# DEVELOPMENT STRATEGIES AND INCOME DISTRIBUTION IN BRAZIL: A SECTORAL ANALYSIS*

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**Abstract**

*Utilizing a multisectoral model of the Brazilian economy, this paper analyzes the income distribution consequences of expanded production in 123 different sectors of the economy. The results indicate relatively little variation in distributive performance by sector. This suggests that the most important determinant of Brazil's severe income inequality is not the sectoral composition of production, but the relatively weak bargaining power of unskilled workers vis-a-vis capital.*

## I. INTRODUCTION

Despite the stellar growth performance of the Brazilian economy in the 1960s and 1970s, it is widely recognized in development circles that this growth process tended to favor therich more than the poor. Even in the 1970s, when government wage setting policy became less repressive, the share of the top 10% increased from 46.4% to 47.7% [1]. With the ascent of democracy in Brazil, there is increasingly a call for a new model of development, one that more fully incorporates the poor into the growth process. One key element of this strategy would be,presumably, the promotion of sectors that do especially well in terms of income distribution. That is, state policy would give special preference to sectors whose expansion creates a relatively large share of income for the poor and a correspondingly small portion for the rich. Economic growth would henceforth have an equalizing effect on the distribution of income, as sectors that pay a large share of their wages and profits to the poor would receive the highest priority.

The purpose of this paper is to shed some light on this issue through an examination of the distributional consequences of expansion in various sectors of the Brazilian economy. Using a modified input-output technique, the distributive performance of 123 sectors of the Brazilian economy is assessed. In addition, correlation analysis is utilized to address the relationship between sectoral performance on distribution, employment, and efficiency.

Previous studies on the Brazilian economy have measured the employment performance of different sectors of the economy[2]. Using input-output techniques, these studies quantify the amount of direct and indirect employment created by a unit increase in final demand for a sector's output. Based on these studies, it is tempting to argue that the most labor intensive sectors (in terms of employment creation) are also the most desirous sectors from a distributional standpoint. Such a conclusion would be premature, however. Given imperfect factor markets and labor of different skill and wage levels, it is possible that the same sectors that generate a large amount of employment for low-wage workers also generate a relatively large amount of profit, due precisely to the fact that lower wages may prevail in these employment-intensive sectors. Hence, sectors that are not employment intensive, yet pay higher wages, may be associated with a functional distribution of income that leaves less profit for capitalists than low wage sectors. Therefore, the distributional consequences of sectoral expansion must be assessed empirically; the most employment-intensive sectors may not perform best on distributional grounds.

This paper is organized as follows. First, the model used to quantify the impact of sectoral expansion on distribution is presented. Second, data and method are delineated. Third, empirical results are given, followed by an analysis of the linkages between sectoral performance on distribution, employment, and efficiency. Finally, a discussion of the policy implications of the results concludes the paper.

## II. DESCRIPTION OF THE MODEL

### A. Introduction

The purpose of the model is to quantitatively assess how the income generated from increased final demand for a sector's output is distributed to different size income groups. An open-ended input-output technique is used, so as to capture both direct and indirect backward linkage effects. In addition, an endogenous consumption function is incorporated into the model, so as to account for Keynesian multiplier effects. Furthermore, consumption is disaggregated by income group, reflecting the different consumption patterns of different income groups.

### B. Structure of the Model

The Leontief input-output model starts with the balance equation stating that the output (supply) of any sector equals the sum of intermediate input demand and final demand:

$$X = AX + F \qquad (1)$$

where X is domestic output, AX[3] is intermediate input demand, and final demand is F. Generalizing the model to the economy as a whole, each element in the output vector X, of dimension jx1, represents a sector of the economy. Vector F is also of dimension jx1, while A is a matrix of dimension ixj, where i=j. The typical element (ij) in matrix A quantifies how much of input i is needed to produce a unit of j.

Income and the distribution of income are determined by the amount of value added (wages, payment to capital, and payments to the self-employed) that accrues to each income group:

$$Z = AzX \qquad (2)$$

where Z is a nxl vector of incomes by income group and Az is an xj matrix of distribution coefficients whose typical element (nj) quantifies the share of income directly generated for income group n per unit produced in sector j.

