STRUCTURAL CHANGE IN THE BRAZILIAN ECONOMY BETWEEN 1959 AND 2000

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ABSTRACT

The purpose of the present paper is to describe the structural change faced by Brazil between 1959 and 2000, employing input-output matrices for these years and for 1970, 1980 and 1990. The 2000 matrix was obtained through a combination of the Delphi and RAS methods. The analysis showed striking results both along sectors and the set of selected variables. First, the share of agriculture in total employment was reduced from two thirds in 1959 to just 20% in 2000. Second, the services sector employment showed an opposite pattern, evolving from 15% in 1959 to 57% in 2000. Thirdly, the symmetry between these two features of employment is dated to the period between 1970 and 1980, the remaining years just reinforcing the enormous breakthrough of the decade. But as a fourth important finding, the correspondence goes beyond agriculture and services, embracing both the main movement in industry in the same decade and other variables, besides employment. Further, there was a remarkable shift in manufacturing: the production of non-durables, which was dominant in 1959, and the epicentre of the import substitution industrialisation fell steadily during the whole period. To conclude, in 1959, the richest households final demand "commanded" 49% of its corresponding value added, this figure increasing to 68% in 2000.

1. INTRODUCTION

The Brazilian economy has, during the last two decades, brought about the attention of the world economic community upon itself, by virtue of its swing between growth and trade policy. Growth itself has become a chimera, occurring in some years, giving place to reduction of GDP in others. This performance inspired Castro (1985) to dub the 1980's as "the lost decade", to which the 1990's came, unfortunately, to join. This overall performance has hidden causes in almost all of the aspects of social life, with at least three well defined sub-periods. The first is associated with the import substitution industrialisation, going from the mid-1950s to the mid-1970s, the end of the so-called "Brazilian Miracle". The second period embraced the very "lost decade", due to its productive backwardness. It was, as well, in the third period, that the internationalisation of the domestic financial sector began.

The 1990s was clearly a period of deep change in the economic model, in terms of its productive dimension. During this period, the liability of an enormous foreign debt generated pressures from the world financial authorities for the productive side of the economy to be open.

The possibility of evaluation of the development trajectory of Brazil through a full system of national accounts goes back to 1947. It was strongly based in the Economic Census performed in 1950, with data of 1949. Ten years later, the process was repeated, and the data were, for the first time, allowing for the assembling of an input-output table for the whole country, embracing more than 30 sectors of activity. After that initial attempt, new tables were assembled for the years of 1970, 1975, 1980, 1991 and 1996. With the data covering the period of 1959-1990, the present

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author, using the opinion of specialists, applied the Delphi methodology, in order to obtain final demand (and its components), gross output, value added, non-competitive imports and employment data for year 2000. Applying the RAS method over this set of data, an eight sectors input-output matrix for this year was obtained.

Besides the assembling of the first input-output matrix for the whole country, 1959 has another important peculiarity. Having assembled the data concerned with the income received by the population, it was possible to calculate an index of Gini, for the first time in Brazilian economic history. Its magnitude was 0.49, placing Brazilian concentration slightly above the upper limit of the developed countries of Europe and the United States, whose interval ranges from 0.25 to 0.45. Accompanying the structural change which is to be described below, the ensuing Gini indexes had an almost monotonic increase up to year 2000, with a record figure of 0.60. To a large extent, this characteristic of the Brazilian economy marked and was marked by structural change itself. Many authors deeply discussed the dualistic character of the Brazilian economy and society, a feature which is to be appreciated in this paper, by looking at the distribution of household consumption by income brackets. Their hypotheses, however, were based on the view that – if there is concentration of property over the productive side of the economy – the patterns of primary income distribution and consumption will also be concentrated. Thus, the position that particular patterns of production generate a particular pattern of income distribution, which - in turn - generates a particular structure of consumption is considered[1]. Specifically, the gap between income generation and household consumption and the other categories of final demand can be bridged through the link of the second and third quadrants of an input-output table.

Still, the distribution-consumption binomial puts Brazil between the most unequal countries in the world, confirmed by the last 40 years unambiguous indicators of such traces and trends. An interesting question, which unfortunately transcends the contours of the present paper, concerns the association between the structural change faced by the Brazilian productive apparatus and its distributive performance. Extraordinary changes occurred in all of the relevant macroeconomic variables, such as value added, final demand, interest rate, investment-income ratio, etc. Enormous changes in relative terms occurred, as well, in the household consumption: 70% of the poor families embraced 29% of the overall goods and services in 1959, and transferred 10 percentage points to the other household groups, when the upper middle class embraced 7 percentage points and the upper class got the remaining 3. This small group, embracing only 3.3% of the population, had their 27% of consumption in 1959 raised to 31% in 1990, and 33% in 2000. Even with this signal of an unequal

[1]In this respect, the author sees his works inserted in a research programme composed of the works of Baer; Guilhoto & Fonseca (1986,1987), Bonelli & Cunha (1981, 1982), and Locatelli (1981, 1983 e 1985), among others. The author's studies on this subject, with the corresponding references to the general literature may be found in Bêrni (1997, 1999), which provided most of the data used here.

process of economic development, stabilisation policies still hold the world attention upon the country, but the kind of issue raised in the last few paragraphs is important in itself, as its answers can offer hints about the way inequality has being built. A powerful instrument to delve into such an analysis is the input-output model.

The present objective embraces the period covered by the input-output matrices of 1959, 1970, 1980 and 1990, and a fifth one corresponding precisely to year 2000. To do so, some information derived from the system of national accounts and a mixture of the Delphi and the RAS methods were used.

In order to achieve these objectives, the paper is organised as follows. Section 2 has two goals. First, it presents the main model to be used, in order to create the concept of sub-economies, which will be shown to be very useful for the description of structural change. Secondly, this very section makes a brief exposition of the methods dealt with in order for the input-output table of year 2000 to be obtained. In the ensuing sections, a discussion is made of the four variables selected to describe each sub-economy, namely, final demand (decomposed in four household groups and its other traditional components), gross output, value added, and employment. In the sixth section, a brief analysis of the relative sectoral productivity of labour is performed. Finally, a number of conclusions achieved during the analysis is put together, while some additional comments attempt to summarise the reasons why it is said that the Brazilian economy faced a powerful process of structural change, characterised by high dynamism and low egalitarianism.

