Support Transfers between the Elderly and the Family in Southeast and Northeast Brazil

by

Paulo Murad Saad, B.A., M.A.

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Approved by
Dissertation Committee:

Joseph E. Potter, Supervisor

Bryan R. Roberts

Robert H. Wilson

Ronald J. Angel

Charles H. Wood

Robert A. Hummer

Dedication

To Rosely, Thaís, Janaína and Rodrigo.

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I received my master's degree about ten years before receiving the invitation to start a doctoral program in Austin in 1992. In the period between these two events, my contact with the university environment was only circumstantial. I already had a relatively stable life, with a job, a wife and three children. It was a tough decision to become a student again. Among the many people who encouraged me to go back to the classroom, my greatest debt is with Dr Joseph Potter, my advisor. To him I am most grateful for his valuable guidance and continuous support. He also encouraged me to carry out the survey from which most data used in this dissertation was drafted.

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Paulo Murad Saad, Ph.D.

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Supervisor: Joseph E. Potter

In a context of widening social inequalities, Brazil has experienced a process of rapid population aging in the last few decades. Public institutions such as the social security and public health systems have shown limited capacity to meet the increasing demands of elderly individuals, making the family a major source of support for them. Despite the progress of Brazilian demographic transition, little research has been done on aging in Brazil, particularly regarding informal support flows involving the elderly. This dissertation explores this topic in two quite different socioeconomic and demographic contexts – the Northeast and Southeast regions – paying special attention to intergenerational transfers between elderly parents and adult children. Because co-residence, especially with adult children, plays an important role as a source of family support, the first multivariate analysis refers to the determinants of the living arrangements of the

elderly. Using data from the 1980 and 1991 Brazilian Demographic Censuses, multinomial logistic regressions were fit to estimate the effects of selected socioeconomic and demographic covariates on the household structure of the elderly, as well as to account for regional patterns of co-residence and changes over the 1980 decade. The results show, in the first place, that high levels of co-residence with children still prevail in both places. The trends over the 1980 decade, however, seems to have followed different paths in the two regions, due in part to the unequal effects of the selected covariates. In the second part of the analysis, logistic regression models were fit to assess the effect of socioeconomic and demographic characteristics of both elderly parents and adult children on support exchanges – material, functional and instrumental – between them. The data used in this analysis came from two different surveys carried out at different times in the cities of São Paulo and Fortaleza. The survey in Fortaleza was designed specifically for this dissertation, and permitted more complete analyses for this city. The results show that intergenerational support transfers in both directions are extremely frequent and depend greatly on the traits of both elderly parents and adult children.

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Introduction

Following a trend observed in most developing countries, Brazil has experienced noticeable population aging during the last two decades, due to a decline in mortality and fertility rates. Despite the advancement of the Brazilian demographic transition, however, relatively little research has been done on aging in Brazil, especially compared to the attention given to aging in other developing countries such as those from East and Southeast Asia (Martin, 1989; Casterline et al., 1991; Chan and DaVanzo, 1991; Hermalin et al., 1992).

Before the release of the 1980 Census, the most common features associated with the Brazilian population were both its youthfulness and its high growth rates, and aging was far from being considered an important demographic or social issue. The scientific fields traditionally devoted to the study of the elderly—gerontology and geriatrics—were concerned almost exclusively with the psycho-social and physiological aspects of the human aging process. Social-demographic studies in this area were practically nonexistent. The projections of Brazilian population based on the 1980 Census heightened public consciousness regarding the aging process, and only then did this issue become the focus of more substantive analyses in Brazil. Because of the newness of this interest, however, no significant amount of knowledge has yet been accumulated in this area.

The literature on aging in Brazil refers mostly to demographic analyses pointing to the rapid aging process to be experienced by the Brazilian population in the near future (Ramos et. al., 1987; Kalache, 1987; Veras et.al., 1987; Imhof, 1987; Saad & Camargo, 1989; Carvalho, 1992). Taking the demographic and epidemiological transitions as the conceptual framework, and making use of census data as well as population projections, these studies attempt to anticipate the economic, political, and social implications of an aging population.

