,837	20	5,521	0,906	25	4,404	0,676	31	5,920	1,069	18	3,500	0,692	27	5,426
S12 Paper Products and Printing	1,161	7	3,916	0,789	27	5,669	1,046	15	5,171	1,143	9	4,715	0,989	22	4,194	1,238	10	3,318
S13 Rubber	1,124	8	4,248	0,802	24	5,409	1,075	14	3,872	0,703	27	5,904	1,015	20	4,128	0,902	17	4,611
S14 Chemicals	1,182	5	4,039	0,735	30	5,866	0,968	21	4,071	0,891	15	4,283	1,076	17	3,077	0,804	20	3,893
S15 Petroleum Refining	0,710	40	6,152	1,037	11	4,182	1,167	6	4,492	2,246	2	2,409	0,789	33	4,597	2,346	2	1,544
S16 Other Chemicals	0,966	20	4,548	0,733	31	5,979	1,093	11	3,786	0,882	16	4,381	0,915	27	4,001	1,419	6	2,552
S17 Pharmaceuticals and Veterinary	0,936	22	4,607	0,685	36	6,303	1,011	20	3,819	0,617	36	6,248	0,944	24	3,395	0,539	37	5,995
S18 Plastics	0,805	34	5,356	0,801	25	5,375	1,088	12	3,782	0,680	30	5,543	0,946	23	3,674	0,803	21	4,073
S19 Textiles	1,053	15	5,604	1,365	5	4,620	1,230	5	4,314	1,264	8	4,204	1,086	15	4,398	1,394	7	3,714
S20 Clothing	1,168	6	4,167	0,682	38	6,325	0,936	23	4,120	0,601	38	6,241	1,094	14	3,398	0,506	38	6,136
S21 Footwear	1,366	4	3,581	0,708	33	6,301	1,108	10	3,967	0,699	28	6,240	1,085	16	3,557	0,634	33	6,139
S22 Coffee	1,621	1	3,934	0,868	15	6,255	1,130	9	4,340	0,755	22	6,276	1,368	3	3,587	0,680	29	6,182
S23 Processed Vegetables	0,926	24	4,802	0,776	28	5,701	1,018	18	4,024	0,716	25	5,387	1,141	11	3,137	0,651	31	4,995
S24 Meat Packing Plants	1,542	2	3,854	1,052	9	4,739	2,435	1	4,143	0,666	33	5,647	1,157	10	3,375	0,638	32	5,356
S25 Dairy Products	1,039	17	4,422	0,682	37	6,323	1,039	16	4,266	0,662	34	6,230	1,290	5	3,383	0,654	30	6,139
S26 Sugar	1,045	16	4,407	0,713	32	6,246	1,146	8	3,820	0,712	26	5,597	1,381	2	3,114	0,759	24	5,338
S27 Vegetable Oil Mills	1,108	10	4,068	0,746	29	5,797	1,252	3	3,671	0,834	17	5,372	1,284	6	3,229	0,795	22	4,825
S28 Other Food Products	1,079	11	4,192	0,790	26	5,666	1,166	7	3,417	0,722	24	5,383	1,225	7	2,727	0,705	26	4,640
S29 Other Manufacturing	0,891	25	5,108	0,898	13	5,074	0,644	39	5,856	0,966	12	3,893	0,668	35	4,707	0,999	15	3,106
S30 Electric, Gas, and Sanitary Services	1,003	19	5,058	1,064	7	4,754	0,967	22	4,990	1,471	6	3,261	0,941	25	4,758	1,232	11	3,596
S31 Construction	1,461	3	3,864	1,040	10	5,432	0,853	29	4,526	0,768	20	5,081	0,992	21	3,291	0,689	28	4,763
S32 Trade	0,939	21	4,707	1,908	2	2,264	0,744	34	5,247	1,584	4	2,398	0,799	32	3,971	1,522	4	2,016
S33 Transportation	0,848	30	5,153	1,470	4	2,934	0,844	30	4,542	0,945	13	4,004	0,889	30	3,807	1,463	5	2,214
S34 Communication	0,812	33	5,357	0,828	21	5,251	0,903	26	4,206	0,670	32	5,633	0,656	36	4,732	0,615	35	5,053
S35 Financial Institutions	0,745	37	5,892	0,953	12	4,582	0,687	36	5,691	0,792	18	4,924	0,605	40	5,205	0,787	23	3,952
S36 Personal Services	0,842	31	5,162	0,853	17	5,096	0,853	28	4,481	0,938	14	4,080	0,941	26	3,362	0,869	18	3,612
S37 Business Services	0,932	23	5,159	1,782	3	2,636	0,931	24	4,661	1,551	5	2,736	0,625	38	5,087	1,051	13	2,969
S38 Real Estate	0,767	35	5,628	0,897	14	4,787	0,730	35	5,170	0,687	29	5,441	0,636	37	4,890	0,633	34	4,878
S39 Public Administration	0,885	27	4,860	0,682	39	6,325	0,792	33	4,714	0,592	39	6,325	0,774	34	3,989	0,490	39	6,325
	0,725	39	5,944	0,682	40	6,325	0,659	38	5,669	0,592	40	6,325	0,608	39	5,070	0,490	40	6,325