2. STUDYING STRUCTURAL CHANGE WITH THE INPUT-OUTPUT MODEL

The input-output model, since its appearance in 1936, has experienced an impressive number of revolutions, embracing different empirical problems in the most varied fields of economics. Its reduced notation states that

$$\mathbf{x} = \mathbf{Bf}, \qquad (1)$$

where **x** is the vector of gross output for n industries, **B** is the Leontief-inverse matrix, of order n x n, and **f** is the vector of final demand for n industries.

However, if a whole matrix of m different categories of final demand is considered, then equation (1) is transformed in

$$\mathbf{X} = \mathbf{BF}, \qquad (2)$$

where **X** is a matrix of order n x m of gross output of the m categories of final demand, **B** has the same interpretation as above and **F** is the matrix of the m categories of final demand.

A characteristic element of matrix **X** informs the direct, indirect and induced requirements for industry i (i = 1, 2, 3, ..., n) to deliver the amount x_{ij} of production, so that the demand of category j (j = 1, 2, 3, ..., m) can be matched. In other words, each element of **F** is mapped into its corresponding element of **X** through matrix **B**. In this sense, in a similar fashion to Adam Smith's prices being **resolved** into wages and profits, it is possible to say that matrix **X** contains the resolved

final demand. In the present study, **F** contains seven categories of final demand. Thus, matrix **X** will embrace these figures, to which the indirect and induced requirements to their production have to be added.

Following this line of reasoning, a number of diagonal matrices can be defined, say, $\mathbf{v}^{\mathbf{D}}$ and $\boldsymbol{\lambda}^{\mathbf{D}}$, whose characteristic elements, are respectively, the value added per unit of output and the amount of labour per unit of output. Under these circumstances, two more matrices can be defined:

$$\mathbf{V} = \mathbf{v}^{\mathbf{D}}\mathbf{BF} \qquad (3)$$

and

$$\mathbf{L} = \boldsymbol{\lambda}^{\mathbf{D}}\mathbf{BF}, \qquad (4)$$

whose characteristic elements are, respectively, the value added (generated) and labour (employed) in sector i in order to match the demand category j, and they can be dubbed the resolved value added and the resolved employment.

The ensemble of corresponding columns of matrices **F**, **X**, **V** and **L** (and a host of other similar matrices) can be attributed the name of a sub-economy, each of which can be christened with the very category of final demand which originated it. Thus, a sub-economy is a fraction of the whole economic system, It shares with the whole economy a technological matrix, and provides information on the direct, indirect and induced requirements of a selected set of variables. In the empirical leg of this paper, these variables are final demand, gross output, value added and employment. With the above mentioned requirements and the set of selected variables, production is made feasible, generating final goods, gross output, value added, employment, etc., along the productive process.

If the above paragraphs have something of non-conventional, this feature resides in the grouping of all of these matrices in the same framework, as the resolved matrices presented in this paper have already appeared in the work of a number of personal and institutional authors[2]. Another feature of the non-conventional approach to studying the Brazilian structural change over the last 40 years consists of using a mixture of the Delphi and RAS[3] methods. In particular, these two methods were used to create the input-output table of 2000.

The Delphi method uses a certain cognitive ability of some specialists on specific subjects, and confronts these opinions with those of other specialists. One way of dealing with it is to create an iterative process in which each specialist is unable to identify and consider the opinion of the others, but only their statistical average, so that he/she can confirm/modify his/her own opinion. In the

[2]Leontief himself dealt with matrices analogous to **V** and **L**, while matrix **X** can be found in IBGE (1979).

[3]See Bacharach (1965), Bonelli & Cunha (1981), Friedlander (1961), Khan (1993), Lecomber (1975), Parikh (1979), Snower (1990), Teixeira (1978) e Toh (1998). In the context of an input-output model designed to forecast or planning, a sort of tolerable error consists of, departing from some relevant piece of information, using the Delphi and RAS methods, which were originally used by Richard Stone. The original application provided estimates of technical coefficients for an input-output table for the United Kingdom. An interesting exposition of similar uses can be found in the book edited by Linstone & Turoff (1975).

present context, the Delphi method was used in the following way. The sectoral share of final demand and its components (the four groups of household consumption, government expenditures, investment and exports), gross output, value added and employment corresponding to eight sectors concerned with the years of 1959, 1970, 1980 and 1990 (agriculture, mineral extraction, manufacturing of production goods, consumer durables, and consumer non-durables, industrial services of public utility, construction, and services) were distributed to a number of economics lecturers, who then were asked about their guesses on these structures in 2000. The same procedure was pursued as regards non-competitive imports and value added.

The selected variables showed stronger regularity along the whole period. To exemplify, consider employment. While the most extraordinary structural change took place between 1959 and 2000, a good amount of regularity along the threshold of this change is undeniable. In 1959, 1970, 1980 and 1990, it fell, respectively, from three quarters, to two thirds, one third, arriving at one fifth in year 2000. At least this 20% is what can be expected from a specialist, given his/her expertise in the field. The difference between the specialists' opinion for year 2000 and the most recent available figures for 1998 are very small, not only for employment, but also for the other variables under scrutiny[4].

With the proportions given by the main variables for year 2000, the next step was to consider the real rate of growth of gross output, final demand, value added and employment, determined in Bêrni (1997) and to apply them upon the 1990 corresponding values, originating the figures of 2000. As regards the consumption of the four household groups, the following procedure was followed. The benchmark of all of the estimates was the definition of four consumption groups, according to the information available from the input-output matrix of 1970. These strata were given in minimum wages, and their association with the income distribution, derived from a Lorenz curve with 10 deciles. This curve was transformed in the irregular "quartiles" shown in Table 1 through the use of cubic splines. Given these data, and the availability of Lorenz curves for the remaining years, a sort of an "income elasticity of consumption" was created to allow for bridging the gap between data on individual income distribution and household consumption. Thus, Ca is the poorest household group, and so on, up to the richest Cd.