Some studies address more specifically the consequences of aging for the health sector (Cavalcanti & Saad, 1990), as well as for the Social Security System (Almeida, 1987; Cabral & Castro, 1988; Castro & Santos, 1989; Prata, 1990 and 1991). Mortality (Saad, 1988; Yazaki & Saad, 1990) and morbidity (Ramos & Saad, 1990) of the elderly have also been the focus of some studies, while socio-demographic profiles of the Brazilian elderly population have been outlined in other studies (Berquó & Leite, 1988; Berquó & Cavenaghi, 1988; Camargo & Yazaki, 1990; Bercovitch, 1992). Few studies have incorporated migration as a component into the population aging process, either by fitting models for the elderly's movements themselves (Machado & Abreu, 1991), or assessing the consequences of the younger population's movements on the pace of the aging process in different regions of the country (Camargo & Saad, 1990).

The household composition of the elderly has been addressed almost exclusively in a descriptive way, in terms of headship of the household (Yazaki et. al., 1991; Bercovitch, 1992), while studies of family support and the determinants of living arrangements of the elderly are, in general, of limited

geographic coverage (Prata & Yazaki, 1991; Ramos, 1987 & 1992; Ramos et al, 1991), or lack a more sophisticated statistical treatment.

At this time, the only study with national coverage and more substantive use of statistical tools is Agree's (1993) Ph.D. dissertation on the effects of demographic change on the living arrangements of the elderly in Brazil during the period 1960-1980. An interesting finding of this study, in terms of regional variation, is the greater amount of horizontal extension, but less vertical extension of the elderly's households in the Northeast region. The implication, according to the author, is that economic hardship in the Northeast played a role in the formation of extended family households, but "labor force out-migration has stripped some of the younger family members from what would have been three-generation households" (pp. 82). Because the findings of this study do not take into account the patterns of assistance among family members outside the household, Agree acknowledges its limited policy implications.

The lack of research on the specific topic of family support transfers is particularly unfortunate for two reasons. First, family support is supposed to play a decisive role in the well-being of the elderly wherever adequate formal support is absent. Second, political, economic, cultural, and demographic changes in Brazil have led to important transformations in the structure and composition of the family, as well as in women's social roles, and these changes will certainly affect the family's capacity to provide support for the elderly.

In fact, instead of a gradual process accompanied by real growth in resources per capita, as occurred in the more developed countries, Brazil is facing

a much faster process of aging, in a context of static or declining resources and widening social inequalities. As a consequence, public institutions in Brazil such as the social security system and the public health system are hardly prepared to meet the increasing demands of an older population, making the family a major source of support for the elderly.

Several factors, however, tend to constrain the elderly-family relationship. First, the traditional extended family characteristic of rural settings, in which the older members used to perform important social roles, has given way to smaller nuclear urban families (Altmann, 1985; Yazaki, 1990), living in small household units, where physical and social space for the elderly has been continuously reduced. On the other hand, the available time of women, who traditionally have been the major provider of basic care for the elderly, has decreased significantly, as female participation in the labor market has increased. In addition, the high migration levels in Brazil in the last three decades, both rural to urban and inter-urban (Saad & Camargo, 1990), have certainly contributed to weakening family ties by separating adult children from elderly parents.

One issue that arises is how these transformations will impinge on the well-being of the larger numbers (and higher proportions) of the elderly projected over the near future. In his influential study, Cowgill (1974) argued that, on balance, most factors associated with development – industrialization, urbanization, advanced health technology, and increased education – tended to reduce the status of the elderly through such mechanisms as keeping them in more traditional jobs, separating them from their families, depriving them of

meaningful roles through early retirement, and lowering their social status relative to the young. Treas and Logue (1986) in reviewing the relationship between economic development and the welfare of the elderly, concluded that the nature of the relationship depends on many situational factors. Faria (1990), after assessing the balance between formal and informal support to the elderly, concludes that the modernization process in Brazil has destroyed the traditional mechanisms of support for the elderly without developing new mechanisms of social protection typical of the welfare state prevailing in the more developed countries.

As suggested by Hermalin (1995), the well-being of the elderly is a multidimensional concept, requiring the assessment of many specific facets that include broad societal forces and institutions, society's demographic structures, and the policies and programs that affect the elderly directly and indirectly. Of these dimensions, he asserts, the systems of exchange between the elderly and family, friends, and more formal sectors of society are of great influence in determining the welfare of the elderly and other members of the society. Moreover, the transfer systems embedded in these exchanges would be key mechanisms through which changing norms and values, as well as explicit policies and programs, would adjudicate the competing needs and demands of different age groups and different social groups.