Final demand is comprised of that part given exogenously, F*, and the part determined endogenously, consumption (C). Let Ak be a consumption matrix of dimension jxn, whose representative element (jn) measures the marginal propensity of income group n to consume the output of sector j. In view of (2), this consumption function can be expressed in linear form as:

$$C = a + AkAzX \qquad (3)$$

Combining equation (1) through (3) and solving for X, we obtain:

$$X = (I - A - AkAz)^{-1} F^* \qquad (4)$$

The interindustry and Keynesian consumption multiplier effects of an increase in final demand for sector j's output can hence be simulated by supposing a unit increase in exogenous final demand for sector j's output. That is, F* in equation (4) can be formulated so that element j has the value of one, with zeroes elsewhere in the vector. For notational purposes, let us designate this policy vector as P.

Premultiplying the inverted matrix in (4) by the matrix of distributional coefficients, we obtain:

$$Z^* = Az(I - A + AzAk)^{-1} \quad P \qquad (5)$$

where Z* is the vector which measures the income accruing to income group n per unit of increased final demand for sector j. The information in column vector Z* can be used to formulate various measures of income distribution, such as the Gini coefficient and the share of total income accruing to the poor.

Employment effects can be measured in a similar manner. Let S1 be the matrix of employment coefficients whose typical element (ij) shows the amount of labor class i's labor (in man-years) required to produce a unit of j. Premultiplying the inverted matrix in (4), we obtain:

$$L^* = Sl(I - A - AzAk)^{-1} \quad P \qquad (6)$$

where L* is the vector showing the employment per labor class (blue collar, administrative, managerial, and self-employed). Each element (ij) in L* measures the amount of employment created for labor class i per unit increase in final demand for sector j's output.

C. Data

The model developed here requires four kinds of data: 1) an input-output matrix; 2) consumption functions; 3) data on the distribution of value added (profits, rents, interest, wages, and payments to the self-employed) by sector to size income groups; and 4) employment data on labor requirements per unit of output. The 1975 input-output table of the Brazilian economy, recently released by the Instituto Brasiliero de Geografia e Estatistica (IBGE), is used for matrix A in the model. The consumption functions found in matrix Ak are based on those estimated by Sadoulet.[4] With respect to the distribution of value added, payments to capital (profits, rents, and interest), workers (wages) and income to the self-employed are given by the input-output table. Wages are distributed to different size income groups in accordance with data from the 1980 Relacao Anual De Informacoes Sociais (RAIS). The RAIS was not used for wage distribution in agriculture, however, as RAIS coverage in these sectors is not very extensive. Instead, data from the 1980 Demographic Census was utilized. This data source was used to distribute payments of the self-employed as well. Distribution of the payments to capital to income groups follows Sadoulet.[5] Data on labor requirements per unit of output were taken from IBGE; these data are published in conjunction with the input-output table.

The impact of sectoral expansion on size income distribution is measured here in terms of the Gini coefficient and the percentage of income accruing to the poor. The Gini coefficient is based on data that calculates what percentage of the population earns what percentage of income. "Income shares" for each size income group per unit increase in sectoral final demand are provided by our simulations. Population weights (showing what percentage of the population belongs to each size income group) are based on the 1980 Demographic Census and are assumed constant for the purposes of this study. This assumption is legitimate in so much as small increases in output are being examined; if large increases in output are analyzed, changes in population weights might occur, changing the percentage of the population classified as "poor." For example, if a large number of workers move from low-paying agriculture to high-paying industry, the percentage of workers classified as poor could change, depending on how many workers were actually absorbed in the industrial sector. Hence, our results may overstate the adverse impact of high-paying sectors on income inequality, as our Gini coefficients do not take into account this upward mobility of the population. This need not concern us, however, as the low labor absorption associated with many high paying industrial sectors limits the impact of sectoral expansion on population weights. Nevertheless, the results presented here should be interpreted in light of these caveats.

