Employment, productive structure, and income distribution in the Brazilian economy, 1996 and 2002 compared

Camargo, Fernanda Sartori de and Guilhoto, Joaquim José Martins

Universidade de São Paulo, Fundação Institute de Pesquisas Econômicas

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EMPLOYMENT, PRODUCTIVE STRUCTURE, AND INCOME DISTRIBUTION IN THE BRAZILIAN ECONOMY, 1996 AND 2002 COMPARED

Fernanda Sartori de Camargo
Economic Research Institute Foundation (FIPE),University of São Paulo, Brazil
E-mail sartori.f@gmail.com

Joaquim J. M. Guilhoto[1]
Department of Economics, FEA - University of São Paulo, Brazil
REAL, University of Illinois; and CNPq Scholar
E-mail: guilhoto@usp.br

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ABSTRACT

Despite the advances in recent years in areas as education and combat to the poverty, Brazil continues to have one of the worst income distributions in the world. Nowadays, in a list with 126 countries and territories, Brazil has the 10th worse income distribution. As much as income distribuition, another problem faced by the Brazilian economy is over the growing demand for employment generation. Taking into consideration both of these aspects, the purpose of this paper is to make a relation and to compare how the productive structure and the income distribution in the Brazilian economy have had an impact over employment generation in 1996 and 2002. This paper uses as a theoretical basis the Leontief-Miyazawa approach. This model is constructed for the Brazilian economy for the above years, taking into consideration five income brackets and 42 sectors.

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1. INTRODUCTION

The reorganization of the Brazilian economy, in the globalization process, has brought out changes in its productive structure, and, consequently, changes in the job market. These changes had impact on the employment at the sectoral level, with great concerns related to the labor relations and to the growing unemployment rates.

According to Brasil (1998), in 1990 the reorientation of the development model, which moved from protection to the industrial sector to an open economy with monetary control, had originated deep changes in the Brazilian job market. The sectoral composition of the job market changed, with the primary and secondary sectors showing reduction in their capacity of job generation, with the tertiary sector absorbing, in part, the employees released from the other sectors (Hilgemberg, 2003).

As much as the growing demand for employment generation, another problem faced by the Brazilian economy is over the income distribuition. Brazil is a country of contradictions: it has the biggest economy of South America, but has also one of the worse income distributions in the world. Despite the advances in recent years in areas as education and combat to the poverty, Brazil continues to have one of the worst income distributions in the world. Nowadays, in a list with 126 countries and territories, Brazil has the 10th worse income distribution[2].

Green et al. (2001) and Gurgel et al. (2003) argue that opening of the economy to external market could help reducing inequality. On the other hand, Barros et al., (2001) e Green, Dickerson e Arbache (2001) did not find significant relationship between openness and income distribution. The income distribution in the countries suggests the existence of regional influences.

Taking into consideration both of these aspects, the purpose of this paper is to make a relation and to compare how the productive structure and the income distribution in the Brazilian economy have had an impact over employment generation in 1996 and 2002, under the optics of the Leontief-Miyazawa analysis, the information from the

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[2] According to the UNDP's Human Development Report 2006

National Household survey was used to estimate the personal income divided into five brackets.

This paper is organized in 4 sections, beyond this brief introduction. In the next sections we will be presenting the methodology based on the Leontief-Miyazawa model. In section 3, the results are presented and the final comments are made in section 4.

2. METHODOLOGY AND DATA BASE

2.1. The Leontief-Miyazawa Model

The analysis of the intersetorial structure will be carried through the application of the Leontief-Miyazawa approach. The Leontief-Miyazawa analysis brings information on the structure of production of the economy and the sectoral origin of the generated income and also the sectoral distribution of income to households in different income brackets, and the sectoral allocation of consumption expenditures by households.

