

Family Spending on Health in Brazil

Some Indirect Evidence of the Regressive Nature
of Public Spending in Health

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Foreword

In 1987, poor families in Brazil were spending a larger share of their household budget on health than higher-income families. In response to this disparity and in an effort to gradually reduce spending on health by lower income families, Brazil's 1988 Constitution mandated universal health care and free access to health care services for all Brazilians. Data to determine the impact of mandated universal and free health care was unavailable until 1996 when a new survey of spending by households was undertaken.

The analysis presented in this report is based on that survey's results, and compares the structure of family spending on health between 1987 and 1996. It also tries to identify, although indirectly, the impact that universal access to health care had on family spending by income. Although the analysis found that these measures did not narrow the gap between spending on health care by poor families and more affluent families, it did yield important lessons that will be helpful in crafting future health policies. Public spending on health must be targeted to lower-income groups so that needy families do not have to spend an increasing portion of their household budget on health care.

We believe that this study will be instructive for all those engaged in the design of public health policies. It provides valuable information that can be used to steer these policies so that they reduce poverty and inequality in the region.

Mayra Buvinic
Chief
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Introduction

The 1987 family spending survey showed that the poorest families spent a larger share of their household budget on health care than higher income families. To correct this disparity, Brazil's 1988 Constitution mandated universal and free health care services for all Brazilian citizens. The goal was for Brazilian families, especially those in the lowest income brackets, to eliminate or gradually reduce their health expenditures, as public health care products and services became available to meet their needs. For a long time, no data were available to analyze the impact of universal health care on household budgets. This changed with a new household survey to study family's budget undertaken in 1996. On the basis of that data, this paper compares the structure of family health expenditures between 1987 and 1996 to determine, albeit by inference, the impact of universal and free health care on family spending across the income spectrum.

The paper is organized into seven sections. The first describes the methodology used to estimate

the data, which is presented in annex 1. The second section describes the income structure of households in Brazil. The third describes the changes in household consumption by income bracket for the period being evaluated. The fourth section describes the distribution of family health expenditures between the two dates. The fifth reports the changes in the composition of family health expenditures by income bracket and region. The sixth section contains total and per capita estimates of the family spending on health care. The main conclusions of the study appear in the final section.

The findings indicate that between 1987 and 1996, the Single Health System (*Sistema Unico de Saude*, SUS) did not in fact narrow disparities in family health expenditures. Therefore, public spending has to be targeted at lower income groups so that poorer families are not forced to spend an ever-larger percentage of their household budget on health care.

Methodological Observations

The family budget survey (*Pesquisa de Orçamentos Familiares*, POF) is the main source of statistical data on the distribution of spending of Brazilian households. The survey is also used to estimate total income and expenditures and calculate the weighting system for the country's main consumer price indexes: the national consumer price index [INPC] and the expanded consumer price index [IPCA]. The *Instituto Brasileiro de Geografia y Estadística* [Brazilian Institute of Geography and Statistics] (IBGE) has been conducting family budget surveys since the 1970s to monitor consumption and nutrition patterns and to update the structure of the price indices. The first survey was the national family

spending study [*Estudo Nacional da Despesa Familiar*] (ENDEF) done in 1976, which was based on a nationwide sampling. The same method was used to conduct the two most recent surveys (1987/88 and 1995/6), which covered the metropolitan areas of Porto Alegre, Curitiba, São Paulo, Rio de Janeiro, Belo Horizonte, Salvador, Recife, Fortaleza and Belem, as well as the municipalities of Goiania and the Federal District (Brasilia). As a whole, in 1996 these metropolitan areas accounted for 29.9 percent of the total population and 37.7 percent of Brazil's urban population.

The 1996 POF was undertaken between October 1, 1995 and September 30, 1996 (benchmark date: September 15, 1996). On average, it took nine days to compile the data on each household. During that time four questionnaires per household were completed (domicile, household spending, individual spending and individual income). The 1996 survey covered 16,100 families and controlled for general characteristics like education, income level, family size, and age structure.

The results were published in two formats: (i) cumulative figures (available on line from the IBGE's automatic data retrieval system), and (ii) microdata, with individualized information

specific to each family. The microdata were used for this paper.

To calculate total health expenditures for Brazilian families, the information compiled through the POF was expanded using the income elasticity of family health expenditures by per capita household income level. The information was reorganized using average income per income bracket in the national household sample surveys [*Pesquisas Nacionais por Amostra de Domicilios-PNAD*] for the areas not covered by the POF. This allowed for nationwide coverage and permitted accounting for disparities between metropolitan and non-metropolitan areas and between urban and rural areas. The method used is described in appendix 1.

Household Income in Brazil

Household health expenditures are a function of the household income level and income distribution profile. As shown in table 1 and figure 1, differences in health expenditures in Brazil are apparent by income level and by region.

There is a pronounced disparity in per capita income among Brazil's metropolitan areas and state capitals. In the more affluent areas, like Brasilia, per capita family income is two times higher than in the poorest areas like Recife and Fortaleza. The difference between these two extremes almost triples when comparing the average income of the poorest 40 percent in São Paulo and Recife, for example. There is also a wide gap between the per capita income of the wealthiest and poorest groups in each metropolitan region. The per capita family income of the wealthiest 10 percent is 17 (Curitiba) to 20 (Recife) times higher than the income of the poorest 40 percent.

The concentration of household income is evident in all metropolitan areas. However, the concentration of income in the poorest regions (Recife, Fortaleza and Salvador) is even more pronounced than in the more prosperous regions (Curitiba, Porto Alegre, São Paulo and Brasilia).

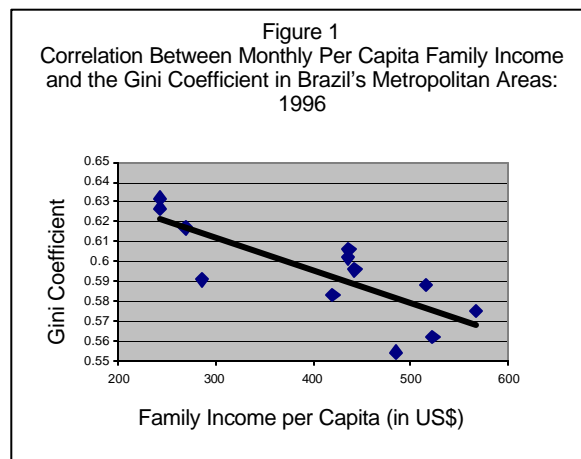


Table 1
Household Income Distribution in Metropolitan Areas (in December 1998 - US\$)

Metropolitan Areas	Gini Coefficient	Monthly Average Income	% of Total Income		Monthly Average Income		
			Poorest 40%	Wealthiest 10%	Poorest 40% (a)	Wealthiest 10% (b)	(a)/(b)
Recife	0.627	247.09	7.4	50.7	45.43	1,266.18	27.9
Fortaleza	0.632	247.14	7.8	52.6	47.99	1,299.37	27.1
Salvador	0.617	273.06	7.6	50.0	52.09	1,374.54	26.4
Belém	0.591	290.34	8.9	47.3	64.70	1,389.46	21.5
Belo Horizonte	0.583	426.70	9.1	46.8	97.05	1,996.17	20.6
Goiânia	0.602	442.71	8.3	47.7	92.10	2,124.00	23.0
Rio de Janeiro	0.606	443.88	8.6	49.9	95.27	2,220.68	23.3
Curitiba	0.554	492.24	10.0	43.2	123.20	2,138.25	17.4
Porto Alegre	0.588	523.89	8.8	46.8	114.71	2,472.76	21.6
São Paulo	0.562	531.31	9.4	43.8	125.28	2,332.46	18.6
Brasília	0.575	575.52	8.0	42.8	115.58	2,499.47	21.6
Average	0.596	449.17	8.2	47.1	91.58	2,122.69	23.2

Source: IBGE: POF 1988 and 1996. Observations: The Gini coefficient is a measure of income concentration that ranges from zero to one, zero being maximum equality and one being maximum inequality.