## III. EMPIRICAL RESULTS

The distributive performance of each of the 123 sectors of the input-output table is displayed in Table 1, where a rank ordering of the Gini coefficients is given. The Gini coefficients in the table are derived from the size distribution of income arising from a unit increase in final demand for each sector's output. As a measure of income inequality, the Gini coefficient may range from a minimum of 0 (total equality) to a Maximum of 1 (total inequality, with the highest income group receiving all the income). Thus, the lower the Gini coefficient, the more equally income is distributed. The rank ordering in Table 1 gives an idea of which sectors perform best (lowest Gini) or worst (highest Gini) on distributive grounds. Distributional performance is also gauged in terms of what share of income accrues to the poor. Following Pfefferman and Webb, the poor are defined as those earning less than two times the minimum wage.[6]

One of the most striking aspects of the results is the sharp urban/rural dichotomy they depict, as agricultural sectors are associated with far lower Gini coefficients than other sectors of the economy. Industrial sectors with strong backward linkages to agriculture (such as food processing industries) also do well in distributive terms. Not all agricultural sectors are characterized by low Gini coefficients; soybean and wheat farming, in particular, are associated with a far higher Gini coefficient than the other agricultural sectors. This is not surprising, given the capital-intensity of this activity.

Another interesting aspect of the results is the high degree of income inequality (high Gini coefficients) associated with certain service sectors. Some service activities, such as the restaurant and hotel business, are correlated with low Gini coefficients; this is in conformity with the usual conception of the service sector, which normally is seen as being associated with less income inequality (lower Gini coefficients) than industry. A glance at the end of Table 1, however, reveals that not all service sectors produce a large share of income for the poor. Communications and financial services, for example, are associated with higher Gini coefficients than a good many industrial activities. In fact, taken as a whole, expansion of the service sector is not associated with a greater share of income for the poor than a similar increase in industrial output. Calculating the Gini coefficients for a unit increase in final demand for the "average" basket of services and non-traded industry, we arrive at coefficients of .856 and .848, respectively.[7] Thus, it is not true that services, as a whole, perform all that differently from industry. While industry does not fare badly in this comparison with services, it still does far worse than agriculture; thus, greater emphasis on agriculture (instead of industry) could be expected to have an equalizing effect on the distribution of income.

What is the relationship between sectoral performance on income distribution and other criteria which may be of interest, such as employment creation and productivity? These relationships are spelled out in Table 2, which reports Spearman correlation coefficients for industrial sectors of the input-output table. One can see that positive performance on distribution (low Gini coefficients) is associated with high employment creation, given the strong negative correlation between EMPLOY and GINI (-.95) Low Gini coefficients also go hand in hand with sectors associated with a high degree of equality in the distribution of wage income (WGINI). Not surprisingly, capital/labor ratios in high Gini sectors are also quite high, given the positive correlation (.59) between K/L and GINI. High Gini coefficient sectors are also more dependent on imports than low Gini activities, as reflected in the significant correlation between GINI and IMP.

One disturbing aspect of the results in Table 2 for the advocates of expansion in low Gini coefficient sectors is the low labor productivity of these sectors. Labor productivity is strongly correlated with the Gini coefficient (.81), implying that sectors that do well on distributive grounds (low Gini coefficients) do rather badly with respect to productivity. Such a condemnation of the efficiency of low Gini coefficient sectors may be premature, however; given that capital, not labor, is the scarcest resource of production in Brazil, labor productivity may not be an accurate measure of efficiency. To accurately measure the efficiency of a sector, both the productivity of labor and capital must be taken into account.

One measure of efficiency for tradeable sectors that takes into account the productivity of both labor and capital is Domestic Resource Cost (DRC). DRC quantifies the total cost of domestic resources such as primary materials, capital, and labor needed to generate one dollar of foreign exchange. Using shadow prices for the inputs, DRC measures the opportunity cost to society of producing a good; the lower the DRC, the lower the opportunity cost to society of producing a particular commodity. Hence, sectors characterized by low DRCs are efficient; high DRCs, on the other hand, indicate inefficiency.

By looking at the correlation between DRCs and Gini coefficients, we can test whether or not low Gini (low labor productivity) sectors are really inefficient. If a positive correlation between DRC and Gini coefficients can be established, then the best of all worlds is present: there is no tradeoff between equality and efficiency, and promoting sectors that do well on distributive criteria will improve efficiency. On the other hand, if a negative correlation is present, then a painful tradeoff between efficiency and equality must be faced.