In the Leontief model the intersectoral flows of goods and services can be determined by technological and economic factors from the following system of equations:

$$\mathbf{X} = \mathbf{AX} + \mathbf{Y} \tag{1}$$

Where $\mathbf{X}$ represents a vector ($n \times 1$) with the value of the total production for sector, $\mathbf{Y}$ is a vector ($n \times 1$) with the values of the sectoral final demand and $\mathbf{A}$ it is a matrix ($n \times n$) with the technical coefficients of the production. The vector of total production is determined by the vector of final demand, considered exogenous to the system:

$$\mathbf{X} = \mathbf{B} \times \mathbf{Y} \tag{2}$$

Where $\mathbf{B}$ is the Leontief inverse ($\mathbf{B} = (\mathbf{I} - \mathbf{A})^{-1}$). The elements in the final demand vector, $\mathbf{Y}$, are:

a)household consumption ($\mathbf{Y_f}$); b)exports ($\mathbf{Y_e}$); c)government expenditure ($\mathbf{Y_g}$); d)investment ($\mathbf{Y_k}$).

From this pure model, Miyazawa (1976) divided to the final demands in internal demands of consumption and exogenous demands (expense of the government, investment and exportations):

$$\mathbf{Y} = \mathbf{Y}^c \times \mathbf{Y}^e \tag{3}$$

where $\mathbf{Y}^c$ is the (n x 1) vector of consumption demand and $\mathbf{Y}^e$ is the (n x 1) vector of exogenous demand.

The multisectoral consumption function is defined as

$$\mathbf{Y^c} = \mathbf{CQ} \tag{4}$$

Where $\mathbf{C}$ is a (n x r) matrix with the consumption coefficients, and $\mathbf{Q}$ is a (r x 1) vector with the total income of each income group. The matriz E is the matrix whose elements e_{ik} represent the total amount of the ith commodity consumed by the kth income group, and c_{ik} be defined as

$$c_{ik} = \frac{e_{ik}}{q_k} \tag{5}$$

And the income-distribution structure can be represented by the simultaneous equations

$$\mathbf{Q} = VX \tag{6}$$

Where V is a (r x n) matrix with the value-added ratios. The simultaneous equations (6) represent the fact that the productive structure prevailing in a country is associated to a corresponding structure of income distribution.

The matrix R be a matrix whose elements r_{kj} represent the income of the kth group earned from the jth sector. Then, v_{kj} is given by

$$v_{kj} = \frac{r_{kj}}{x_j} \tag{7}$$

To solve static model we start by substituting (3), (4), and (6) into (1), getting

$$X = AX + CVX + Y^e \tag{8}$$

whose solution is

$$X = (I - A - CV)^{-1} Y^e \tag{9}$$

Moreover, it is convenient to express the matrix in (9) as the product of $B = (I - A)^{-1}$ - which reflects the production flows - and another matrix reflecting the endogenous consumption flows, that is,

$$X = B(I - CVB)^{-1} Y^e \tag{10}$$

Finally, substituting (10) into (6), the multisectoral income multiplier is given by

$$Q = VB(I - CVB)^{-1} Y^e \tag{11}$$

Which shows that the income for each group (and, of course, the aggregate income) will have different values depending on the sectors' shares in the exogenous final demand (Miyazawa, 1963 and 1976).

2.2. Data Source

For the elaboration of this paper we used 3 different databases, all produced by the Brazilian National Statistical Office (IBGE):

• System of National Accounts[3]: Assembly of the Input-Output regional matrices on the basis of the methodology developed by Guilhoto and Sesso-Filho (2005);

• Household consumption: Insertion of the referring data to the consumption of the families on the basis of the Research of Familiar Budgets - POF (IBGE, 2005);

• Income of the families: The information had been tabulated using the Household Survey, PNAD (IBGE, 2004).

3. MAIN RESULTS

This section presents the main results to the Brazilian economy in the year of 1996 and 2002. We start by presenting some information from the Input-Output matrices of each year. First of all, we compare the number of employees in the year of 2002 and 1996. Tables 1 and 2 presents the difference between the number of workers in the year of 2002 considering the number of workers in 1996 as a reference: Table 1 represents sectors which have increased the number of jobs and the Table 2 represents sectors which have reduced the number of jobs. The values of these tables shows the changes in the total number of jobs and it is possible to compare which of the sectors have increased, or not, its capacity to employ.