With the final demand, gross output, and value added figures, it was possible to determine, by difference, the corresponding figures of purchases and sales of inputs. This provided the borders of the block of the intermediate transactions of an input-output table for year 2000. Applying the RAS method upon these borders, using the 1990 input-output table as the proxy, the monetary figures of intermediate transactions of 2000 were determined.

[4]See the following electronic address: www.ibge.gov.br/contasnacionais, where these figures are available

Table 1 – Shares in individual's income and their association with household consumption, based on the classification created in the input-output of 1970. Brazil, 1959/1990

Com-sump-tion group	Classes of individual earnings in minimum wages in 1970	% of the popu-lation in 1970	1959 % Y	1959 % C	1970 % Y	1970 % C	1980 % Y	1980 % C	1990 % Y	1990 % C
Ca	0 to less than 2	70.4	35	29	28	23	24	20	23	19
Cb	2 to less than 5	18.6	23	28	22	27	22	26	22	23
Cc	5 to less than 10	7.7	14	16	19	21	23	25	23	27
Cd	10 and more	3.3	28	27	31	29	31	29	32	31

Source: Author's calculations, according to the methodology presented in Bêrni (1997, 1999).
N.B.: % Y means percentage of the individual income and % C means percentage of the household consumption.

3. CHANGES IN FINAL DEMAND

Derived from the model exposed in Section 2 above, final demand has a key role in determining the different sub-economies in which a whole economy can be divided. The study of their evolution pinpoints the uses that society (armed with its purchasing power) makes of the bundle of goods and services produced in a unit of time. Table 2 shows the evolution of final demand along the period under scrutiny. The most striking point is the confirmation of the loss of weight of agriculture, particularly between 1959 and 1970. To this sector, it should be added the consumer non-durables group, an industrial group strongly related to agriculture. In both cases, it is possible to speak of a manifestation of Engel's law, in that the bigger the per capita income of the country along the period, the smaller is the share of food and related products in the composition of demand.

Industry as a whole reached its peak in 1970, during the epicentre of the "Brazilian Miracle", producing almost 60% of final demand. This can be contrasted with the loss faced by agriculture between 1959 and 1970. In the following decade, industry faced another impressive movement: while from 1959 to 1970, it gained 6.9 percentage points, the loss observed between 1970 and 1980 reached 12.5 percentage points. From 1980 onwards, moderate falls can be observed in final demand originated from Industry, reaching 40% in year 2000. While impressive in themselves, these figures provide an initial idea of a variant of the de-industrialisation phenomenon which has been associated with a number of Third World countries from the mid 1980s onwards[5]. Other variables, such as value added and employment, have to be examined, in order to provide more convincing evidence about this point[6].

Among the four industrial classes, the direct sales of mineral extraction to final demand have been and are kept at a small level. Manufacturing faced a monotonic decrease, with two of its three components accompanying the whole: production goods and consumer non-durables, while

[5]In fact, many people speak of de-industrialisation in Brazil, a phenomenon observed in Europe since the article of Singh (1977) as if it were applicable to Brazil. See also the de-industrialisation concept adopted by Rowthorn & Wells (1987), as will be presented in Section 4.

[6]An interesting discussion about this subject can be found in Momigliano & Siniscalco (1982).

consumer durables did not show an explicit trend, with a small variance around 7.5-8.8%. In 2000 it slightly reduced its share as regards the beginning of the decade. The ISPU and construction showed less regular patterns, but it is clear that a marked structural change took place in final demand due to shifts in their performance. The most striking performance accompanied the services sector, with a monotonic increase during the 40 years under scrutiny. Complementing the already discussed turning points of agriculture and industry as a whole, the services sector accompanied the industrial movement. That is to say, its big leap occurred between 1970 and 1980, although the change between 1990 and 2000 should also be mentioned.

Table 2 – Percentage structure of final demand. Brazil, 1959/2000.

Sectors	**1959**	**1970**	**1980**	**1990**	**2000**
Agriculture	14.3	6.2	5.2	4.7	4,3
Industry	51.0	57.9	45.4	44.2	39,8
MinExtr	0.2	0.4	0.8	0.6	0,6
Manufact	41.9	39.5	29.7	28.7	24,5
ProdGoods	10.9	10.1	8.1	5.8	4,5
ConsDurab	7.7	8.1	7.5	8.8	8,2
ConsNonDur	23.2	21.2	14.1	14.1	11,8
ISUP	0.3	1.5	0.8	1.4	1,7
Construction	8.7	16.6	14.1	13.5	12,9
Services	34.6	35.9	49.4	51.1	56,0
T o t a l	100.0	100.0	100.0	100.0	100,0

Source: Bêrni (1997, 1999), Rijckeghen (1967), IBGE (1979, 1989, 1990).

The fact that in year 2000 it is on the road to supply near 60% of the whole of final demand simply points to the "modernisation" of the country during the 40 years, placing it close to the sectoral pattern of the advanced capitalist countries. One striking contrast between Brazil and these economies is that Brazilian income is near four times smaller. A second difference consists of the low productivity of the services sector in recent times.

An interesting implication of the low productivity of the services can be reached in deductive terms. It is widely known that, inside this sector, there exists a profound dualism. It has a modern component (banks, telecommunications, firm-to-firm services, etc.) and another traditional component (part of the trade sub-sector, cargo transport, and part of the government supply of services). Established this dualism, the increased share of the services sector in final demand becomes clearer. In fact, there is an enormous segment of the Brazilian economy facing a process leading to maturity. The key words in this context are two. First, the internationalisation of capital shows its presence in Brazil with increasing frequency: Brazilian firms (both private and public) are being absorbed. New production methods of management and marketing are put into action, increasing labour productivity and reducing employment. Secondly, the so-called de-industrialisation

phenomenon, latent since the mid 1980s, which became clear along the decade[7]. In the 1990s, final demand (purged from imports) grew 74% (i.e., 5.7% a.a.) at the prices of 1990, while employment grew modest 11% (or 1.1% a.a.), and the industrial employment, mere 5.8% along the whole decade.