Table 3 gives DRCs for 58 industrial sectors, as calculated by Savasini and Kume for 1970.[8] One can immediately observe that many high Gini coefficient sectors have low DRCs, even though these sectors are not labor intensive. In general, capital-intensive sectors that reap the benefits of natural resource rents, such as mining and petroleum extraction, have extremely low DRCs. Using correlation analysis, no significant relationship emerges between DRC, GINI, or EMPLOY. Therefore, employment-intensive development strategies that distribute a large share of their income to the poor are not necessarily efficient. On the other hand, the pursuit of efficiency does not in and of itself entail a loss of equality. What one can see from Tables 1 and 3 is that no clear pattern emerges in terms of classifying low DRC sectors as being high income inequality" or "low income inequality." This implies that a development strategy seeking to achieve efficiency high employment creation, and a more equal distribution of income must be formulated on an industry-by-industry basis. The results presented thus far imply this can be done, for there does not seem to be a conflict between these goals.

## IV. CONCLUSIONS AND POLICY IMPLICATIONS

The results presented here clearly indicate that the distributional performmance of agriculture is far better than that of industry and services. Both in terms of the Gini coefficient and the share of income accruing to the poor, the income generated from the production of agricultural products is distributed most equally. Sectoral performance on income distribution is strongly linked with high employment generation; thus, a development strategy that emphasizes high employment creation will also do well on the distribution front. Such a strategy will not necessarily have an adverse impact on efficiency, as there is no significant relationship between economic efficiency (domestic resource cost) and distributional performance (Gini coefficient).

While income is distributed more equally in agriculture than in industry or services, promotion of agriculture in lieu of these other sectors will not be a panacea for Brazil's severe income inequality. Perhaps what is most noteworthy in our results is the extremely high value of the Gini coefficients in all sectors, as well as the relatively small changes in Gini coefficient from sector to sector. Thus, a shift in sectoral production towards agriculture will have but a token impact on the aggregate Gini coefficient, given the high degree of income inequality in agriculture as well. As Table 1 evinces, Gini coefficients are high in all sectors, indicative of the meager share of income the poor receive. This implies that the major cause of income inequality in Brazil is not the sectoral composition of production (whether the economy is intensive in agriculture, industry, etc.). Given the high income inequality in almost all the sectors, it is apparent that, as a whole, low income groups (unskilled workers) have weak bargaining power vis-a-vis managerial workers and capital. This extreme inequality in the functional distribution of income is reflected in the 1980 Industrial Census, which reports that wages comprise just 18% of industrial value added. The weak bargaining power of labor in the Brazilian economy cuts across all sectors of the economy, so that they all are characterized by a high degree of inequality. Thus, the major way in which income distribution in Brazil can be improved is through measures that increase the share of wages (especially those of the unskilled) relative to other factors of production. This will not be easy, as oligopolistic capital is able to shift wage and tax increases onto consumers, leaving the functional distribution of income relatively untouched. Given the relative abundance of labor in Brazil, it is difficult to foresee an improvement in workers' bargaining power without profound structural changes in the Brazilian economy. Primary among these structural changes would be a redistribution of land in agriculture, reducing the number of landless laborers who swell the ranks of the reserve army of the under and un-employed. A greater emphasis on agriculture (instead of industry) would also increase the aggregate labor absorption of the Brazilian economy, reducing some of this surplus labor. Such an emphasis on agriculture and land redistribution is not likely to occur soon in Brazil, given the current structure of political power. Nevertheless, it is difficult to envision any significant change in the distribution of income without such a fundamental redistribution of property.