Services and Trade have been the ones responsible for the growth in the number of employees in the economy. About 8 million jobs they have been created between 1996 and 2002 (Table 1). On the other side, the Agriculture has decreased significantly its capacity to generate jobs (Table 2).

Such result might indicate that the opening of the economy, the valuation and stabilization of the national currency, and the increments in the wage probably have increase the potential of the household consumption, which was restrained in the past by the high inflation rates.

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[3] The information uses in this paper refers to the data in the System of National Accounts before revision released in march 2007.

Table 1 – Difference between the number of workers in the year of 2002 and 1996 – sectors which had increased the number of employment

Sectors	Difference between the number of employment (2002 less 1996)
Fertilizers and others chemical industries	100
Coffee industries	300
Non-ferrous metallurgy	7,700
Non-metallic minerals	8,300
Motors and parts for vehicles industries	8,800
Vegetal products processing	16,100
General food	25,100
Plastics industries	28,500
Petrol and gas	35,300
Financial institutions	35,800
Shoes	53,900
Other manufacturing	64,600
Other metallurgic industries	83,600
Communication	92,800
Wood and furniture	106,200
Machinery and equipment	122,200
Apparel	148,200
Transport	521,100
Construction	541,200
Public administration	815,800
Services to business	906,300
Non-business private services	1,029,300
Services to households	1,471,300
Trade	2,040,600
Total	8,163,100

Source: Research data.

Table 2 – Difference between the number of workers in the year of 2002 and 1996 – sectors which had decreased the number of employment

Sectors	Difference between the number of employment (2002 less 1996)
Agriculture	-1,397,400
Electric material	-27,600
Building rent	-22,500
Electronic equipment	-21,200
Chemicals	-18,800
Petrol refining	-15,500
Vegetal oil mills	-10,100
Public utility services	-7,600
Sugar industries	-7,300
Pharmaceutical and veterinary	-5,800
Dairy products industries	-4,800
Automobilies, trucks and buses industries	-4,000
Textiles industries	-3,200
Steel industries	-3,100
Meat industries	-2,400
Rubber industries	-1,600
Mineral extraction (except fuel)	-1,000
Cellulose, paper and printing	-600
Total	**-1,554,500**

Source: Research data.

From Table 3, the sectors that have showed the biggest participation in the total of jobs have been: a) Agriculture, with a falling share from 23.3% in 1996 to 18.8% in 2002; b) Trade, increasing its participation from 14.6% in 1996 to 16.2% in 2002; c) Services to households, increasing its participation from 14.7% in 1996 to 15.5% in 2002; d) Non-business private services, increasing its participation from 8.9% in 1996 to 9.6% in 2002.

The sectoral income share by each income class (Tables 4 and 5) did not represent significant changes in theses years. The Public Administration continues to be the sector which has the highest share of income by income brackets.

Table 3 – Sector participation in the employment (%) – 1996 to 2002

	1996	2002
Vegetal oil mills	0.08%	0.06%
Petrol refining	0.10%	0.07%
Rubber industries	0.09%	0.08%
Chemicals	0.13%	0.09%
Dairy products industries	0.11%	0.09%
Petrol and gas	0.04%	0.09%
Non-ferrous metallurgy	0.09%	0.09%
Automobilies, trucks and buses industries	0.13%	0.11%
Coffee industries	0.13%	0.11%
Steel industries	0.14%	0.12%
Sugar industries	0.16%	0.13%
Electronic equipment	0.19%	0.14%
Electric material	0.24%	0.17%
Pharmaceutical and veterinary	0.21%	0.18%
Fertilizers and others chemical industries	0.26%	0.23%
Mineral extraction (except fuel)	0.35%	0.31%
Plastics industries	0.30%	0.31%
Motors and parts for vehicles industries	0.36%	0.33%
Public utility services	0.39%	0.34%
Meat industries	0.41%	0.37%
Textiles industries	0.41%	0.37%
Building rent	0.47%	0.39%
Communication	0.29%	0.40%
Other manufacturing	0.39%	0.45%
Vegetal products processing	0.52%	0.50%
Shoes	0.58%	0.60%
Cellulose, paper and printing	0.71%	0.64%
Non-metallic minerals	0.73%	0.67%
Machinery and equipment	0.70%	0.81%
General food	1.08%	1.01%
Other metallurgic industries	1.05%	1.07%
Financial institutions	1.25%	1.18%
Wood and furniture	1.43%	1.45%
Apparel	2.66%	2.62%
Transport	3.78%	4.19%
Services to business	3.64%	4.64%
Construction	5.89%	6.12%
Public administration	8.98%	9.31%
Non-business private services	8.93%	9.59%
Services to households	14.72%	15.47%
Trade	14.63%	16.25%
Agriculture	23.27%	18.85%
Total	100%	100%