SOURTH: Elaboration of the Authors

TABLE 15
PURE LINKAGES INDICES

SECTOR	North			Northeast			Center-South		
	PBL	PFL	PTL	PBL	PFL	PTL	PBL	PFL	PTL
S1 Agriculture	2872,5	3907,5	6780,0	7900,3	26848,1	34748,5	68117,5	125836,3	193953,8
S2 Mining	467,9	907,0	1374,9	1686,3	14263,7	15950,0	22717,7	59576,9	82294,5
S3 Nonmetallic Minerals	374,6	932,4	1307,1	1546,5	2427,5	3974,0	24090,2	22926,8	47017,1
S4 Steel	9,6	72,5	82,1	1162,3	499,5	1661,8	33380,6	54721,5	88102,1
S5 Nonferrous Metals	73,3	210,1	283,5	947,5	1595,3	2542,8	13122,6	26920,0	40042,6
S6 Other Metal Products	139,8	565,5	705,2	765,9	1094,4	1860,3	58253,7	65621,0	123874,8
S7 Machinery	328,5	634,1	962,5	1134,8	2560,6	3695,4	52446,8	52454,9	104901,7
S8 Electrical Equipment	105,9	177,3	283,3	995,3	877,6	1872,8	29336,4	16523,7	45860,1
S9 Electronic Equipment	856,6	32,1	888,7	15,0	14,4	29,4	14012,5	2656,9	16669,3
S10 Transportation Equipment	309,9	37,3	347,2	297,4	258,3	555,7	66367,1	19887,8	86254,9
S11 Wood Products and Furniture	1497,1	687,8	2184,9	700,4	751,6	1452,0	20357,0	10321,2	30678,1
S12 Paper Products and Printing	501,5	197,1	698,6	584,1	2011,3	2595,4	24190,4	37792,1	61982,5
S13 Rubber	355,5	266,2	621,7	250,2	250,4	500,6	9191,8	18165,6	27357,4
S14 Chemicals	145,6	91,7	237,3	3062,7	2693,3	5756,1	29689,7	25638,6	55328,3
S15 Petroleum Refining	29,6	868,0	897,7	11783,5	8787,3	20570,8	50538,1	123360,5	173898,6
S16 Other Chemicals	50,1	142,0	192,1	2429,3	3275,3	5704,6	24647,4	65656,4	90303,7
S17 Pharmaceuticals and Veterinary	54,7	14,0	68,6	822,3	177,6	999,9	19160,8	3753,3	22914,1
S18 Plastics	60,2	400,5	460,7	1420,8	1202,3	2623,1	15254,2	21817,6	37071,8
S19 Textiles	146,4	259,0	405,4	4460,1	2029,3	6489,5	24179,5	28168,5	52348,0
S20 Clothing	79,0	0,0	79,0	1715,1	123,4	1838,5	40189,9	1337,8	41527,7
S21 Footwear	83,9	16,1	100,0	851,4	101,1	952,6	15065,4	1186,9	16252,3
S22 Coffee	546,8	30,9	577,6	1153,3	118,2	1271,5	25309,0	1466,4	26775,4
S23 Processed Vegetables	624,7	209,5	834,2	6494,1	1199,2	7693,3	39807,6	11654,3	51461,9
S24 Meat Packing Plants	1370,9	128,2	1499,2	14486,8	459,2	14945,9	38784,1	6595,6	45379,7
S25 Dairy Products	52,3	1,1	53,5	1661,1	158,4	1819,6	15659,9	1856,4	17516,3
S26 Sugar	46,4	14,6	61,0	3819,7	841,5	4661,2	12903,2	7227,3	20130,5
S27 Vegetable Oil Mills	43,4	17,4	60,8	1295,3	654,5	1949,8	30877,4	12926,0	43803,5
S28 Other Food Products	752,4	435,7	1188,2	4585,3	1973,9	6559,2	52315,2	19236,0	71551,2
S29 Other Manufacturing	206,4	294,8	501,2	242,7	4831,1	5073,8	12264,0	46012,1	58276,1
S30 Electric, Gas, and Sanitary Services	338,6	752,0	1090,6	1639,4	5241,9	6881,3	14072,6	32835,6	46908,2
S31 Construction	4143,7	630,9	4774,6	13923,9	2423,9	16347,8	124259,9	13569,6	137829,5
S32 Trade	467,4	3080,8	3548,1	2234,3	9880,1	12114,4	6839,7	95957,4	102797,1
S33 Transportation	389,8	2301,2	2691,0	1744,8	4238,0	5982,8	40193,0	75863,8	116056,8
S34 Communication	110,8	444,2	555,0	680,4	1238,7	1919,0	4551,3	11020,5	15571,8
S35 Financial Institutions	89,0	830,9	919,8	402,1	2892,7	3294,7	6961,2	25131,7	32092,9
S36 Personal Services	1304,3	583,2	1887,5	11547,4	4079,6	15626,9	86193,3	34876,3	121069,7
S37 Business Services	571,1	2136,4	2707,5	2684,9	7828,2	10513,1	13995,3	55661,5	69656,9
S38 Real Estate	585,0	794,7	1379,7	2576,6	1800,7	4377,3	11870,6	11352,9	23223,6
S39 Public Administration	1896,7	0,0	1896,7	8070,9	0,0	8070,9	81593,9	0,0	81593,9
S40 Community Services	59,6	0,0	59,6	366,8	0,0	366,8	1907,6	0,0	1907,6
AVERAGE	**553,541**	**577,614**	**1131,155**	**3103,5**	**3042,6**	**6146,1**	**31866,7**	**31189,2**	**63055,9**