Shifts in the Structure of Family Consumption

Between the 1980s and the 1990s, Brazil experienced a period of economic stabilization and declining inflation. One of the main effects of stabilization was a shift in the structure of relative prices. The prices for nondurable goods declined when the speculative shocks associated with defensive expectations and the behavior of producers and consumers became less and less likely. At the same time, the process of globalization contributed to a relative devaluation of the international prices of no durable goods and commodities. However, the relative prices of goods and services in the health sector have increased worldwide, in developed and developing countries alike. A number of interrelated factors are behind the increase.

- The introduction of technology into diagnostic equipment and new therapies.
- A shift in demographics resulting from the relative increase in the weight of the elderly in the total population.
- An increase in coverage as more people covered (quantitative increase) and a greater

number and wider variety of services are offered per covered person (qualitative increase).

- The greater administrative complexity of the health sector increases in transaction costs in the sector.
- The gradual transition to a model based on individual and/or collective risk.

Between October 1987 and September 1996, the period during which the two POF were conducted, the prices of health goods and services in Brazil, as measured by the expanded consumer price index (INPCA) for the health sector, increased 1.8 times the average price index. The increase was caused by many of the factors listed above.

During this same period, expenditures on food, clothing and transportation accounted for a significantly smaller share of family budgets. The areas where the relative increase in spending was greatest were housing, education and health, as table 2 shows. Health spending rose from 5.3 percent to 6.5 percent of total spending; from 6.5

Table 2
Shifts in the Structure of Consumption between the 1987/88 POF and the 1995/96 POF
(Data expressed as percentages)

Type of expenditure	1987/88			1995/96		
	Total Exp.	Re-current Exp.	Consump. Exp.	Total Exp.	Recurrent Exp.	Consump. Exp.
Total expenditures	100.0	-	-	100.0	-	-
Recurrent expenditures	84.5	100.0	-	81.3	100.0	-
Consumption expenditures	73.9	87.4	100.0	71.1	87.6	100.0
• Food	18.7	23.0	26.4	16.6	20.4	23.3
• Housing	15.7	19.3	22.1	20.5	25.2	28.8
• Clothing	9.5	11.7	13.4	4.7	5.8	6.6
• Transportation	11.1	13.6	15.5	9.8	12.1	13.8
• Hygiene	1.4	1.7	2.0	1.3	1.7	1.9
• Health	5.3	6.5	7.5	6.5	8.0	9.1
• Education	2.7	3.3	3.8	3.5	4.3	4.9
• Recreation and culture	3.2	3.9	4.5	2.5	3.1	3.5
• Tobacco	1.1	1.4	1.6	1.0	1.2	1.4
• Personal services	1.1	1.4	1.6	1.2	1.4	1.6
• Miscellaneous	4.0	4.9	5.6	3.5	4.3	4.9
Other recurrent expenditures	10.6	13.6	-	10.1	12.4	-
Increase in assets	14.1	-	-	16.9	-	-
Decrease in liabilities	1.4	-	-	1.8	-	-

Source: IBGE-POF 1998 and 1996

percent to 8 percent of recurrent expenditures, and from 7.5 percent to 9.1 percent of household consumption spending between October 1987 and September 1996.

These changes were homogeneous by income level (see table 3). During the period under analysis, spending by of the poorest families fell, while that of higher income families increased.

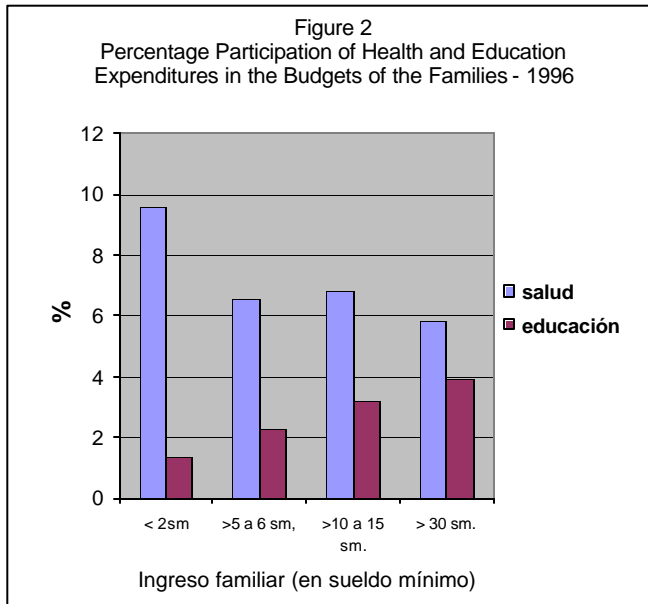
With the economic stabilization that began in 1994, the percentage decline in spending on food was greater among families with incomes of up to two monthly minimum wages than it was among families with higher incomes, thereby improving the quality of life of the poorest.

The share of family spending on some consumption categories increases across the

Table 3
Shifts in the Structure of Household Consumption by Income Level
(in monthly minimum wages)

Type of expenditure	Up to 2 MW		+from 5 to 6 MW		+ from 10 to 15 MW		+ from 30 MW	
	1988	1996	1988	1996	1988	1996	1988	1996
Total expenditure	100	100	100	100	100	100	100	100
Recurrent expenditure	94	95	92	91	90	85	79	75
Consumption expenditure	91	93	86	85	81	78	64	60
Food	40	33	32	26	23	19	11	10
Housing	20	26	18	25	17	23	14	18
Dress	8	5	10	6	11	6	8	4
Transportation	7	9	9	10	11	11	12	9
Hygiene	2	2	2	2	2	2	1	1
Health	6	10	5	7	5	7	5	6
Education	1	1	2	2	3	3	3	4
Recreation and culture	1	1	3	2	3	3	4	3
Tobacco	3	3	2	2	2	1	0	0
Personal services	1	1	1	1	1	1	1	1
Miscellaneous	2	2	3	3	3	3	5	4
Other recurrent expenditures	3	2	6	6	9	7	15	15
Increase in assets	6	4	8	8	9	13	19	23
Decrease in liabilities	0	0	0	1	1	2	2	2

Source: IRGE- POF 1988 and 1996



highest per capita family income levels, whereas in others the opposite is observed. Figure 2 shows the pattern of health and education spending in 1996. Health-related expenditures were higher than education-related expenditures across income groups. However, the percentage of the family budget that went into education is progressive (higher family income groups spent more in education than lower family income groups), whereas the percentage of the family budget spent on health is regressive across income groups. The percentage of the household budget devoted to health care is higher among lower income groups. In other words, while public policies in education enabled the poorest to spend less on education, the same cannot be said for health expenditures (in 1996, almost 10 percent of the budgets of the poorest families went to pay health-related expenses).

The Regressive Nature of Family Health Expenditures

As has been shown, household health spending declines as income rises. The question is whether this regressiveness increased or decreased in recent years¹. The 1988 Brazilian Constitution instituted the Single Health System (*Sistema Unico de Saude*, SUS)—a universal system of free health care—in order to provide universal access to all health goods and services, including medications. One might suppose, therefore, that the system's introduction would enable lower

income groups (for whom consumption accounts for a relatively large share of the family budget) to gradually reduce health expenses in the 1990s as they become SUS users. This was the experience in the education sector. Table 4 and figure 3 illustrate the changes.

The health expenditures of families with lower per capita incomes increased by a larger percentage than those of families with higher per capita incomes. The share of health expenditures in the household budgets of families earning two minimum wages or less was up 52 percent (from 6.3 percent to 9.6 percent). However, families with incomes in excess of 30 minimum wages experienced only a 15 percent (from 5 percent to 5.8 percent) increase in the percentage of the family budget devoted to health. Figure 3 shows that the structure of health expenditures as a percentage of family budgets was more regressive in 1996 than in 1987.

¹ As a rule, the term regressive is associated with tax matters. A tax is said to be regressive if it takes a larger percentage of the income of poor people than of rich people. By analogy, a social policy is regressive if it does more for the rich than for the poor. In the present analysis, the term regressive is used indirectly. The hypothesis is that with a universal health care policy like the one mandated in the Brazilian Constitution of 1988, no one—especially the poorest groups—should be paying for health care. In this sense, if the poor are spending a larger percentage of their household budget on health than the rich are, it is because health care services are not reaching the poor, which means, therefore, that public spending is regressive.