Source: Research data.

Table 4 –Sectoral Income share by each income class (%) – 1996

Sectors	Sectoral Income share by each Income Class - 1996				
	1	2	3	4	5
Agriculture	13.2%	8.8%	6.5%	5.9%	5.8%
Mineral extraction (except fuel)	0.6%	0.5%	0.4%	0.2%	0.3%
Petrol and gas	0.3%	0.3%	0.4%	0.4%	0.5%
Non-metallic minerals	1.1%	1.2%	0.9%	0.7%	0.7%
Steel industries	0.4%	0.5%	0.6%	0.6%	0.5%
Non-ferrous metallurgy	0.4%	0.4%	0.3%	0.3%	0.2%
Other metallurgic industries	2.4%	2.6%	1.7%	1.0%	0.6%
Machinery and equipment	1.0%	1.5%	1.9%	1.8%	1.7%
Electric material	0.3%	0.5%	0.6%	0.6%	0.5%
Electronic equipment	0.8%	0.8%	0.8%	0.7%	0.6%
Automobilies, trucks and buses industries	0.4%	0.6%	0.7%	0.7%	0.6%
Motors and parts for vehicles industries	0.8%	1.2%	1.1%	0.9%	0.7%
Wood and furniture	1.2%	1.4%	1.0%	0.7%	0.5%
Cellulose, paper and printing	0.5%	0.8%	1.0%	1.0%	1.0%
Rubber industries	0.2%	0.2%	0.3%	0.3%	0.2%
Chemicals	0.4%	0.5%	0.5%	0.6%	0.5%
Petrol refining	1.2%	1.3%	1.4%	1.7%	1.6%
Fertilizers and others chemical industries	0.8%	0.9%	0.7%	0.6%	0.6%
Pharmaceutical and veterinary	0.4%	0.4%	0.5%	0.6%	0.7%
Plastics industries	0.4%	0.6%	0.7%	0.5%	0.4%
Textiles industries	0.5%	0.7%	0.7%	0.6%	0.5%
Apparel	0.8%	1.0%	0.9%	0.7%	0.4%
Shoes	0.4%	0.5%	0.4%	0.3%	0.2%
Coffee industries	0.2%	0.2%	0.2%	0.2%	0.1%
Vegetal products processing	1.3%	1.1%	0.6%	0.5%	0.4%
Meat industries	1.0%	0.8%	0.5%	0.4%	0.3%
Dairy products industries	0.4%	0.3%	0.2%	0.2%	0.2%
Sugar industries	0.4%	0.3%	0.2%	0.1%	0.1%
Vegetal oil mills	0.3%	0.3%	0.2%	0.2%	0.2%
General food	2.6%	2.1%	1.2%	0.8%	0.7%
Other manufacturing	0.3%	0.4%	0.5%	0.4%	0.4%
Public utility services	1.1%	1.8%	2.6%	3.5%	2.4%
Construction	8.3%	10.1%	8.5%	6.9%	5.9%
Trade	6.6%	8.6%	8.7%	8.3%	8.8%
Transport	2.1%	4.0%	4.4%	3.6%	2.9%
Communication	1.0%	1.3%	1.6%	1.7%	1.7%
Financial institutions	2.4%	2.0%	4.1%	8.3%	10.2%
Services to households	7.0%	8.1%	8.2%	7.9%	8.9%
Services to business	2.1%	2.4%	2.8%	3.4%	5.3%
Building rent	9.2%	9.2%	9.2%	9.3%	9.6%
Public administration	14.8%	15.7%	20.3%	22.3%	22.2%
Non-business private services	9.8%	3.9%	2.2%	1.0%	0.4%
Total	100%	100%	100%	100%	100%

Source: Research data.