Returning to the manifestation of the Engel's law associated with the reduction of the share of agriculture in final demand along the five years under study, Table 3 allows another view of the subject.

Table 3 – Share of the different groups of household consumption in agricultural final demand goods. Brazil, 1959/2000.

Consumption Group	1959	1970	1980	1990	2000
Ca	25	12	9	8	6
Cb	20	10	6	6	5
Cc	15	7	5	4	4
Cd	10	4	3	3	3

Source: Bêrni (1997, 1999), Rijckeghen (1967), IBGE (1979, 1989, 1990).

In the words of Rowthorn & Wells (1987), the "gastronomic transition" appears to have been made by the richest households, starting with 10% of their expenditures devoted to agricultural goods in 1959, reaching a steady bottom line of 3% from 1980 onwards. But it is not strange that the remaining households reduced their expenditures in raw agricultural products, as well. The poorest households, for instance, show a remarkable fall of one quarter of their consumption being associated with food and related primary products in 1959 to just 6% in 2000. That is to say: while the poorest families reduced by 4.2 times their relative expenditures in agricultural goods, the richest cut their purchases 3.3 times. These are not spectacular differences, unless the absolute figures which originated Table 1 are considered. To a reasonable extent, this is reflecting the action of Engle's law. As a whole, the strongest signal of this "revolution" seems to have happened between 1959 and 1970. From this year onwards, the falls were not as spectacular.

Associating these figures with the agricultural exports performance (respectively 10%, 11%, 14%, 3% and 5% to the five years), it is possible to raise an interpretation: they show a process of increasing industrialisation, with increased processing of primary products. Even reducing their share on total expenditures, production goods and non-durables might have increased their absorption of raw materials, expanding the value added of these industrial groups, detrimental to agriculture itself. At this point, the presence of "substitutionist hypethesis" should be brought about to the picture. According to it, modern industry tends to substitute agricultural goods for well behaved inputs originating in industry itself, by virtue of the regularity and quality of their supply. In itself, this might be one of the causes of the reduction of agriculture in the economic system.

[7]It is important to insist that what is being observed in Brazil is not de-industrialisation, in the sense of Rowthorn & Wells (1987).

The expansion of the government expenditures in services is also eloquent (44%, 64%, 87%, 67% and 74%), in contrast to its reduction in industrialised goods (55%, 36%, 12%, 31% and 22%). These figures point into another direction, namely, that the government sub-economy is changing the pattern of its expenditure, buying more industrial goods not directly from industry, but by the trade sector. For instance, to buy ambulances, the government could order them directly to the transport materials industry or to buy from the retail car trade sector. Clearly, the investment expenditures sub-economy shows a heavily concentrated pattern in industrial goods and – within industry – the construction activity (40%, 87%, 67%, 66% and 61%). In terms of this variable, the possible classification problems that might occur either in 1959 or 1970 or both, are overshadowed by regularity shown from 1980 onwards. However, the import substitution industrialisation had its peak near 1959, with the massive entry of foreign capital in the country, particularly directed to the production goods and consumer durables sub-economies.

To summarise, the 40 years studied in this paper showed a very marked pattern as regards final demand: reduction of importance of the agricultural and industrial sectors, and an increased role reserved to services of a massively urban informal[8] economy. In fact, the services sector is due to match almost 60% of the final demand in 2000. This year also shows another striking feature: the 70% poorest households absorbed 19% of final demand, by contrast with the richest families, whose absorption was raised to 31%. The income distribution allegedly occurred during the decade favoured the upper classes.

4. CHANGES IN RESOLVED FINAL DEMAND (GROSS OUTPUT)

Moving from final demand to gross output through the Leontief matrix means to attach to the goods and services delivered to their final purchasers the indirect and induced requirements associated with their production. Under this perspective, they were dubbed the resolved final demand. Of course, the money figures of the latter are bigger than their corresponding original final demand figures. However, when the shares of the different sectors on their corresponding totals are observed, rarely the movements of resolved final demand escort those of final demand itself. This can be observed in Table 4.

To begin with, the comparison of the shares of agriculture in total final demand (Table 2) and gross output (Table 4) shows the same declining trend, although the latter are systematically bigger than the former. Besides, the move from 1959 to 1970 was less drastic in terms of the resolved final demand. The same behaviour is true, as regards industry as a whole, and all of its four classes, except construction. But, inside the manufacturing industrial class, both consumer durable

[8]Here, informal sector is understood as that which cannot be captured by the national accounts measurement procedures.

and non-durable goods show smaller shares in their respective totals in terms of gross output, as compared with final demand.

Table 4 – Percentage structure of sectoral resolved final demand (gross output). Brazil, 1959/90.

Sectors	**1959**	**1970**	**1980**	**1990**	**2000**
Agriculture	16.6	11.1	7.6	6.9	5,8
Industry	52.4	60.2	51.9	53.4	47,8
MinExtr	0.5	0.8	1.1	1.5	1,7
Manufact	44.8	47.0	40.7	40.9	35,9
ProdGoods	23.1	22.7	23.6	21.0	16,4
ConsDurab	5.3	7.4	6.4	8.8	9,0
ConsNonDur	16.3	16.9	10.8	11.2	10,4
ISUP	0.7	1.7	1.5	2.7	2,9
Construction	6.4	10.7	8.6	8.3	7,4
Services	31.1	28.7	40.4	39.7	46,4
T o t a l	100.0	100.0	100.0	100.0	100,0

Source: Bêrni (1997, 1999), Rijckeghen (1967), IBGE (1979, 1989, 1990).