Table 4 - Percentage of Family Budget Spent on Health, by Income Level
(In minimum wages): 1987-1996

Per capita family income level (in minimum wages)	1987	1996	Change in percentage share (%)
Up to 2	6.30	9.59	52.22
+ from 2 to 3	5.45	7.29	33.76
+ from 3 to 5	5.21	6.65	27.64
+ from 5 to 6	4.61	6.54	41.87
+ from 6 to 7	5.07	6.57	29.59
+ from 7 to 10	5.67	7.04	24.16
+ from 10 to 15	5.36	6.84	27.61
+ from 15 to 20	5.80	7.55	30.17
+ from 20 to 30	5.72	6.76	18.18
+ from 30	5.04	5.80	15.08
Total	5.31	6.50	22.41

Source: IBGE: 1987 and 1996 POF

The **Gini** and **Suits** concentration indices can also be used to test the regressiveness of health spending by Brazilian families. The method used to arrive at these measurements is described in appendix 2. The Gini coefficient measures the concentration of families' gross consumption (with health) and net consumption (without health expenses) in 1988 and 1996. The values of the Gini coefficient range from zero (representing total equality) to one (representing total inequality). Gross consumption (Cg) is total family consumption, while net consumption (Cn) is gross consumption less expenditures for health-related goods and services.

Two hypotheses support this method. First, if the Gini coefficient of gross consumption $G(C_g)$ is lower than the Gini coefficient of consumption net of health expenditures $G(C_n)$, health spending is progressive within family consumption; in other words, the wealthier income groups pay proportionately more than the poorest families relative to income. Second, and by analogy, if $G(C_g) > G(C_n)$, health spending is regressive and the poorest must use a relatively larger percentage of their income to pay for health care products and services.

The results shown in table 5 illustrate the regressive nature of health expenditures in Brazil, and how those expenditures became even more regressive between 1988 and 1996.

The Suits index measures the progressive or regressive nature of a variable in relation to the behavior of another variable. The values of the index range from -1 to 1 . When the index is negative, distribution is regressive; when the index is positive, the distribution of the variable in question is progressive. For this paper, we considered the distribution of family health spending in relation to the distribution of total consumption. The regressiveness of health spending intensified between 1988 and 1996, as the Suits index went from -0.0119 to -0.0444 .

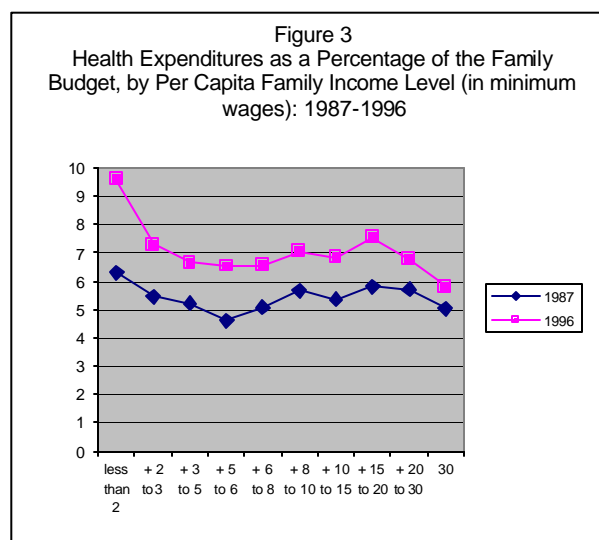


Table 5
Measurements of Concentration and of the Progressive or Regressive Nature of
Health Expenditures in Brazil: 1988-1996

Indices	1988	1996	% Change
Gini (Cg)	0.4637	0.4697	1.29
Gini (Cn)	0.3936	0.3926	-0.25
Suits	-0.0119	-0.0444	273.1

Source: IBGE: 1988 and 1996 POF

The Composition of Household Health Expenditures

The information compiled through the POF reveals the structure of consumption for health care goods and services. The seven main expensive items are drugs and medical supplies, health insurance premiums, dental care and related products, visits to physicians and other health care professionals, eye-care treatment and products, hospitalization, medical diagnostics and other expenses. Table 6 shows the distribution of those expenditures in 1988 and 1996.

As table 6 shows, the principal expenses were drugs, health insurance, and dental care and related products. Between 1988 and 1996, the share of drugs and dental care in total spending gradually decreased, while health insurance premiums increased their relative weight in family expenditures. This increase seems to be the

underlying factor driving shifts in household spending on health. As families enroll in health insurance plans, their out-of-pocket expenses for hospitalization, visits to the doctor and tests are relatively smaller because they are covered by their insurance plans.

But the structure of family expenditures changes drastically across the family income brackets, as table 7 shows. In the families with lowest income (those with less than two minimum wages), 'drugs' is the single greatest expense. Next in order of importance are visits to physicians and other health care professionals, followed by health insurance. Hospitalization expenses accounts for a larger share of poor families' health care expenses since their medical insurance coverage is relatively limited.

Table 6
Percentage Distribution of Household Health Expenditures
1988-1996

Expenditure	1988	1996
Drugs and medical supplies	34.23	30.89
• Drugs	33.79	30.22
• Medical supplies	0.55	0.53
• Childcare products	-	0.13
• Other pharmaceuticals	-	0.10
Health insurance	11.92	29.02
Dental care and related products	20.00	16.74
Visits to physicians and other health professionals	17.00	7.98
Eye-care and related products	5.45	2.74
Hospitalization	3.63	2.81
Medical, Image and Lab. Diagnostic, etc.	4.23	1.75
Others	3.33	8.37
Total	100.0	100.0

Source: IBGE: 1988 and 1996 POF

Table 7
 Percentage Distribution of Household Expenditures on Health by Level of Monthly Income
 (in minimum wages): 1988-1996

Expenditure	1988				1996			
	Up to 2	From 5 to 6	From 10 to 15	From 30 up	Up to 2	From 5 to 6	From 10 to 15	From 30 up
Medications and medical supplies	70.7	58.9	44.7	21.3	58.8	52.3	35.2	19.4
• Medications	70.7	57.9	44.3	20.7	57.9	50.8	33.9	19.1
• Medical supplies	-	1.0	0.4	0.6	0.3	0.8	0.9	0.3
• Childcare products	-	-	-	-	0.4	0.5	0.2	-
• Other pharmaceuticals	-	-	-	-	0.2	0.2	0.2	0.1
Health insurance	2.4	6.3	9.4	17.6	10.9	23.3	29.3	32.0
Dental treatment and products	8.5	13.2	20.5	20.7	3.8	11.1	14.5	21.0
Visits to physicians and other health-care professionals	7.7	8.7	10.4	23.2	17.4	2.1	5.5	12.3
Eyecare and products	5.8	7.0	5.4	5.2	1.3	1.7	3.2	3.1
Hospitalization	1.9	1.9	2.2	4.9	5.0	0.2	1.3	3.3
Tests	2.4	3.0	5.2	4.5	1.3	2.3	1.3	2.0
Other	0.5	0.8	2.2	2.5	8.0	7.2	9.6	6.8
Total	100	100	100	100	100	100	100	100

Source: IBGE: 1988 and 1996 POF

The following is an analysis of the shifts in the structure of family health expenditures, by category of expenditure and income level.