Table 5 – Sectoral Income share by each income class (%)– 2002

Sectors	Sectoral Income share by each Income Class - 2002				
	1	2	3	4	5
Agriculture	11.0%	7.4%	6.1%	6.0%	6.0%
Mineral extraction (except fuel)	0.6%	0.5%	0.4%	0.4%	0.4%
Petrol and gas	1.7%	1.8%	1.9%	1.9%	2.0%
Non-metallic minerals	1.3%	1.1%	0.8%	0.7%	0.6%
Steel industries	0.9%	0.9%	0.9%	0.8%	0.8%
Non-ferrous metallurgy	0.3%	0.3%	0.3%	0.3%	0.3%
Other metallurgic industries	1.0%	1.3%	1.2%	0.8%	0.6%
Machinery and equipment	1.8%	2.3%	2.4%	2.4%	2.2%
Electric material	0.2%	0.3%	0.3%	0.3%	0.3%
Electronic equipment	0.4%	0.4%	0.5%	0.5%	0.5%
Automobilies, trucks and buses industries	0.3%	0.4%	0.4%	0.4%	0.4%
Motors and parts for vehicles industries	0.4%	0.7%	0.8%	0.8%	0.7%
Wood and furniture	1.4%	1.2%	0.9%	0.5%	0.4%
Cellulose, paper and printing	0.8%	1.0%	1.1%	1.1%	1.4%
Rubber industries	0.3%	0.3%	0.3%	0.3%	0.3%
Chemicals	0.6%	0.6%	0.6%	0.6%	0.7%
Petrol refining	1.7%	1.7%	1.8%	1.9%	1.9%
Fertilizers and others chemical industries	0.6%	0.8%	0.7%	0.7%	0.9%
Pharmaceutical and veterinary	0.3%	0.4%	0.4%	0.6%	0.6%
Plastics industries	0.3%	0.5%	0.4%	0.3%	0.3%
Textiles industries	0.4%	0.5%	0.3%	0.3%	0.2%
Apparel	1.1%	1.1%	0.7%	0.6%	0.4%
Shoes	0.5%	0.5%	0.4%	0.2%	0.3%
Coffee industries	0.3%	0.3%	0.2%	0.2%	0.2%
Vegetal products processing	0.7%	0.6%	0.5%	0.4%	0.4%
Meat industries	0.6%	0.5%	0.4%	0.3%	0.3%
Dairy products industries	0.2%	0.2%	0.1%	0.1%	0.1%
Sugar industries	0.4%	0.4%	0.3%	0.3%	0.3%
Vegetal oil mills	0.3%	0.3%	0.2%	0.2%	0.2%
General food	1.2%	1.1%	0.8%	0.6%	0.6%
Other manufacturing	0.4%	0.4%	0.4%	0.3%	0.4%
Public utility services	2.2%	2.8%	3.2%	3.5%	2.8%
Construction	9.7%	8.5%	6.1%	5.1%	4.9%
Trade	9.0%	9.4%	8.8%	8.4%	7.8%
Transport	2.8%	4.7%	3.7%	3.2%	1.8%
Communication	1.7%	2.0%	2.4%	2.4%	2.6%
Financial institutions	3.3%	4.0%	6.2%	8.8%	9.6%
Services to households	6.9%	6.6%	5.8%	5.3%	6.8%
Services to business	2.6%	3.4%	3.5%	4.8%	7.2%
Building rent	7.4%	7.5%	7.6%	7.8%	7.8%
Public administration	14.5%	18.1%	24.8%	25.6%	23.9%
Non-business private services	7.9%	3.5%	1.4%	0.4%	0.4%
Total	100%	100%	100%	100%	100%

Source: Research data.