Clearly, what is being observed is a sort of a zero sum game, as far as – by construction – the share of all sectors in their respective totals both in final demand and in its resolved counterpart must add up to 100%. On this respect, the most peculiar phenomenon can be observed in the services sector. In 1959, 1970 and 1980, it increased monotonically its share both in final demand and gross output, showing the same abrupt leap from 1970 to 1980. However, in the next two years, the shares of gross output overshadowed those of final demand. In this context, it has to be stressed the pressure of a relative (but not absolute) phenomenon of de-industrialisation. In fact, it is not possible to speak of a proper de-industrialisation, at least in the sense of Rowthorn & Wells (1987). The British authors define this term as a phenomenon of reduced industrial employment, increased production and increase participation in international trade. The fact is that, in Brazil, the industrial employment was expanded all over the period.

To conclude, escorting the general trends already pointed out, as regards final demand, there was a big downwards leap in agriculture between 1959 and 1970, whose resolved counterpart (gross output) dropped from 16.5% of the total to 11%. The downward big leap of resolved final demand also took place between the above mentioned 11% in 1970 to 8% ten years later. It appears that the drop in the structural position of agriculture between 1959 and 1970 was repeated by industry between 1970 and 1980, mainly centred in manufacturing and, within this industrial class, consumer durables.

As a general interpretation of these facts, it is possible to recur to the very concept of direct, indirect and induced effects associated with the Leontief inverse and with its traditional interpretation through the following series:

$$\mathbf{B} = \mathbf{I} + \mathbf{A} + \mathbf{A}^2 + \mathbf{A}^3 + \mathbf{A}^4 + ..., \qquad (5)$$

where **B** is the Leontief inverse, as before, **I** is the identity matrix, and **A** is the matrix of technical coefficients. In other words, the fact that the services sector had smaller shares on gross output than on final demand in the last two years informs that it transferred to industry a larger part of the requirements needed for its supply. That is to say, an increased sectoral division of labour transferred from services to industry the responsibility to produce more modern inputs needed in its production function.

The above reasoning is made clearer with the examination of Table 5, where the resolved final demand of the services sector is shown for all of the sub-economies in which an economic system is usually decomposed. There are three well marked periods of structural change. In particular, the household sub-economies show the same pattern between 1959 and 1970. There was a rise from 1970 to 1980, which was kept more or less constant in 1990, when a new leap in all of the four households groups took place between 1990 and 2000. The richest households recurred to the services, expending 58% of their purchases, delimiting a moderate contrast with the 54% of the poorest families.

Table 5 – Share of the four households sub-economies expenditures in services in relation to their corresponding total. Brazil, 1959/2000.

Sub-economies	1959	1970	1980	1990	2000
Ca	30	30	45	45	54
Cb	32	32	46	47	56
Cc	35	34	48	50	56
Cd	39	36	49	53	58
Gov	38	52	68	50	58
Inv	19	10	20	14	21
Exp	24	16	23	23	28
T o t a l	31	29	40	40	46

Source: Bêrni (1997, 1999), Rijckeghen (1967), IBGE (1979, 1989, 1990).

The demand for services due to the consumption of the four household sub-economies increased almost monotonically all over the period. So strong was this increase, associated with the weight of household consumption in final demand, that the whole of the services sector exhibited a similar increasing pattern. The remaining three sub-economies, namely, government consumption, investment and exports, do no show so discernible trends. In particular, the government direct, indirect and induced demand for goods and services is rather erratic, but it suggests an increasing role for the demand for services.

It is worth making the contrast between the investment and the exports sub-economies. In terms of direct, indirect and induced requirements, the exports of services were systematically bigger than the services contents of investment. Particularly, the movements of the investment sub-economy, as regards its services contents, might be suggesting a pendulous swing between

specialised services (i.e., labour) and their transformation into industrial goods designed to reproduce these services (i.e., physical capital). In industry as a whole, it can be shown that the investment sub-economy has a much smaller variability than in services (namely, 75%, 88%, 77%, 81% and 75%), while the regularity of the four households sub-economies is lost, in spite of the fact that the variability is much more well behaved than that of their services counterpart.

5. CHANGES VALUE ADDED

After dressing final demand with its intermediate inputs, to obtain its resolved counterpart, that is to say, gross output, it is time to proceed to a symmetric operation. Now, departing from the resolved final demand and withdrawing from it both intermediate inputs (and disconsidering non-competitive imports), the result is the resolved value added. Table 6 presents the sectoral shares in value added as conventionally defined for the five years under scrutiny. From this table, the general trends observed both in final demand and gross output can be confirmed.

Table 6 – Percentual structure of sectoral value added. Brazil, 1959/2000.

Sectors	**1959**	**1970**	**1980**	**1990**	**2000**
Agriculture	25.3	13.8	9.8	7.8	6,7
Industry	34.9	46.8	36.0	40.0	39,3
MinExtr	0.7	1.0	1.4	1.2	1,2
Manufact	29.9	34.5	24.7	27.0	26,6
ProdGoods	16.3	17.8	14.5	14.8	12,6
ConsDurab	4.0	6.0	4.4	5.9	6,9
ConsNonDur	9.6	10.7	5.8	6.2	7,0
ISUP	0.7	2.5	1.7	2.8	3,0
Construction	3.5	8.9	8.2	9.0	8,5
Services	39.8	39.4	54.2	52.2	54,0
T o t a l	100.0	100.0	100.0	100.0	100,0

Source: Bêrni (1997, 1999), Rijckeghen (1967), IBGE (1979, 1989, 1990).

Agriculture presented a monotonic fall of its share in total value added, with the most striking drop occurring between 1959 and 1970, as already pointed out when final demand and its resolved counterpart were analysed. As compared with final demand (Table 3), it is clear that value added was systematically larger. Contrasting with agriculture, the services sector can be mentioned, with its persistent increase, with the same big leap faced by final demand and gross output between 1970 and 1980. After a "big push" experienced between 1959 and 1970, industry was confronted with a "big pull" in the ensuing decade. In the later case, it repeated the services big leap forwards. Manufacturing was the sector which determined these changes.

The same happened with the construction industry. Starting with 3.5% of the economy's income in 1959, construction reached 9% in 1970, and maintained this level from this year onwards.