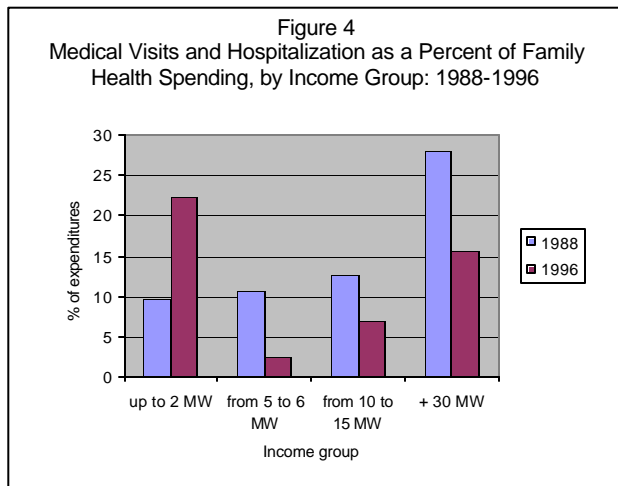
Spending on drugs and medical supplies—Three trends were found: (i) its relative weight in total family spending was down across all income levels; (ii) the relative weight lessens as incomes rise; this is the single largest expense for families with incomes of up to six minimum wages (in 1996, it accounted for 59 percent of the health expenses of families with incomes of up to two minimum wages, but only 19 percent of the health expenses of families with incomes over 30 minimum wages); (iii) the decline in this category's share of total health expenditures during the years under study was greater for lower income families. The inference is that part of the decline may be associated with an increase in government supplied medications and health care services or to increased coverage for medications in medical insurance plans.

Expenditures on health insurance policies—Three trends were observed: (i) the share of this expenditure in total household health spending

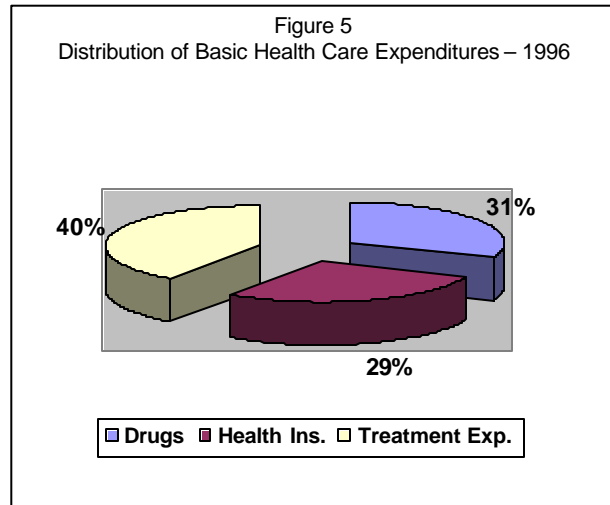
increased dramatically across all income brackets; (ii) the money spent on health insurance policies increased as incomes rose, with families with incomes of over 30 minimum wages spending the most; and (iii) however, the increase in this category's relative weight was greater in the case of lower income families (due to the fact that the higher income families already had medical insurance). Thus, among families with monthly incomes of up to two minimum wages, this category went from 2 percent to 11 percent of household health expenditures, whereas among families with monthly incomes of over 30 minimum wages it went from 18 percent to 31 percent.

Dental care and related products—Two trends are observed: (i) this category's share of total health expenditures among low- and middle-income families fell because of the high cost of dental care, the increase in dental coverage under the SUS, and the fact that some insurance policies started to cover such services; and (ii) this category's relative weight in the health expenditures of higher income families (in excess of 30 minimum wages) held steady.

Medical visits and hospitalization—The portion of a family’s total health expenditures that this expense represents increased among the lowest income families (up to two minimum wages), but decreased among the more affluent families (see figure 4). The assumption is that for middle- and high-income families, medical insurance covered more of the cost of medical visits and hospitalization, which explains why the relative weight of these expenses in their total consumption decreased. Expanded coverage under the SUS was expected to lower the cost of hospitalizations and doctor’s visits for low-income families, but that decrease did not materialize. There are two possible explanations for this: either low-income families received medical care in the private sector and therefore had to pay for the services, or they received publicly financed services but had to pay for it (against the law) in order to receive treatment.² The only evidence to support these two explanations is that there was payment for the services. This information confirms the regressive nature of these expenses, even in the case of basic treatment and hospitalization.



² Some SUS-financed private hospitals issue invoices to clients for services that were already paid by the public system creating a double accounting mechanism. The Brazilian government does not have the capacity to audit public expenditures and to avoid this kind of fraud. On the other hand, the procedures covered by the public system are under-reimbursed, forcing private hospitals to find other ways to balance their budgets.



One quick way to summarize these expenses is to lump them into three different categories: drugs and supplies; medical insurance, and out-of-pocket treatment expenses (the sum of the amount spent for dental care and related products; visits to the doctor and other health care professionals; eye-care and related products; hospitalization; diagnostic services, and so on) (see figure 5). In 1996, drugs represented 31 percent of the total amount spent; medical insurance accounted for 29 percent, and out-of-pocket treatment expenses (where the major items were doctor’s visits, dental treatment and hospitalization) accounted for 40 percent.

From a regional perspective, the distribution of health expenditures varies, as table 8 illustrates. Every metropolitan area in Brazil has a different income structure, which in turn affects the composition of average health expenses. Also, public provision of services (whether large or small) can affect the dynamics of private spending and hence families’ willingness to invest in medical insurance policies.

These figures reveal that there was a steep decline in out-of-pocket treatment expenses and a sharp increase in medical insurance expenses in the northern and northeastern metropolitan areas (Belem, Fortaleza, Recife and Salvador). Expenditures on drugs did not vary greatly during the period under study and their relative weight in total household health expenditures remained more or less the same.

Contrary to popular belief, expenditures for the purchase of health insurance policies account for a large portion of total health expenditures in the poorest metropolitan areas of the northeast. This is true in Recife, where health insurance premiums account for 44 percent of health expenditures; in Salvador, where they account for 36 percent; in Belem, where they reach 36 percent; and Fortaleza, where they represent 30 percent of health expenditures. Two factors are likely at work here. First, average family incomes are lower in these regions but the cost of health plans does not vary much from one region to the next. Second, public health services are not enough available in poorer cities. As a result, middle and high-income groups invest in private health insurance to cover all their needs in this area.

Medical insurance expenses also increased in the metropolitan areas in southeastern, southern and

west central Brazil, but not at the same rate that they increased in the northern and northeastern regions. The exception was São Paulo (the largest market for medical insurance in Brazil) where health insurance expenditures rose sharply.

In the southeastern, southern and west central regions, out-of-pocket expenses as a percent of total health spending declined only slightly and (contrary to the case in the north and northeast) remained the largest single-family health expenditure. One might hypothesize that higher family incomes in those regions provided allowed for the development of a large-scale private, autonomous health-care market. This is the opposite of what happened in the northeast, where health plans are the largest consumption expense that middle- and lower-middle class families have.

Table 8
Distribution of Health Expenditures in the Metropolitan Areas, for Major Categories:
1988-1996

Metropolitan areas and state capitals	Health Insurance		Drugs		Treatment Costs	
	1988	1996	1988	1996	1988	1996
Belem	8.2	36.3	41.6	39.2	50.2	24.5
Fortaleza	7.2	30.1	36.7	41.7	56.1	28.2
Recife	16.9	43.8	38.2	30.7	44.9	25.5
Salvador	9.4	35.8	42.1	36.4	48.5	27.8
Rio de Janeiro	16.3	26.8	36.9	30.1	46.8	43.1
Belo Horizonte	6.3	20.4	33.0	28.2	60.7	51.4
São Paulo	14.4	34.4	31.8	28.2	53.8	37.4
Porto Alegre	6.6	17.6	34.0	41.2	59.4	41.2
Curitiba	3.2	19.6	34.6	32.1	62.2	48.3
Goiania	0.3	15.9	31.6	35.7	68.1	48.4
Brasilia	4.4	15.8	37.9	35.3	47.7	48.9

Source: 186E, PUF 1998 y 1996

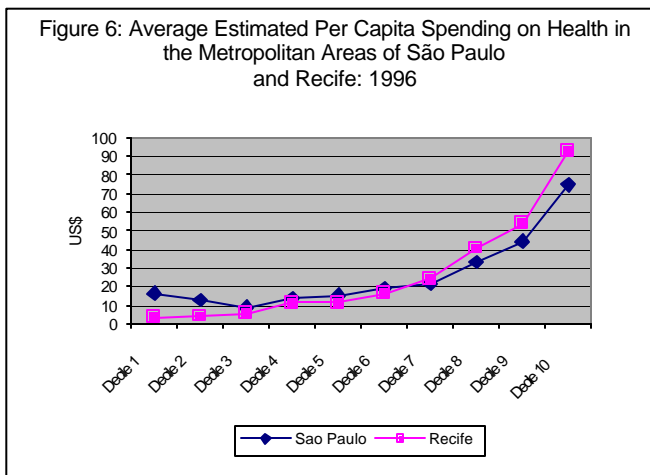
Estimated Total and Per Capita Family Health Spending

The income elasticity of health expenditures was used as the basis for estimating the total amount spent by Brazilian households on health, by means of the method shown in Appendix 1. The results were an estimated annual total of between US\$32.9 billion and US\$33.1 billion in 1996.