Table 1
DISTRIBUTIONAL PERFORMANCE BY SECTOR
(RANK ORDERING BY GINI COEFFICIENT)

| | Gini Coefficient | Income Share of the Poor |
|---|---|---|
| Fishing and hunting | .670 | .208 |
| Sugarcane growing | .672 | .215 |
| Miscellaneous agriculture | .701 | .185 |
| Miscellaneous crop growing | .711 | .184 |
| Coffee growing | .725 | .172 |
| Cattle raising | .743 | .159 |
| Sugar processing | .745 | .155 |
| Coffee processing | .754 | .149 |
| Forestry | .755 | .140 |
| Rice | .765 | .137 |
| Poultry | .769 | .133 |
| Meat slaughtering | .772 | .128 |
| Manufacture of dairy products | .775 | .130 |
| Rice processing | .776 | .130 |
| Poultry slaughtering | .776 | .115 |
| Hospital services | .777 | .115 |
| Natural fiber mills | .783 | .125 |
| Preparation of miscellaneous food products of vegetable origin | .784 | .124 |
| Train transportation | .785 | .092 |
| Sugar refining | .787 | .122 |
| Restaurants, hotels | .798 | .122 |
| Vegetable oil | .799 | .112 |
| Footwear | .799 | .126 |
| Soybean and wheat farming | .801 | .104 |
| Wooden structures | .801 | .121 |
| Coffee mills, instant coffee | .801 | .113 |
| Preparation of animal feed | .803 | .108 |
| Miscellaneous services | .806 | .087 |
| Vehicle repair | .806 | .099 |
| Plywood | .808 | .112 |
| Flour | .808 | .104 |
| Distribution and trucking | .809 | .083 |
| Synthetic textiles | .810 | .101 |
| Vegetable and fruit canning | .810 | .102 |
| Construction | .814 | .087 |
| Clothing | .819 | .072 |
| Leasing of equipment | .821 | .046 |
| Wooden furniture | .822 | .096 |
| Maintenance, repair and installation of machines | .827 | .061 |
| Bakery products | .828 | .089 |
| Miscellaneous food products | .830 | .087 |
| Pig-iron | .831 | .080 |
| Leather and hides | .831 | .094 |
| Vegetable oil and fat refining | .833 | .086 |
| Non-vehicle repair | .837 | .079 |
| Alcohol produced from sugarcane | | |

| | | |
|---|---|---|
| and cereals | .839 | .082 |
| Bus transportation | .839 | .054 |
| Porcelean and ceramics | .840 | .075 |
| Knitting | .840 | .078 |
| Metal furniture | .841 | .080 |
| Coal industry products | .841 | .061 |
| Airline transportation | .845 | .061 |
| Tobacco industry | .847 | .075 |
| Glass | .848 | .069 |
| Miscellaneous textiles | .849 | .072 |
| Coal mining | .853 | .055 |
| Primary iron and steel | .856 | .060 |
| Boat transportation | .857 | .092 |
| Alcoholic beverages | .858 | .065 |
| Cast iron and steel | .859 | .052 |
| Pulp mills | .860 | .063 |
| Yarn and cloth | .862 | .062 |
| Miscellaneous nonmetallic mineral products | .864 | .058 |
| Machine parts | .864 | .040 |
| Stamped metal products | .869 | .047 |
| Communications | .870 | .033 |
| Concrete, cement structures | .871 | .053 |
| Miscellaneous vehicles | .871 | .039 |
| Non-alcoholic beverages | .871 | .054 |
| Miscellaneous industrial products | .871 | .057 |
| Objects of paper, cardboard | .872 | .050 |
| Metal boxes, packaging | .875 | .045 |
| Plastic articles | .875 | .053 |
| Metal structures | .876 | .043 |
| Electrical material, repair of electrical appliances | .876 | .045 |
| Automobiles | .876 | .041 |
| Wholesale and retail trade | .876 | .058 |
| Electronic material | .878 | .044 |
| Vehicle motors and parts | .878 | .039 |
| Paper and cardboard | .878 | .046 |
| Rubber | .878 | .045 |
| Steel foundaries | .879 | .052 |
| Miscellaneous metallurgical products and services | .879 | .042 |
| Hydraulic pumps, engines | .879 | .039 |
| Water works and supply | .879 | .036 |
| Turbines and boilers | .880 | .038 |
| Industrial machines, equipment | .880 | .038 |
| Nonferrous metal-rolling, casting, extruding | .881 | .042 |
| Bus, truck production | .881 | .038 |
| Metal wire | .882 | .040 |
| Electric energy equipment | .882 | .042 |
| Electric motors, appliances | .883 | .041 |
| Naval industry | .884 | .035 |
| Electric material for vehicles | .885 | .040 |
| Sheet metal | .886 | .040 |
| Train production, repair | .887 | .038 |