With the incorporation of the data from the PNAD and POF (Brazilian National Statistical Office) to the Leontief-Miazawa model it was possible, to get the total jobs generated in each sector, as well as the indirect and induced impacts for the Brazilian economy as a whole.

The values of the direct, indirect and induced employment generation represents the number of jobs to the production monetary value, expressed in the Brazilian currency (Reais in constant prices of 2002). As so, the values of the employment coefficients for the year 1996 were expressed in value terms of 2002, what ensures that the employment generation coefficients are in the same unit for 1996 and 2002 (jobs generated by R$ 1 million of 2002).

The employment effects are classified into three types:

a) direct employment effect: that determines how many jobs are generated by a given sector when its production is increased;

b) indirect employment effect: that determines how many jobs are generated in all the other sectors when the production of a given sector is increased; and

c) induced employment effect: that determines how many jobs are generated as a result of households consumption, in consequence of the rise in their income, given the increase of direct, indirect and induced jobs.

Figure 1 displays, for 1996 and 2002, the value of the total employment generated by and increase of R$ 1 million (2002 constant prices) in the final demand of a given sector. The only sector that had an increase in the year of 2002 was the Apparel. All the others sectors had a decrease in the total employment generated.

The Tables 6, 7 and 8 shows, for 1996 and 2002, the value of the direct, indirect and induced, respectively, employment generated by and increase of R$ 1 million in the final demand of a given sector. The data show that the great majority of the sectors have decreased they capability of generate direct employment.

The Table 6 represets the direct employment generated by a increase of R$ 1 million (2002 constant prices) in the final demand of a given sector in both the years. The

direct employment generated in the sector corresponds to the additional work required by the activity when it has an increase in production.

The Table 7 represets the indirect employment generated by a increase of R$ 1 million (2002 constant prices) in the final demand of a given sector in both the years. Only 5 sectors shows increased in the direct jobs generated by an increase in the final demand: Textiles industries, Apparel, Public utility services, Communication and Building rent.

Finally, with the proposed methodology it is possible to estimate the induced employment, also known as the income effect, i.e., it measures the impact on employment given by the expenditures of the newly employed persons. The results (Table 8) show that there was reduction of the generation of jobs in all the sectors
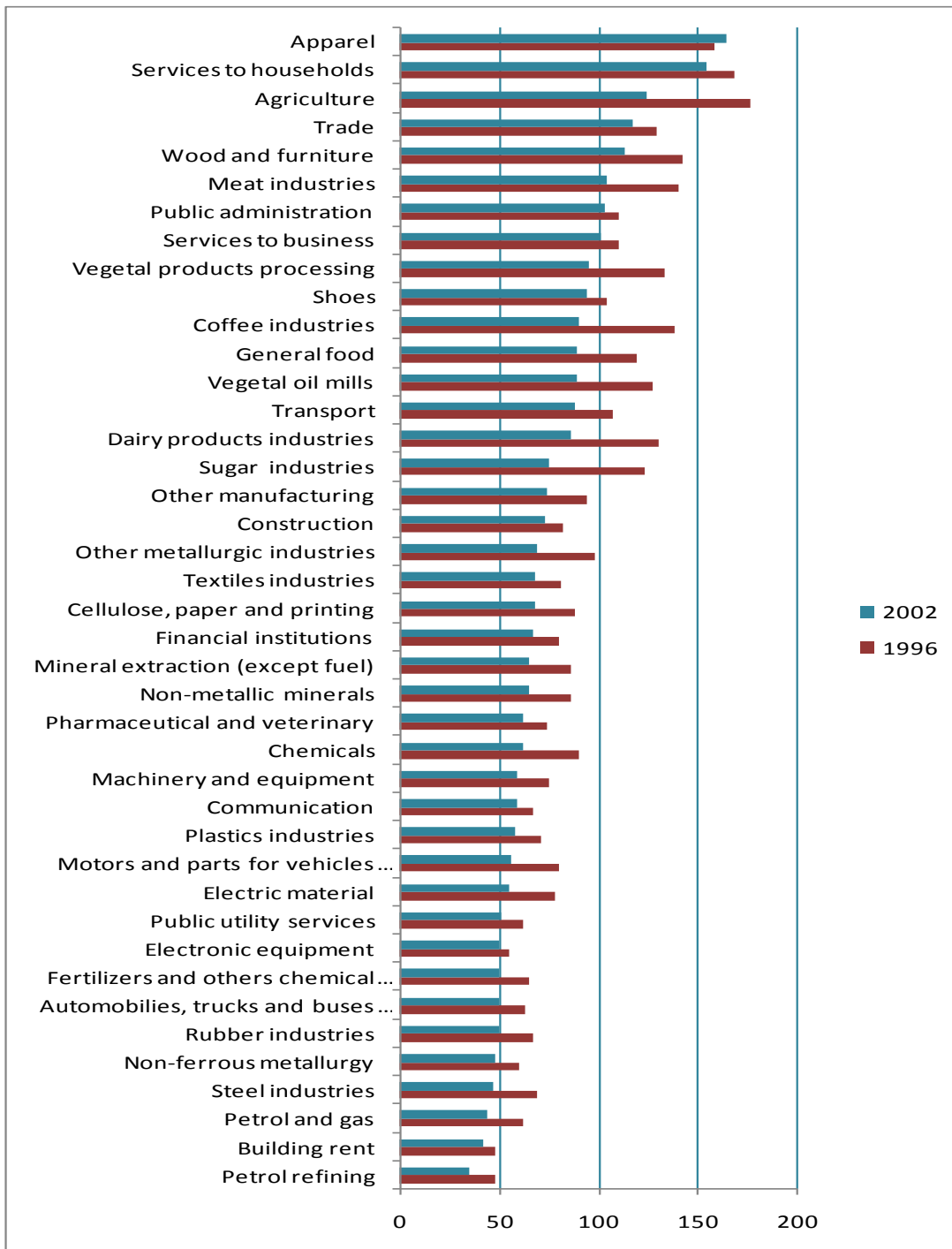
Figure 1 – Total Employment generated by a increase of R$ 1 million (2002 constant prices) in the final demand of a given sector – 1996 and 2002.