A review of the recent literature shows that the broad subject of intergenerational transfers, approached from macro and micro-economic frameworks as well as sociological and anthropological perspectives, is emerging as a major focus of the demography of aging. The relationships between

generations, however, can be manifested at two different levels: in the public arena, where the concept of 'generation' refers to cohorts of persons born at different times, without taking into account interpersonal bonds linking them, and within the family, where 'generations' are defined by kinship ties. While studies in the more developed countries have emphasized the first level, focusing on governmental programs that respond specifically to the needs of people of different ages, studies in developing countries have emphasized the second level, focusing on the issues of parental or filial obligations, and the expectations of older parents and their adult children about flows of help and support between the generations.

This dissertation is intended to add substantial knowledge about the intergenerational flows of informal support within the family in Brazil, a matter practically absent in both Brazilian and Spanish speaking Latin American demographic literature. The more general objective of the study is to explore, in a comparative fashion, factors affecting support transfers between the elderly and their families in two quite different socioeconomic and demographic Brazilian contexts: the Northeast and the Southeast regions. If, on the one hand, regional differences in the stage of demographic transition have led to distinct paces of population aging, social-economic heterogeneity, on the other hand, suggests unique implications of the aging process within each region. For this reason, the analysis incorporates the regional component as much as the available data allow.

In order to achieve the proposed objective, the dissertation is organized as follows. After this *Introduction*, three important aspects related to the study's

framework are discussed in *Chapter I*: the concept of elderly population, the process of population aging in Brazil, and the socioeconomic and demographic differentials between Brazilian Southeast and Northeast regions. Then, using data from Brazilian Demographic Censuses, *Chapter II* investigates the patterns and trends of the living arrangements of the elderly in the Southeast and Northeast regions during the 1980s. Next, *Chapter III* uses survey data to explore the intergenerational support transfers involving elderly parents and adult children in the cities of São Paulo-SP – located in the Southeast region – and Fortaleza-CE – located in the Northeast region. Finally, the last section presents the *Conclusions* of this study.

Chapter 1: Population Aging and Regional Socioeconomic Differentials in Brazil

The Concept of Elderly Population

A first issue that arises when focusing on the elderly population is to define who belongs to this population. Establishing an unambiguous dividing line between young and old is a very difficult, if not impossible, task. The multiple conceptions about old age are, in general, subjective and changeable both overtime and according level of socio-cultural development. Despite this diversity of conceptions, however, there are some attributes that are typically associated with old age. It is usual, for instance, an individual become elderly in the eyes of society after retiring. Physical and mental health, on the other hand, used to play a decisive role, especially when affecting individuals' autonomy. People are seen as elderly after becoming dependent on the help of others to accomplish their basic needs or to perform ordinary tasks.

Such situations, however, differ substantially according to the context. There are places in which retirement is compulsory, while in other places people work until the day they die. The nature of the work performed during the economically active life, on the other hand, directly affects the individual's physical and mental health conditions at older ages. Usually, people retire in the more developed societies in good physical conditions. The same, however, is not true in the less developed regions, where the retirees, in general, have been exposed for many years to adverse working conditions. Wherever the access to

the health system is easier and life conditions more satisfactory, the period in which people remain healthy and autonomous is likely to be considerably longer.

For methodological purposes, it is always necessary to explicitly delimit the elderly population that is under investigation. In general, the chronological criteria is chosen, although the age at which citizens are defined as elderly tends to differ even among individuals belonging to the same society. In a survey carried out in the United States by the National Council on Aging, for instance, the mean age reported by people under 65 as being the starting point of old age was 63. Seven years later, a new survey revealed that the mean age had risen to 66 years of age (Sheppard, 1985). Besides this significant increase in a period of only seven years, important differences were detected according to the educational level, the working status and the health conditions of the respondents. For people between 18 and 54 years of age with a high-school degree, the mean reported starting point of old age was 67, while for those with less schooling, the mean age reported dropped to 63. The mean age reported by retirees, on the other hand, was significantly lower than that reported by non-retirees of the same age. This difference probably reflects the effect of health status: the mean age reported by people 55 to 64 years old in good or excellent health conditions (around 69) was almost five years greater than that reported by people in the same age group, but in fair or bad health (Sheppard, 1985).