| | | |
|---|---|---|
| Books, magazines, newspapers | .887 | .039 |
| Perfumes, soaps, candles | .890 | .043 |
| Telephones, radios, televisions | .891 | .037 |
| Agricultural machinery | .892 | .033 |
| Electrical conductors | .892 | .036 |
| Plastic sheets and plates | .892 | .041 |
| Office equipment | .895 | .032 |
| Tires | .895 | .036 |
| Television and radio receptors, sound equipment | .897 | .035 |
| Metallic mining | .899 | .031 |
| Non-metallic mining | .899 | .031 |
| Chemical elements | .900 | .032 |
| Miscellaneous chemical products | .903 | .032 |
| Electricity | .904 | .023 |
| Paints, tints, solvents | .907 | .028 |
| Cement | .912 | .027 |
| Resins, synthetic fibers | .912 | .025 |
| Fertilizers | .914 | .026 |
| Pharmaceuticals | .919 | .022 |
| Petrochemicals | .920 | .020 |
| Petroleum refining | .922 | .019 |
| Petroleum, natural gas extraction | .927 | .016 |
| Financial services | .928 | .013 |

TABLE 2

CORRELATION MATRIX AMONG DISTRIBUTIONAL INDICATORS

| | GINI | POOR | WGINI | EMPLOY | PERBL | K/L | IMP | PROD |
|---|---|---|---|---|---|---|---|---|
| GINI | 1.00 | | | | | | | |
| POOR | -.99 | 1.00 | | | | | | |
| WGINI | .91 | -.95 | 1.00 | | | | | |
| EMPLOY | -.91 | -.88 | -.78 | 1.00 | | | | |
| PERBL | -.26 | .30 | -.36 | -.07* | 1.00 | | | |
| K/L | .59 | -.49 | .30 | -.56 | -.05* | | | |
| IMP | .32 | -.30 | .26 | -.34 | .14* | .41 | 1.00 | |
| PROD | .75 | -.70 | .61 | -.73 | -.21 | .82 | .38 | 1.00 |

*=coefficient insignificant at the .05 level. All other coefficients are significant at the .05 level.

Legend: GINI=Gini coefficient; POOR=share of poor in total income generated; WGINI=Gini coefficient of wage distribution; EMPLOY=employment (man-years) per unit increase in final demand; PERBL=percentage of employment accruing to blue-collar workers; K/L=capital income/labor income (wage bill + self employed income) ratio; IMP=imports required per unit increase in final demand; PROD=labor productivity, defined as the quantity of value added created per unit increase in final demand divided by the total employment created per unit increase in final demand.

TABLE 3

DOMESTIC RESOURCE COST BY SECTOR, 1970

| | DRC |
|---|---|
| Mining | .65 |
| Fossil material and fuel exploration | .87 |
| Cement | 1.24 |
| Glass | 1.46 |
| Other nonmetallic minerals | 1.24 |
| Iron and steel in primary forms | 1.29 |
| Rolled steel | 1.50 |
| Cast iron and steel | 1.31 |
| Metallurgy of nonferrous metals | 1.34 |
| Other metallurgy | 1.40 |
| Pumps and motors | 1.37 |
| Parts for machinery | 1.33 |
| Industrial machinery, equipment | 1.29 |
| Agricultural machinery, equipment | 1.16 |
| Office machinery and equipment | 1.33 |
| Tractors and earth-moving machinery | 1.56 |
| Equipment for electric energy | 1.36 |
| Electrical cables and conduits | 1.20 |
| Electrical material | 1.21 |
| Electrical appliances | 1.55 |
| Electronic material | 1.39 |
| Communications equipment | 1.52 |
| Automobiles | 1.56 |
| Trucks, buses | 1.77 |
| Automobile parts | 1.34 |
| Naval industry | 1.55 |
| Railway stock and other vehicles | 1.32 |
| Wood | 1.18 |
| Furniture | 1.31 |
| Cellulose and pasteboard | 1.11 |
| Paper and cardboard | 1.80 |
| Paper products | 1.31 |
| Rubber | 1.26 |
| Leather and hides | 1.24 |
| Chemical elements and compositions | 1.08 |
| Oil refining and petrochemicals | .92 |
| Coal derivatives | .94 |
| Artificial threads and resins | 1.29 |
| Raw vegetable oils | 1.21 |
| Pigments, paints, solvents | 1.27 |
| Other chemical products | 1.50 |
| Pharmaceuticals | 1.17 |
| Perfumery, soaps, candles | 1.22 |
| Plastics | 1.37 |
| Processing of natural fibers | 1.01 |
| Spinning and weaving of artifical fibers | 1.13 |