SOURTH: Elaboration of the Authors

TABLE 16

REGIONAL PERCENTAGE DISTRIBUTION OF THE OUTPUT MULTPLIER EFFECTS NET OF THE INITIAL INHECTION: BRAZIL, 1985

SECTOR	North			Northeast			Center-South		
	North	Northeast	Center-South	North	Northeast	Center-South	North	Northeast	Center-South
S1 Agriculture	52,3%	3,9%	43,8%	0,3%	68,8%	30,8%	2,1%	4,2%	93,7%
S2 Mining	55,0%	7,5%	37,5%	0,7%	71,8%	27,5%	1,1%	2,6%	96,2%
S3 Nonmetallic Minerals	61,5%	3,9%	34,7%	0,3%	78,8%	20,8%	3,1%	3,4%	93,5%
S4 Steel	10,2%	2,0%	87,8%	0,4%	60,2%	39,4%	1,0%	3,1%	95,9%
S5 Nonferrous Metals	67,9%	1,2%	30,9%	1,2%	71,0%	27,8%	3,3%	3,5%	93,2%
S6 Other Metal Products	31,5%	21,3%	47,2%	0,5%	48,9%	50,6%	1,0%	2,9%	96,1%
S7 Machinery	38,8%	6,8%	54,4%	2,5%	38,4%	59,1%	1,1%	2,6%	96,3%
S8 Electrical Equipment	49,4%	11,8%	38,8%	1,8%	67,7%	30,4%	1,4%	3,3%	95,2%
S9 Electronic Equipment	38,2%	3,9%	57,8%	4,0%	16,3%	79,8%	6,9%	2,7%	90,4%
S10 Transportation Equipment	32,2%	6,8%	61,0%	1,3%	35,8%	62,9%	1,4%	2,6%	96,0%
S11 Wood Products and Furniture	71,7%	3,6%	24,7%	2,5%	64,0%	33,5%	2,9%	4,1%	93,1%
S12 Paper Products and Printing	58,3%	2,2%	39,6%	0,3%	66,0%	33,7%	1,1%	3,0%	95,9%
S13 Rubber	76,5%	2,6%	20,9%	4,6%	64,1%	31,4%	1,5%	7,8%	90,7%
S14 Chemicals	71,8%	4,0%	24,2%	0,3%	68,6%	31,1%	1,7%	2,9%	95,3%
S15 Petroleum Refining	14,7%	1,8%	83,5%	0,2%	81,1%	18,7%	0,5%	11,8%	87,6%
S16 Other Chemicals	32,7%	7,6%	59,7%	0,3%	65,5%	34,2%	1,1%	8,7%	90,2%
S17 Pharmaceuticals and Veterinary	43,4%	3,4%	53,2%	0,8%	46,8%	52,4%	1,2%	5,5%	93,2%
S18 Plastics	22,5%	6,0%	71,5%	0,1%	80,0%	19,8%	0,4%	13,8%	85,7%
S19 Textiles	62,5%	6,5%	31,0%	0,2%	73,2%	26,6%	0,5%	11,8%	87,7%