On the other hand, it appears that services are becoming more "heavy", as time goes by, contrasting with the reduction of the weight of the production goods group of manufacturing.

In fact, as in the case of agriculture, the share of sectoral value added was systematically larger than its final demand counterpart. This implies that the input sales by agriculture were larger than its input purchases. A sector which sells more inputs to the system than buys from it is supposed to have higher intermediate inputs productivity than the economy's average. This agricultural feature has to do with its exclusive ability to extract from nature goods to be consumed either in a raw form or to be transformed by manufacturing. This phenomenon contradicts the "substitutionism hypothesis", but it might be argued that it is hampered by the present stage of industrial development. Precisely the same occurred with respect to the extraction of minerals. This behaviour is also visible in the production goods group of manufacturing and in the ISPU.

Industry as a whole, and its consumer durables and non-durables sub-economies showed the opposite: their inputs productivity was smaller than the economy's average. In particular, the consumer non-durables, processing mostly agricultural inputs is the other face of the coin, in terms of agriculture itself. To conclude, the services showed changing behaviour: from 1959 to 1990, its value added encompassed a larger share of the total than the corresponding final demand. Only in the last year of the series, its inputs productivity was smaller than the economy's average.

As regards the sub-economies, starting with the examination of agriculture, the four household consumption groups show, in terms of resolved value added, the same behaviour previously dubbed Engel's law. Two phenomena are intertwined in this respect. First, the economic growth of the country made people richer, so that non-processed food products accounted for 39% of the total expenditures of the poorest households, declining to 9.3%. The second is more directly concerned with the traditional formulation of the law: contrasting with the just mentioned 39%, the richest families accounted for 19.3% of resolved value added, falling to just 6% in year 2000.

The exports sub-economy, in terms of agriculture, mimicked the behaviour of the poorest families, being responsible for 40% of the direct and indirect generation of value added in 1959, falling to 25%, 21%, 9% and 10% in the ensuing years. The government and investment sub-economies responded for a small and decreasing fraction of resolved value added along the period.

Industry as a whole showed a remarkably small variability along the resolved value added generated by the final demand of households, both along time and income group. Specifically in terms of manufacturing, the pattern just described was repeated, with two exceptions. First, the investment sub-economy had a declining share in the generation of resolved value added, with 46% in 1959, reaching 27% in the last year of the series. Secondly, the exports sub-economy showed the following figures: 25%, 45%, 35%, 46% and 44%.

In terms of the construction industry, it is worth mentioning the resolved value added due to the investment sub-economy. From a jump beginning with 14% in 1959, to 46% in 1970, it fell to 35% in 1980, and stabilised between 40-42% in the last two years. The services sector had a

behaviour almost symmetric to agriculture, as regards its seven sub-economies. This is the other side of the coin representing the Engel's law: the richer the economy, the bigger the expenditure in services (both to households and firms) and, thus, the bigger the corresponding resolved value added.

6. CHANGES IN EMPLOYMENT

In a number of ways, the previous sections showed that Brazil faced an enormous structural change, whose underpinnings were located at its strong dynamism. In other words, growth took place at different paces along the different sectors of the economy and its sub-economies. But all of them changed radically during the process. Of course, growth itself is the engine of employment. However, employment has another important feature. Meaning the wages and salaries, it also means consumption opportunities and, in the sequence, is an indicator of the bigger or smaller degree of egalitarianism of a country[9].

Table 7 shows a rather steady reduction in agricultural employment and a less clear pattern as regards industry. Even in absolute terms, the increase in employment is rather modest for a rapidly expanding population, particularly that living in the urban areas. To a certain extent, the revival of agriculture as a relatively important supplier of jobs is not so much due to its positive performance (which, by the way, did not occur), but to the clearly negative fact of reducing industrial employment. All this points to a meagre performance in terms of egalitarianism. The year of 1995 marked the employment record in Brazil: 61.2 million jobs, while the period between this year and 1998 (the last available data, at present) witnessed a fall of 1.3 million jobs.

Table 7 – Percentual structure of sectoral employment. Brazil, 1959/2000.

Sectors	**1959**	**1970**	**1980**	**1990**	**2000**
Agriculture	72.0	65.7	34.4	25.7	19,9
Industry	13.0	17.1	23.1	24.5	23,3
MinExtr	0.2	0.2	0.7	0.6	0,6
Manufact	8.5	9.8	13.7	16.5	15,4
ProdGoods	4.6	5.2	7.0	7.0	5,8
ConsDurab	1.2	1.5	2.4	2.9	3,2
ConsNonDur	2.6	3.1	4.3	6.6	6,4
ISUP	0.5	0.5	0.6	0.6	1,5
Construction	3.8	6.5	8.1	6.8	5,8
Services	15.0	17.3	42.6	49.8	56,8
T o t a l	100.0	100.0	100.0	100.0	100,0

Source: Bêrni (1997, 1999), Rijckeghen (1967), IBGE (1979, 1989, 1990).

[9]Brazilian data challenge the so called Kuznets curve (also known as the inverted "u" curve), which associates per capita income with inequality. According to this curve, Brazilian per capita income should be mapped into a smaller degree of inequality, or in the declining leg of the second degree parabola. An excellent survey on this subject can be found in Bacha (1979), a version of which is available in Portuguese, as well. Taylor & Bacha (1976) also have modelled this sort of dualistic economy.

The remarkable fact about the Brazilian employment is concerned with the dramatic reduction of rural employment. Of all variables used to describe the structural change faced by the country in these 40 years, employment is the most remarkable. As is shown in Table 7, the employment in agriculture is reaching in 2000 the benchmark between a developed and an underdeveloped country, as suggested by the early development economists of the 1950s[10]. Although at present no advanced capitalist country has more than 5% of its labour force employed in agriculture[11].

It was repeated in the sections devoted to examine final demand, resolved final demand and value added that they followed a similar pattern: increasing importance between 1959 and 1970, as regards agriculture, and a corresponding radical change in industry and services during the adjacent decade. By contrast, employment followed another path: all of the three substantive sectors changes occurred between 1970 and 1980. This sort of behaviour suggests that these were somewhat important phenomena in the sphere of productivity, an analysis postponed to the next section.