TABLE 3 Continued

| | |
|---|---|
| Spinning and weaving of natural fibers | 1.56 |
| Other textile industries | 1.38 |
| Clothing | 1.38 |
| Footwear | 1.24 |
| Agroindustry | 1.10 |
| Sugar refining | 1.06 |
| Oil refining and preparation of vegetable fats for human consumption | 1.27 |
| Other foodstuff products | 1.38 |
| Beverages | 1.32 |
| Tobacco | .74 |
| Printing and publishing | 1.26 |
| Miscellaneous | 1.04 |

Source: Jose A. A. Savasini and H. Kume, Custos Dos Recursos Domesticos (Rio de Janeiro: Fundacao Centor de Estudos do Comercio Exterior, 1979), pp. 75-76.

## ENDNOTES

*The author would like to acknowledge the financial and institutional support of the Zahm Travel Fund, the Kellogg Institute for International Studies, and the Instituto Brasileiro de Pesquisas Sociais in Rio de Janeiro. These organizations and institutions are not, of course, responsible for any errors or omissions in the text.

1. Werner Baer, The Brazilian Economy: Growth and Development (New York: Praeger Publishers, 2nd edition, 1983), p. 47.

2. See, for example, Paulo Zaghen and Luiz C. Costa Rego, Exportacoes e Emprego no Brasil (Rio de Janeiro: Fundacao Centro de Estudos do Comercio Exterior, 1979), and Eleuterio F.S. Prado and Decio K. Kadota, "Multiplicadores de Emprego no Brasil," Pesquisa e Planejamento Economico 12 (April 1982), 207-230.

3. The A matrix only covers domestic (non-imported) inputs.

4. Elisabeth Sadoulet, Croissance Inegalitaire Dans Une Economie Sous Developpee (Geneva: University of Geneva Press, 1983). Sadoulet's estimates of income elasticity of demand by sector were converted to marginal propensities to consume by postmultiplying the elasticity estimates by the average propensity to consume. Consumption in our model is assumed to be a function of labor income, that is, all income to capital is assumed to be saved.

5. Ibid.

6. Guy Pfefferman and R. Webb, "Poverty and Income Distribution in Brazil," World Bank Working Paper 356, 1979. According to the 1980 Demographic Census, approximately 67% of the economically active population earned two times or less the minimum wage.

7. The average basket for these categories was formed as a weighted average, with the contribution of each sector to the category total determining the weight of the sector in the average basket. Nontraded industry was calculated by subtracting industrial exports from industrial final demand by sector.

8. Jose A. A. Savasini and Honorario Kume, Custos dos Recursos Domesticos da Exportacoes Brasileiras (Rio de Janeiro: Fundacao Centro de Estudos de Comercio Exterior, 1979). Savasini and Kume estimate that the exchange rate was overvalued by approximately 30% in 1970, so that the DRCs in Table 3 should all be deflated by 30%. In light of this overstatement of DRC (due to the overvalued exchange rate), they state that any sector with a DRC greater than 1.35 should be interpreted as having a "negative social benefit," that is, costs of expanded production exceed benefits. Any sector with a DRC of 1.25-1.35 has an "indeterminant social benefit"; it is indeterminant because the estimate of exchange rate overvaluation (30%) is only an approximation, and hence an error of .05 on either side of 1.30 should be allowed for. Any sector with a DRC less than 1.25 has a clear positive social benefit.