S20 Clothing	58,5%	4,7%	36,8%	0,2%	60,6%	39,2%	0,4%	7,7%	91,9%
S21 Footwear	71,4%	2,2%	26,3%	2,8%	46,8%	50,4%	1,8%	4,3%	93,9%
S22 Coffee	82,7%	1,3%	16,0%	0,3%	66,6%	33,0%	1,0%	1,8%	97,2%
S23 Processed Vegetables	70,4%	2,1%	27,5%	0,8%	67,3%	31,9%	4,8%	4,6%	90,6%
S24 Meat Packing Plants	81,7%	1,4%	16,8%	1,2%	85,3%	13,5%	10,5%	2,2%	87,3%
S25 Dairy Products	81,7%	1,5%	16,8%	0,2%	78,3%	21,5%	1,0%	3,3%	95,8%
S26 Sugar	51,2%	1,9%	46,9%	0,2%	85,4%	14,4%	0,8%	2,4%	96,7%
S27 Vegetable Oil Mills	80,5%	1,5%	17,9%	2,0%	59,8%	38,2%	4,3%	3,1%	92,7%
S28 Other Food Products	53,9%	3,0%	43,2%	0,6%	76,1%	23,4%	2,3%	4,2%	93,4%
S29 Other Manufacturing	51,3%	2,6%	46,1%	0,4%	80,5%	19,1%	3,1%	4,6%	92,3%
S30 Electric, Gas, and Sanitary Services	41,7%	5,0%	53,2%	0,3%	81,9%	17,8%	0,4%	1,5%	98,1%
S31 Construction	25,1%	5,8%	69,1%	0,6%	59,8%	39,6%	1,6%	2,8%	95,6%
S32 Trade	54,5%	2,7%	42,8%	0,1%	64,9%	35,0%	0,6%	3,2%	96,2%
S33 Transportation	23,0%	6,3%	70,7%	0,5%	56,6%	42,8%	0,9%	5,0%	94,1%
S34 Communication	39,7%	3,4%	56,9%	0,5%	69,1%	30,4%	2,2%	2,3%	95,5%
S35 Financial Institutions	70,9%	2,1%	27,1%	0,2%	82,1%	17,7%	0,6%	1,3%	98,1%
S36 Personal Services	47,1%	6,1%	46,9%	0,6%	57,6%	41,8%	2,0%	3,3%	94,7%
S37 Business Services	55,8%	2,6%	41,6%	0,3%	76,4%	23,3%	1,1%	1,6%	97,3%
S38 Real Estate	38,8%	4,7%	56,5%	0,3%	82,0%	17,7%	0,8%	1,5%	97,7%
S39 Public Administration	46,9%	3,3%	49,8%	0,3%	76,2%	23,5%	1,1%	2,8%	96,1%
S40 Community Services	56,3%	2,7%	41,0%	0,6%	75,1%	24,3%	2,0%	2,5%	95,5%
AVERAGE	**48,6%**	**4,4%**	**47,1%**	**1,0%**	**65,7%**	**33,3%**	**2,1%**	**4,2%**	**93,7%**