The industrial sector employed 13% of the labour force in 1959, reaching its peak in 1990, with one quarter of the whole employment, as was pointed out in Section 2. Manufacturing gave the pace to the just mentioned phenomenon, while its three component groups do not show a particularly deviant pattern. The construction industry also followed this sort of oscillating movement.

The agricultural phenomenon had its counterpart in the services sector, which departed from a modest 15% of total employment in 1959, reaching 17% in 1970, when the big leap was observed: 43% in 1980. From then up to year 2000, a steady increase was observed, with the sectoral share of services reaching 57% in year 2000.

The expulsion of landless workers from the countryside led to a reduction in absolute terms of the rural employment, reaching around 13 million people at present, or near 35% of the rural population. In contrast, the 52,5 million urban workers responded for about 30%. As argued before, among these near 40 million workers in the urban service sector, there are highly qualified professionals, and a large amount of the sort of people described by Arthur Lewis in his 1954 famous paper on “surplus labour”.

In terms of the sub-economies, there was a generalised fall of participation of agriculture in resolved employment. The largest figure means that the poorest households final demand encompassed 84% of the total employment designed to provide goods and services for this group. The contrast with this figure can be made when the mere 16,7% resolved employment of the richest households in year 2000 is considered. Also in this year the exports sub-economy became the greatest responsible for the resolved employment: 29%.

[10]This statement is due to the German-British economist of Sussex University, Prof. Hans Singer, according to Diana Hunt (1989), herself a respectable development economist.

[11]Interesting enough, this is the share of rural employment in the states of São Paulo and Rio de Janeiro.

As a whole, the four households sub-economies created a very discernible pattern both in industry and in the manufacturing class: increasing shares in resolved employment, as time goes by, and as the household gets richer. Again, the construction industry reduced its share on resolved employment along time and the wealth of the consumption groups. However, its impact was very small. The really impressive movement can be detected, when the investment sub-economy is examined. Even with some disturbance due to classification matters, it embraced 22% of resolved employment in 1959, remaining between 30-40% in the last three years of the series.

To conclude, the services sectors repeated a now widely known pattern. The four households sub-economies increased their share in resolved employment both in time and along income classes. The government sub-economy departed from a share of 35% in resolved employment, arriving at 67% in year 2000, despite some important oscillation in the intermediary years. This figure places it 10 percentage points above the economy's average. The remaining sub-economies, namely, investment and exports, show increased use of direct, indirect and induced labour along time. Investment grew from 14% in 1959 to 32% in 2000, while exports showed an even more impressive increase: 9% in 1959 to 39% in 2000.

7. LABOUR PRODUCTIVITY

The last aspect to be studied in order to describe the Brazilian structural change over the last 40 years consists of examining the evolution of the sectoral productivity of labour. It is needless to emphasise the importance of this variable, as regards the degree to which different sectors are able to generate income to be distributed among the production factors, government taxes, and factors of property of foreigners (particularly the increasingly important interest payment on debt). Of course, a complete picture of this phenomenon lacks at least one missing variable. It is concerned with the creation of a series of deflators[12]. The fact is that during these 40 years, Brazil faced an incredibly huge raise in its general price level and deep changes in relative prices that, instead of using the conventional measures of real value added per worker, an alternative approach has to be dealt with: the relative sectoral productivity. This measure is obtained by dividing each element of Table 6 by its corresponding element in Table 7, and multiplying it by 100, generating Table 8. However, the loss due to the use of this approach is that comparisons cannot be made across the different years.

The standard of comparison of each year is the economy's average, which adds up to 100.0. The first point to be made is concerned with the relative productivity of agriculture, which always represented a small fraction of the total. Starting with 35% of the economy's average in 1959, it faced a dramatic drop in 1970, reaching only one fifth of the total. From then onwards, it faced a steady increase, to reach one third, in year 2000, still bellow the 1959 starting point.

[12]Another and more comprehensive approach could be attempted if the sectoral capital stock were available, in which case, total factor productivity could be studied.

Table 8 – Relative sectoral productivity of labour. Brazil, 1950/2000.

Sectors	**1959**	**1970**	**1980**	**1990**	**2000**
Agriculture	35,1	21,0	28,5	30,4	33,7
Industry	268,5	273,7	155,8	163,3	168,7
MinExtr	350,0	500,0	200,0	200,0	200,0
Manufact	351,8	352,0	180,3	163,6	172,7
ProdGoods	354,3	342,3	207,1	211,4	217,2
ConsDurab	333,3	400,0	183,3	203,4	215,6
ConsNonDur	369,2	345,2	134,9	93,9	109,4
ISUP	140,0	500,0	283,3	466,7	200,0
Construction	92,1	136,9	101,2	132,4	146,6
Services	265,3	227,7	127,2	104,8	95,1
T o t a l	100,0	100,0	100,0	100,0	100,0

Source: Bêrni (1997, 1999), Rijckeghen (1967), IBGE (1979, 1989, 1990).

Industry as a whole and the services sector display similar trends of reducing their difference as regards the whole economy. But there are some important qualitative (as well as quantitative) differences between them. On the one hand, the abrupt fall in relative labour productivity of industry occurred between 1970 (index of 274) and 1980 (index of 156). From this year onwards, there is a visible increase in its product as regards the whole. This might be manifesting precisely the relative de-industrialisation trend already touched: more production with relatively less labour, a trend which was exhaustively discussed in Sections 3 to 6. In particular, the divergent movements of value added of both agriculture and industry between, on the one hand, 1959 and 1970, and the whole decade of the 1970s, on the other, had to be magnified in terms of the intersectoral differences of productivity.

On the other hand, the services showed a monotonic fall in their relative labour productivity. Starting the series with an index of 265 (contrasting with the already mentioned 35 of agriculture), it faced an enormous fall between 1970 and 1980, and kept on falling, to become smaller than the economy's average in 2000. Clearly, his sort of negative trend is another way of observing the same phenomenon of landless workers expulsed from the countryside. The rural-urban migrant who had the opportunity to enter the labour market did so at a very low productivity, as previously indicated.