We can also estimate the regional variations in per capita family spending by income decile. The poorest 10 percent of the population in states like Rio Grande do Sul, Paraná, Santa Catarina, Mato Grosso do Sul, São Paulo and Rio de Janeiro may, on average, spend more on health than families in the second decile and, in some cases, more than even those in higher income deciles. In these

states, the income elasticity of health expenditures for the poorest families seems to be low, a phenomenon more typical of the relatively less developed states of the north and northeast.

To illustrate, figure 6 shows average estimated annual per capita household expenditures for the metropolitan areas of São Paulo and Recife. Interestingly, spending on health for families in the second and third decile in the Sao Paulo metropolitan region is lower than that of families in the first income decile (US\$16 in the latter case compared to US\$12.9 and US\$9, respectively, in the former). Similarly, higher income households in Recife spend more on health than do comparable households in São Paulo. Without further information on morbidity and families' access to health services by income level, it is almost impossible to arrive at a definite conclusion about these differences. However, three factors may figure in the explanation. First, because of differences in income between poor families in the two regions, families in São Paulo may be spending more on health than families in Recife. Second, higher income families in São Paulo may be making more use of the free, government-run health services and, as a result, spend less on health than their counterparts in Recife. The third explanation has to do with the



complexity of the São Paulo region itself. Weak competition in the market for health care products in areas where families in the lowest income deciles live, plus long distances to health centers and clinics may mean that the poorest households spend more on health care goods and services than families in the next three income declines, who live in areas where living conditions and access to public health services and products are better. Regardless of the explanation, analysis of absolute household expenditures by income deciles confirms the regressive nature of household health expenditures in Brazil.

Conclusions and Recommendations

Four main conclusions can be drawn from the analysis presented here:

First: Health expenses increased considerably between 1988 and 1996. As a percentage of the family budget, health expenditures went from 5.3 percent to 6.5 percent of total expenditures; from 6.5 percent to 8 percent of recurrent expenditures, and from 7.5 percent to 9.1 percent of family spending on consumption.

Second: A good portion of the increase in health spending can be explained by inflation. During the period examined, the prices of health care goods

and services increased 1.8 times faster than the overall inflation rate.

Third: Unlike what happened in other social sectors such as education, household spending on health was regressive. During the period under consideration, families with incomes of two minimum wages or less increased their spending on health (as a percentage of total household spending) by 52 percent, while families with incomes of over 30 minimum wages increased their spending on health by only 15 percent.

Fourth: Medical insurance became a much large item in total household expenditures on health. Indeed, health insurance became the principal

expense in a number of metropolitan areas. Although the relative importance of spending on drugs was off slightly, they continued to account for a very large percentage of total health expenditures. The largest relative decline in spending during the period studied was for medical treatment costs. This was the result of the increased coverage by public health services and private health insurance plans.

To reverse the regressive structure of health spending, low-income families need to be guaranteed fuller access to health goods and services. This is especially true of medications, which account for almost 60 percent of spending on health for Brazil's poorest families. Brazil has chosen to increase health coverage for low-income groups through family health programs combined with other programs that provide access to basic health care packages.³

These programs have helped to correct the problems caused by the regressiveness of household health expenditures.

Furthermore, inasmuch as a good percentage of middle- and high-income families opt for private medical insurance, the regulatory structure needs to be improved to make sure that those plans meet their equity, coverage and quality objectives. To ensure that this market is able to expand and grow on a foundation of trust and efficiency, all the services should be regulated and consumers kept informed of the real costs of plans.⁴ At the same time, incentives have to be created so that those who opt for a private insurance are not using the public system as well. Public health services should not end up becoming a means to provide cross-subsidies for private health insurance companies.⁵

³ Such as the Basic Assistance Service Package (PAB) developed by Brazil's Ministry of Health, and the SUS' Basic Pharmacy, which is a federal revenue-sharing program for medications involving a matching grant with state and municipal resources.

⁴ A first step in this direction was taken in early 2000 when the national supplementary health agency (ANS) was created to regulate services and establish a proper regulatory framework. The activities and functions of that agency still need to be fully established.

⁵ The practice of charging members of private health insurance plans when they avail themselves of public health services was introduced in late 2000.

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Appendix 1

ESTIMATING NATIONAL HOUSEHOLD EXPENDITURES ON HEALTH⁶

I) Methodology

A) Calculating State Per Capita Health Expenditures

As a tool for estimating what Brazilian households spend on health care, the POF has one shortcoming, namely, that the survey was confined to the country's urban areas.⁷ A methodology had to be devised to arrive at an estimate of household spending on health for the nation as a whole. That methodology consisted of the following steps:

- (i) Calculating the income elasticity of household health expenditures (based on the 1996 POF) for each household income level. The results of this calculation are used for estimating national per capita household expenditures.
- (ii) Reorganization of the data that the 1996 *Pesquisas Nacionais por Amostra de Domicílios* - PNAD [National Household Sample Polls] compiled on per capita family income, to obtain independent estimates of household income in metropolitan, urban non-metropolitan, and rural areas for each Brazilian state.

Based on these statistics, the following formula was used to estimate total family and per capita health expenses by state:

$$Se = \Sigma[S(i)]/N \quad (1)$$

⁶ Fernando Gaiger Silveira, Frederico Andrade Tomich and Luís Carlos Garcia de Magalhães of Brazil's Institute of Applied Economic Research (IPEA) put together the database for this appendix.

⁷ POF data were from the metropolitan areas of Porto Alegre, Curitiba, Sao Paulo, Rio de Janeiro, Belo Horizonte, Salvador, Recife, Fortaleza and Belem, and the cities of Goiânia and Brasília.

$$S(i) = Sm.\beta.(Sn/Sm) \quad (2)$$

Where:

Se = per capita spending on health in the state;

S(i) = per capita spending on health in the state by income level i;

N = number of levels of income.

Sm = per capita spending on health by income level i for each metropolitan area in the state;;

β = Income elasticity of health spending for income level i;

Sn = per capita spending on health in the state's nonmetropolitan area, by level of income i.

Using POF data, the Sn/Sm ratio was obtained for those states that are home to the nine metropolitan regions and two cities surveyed. Other criteria, such as regional proximity and similarity in terms of income and the UNDP human development index, were used to figure out the Sn/Sm ratio for the other states. A matrix was thus established, shown in Table A.1.1, to calculate that ratio.

B) Calculating the Income Elasticity of Family Health Expenditures

Using the elasticity differences between the income levels we can establish three hypotheses on grouping the elasticity estimates:

- (i) Income elasticity of health spending can be grouped into three income groups, each having seemingly similar behavior. The income groups are those earning less than 5 minimum wages, those earning between 5 and 10 minimum wages, and those earning more than 10 minimum wages,

Table A.1.1
Correspondence Between States and POF Metropolitan Areas Used to Estimate National Per Capita Household Health Expenditures

Benchmark Metropolitan Areas	States
Porto Alegre	Rio Grande do Sul
Curitiba	Paraná, Santa Catarina and Mato Grosso do Sul;
Sao Paulo	São Paulo
Rio de Janeiro	Rio de Janeiro
Belo Horizonte	Minas Gerais and Espirito Santo
Salvador	Bahia
Recife	Pernambuco, Rio Grande do Norte and Paraíba;
Fortaleza	Ceará, Maranhão, Piauí and Alagoas;
Belém	Para, Amazonas, Amapá, Acre, Rondonia, Roraima and Tocantins;
Goiânia	Goiás and Mato Grosso
Brasília	Federal District

- (ii) The elasticity of health spending can be grouped into two income groups, with similar behavior: those earning up to 10 minimum wages and those earning over 10 minimum wages.
- (iii) There are no significant differences in the income elasticity of health spending.