Source: Research data.

Tabel 6 – Direct Employment generated by a increase of R$ 1 million (2002 constant prices) in the final demand of a given sector – 1996 and 2002.

	1996	2002
Petrol refining	0.6	0.3
Petrol and gas	0.8	1.5
Steel industries	1.4	1.4
Vegetal oil mills	1.5	1.2
Building rent	2.2	1.8
Chemicals	2.7	2.2
Non-ferrous metallurgy	2.7	2.7
Automobilies, trucks and buses industries	3.3	2.4
Public utility services	3.5	2.6
Electronic equipment	3.7	5.7
Rubber industries	4.0	3.6
Sugar industries	4.1	5.3
Fertilizers and others chemical industries	4.3	4.0
Coffee industries	6.1	6.1
Financial institutions	6.3	6.2
Dairy products industries	6.3	4.4
Meat industries	7.4	5.6
Communication	7.6	4.4
Motors and parts for vehicles industries	7.8	5.5
Pharmaceutical and veterinary	8.6	5.5
Machinery and equipment	9.0	9.4
Cellulose, paper and printing	9.6	9.4
Electric material	10.6	5.2
Vegetal products processing	10.9	9.1
Mineral extraction (except fuel)	12.2	14.3
Textiles industries	12.3	9.2
Plastics industries	13.8	13.8
Non-metallic minerals	16.1	14.8
General food	19.3	13.0
Public administration	21.3	21.5
Other manufacturing	22.0	19.6
Construction	22.7	23.1
Other metallurgic industries	23.2	17.2
Shoes	23.5	35.8
Transport	36.1	31.6
Services to business	40.8	38.3
Wood and furniture	43.8	43.5
Trade	55.7	58.7
Apparel	77.5	81.7
Services to households	90.7	86.3
Agriculture	98.9	64.2
Non-business private services	395.0	402.2

Source: Research data.

Table 7 – Indirect Employment generated by a increase of R$ 1 million (2002 constant prices) in the final demand of a given sector – 1996 and 2002.