SOURTH: Elaboration of the Authors

TABLE 17

COMPONENTS OF TRIPLE DECOMPOSITION OF THE SECTORALGROSS OUTPUT

SECTOR	North			Northeast			Center-South		
	p_i	q_i	r_i	p_i	q_i	r_i	p_i	q_i	r_i
S1 Agriculture	0,4807	0,0228	0,4965	0,0015	0,9171	0,0813	0,0039	0,0294	0,9667
S2 Mining	0,5242	0,0211	0,4548	0,0210	0,4667	0,5123	0,0294	0,0416	0,9290
S3 Nonmetallic Minerals	0,9959	0,0002	0,0039	0,0229	0,9630	0,0141	0,1368	0,0766	0,7866
S4 Steel	0,9452	0,0005	0,0543	0,0621	0,5368	0,4011	0,0325	0,0442	0,9233
S5 Nonferrous Metals	0,8487	0,0036	0,1477	0,0256	0,8442	0,1301	0,0261	0,0178	0,9561
S6 Other Metal Products	0,9214	0,0084	0,0702	0,1080	0,6427	0,2493	0,0387	0,0306	0,9307
S7 Machinery	0,7897	0,0607	0,1497	0,0233	0,8267	0,1500	0,0171	0,0328	0,9500
S8 Electrical Equipment	0,6865	0,0144	0,2991	0,0931	0,8078	0,0991	0,0408	0,0159	0,9433
S9 Electronic Equipment	0,8282	0,0030	0,1688	0,0369	0,9577	0,0054	0,0514	0,0081	0,9405
S10 Transportation Equipment	0,4103	0,0151	0,5746	0,1291	0,6029	0,2680	0,0148	0,0192	0,9660
S11 Wood Products and Furniture	0,7604	0,0021	0,2376	0,0111	0,9723	0,0166	0,0060	0,0037	0,9903
S12 Paper Products and Printing	0,8055	0,0126	0,1819	0,0128	0,9324	0,0548	0,0146	0,0326	0,9529
S13 Rubber	0,3752	0,0578	0,5671	0,0497	0,7412	0,2090	0,0222	0,0682	0,9096
S14 Chemicals	0,9347	0,0017	0,0636	0,0114	0,6937	0,2949	0,0183	0,0416	0,9401
S15 Petroleum Refining	0,8385	0,0066	0,1549	0,0184	0,6125	0,3691	0,0227	0,0525	0,9248
S16 Other Chemicals	0,5761	0,0160	0,4079	0,0211	0,7470	0,2319	0,0369	0,0599	0,9032
S17 Pharmaceuticals and Veterinary	0,9802	0,0005	0,0194	0,0134	0,9650	0,0216	0,0090	0,0394	0,9516
S18 Plastics	0,8931	0,0052	0,1017	0,0495	0,7824	0,1681	0,0358	0,0555	0,9087
S19 Textiles	0,9452	0,0055	0,0493	0,0056	0,6451	0,3493	0,0059	0,0524	0,9417
S20 Clothing	1,0000	0,0000	0,0000	0,0003	0,9994	0,0004	0,0005	0,0006	0,9989
S21 Footwear	0,9526	0,0014	0,0460	0,0001	0,9789	0,0209	0,0004	0,0043	0,9953
S22 Coffee	0,9461	0,0006	0,0533	0,0000	0,9986	0,0014	0,0003	0,0023	0,9974
S23 Processed Vegetables	0,8918	0,0030	0,1053	0,0005	0,9504	0,0490	0,0014	0,0119	0,9867
S24 Meat Packing Plants	0,9927	0,0037	0,0036	0,0003	0,9918	0,0079	0,0011	0,0164	0,9825
S25 Dairy Products	1,0000	0,0000	0,0000	0,0016	0,9294	0,0690	0,0019	0,0135	0,9846
S26 Sugar	0,9804	0,0006	0,0191	0,0025	0,9794	0,0181	0,0115	0,0123	0,9761
S27 Vegetable Oil Mills	0,7237	0,2383	0,0380	0,0081	0,8485	0,1434	0,0078	0,0265	0,9656
S28 Other Food Products	0,8279	0,0058	0,1663	0,0027	0,9667	0,0306	0,0034	0,0265	0,9701
S29 Other Manufacturing	0,6777	0,0400	0,2823	0,0195	0,6660	0,3145	0,0125	0,0340	0,9535
S30 Electric, Gas, and Sanitary Services	0,9411	0,0025	0,0563	0,0085	0,8857	0,1058	0,0320	0,0142	0,9539
S31 Construction	0,9969	0,0001	0,0030	0,0000	0,9992	0,0007	0,0007	0,0008	0,9985
S32 Trade	0,7912	0,0066	0,2022	0,0043	0,8382	0,1575	0,0049	0,0075	0,9876
S33 Transportation	0,7890	0,0080	0,2029	0,0026	0,9319	0,0655	0,0091	0,0172	0,9736
S34 Communication	0,9072	0,0033	0,0896	0,0012	0,9771	0,0217	0,0089	0,0089	0,9823
S35 Financial Institutions	0,9576	0,0017	0,0407	0,0002	0,9964	0,0034	0,0014	0,0019	0,9967
S36 Personal Services	0,9766	0,0010	0,0224	0,0008	0,9601	0,0391	0,0046	0,0049	0,9905
S37 Business Services	0,8642	0,0061	0,1297	0,0065	0,9225	0,0711	0,0153	0,0134	0,9712
S38 Real Estate	0,9669	0,0014	0,0317	0,0002	0,9952	0,0046	0,0063	0,0044	0,9893
S39 Public Administration	1,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	1,0000
S40 Community Services	1,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	1,0000
AVERAGE	**0,7832**	**0,0095**	**0,2073**	**0,0074**	**0,8786**	**0,1140**	**0,0133**	**0,0210**	**0,9656**

SOURTH: Elaboration of the Authors