Using these three hypotheses, the model used can be represented using the following formula:

$$\log S_i = \mathbf{a} + \mathbf{b} \cdot \log R_i + \sum_{h=1}^2 \mathbf{d}_h D_{hi} (\log Ri - \log qh) + u_i \quad (3)$$

Where:

S_i = health spending;

R_i = income;

β = income elasticity of level i;

$\beta + \delta_1$ = income elasticity in level ii;

$\beta + \delta_1 + \delta_2$ = income elasticity in level iii;

θ_h = upper limit of the highest level;

u_i = error term of the regression

D_{hi} = binary variable assuming the following values: $D_{hi} = 0$ for $R_i < \theta_h$ and $D_{hi} = 1$, for $R_i \geq \theta_h$.

The hypothesis that there are no elasticity differences among income levels is expressed as follows:

$$\log S_j = \alpha + \beta \cdot \log R_j + u_i \quad (4)$$

The adjustment was done using weighted least squares with the number of families in each income group as the weighting factor. This model can be represented in a Cartesian coordinates system as a polygon with a segment in each quadrants (?), where $\log R_i$ is the horizontal axis (abscissa) and S is the vertical axis (ordinate). The model can thus be labeled a log-log polygon. The limits used to construct the binary variables were: $\theta_1 = 560$ and $\theta_2 = 1120$. For hypothesis 2, postulating an elasticity difference between two income groups, the equation was $\theta_1=1120$.

The hypothesis $H_0: \delta_1=0$ was tested to determine whether there is a difference between elasticity coefficients II and I. A similar procedure was used to verify whether the income elasticity coefficients of strata II and III are different, by testing the hypothesis $H_0: \delta_2 = 0$

Table A.1.2
Hypothesis 1 – Estimated Income Elasticity Coefficients of Total Health Spending by Metropolitan Area,
Assuming a Different Elasticity in Each of Three Income Levels

Metrop. Area	Estimated elasticity coefficients			Probability associated with the coefficient			R ²	AdjustedR ²
	b (up to 5 mw)	d ₁ (5 to 10 mw)	d ₂ (+ 10 mw)	P of b	P of d ₁	P of d ₂		
RJMR	0.368	0.669	-0.267	0.993	0.982	0.135	0.988	0.982
PAMR	0.077	0.801	-0.004	0.659	0.958	0.496	0.918	0.958
BHMR	0.473	0.789	-0.630	0.997	0.989	0.017	0.988	0.982
REMR	0.750	0.783	-0.645	1.000	0.982	0.043	0.992	0.988
SPMR	-0.126	1.298	-0.449	0.183	0.998	0.044	0.986	0.979
Brasília	0.652	0.239	-0.039	0.995	0.730	0.450	0.984	0.977
BEMR	0.761	0.294	-0.230	1.000	0.871	0.177	0.993	0.989
FOMR	0.831	0.474	-0.553	1.000	0.991	0.006	0.997	0.996
SAMR	0.723	0.429	-0.410	0.999	0.830	0.195	0.975	0.962
CUMR	0.284	0.894	-0.444	0.899	0.965	0.112	0.974	0.961
Goiânia	0.500	0.352	-0.181	0.999	0.921	0.202	0.990	0.985

C) Findings of the Elasticity Calculations

Tables A1.2 to A1.4 show the income elasticity coefficients for total health expenditures by metropolitan area and municipality, based on the 3, 2 and 1 income level hypotheses.

Assuming the first hypothesis, that is, that elasticity is different at each income level, the findings are that the income elasticity of health spending is lower for families with per capita incomes of up to 5 minimum wages than it is for

expenditure would increase 3.7 percent for families with monthly incomes equal to less than 5 minimum wages; 10.4 percent for families with incomes between 5 and 10 minimum wages, and 7.7 percent for families with monthly incomes of over 10 minimum wages.⁸

The figures indicate that the percentage change in total health expenditures did not keep pace with the positive changes in income level variations, indicating that the income elasticity of health expenditures is positive, but less than one.

Table A.1.3
Hypothesis 2 – Estimated Income Elasticity Coefficients for Total Health Spending by Metropolitan Area,
Assuming a Different Income Elasticity in 2 Income Strata

Metrop. Area	Estimated coefficient of elasticity		Probability associated with the coefficient		R ²	AdjustedR ²
	b	d ₁	P of b	P of d ₁		
RJMR	0.613	0.246	1.000	0.924	0.974	0.966
PAMR	0.388	0.577	0.994	0.988	0.951	0.937
BHMR	0.760	-0.021	1.000	0.453	0.969	0.960
REMR	0.951	0.107	1.000	0.696	0.982	0.977
SPMR	0.400	0.457	0.990	0.960	0.933	0.914
Brasília	0.747	0.129	1.000	0.802	0.983	0.979
BEMR	0.856	0.002	1.000	0.562	0.991	0.989
FOMR	0.953	-0.104	1.000	0.184	0.993	0.991
SAMR	0.833	-0.003	1.000	0.495	0.970	0.962
CUMR	0.658	0.172	0.999	0.777	0.953	0.940
Goiânia	0.616	0.107	1.000	0.826	0.986	0.982

higher income families. To illustrate, if family income in the Rio de Janeiro metropolitan region is increased by 10 percent across the board, health

⁸ For income groups earning over 5 minimum wages, parameters δ_1 and δ_2 are additive in relation to β .

Table A.1.4
Hypothesis 3 – Estimated Coefficient of Income Elasticity of Total Health Spending by Metropolitan Area,
Assuming No Elasticity Differences among Income Strata

Metrop. Areas	Estimated coefficients of elasticity (b)	Probability associated with the coefficient (P of b)	R ²	Adjusted R ²
RJMR	0.724	1.000	0.964	0.960
PAMR	0.674	1.000	0.893	0.880
BHMR	0.750	1.000	0.969	0.965
REMR	0.984	1.000	0.981	0.979
SPMR	0.634	1.000	0.893	0.880
Brasilia	0.816	1.000	0.981	0.979
BEMR	0.864	1.000	0.991	0.989
FOMR	0.917	1.000	0.992	0.991
SAMR	0.833	1.000	0.970	0.967
CUMR	0.748	1.000	0.949	0.942
Goiânia	0.664	1.000	0.984	0.982

Assuming elasticity differences between two income levels (up to 10 minimum wages (MW) and more than 10 MW), table A1.3 shows that while the estimated coefficient is positive in all cases, the rate at which higher income households increase their spending on health is greater than the percentage increase in incomes as income brackets rise.

Finally, assuming there are no differences in the income elasticity of health spending across the income levels (table A.1.4), the estimated coefficients are positive, as was to be expected. It is interesting to note, however, that in the northern and northeastern metropolitan areas, the income elasticity of health spending is greater than it is in the southern, southeastern and west central metropolitan regions.

II) Household Health Spending Nationwide

The POF data on health expenditures in the metropolitan regions were used to extrapolate figures encompassing all the reference areas listed in table A.1.1. Estimates of health expenditures were put together using various hypotheses about the elasticity coefficients of different income levels.

That procedure yielded different figures for the values of monthly household health expenditures. For the country as a whole, the monthly figure can range between US\$2.7 billion and US\$2.8 billion per month, or US\$32.9 billion to US\$33.1 billion per year.

In estimating per capita spending in the states, no other factor was introduced to adjust spending down from the levels found in the metropolitan areas surveyed in the POF. The hypothesis being used, therefore, assumes that the income elasticity of health spending is the only factor sensitive to differences between expenses in this category in the metropolitan areas and non-metropolitan areas for a given income level.

The results of this approach appear in tables A.1.5 and A.1.6. Table A.1.5 presents monthly per capita health spending for each state by income deciles; in those states with POF-surveyed metropolitan areas, health spending in metropolitan and no metropolitan areas is segregated.

Table A.1.6 shows total annual household spending by state and income deciles. The figures in this table were used to estimate what Brazilian families spent on health in 1996.