Manufacturing and its three components mimicked (and determined) the overall performance of the industrial sector. A fact deserving to be mentioned is that the relative labour productivity of

consumer non-durables fell below the economy average in 1990. The other two groups of manufacturing exhibited irregular movements, as regards the relative labour productivity, but they almost always showed at least twice the economy's average. The mineral extraction industrial class showed an irregular pattern, but has always being positioned at least 30-40% above of the economy's average, with the exception of 1980, when its 101 index reproduced the average.

To sum up, the interplay between agriculture and the services is still the most important phenomenon to be stressed. It has to do, on the one hand, with the rural-urban migration, and, on the other, with the capacity of industry and services to absorb both the rural and urban surplus labour. But they did so at a low productivity. Table 8 also contributes figures to heat an important contemporary controversy: the existence or not of inter-sectoral productivity catching up.

8. CONCLUSION

It was only in the last 40 years of the official Brazilian history that contours of strong productive dynamism and similarly strong distributive inegalitarianism were to be properly measured. Although the statistical evidence is scant as regards previous periods, there are reasons to believe that poor and rich people had consumption patterns rather diverse. This paper did not place in the centre of its concern the possible consequences of either maintaining or reducing income concentration upon the political and economic dynamism of the country. However, it is clear enough that economic policy measures which allow for the aggregation of the poorest 70% of the population have to be implemented. This "consumption reserve army", embracing near 20% of total consumption, has enormous appeal in favour of an autarchic style of development.

This is so, because the extraordinary magnitude of structural change itself was not able to mitigate the inegalitarian character of growth. Further, the period under study witnessed three growth styles. From the mid 1950s to the mid 1970s, Brazil exhausted the process of import substitution industrialisation, which was engine both of growth and inequality. The 1980s were dubbed "the last decade", as the country's attention was paid to the internal and external debt crises. Finally, at present, it is possible to observe that the 1990s initiated another general model of economic organisation, marked by the intense absorption of both private and government corporations by foreign capitals.

Summarising and resuming what was said about the direction of structural change between 1959 and year 2000, there are some features which are worth to emphasise:

a) as regards final demand, the fall in the importance in agriculture mainly between 1959 and 1970 was simply extraordinary. In contrast, the 1970s saw a change of position between industry's fall and services increase. This set of phenomena were shared by the resolved final demand and resolved value added, contrasting with what happened with resolved employment;

b) as regards gross output, or the resolved final demand, the following inter-sectoral movements can be stressed: the trend of reduction of the importance of both agriculture and industry,

with the concomitant increase of the share of services. There is no doubt that the industrial underpinnings of the Brazilian economy have deepened, deserving special reference the production goods group of manufacturing, even though it faced reduction in relative productivity. Such a phenomenon might be due to the expansion of actual monetary productivity, with the accompanying phenomenon of relative prices fall;

c) the sectors more directly responsible for the change in the structure of value added were agriculture, with its persistent fall, the services, with a persistent raise, and the construction industry, with a consistent ascending trajectory. This sector took-off from mere 3,5% of income in 1959, and arrived at 2000 with almost 13%. Further, an important increase of industry in value added and a corresponding reduction in final demand signals to the fact that services are, in effect, the sector which is most linked to income expansion, although it is possible to expect an increase in informality in the urban labour relations;

d) as regards employment, emphasis has to placed upon the swap of positions between low productivity agriculture with a services sector, with its productivity of labour far below that of industry. In 1959, there were 15.1 million workers in the rural areas, responding for three quarters of total employment. In year 2000, rural employment has 13.1 million people, and 19.9% of total employment. In contrast, the employment in services was of 3.2 million people in 1959, with 15% of the total offer of jobs, jumping to 37.5 million in 2000. Part of this monumental labour force is devoted to high productivity activities. The major part, however, has so low a productivity that is almost incapable of creating income to buy consumer goods that match fundamental needs.

This type of comment addresses itself to the paradox observed in Brazil between robust economic growth and income distribution. This places the country as an anomaly as regards the Kuznets curve: per capita income is too high to be accompanied by such a level of distributive concentration. It seems that there is an exclusion bias all over the Brazilian growth style of the last 40 years, which does not appear to react spontaneously to the system's working. Thus, an arsenal of economic policy measures must be used, in order to fight inequality.

The internal consequences of the government struggle to stabilise the economy do not make clear whether Brazil will resume the autarchic path of development or it will increase its worldwide productive and financial integration. Unfortunately, the 2000 input-output table dealt with in this paper is not a conventional one, so that the degree of belief in its results is limited. However, there are some trends which can be considered as most likely to be happening in the next few years of the economic development of the country, beyond those previously mentioned. As a result of the exchange rate policy, the country can resume its autarchic patterns of development or it can increase its integration into the international trade markets. In this case, the shift in value added and final demand will be clearly in favour of the agribusiness activity, while employment cannot be expected to act as a true egalitarian variable. This shortcoming of employment is due to the traditional surplus labour faced by the country, to which the new technological wave has to be added. In general terms,

it changed the production functions, placing even less strength in the demand for labour outside the services sector.

To sum up, the dimension of economic change in Brazil along the last 40 years was very impressive. In particular, during the 1990s, an abrupt process of opening the economy created a number of opportunities, but also a host of difficulties to a number of domestic and multinational firms, but also and undoubtedly to the Brazilian working class. The present paper has dealt with reliable data to describe this change. However, in particular the comparisons of the structure of the economy in 1990 with 1992-3 and with the official input-output tables for 1998 and 1999 may help to achieve new results. Dealing with alternative input-output methodologies, particularly devoted to compare domestic with imported production and absorption, the causes of the model changes occurred in the 1990s will be grasped. In particular, this proposed type of study can help to answer how a deliberate trade policy can affect both the dynamism and the egalitarianism of the Brazilian economy.

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