	1996	2002
Agriculture	27.9	21.2
Mineral extraction (except fuel)	19.2	12.0
Petrol and gas	12.6	4.6
Non-metallic minerals	18.7	13.6
Steel industries	23.7	13.8
Non-ferrous metallurgy	15.7	14.2
Other metallurgic industries	18.1	14.2
Machinery and equipment	13.3	9.5
Electric material	19.4	16.3
Electronic equipment	12.9	11.3
Automobilies, trucks and buses industries	17.7	16.9
Motors and parts for vehicles industries	19.8	16.3
Wood and furniture	41.7	27.4
Cellulose, paper and printing	25.0	17.6
Rubber industries	19.9	14.0
Chemicals	40.4	24.0
Petrol refining	9.6	6.5
Fertilizers and others chemical industries	17.2	12.7
Pharmaceutical and veterinary	19.7	19.4
Plastics industries	10.4	9.1
Textiles industries	26.4	26.4
Apparel	23.4	39.9
Shoes	27.2	19.6
Coffee industries	81.6	46.0
Vegetal products processing	72.4	48.9
Meat industries	81.5	60.8
Dairy products industries	74.6	47.2
Sugar industries	66.3	32.8
Vegetal oil mills	78.2	52.2
General food	48.3	37.9
Other manufacturing	19.1	16.2
Public utility services	6.2	6.8
Construction	12.9	12.4
Trade	12.6	10.1
Transport	14.6	13.3
Communication	6.6	12.0
Financial institutions	11.4	8.9
Services to households	18.0	16.6
Services to business	9.4	8.4
Building rent	1.3	1.6
Public administration	14.7	13.7
Non-business private services	3.5	2.7

Source: Research data.

Table 8 – Induced Employment generated by a increase of R$ 1 million (2002 constant prices) in the final demand of a given sector – 1996 and 2002

	1996	2002
Agriculture	50	38
Mineral extraction (except fuel)	54	39
Petrol and gas	49	38
Non-metallic minerals	52	36
Steel industries	44	32
Non-ferrous metallurgy	42	31
Other metallurgic industries	56	38
Machinery and equipment	52	41
Electric material	48	33
Electronic equipment	38	33
Automobiles, trucks and buses industries	42	30
Motors and parts for vehicles industries	53	34
Wood and furniture	57	43
Cellulose, paper and printing	53	41
Rubber industries	43	32
Chemicals	47	36
Petrol refining	38	28
Fertilizers and others chemical industries	43	33
Pharmaceutical and veterinary	46	37
Plastics industries	47	35
Textiles industries	42	33
Apparel	57	42
Shoes	53	38
Coffee industries	50	38
Vegetal products processing	49	36
Meat industries	51	38
Dairy products industries	49	34
Sugar industries	52	37
Vegetal oil mills	47	35
General food	51	38
Other manufacturing	53	38
Public utility services	53	42
Construction	46	38
Trade	61	49
Transport	57	44
Communication	52	43
Financial institutions	62	52
Services to households	59	51
Services to business	60	54
Building rent	44	39
Public administration	74	68
Non-business private services	94	64

Source: Research data.

4. FINAL CONSIDERATIONS

This paper presents the results of the impact over employment generation in 1996 and 2002, concerned the productive structure and the income distribution in the Brazilian economy. The Leontief-Miazawa model were utilized to portray the structure of the economy in both years and to calculate the employment effect by increase of R$ 1 million in the final demand of a given sector.

From the above, one has that the total number of employees in the economy, from 1996 to 2002, had grown by about 8 million. Services and Trade have been the ones responsible for the growth in the number of employees in the economy and the Agriculture has decreased significantly its capacity to generate jobs. This decrease was mainly due by the adjustments in its productive process as well as for changes in the economic environment.

The analyzed databases of the National Account Systems, the National Household Survey, and the Leontief-Miazawa model shows the reduction in the capability of Brazilian sectors to generate employment (addition of the direct, indirect and induced effects). In general lines, all sectors have had a reduction of the total employment effect, mainly due to changes in the productive structure which were related to changes in the national economic environment, increase of imported inputs (improving the productivity) and in the continuous process of globalization.

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