Table A.1.5
Total Average Per Capita Household Spending on Health, by Income Level and State, Assuming Elasticity Differences
among Three Income Levels (Hypothesis 1)
(in December 1998 - US\$)

State	Income Deciles									
	1	2	3	4	5	6	7	8	9	10
Rio Grande do Sul										
• PAMR	11.42	9.45	10.68	12.09	10.26	13.89	18.93	35.68	44.42	80.64
• Other areas	11.42	9.45	10.68	11.35	9.60	13.42	17.92	31.11	43.11	63.16
Paraná										
• CUMR	11.93	8.22	11.44	11.21	15.15	18.08	32.01	28.11	37.06	88.30
• Other areas	11.18	7.92	11.12	10.83	14.89	18.10	31.14	26.17	33.93	82.30
Santa Catarina	11.29	8.02	11.28	10.95	15.12	17.24	31.19	25.09	35.50	78.59
Mato Grosso do Sul	10.96	8.04	11.06	10.81	14.10	16.92	32.06	24.42	29.81	75.11
São Paulo										
• SPMR	16.16	12.88	8.98	13.42	15.29	19.01	21.88	33.21	44.16	74.67
• Other areas	16.16	12.88	8.98	12.31	15.84	16.86	21.25	32.82	45.64	66.57
Rio de Janeiro										
• RJMR	8.83	8.06	9.71	10.05	13.79	15.17	22.95	35.58	43.54	86.15
• Other areas	8.71	7.69	9.29	9.04	12.60	13.67	19.86	32.23	34.94	61.90
Minas Gerais										
• BHMR	7.70	8.36	9.67	10.72	15.88	21.26	23.03	43.00	39.15	76.03
• Other areas	7.62	8.16	9.49	11.00	16.48	21.89	23.74	41.47	40.84	71.79
Espirito Santo	7.53	8.03	9.61	11.38	18.00	22.88	23.08	40.41	45.04	77.31
Bahia										
• SAMR	3.78	4.99	9.55	7.40	9.96	16.54	23.73	28.34	42.94	68.16
• Other areas	3.34	4.53	8.86	6.20	8.42	13.60	22.48	23.49	38.12	67.69
Pernambuco										
• 55REMR	3.24	4.14	5.62	11.29	11.63	16.07	24.49	40.57	53.89	93.30
• Other areas	2.87	3.67	5.06	9.00	10.20	9.28	17.19	33.06	34.76	50.46
Rio Grande do Norte	3.05	3.98	5.10	9.33	9.33	10.99	20.15	34.28	39.51	67.45
Paraíba	2.90	3.93	5.02	10.42	9.03	10.41	23.61	34.74	38.94	65.48
Ceará										
• FOMR	2.27	3.39	4.47	6.19	8.56	10.11	16.71	18.01	30.08	57.07
• Other areas	1.91	3.06	3.89	6.88	8.38	10.57	18.48	11.66	31.82	77.83
Maranhão	1.95	2.85	3.93	5.67	8.00	8.95	14.55	13.52	21.21	81.42
Piauí	1.83	2.99	4.02	7.91	7.43	11.82	14.06	14.47	23.86	45.49
Halagaos	2.08	2.94	3.87	6.43	9.44	11.02	15.02	17.87	34.30	52.16
Pará										
• BEMR	4.46	4.94	6.44	9.01	12.45	11.33	17.48	26.44	30.94	66.33
• Other areas	4.41	4.69	5.59	8.13	10.25	9.34	15.94	23.47	38.62	43.57
Amazonas	4.46	4.58	5.77	8.89	11.69	9.52	16.12	23.88	31.50	55.57
Amapá	5.45	4.87	6.27	11.45	10.91	7.48	16.62	16.95	21.91	61.68
Acre	5.16	5.58	5.64	11.36	14.50	13.30	20.06	38.20	32.59	84.30
Rondônia	5.12	5.94	6.64	11.02	15.60	15.48	21.37	31.20	30.31	65.71
Roraima	5.40	5.44	8.83	16.40	17.54	19.11	23.15	25.81	27.52	31.43
Tocantins	3.99	5.00	6.22	9.41	12.80	9.92	17.32	27.99	31.15	69.94
Goiás	8.04	9.91	11.94	12.08	17.04	17.53	22.33	28.83	45.68	68.45
Mato Grosso	7.56	9.70	11.51	12.54	16.52	17.38	21.72	29.28	44.84	58.81
Federal District	4.87	5.54	6.31	11.54	9.49	17.04	16.20	26.22	33.84	69.05

Table A.1.6
Average Annual Household Health Expenditures, by Income Decile and State, Assuming Elasticity Differences among
Three Income Levels (Hypothesis 1)
(in Dec. 1998 US\$ millions)

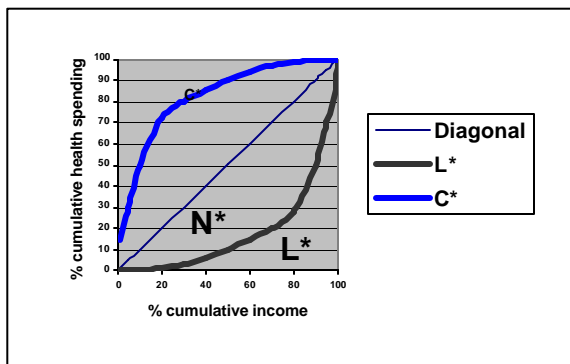
State	Income Decile									
	1	2	3	4	5	6	7	8	9	10
Rio Grande do Sul	126.6	94.8	216.3	100.2	118.5	135.9	341.1	255.8	316.8	738.9
Paraná	119.4	105.6	166.9	75.2	186.9	155.9	379.0	226.8	219.6	741.4
Santa Catarina	43.3	38.9	109.5	46.9	122.2	103.2	277.4	132.5	117.0	326.2
Mato Grosso do Sul	38.2	27.3	48.1	16.0	27.6	26.4	63.8	40.6	30.7	123.6
São Paulo	456.7	343.9	483.7	389.1	721.3	636.9	1509.4	1324.3	1463.9	3572.6
Rio de Janeiro	122.7	113.9	301.0	142.5	280.8	201.2	450.2	368.4	396.4	1036.0
Minas Gerais	172.3	189.0	389.6	167.9	351.4	321.7	551.7	600.0	434.6	883.1
Espírito Santo	39.9	35.2	68.7	28.8	54.0	45.6	74.5	86.4	71.6	137.4
Bahia	202.5	98.3	204.6	64.2	106.7	97.7	103.6	107.5	102.8	237.4
Pernambuco	90.8	51.1	83.6	51.7	75.1	55.8	106.2	81.3	133.9	251.5
Rio Grande do Norte	28.7	18.3	28.8	21.6	22.5	11.7	41.9	37.9	50.6	93.8
Paraíba	37.8	24.9	34.5	29.0	29.2	22.8	40.1	45.7	42.4	89.6
Ceará	55.2	44.1	64.2	25.7	51.3	33.7	62.1	31.1	55.8	152.2
Maranhão	49.3	31.0	35.6	21.2	33.2	23.0	40.5	41.5	30.7	68.1
Piauí	24.9	15.2	20.7	6.5	16.7	10.9	28.1	24.4	15.7	18.8
Halagaos	23.7	14.3	21.7	10.0	18.8	13.5	27.6	14.1	25.2	62.0
Para	24.1	25.4	51.3	26.2	35.8	22.6	34.1	28.1	42.2	80.1
Amazonas	8.8	12.6	27.4	15.6	25.5	19.5	37.8	29.9	39.9	53.3
Amapá	1.7	2.3	5.3	2.3	5.6	2.3	9.9	4.0	8.1	13.3
Acre	2.3	2.9	5.9	1.9	3.9	3.7	5.4	5.3	10.1	24.0
Rondônia	5.9	7.7	14.5	9.7	12.8	7.4	17.5	15.2	18.6	23.5
Roraima	1.0	0.9	2.1	1.2	4.5	3.3	7.7	5.2	8.7	4.3
Tocantins	11.1	7.0	10.8	5.7	8.8	5.9	5.2	5.7	7.1	22.1
Goiás	83.0	80.8	129.3	52.2	83.3	56.4	117.7	64.7	90.9	200.8
Mato Grosso	35.2	34.8	63.9	21.5	46.5	32.1	57.3	37.1	47.8	92.7
Federal District	4.5	7.0	17.2	13.5	18.9	27.2	51.0	65.1	83.6	282.9
Total	1,809.7	1,426.9	2,647.6	1,605.3	2,461.7	2,076.5	4,513.3	3,663.1	3,864.7	9,329.6

Appendix 2

Gini Coefficient and Suits Index

I) Introduction

The Gini coefficient and the Suits index can be used to measure the fairness of health spending. As a rule, the two indices are ratios of the cumulative distribution of a variable to the cumulative distribution of another variable. These indices are depicted by means of Lorenz curves. For purposes of this annex, the Lorenz curve reflects the cumulative distribution of a given population's health spending relative to the cumulative distribution of that population's income. If the distribution of spending is progressive (the share of health spending is lower among low-income groups), the Lorenz curve is represented by (L*). Assuming a regressive distribution of health spending (the share of health spending is higher among low-income groups), the Lorenz curve will look like (C*). Neutrality, that is, the Lorenz curve is neither progressive nor regressive, is depicted by (N*).



For reasons having to do with the asymmetry of the information and the importance attached to preserving life and health, health-related expenditures tend to be naturally regressive, as low-income families place a higher premium on spending for health care than other expenditures. From the standpoint of equity, the goal of governments should be a progressive distribution

of these expenses; in other words, low-income families should spend a smaller share of their income on health than higher income families do. To reach that goal, governments should help lower the health care expenses of the poorest by providing either demand-side subsidies or public services that target lower income groups. A policy that succeeds in achieving these objectives is progressive.

If the government does not succeed in lowering the percentage of the family budget that the poor spend to keep themselves healthy to the point where it is a smaller percentage than that spent by more financially comfortable families use, then the government's health policy is not up to the task of reversing the inherent regressiveness of health spending.

II) The Equity of Health Spending as Measured by the Gini Coefficient

The Gini coefficient is a graphical representation of the surface area between curve (L*) and the diagonal (N*), divided by the total area below (N*). The value of the index ranges between zero and one.

If (L*) depicts maximum equity, it will be identical to (N*). In this case, the difference between (N*) and (L*) will be zero and the Gini coefficient will also be zero.

Conversely, with maximum inequality, the area under (L*) would be equal to zero and the area between (N*) and (L*) would be equal to the area under (N*). In this scenario, the Gini coefficient is equal to one.

The Gini coefficient will not show the degree of equity in health spending as the ratio of cumulative health spending to the cumulative income of families; however, the Gini coefficient can be used to show equity in health spending by measuring the cumulative distribution of the

Table A.2.1
Results of Calculating the Gini Coefficients of Household Consumption Spending
(Gb and Gs): 1987 and 1996

Gini coefficients	1987	1996	% Change
Gb	0.4637	0.4697	1.3%
Gs	0.3936	0.3921	-0.4%
% Change	-15.1%	-16.5%	-

Source: IBGE – Data from the 1987 and 1996 POF

population (by per capita household income) and total family spending on consumption,⁹ based on two factors: gross and net family consumption (net family consumption is total consumption less health expenses).

If the Gini coefficient of total gross consumption (Gb) is higher than that of total consumption less spending on health (Gs), health spending is having a regressive effect on the distribution of household spending, since the income distribution is more progressive without factoring in health spending. By analogy, if Gb is less than Gs, the inclusion of health expenditures will have a progressive effect on the distribution of consumption.

To arrive at the Gini coefficient, the formula for its lower limit was used, which does not factor in the variation in incomes within each population group (ordered by income level) reported in the coefficient's calculation. The formula for the Gini coefficient's lower limit is:

$$G = 1 - \sum_{i=1}^n [(X_i - X_{i-1})(Y_i + Y_{i-1})]$$

Where:

G = Gini coefficient;

X_i = cumulative % of the population in group i

X_{i-1} = cumulative % of the population in group (i-1)

⁹ Household spending on consumption is chosen over total spending because the addition of family investments (an increase in assets or decrease in liabilities) by income level can skew the concentration of spending.

Y_i = cumulative % of the income in population group i

Y_{i-1} = cumulative % of the income in population group (i-1)

n = number of population groups considered

Data from the 1987/88 and 1995/96 POF were used to calculate the Gini coefficient. The results appear in Table A.2.1:

The results show that in both 1987 and 1996, Gb is greater than Gs, demonstrating that the health policy did not succeed in reversing the regressiveness of Brazilian households' health expenditures. Furthermore, health expenditures became even more regressive between 1987 and 1996, since the difference between Gb and Gs rose from 15.1 percent to 16.5 percent and Gb was 1.3 percent more concentrated, while the concentration of Gs was reduced by 0.4 percent.

III) The Equity of Health Spending as Measured by The Suits Index

The Suits index (S) plots relative concentration curves. The horizontal axis represents the cumulative percentages of total income by income level. The vertical axis measures other variables that can be more concentrated or less concentrated than income, and thus depict how progressive or regressive that variable is in relation to a given income distribution n.

Working from the Lorenz curves figure, the Suits index (S) measures the difference between the area under the curve and the diagonal (N*). Thus, if the distribution is progressive, S will be calculated –(as with the Gini index) as the difference between the areas under (N*) and (L*) divided by the area under (N*). By analogy, S is

the difference between the areas under (N*) and (C*) divided by the area under (N*).

Because $(C^*) > (N^*)$, the value of S may range from -1 to 1 and may be negative. If the value of S is negative (between -1 and 0) then the distribution of the variable in question is regressive. If the value of S is positive (between 0 and 1), the distribution of the variable is considered progressive.

Applying this criterion to the 1987/88 and 1995/96 POF produced Suits indices of -0.012 for 1988 and -0.444 for 1996, indicating that health expenditures in Brazil were mildly regressive, but that the regressiveness intensified between the second half of the 1980s and the first half of the 1990s. This confirms the hypothesis already proven by means of the Gini coefficients relative to health spending. Tables A.2.2 and A.2.3 contain the database used to calculate the Gini and Suits indices for 1988 and 1996.

Table A.2.2
Database Used to Compute the Gini Coefficient and Suits Index -1988

Income Group (in minimum wages)	Cumulative % of the population	Cumulative % of household consumption spending	Cumulative % of household health spending	Cumulative % of household consumption spending, less health spending
Up to 2	8.278	0.880	1.045	0.871
+ from 2 to 3	12.230	2.354	2.556	2.343
+ from 3 to 5	28.325	7.776	7.858	7.754
+ from 5 to 6	35.591	10.867	10.557	10.884
+ from 6 to 8	47.184	17.132	16.535	17.165
+ from 8 to 10	55.925	22.690	22.467	22.703
+ from 10 to 15	70.955	35.171	35.069	35.177
+ from 15 to 20	79.722	45.862	46.698	45.767
+ from 20 to 30	80.538	60.997	63.030	60.883
+ from 30 up	100.000	100.000	100.000	100.000

Source: IBGE, 1996 Survey of Family Budgets

Table A.2.3
Database Used to Compute the Gini Coefficient and Suits Index – 1996

Income Group (in minimum wages)	Cumulative % of the population	Cumulative % of household consumption spending	Cumulative % of household health spending	Cumulative % of household consumption spending, less health spending
Up to 2	8.278	1.423	2.096	1.376
+ from 2 to 3	15.833	3.356	4.265	3.293
+ from 3 to 5	31.136	8.659	9.691	8.588
+ from 5 to 6	38.354	11.859	12.911	11.786
+ from 6 to 8	49.747	18.185	19.306	18.107
+ from 8 to 10	57.998	23.668	25.242	23.558
+ from 10 to 15	72.246	36.422	38.648	36.267
+ from 15 to 20	80.552	46.600	50.568	46.331
+ from 20 to 30	88.342	59.666	64.047	59.361
+ from 30 up	100.000	100.000	100.000	100.000

Source: IBGE: 1996 family budget survey