The previous illustration makes it clear that any age cut off chosen to delimit the elderly population will carry some degree of arbitrariness. Nevertheless, there is no way to avoid the use of the chronological criteria in

order to accomplish the objectives proposed. The United Nations used to define as elderly, in developing countries, people who were 60 years and older. Since the main focus of this study is on support transfers involving the elderly, particularly with adult children, it seemed appropriate, however, to consider 65 years as the minimum age of the elderly population in order to guarantee a greater number of elderly with some kind of need, as well as adult children in a position to provide support. Moreover, it will allow for comparative analysis, as most studies on the subject of intergenerational support transfers adopt the age of 65 as the cut point for the elderly population.

Population Aging in Brazil

Although there are no reliable data regarding Brazilian demographic dynamics prior to 1940, it is assumed that high mortality and fertility rates had prevailed for a long period, in which the population grew by relatively low rates – around 2 percent or less yearly – and its age structure remained essentially young. The transition from high to low demographic rates began about five decades ago, first with the reduction of mortality rates, later followed by a decline of fertility rates.

The process of declining mortality started just after the Second World War, in the second half of the 1940's. The reduction in the crude death rate (CDR) that took place between 1940 and 1950 (about 13 percent) was similar to that observed for the entire period of the prior four decades (about 16 percent). During this ten year period, the life expectancy of the male population increased as much as in the prior forty years (4 years approximately). In the case of the

female population, life expectancy grew during the 1940 decade (6.8 years) even more than in the forty year period from 1900 to 1940 (5.4 years) (Santos, 1978).

As a consequence of the continuous improvement in health and sanitation conditions, the Brazilian population's life expectancy has continued to increase in the second half of this century as mortality levels have declined. In 1950, life expectancy in Brazil was around 50 years; at the present time, its has already surpassed 67 years, and is expected to reach 75 years around the year 2020 (Table 1).

Because the decline in mortality levels during the first stage of demographic transition was mostly due to reductions in infant mortality rates, and was not accompanied by any reduction in fertility rates, the more immediate consequence was an important increase in the population growth rate, which exceeded 3 percent annually during the 1950's. Thus, the effect of mortality decline on the process of population aging is expected to be noticed only in the medium run, when both the surviving children born in 1950s start reaching older ages, and improvements in adult and old age mortality become more significant.

The effect of fertility decline – which began around the middle of the 1960's – on the aging process of Brazilian population has been far more direct and immediate than the effect of mortality decline. In the thirty two year period from 1964 to 1996, the fertility rate in Brazil dropped from 6.15 to 2.50 children per woman, and is expected to decline to 2.04 in the year 2000, to 1.85 in the year 2010 and to 1.81 in the year 2020 (Table 1).

Table 1: Total fertility rate (TFT) and life expectancy by sex for selected periods and years, Brazil, 1950 – 2020.

Period / Year	TFT	Life Expectancy (in years)		
		Total	Male	Female
1950 – 1955	6.15	50.99	49.32	52.75
1955 – 1960	6.15	53.44	51.60	55.38
1960 – 1965	6.15	55.87	54.02	57.82
1965 – 1970	5.31	57.90	55.94	59.95
1970 – 1975	4.70	59.81	57.57	62.17
1980	4.00	61.76	58.95	64.68
1985	3.30	64.34	61.17	67.65
1991	2.57	65.90	62.58	69.34
1996	2.50	67.32	63.81	70.38
2000	2.04	68.51	65.41	71.74
2010	1.85	71.77	68.90	74.77
2020	1.81	75.51	72.82	78.31

Sources: 1950-75: (Neupert, 1987);1980-2020: (IBGE, 1997B); TFT/1996: (Bemfam, 1997).
Note: TFT refers to the mean number of children per woman at the end of the reproductive cycle.

This extraordinary reduction in fertility rates resulted in a sharp decline in population growth. After reaching a peak of 3.04 percent during the 50s, the growth rate of Brazilian population decreased to 2.48 percent annually in the 1970s, and to 1.36 percent from 1991 to 1996 (Table 2). As a consequence, the age structure of the population became older, i.e. the proportion of children sharply decreased along with an important increase in the proportion of older groups, especially the elderly (65 years and older). From 1940 to 1996, the proportion of the Brazilian population younger than 15 decreased from 42.6

percent to 31.6 percent, while the proportion of individuals 65 years and older increased from 2.4 percent to 5.4 percent. During this same period, the growth rate of the elderly population remained always significantly higher than that of the total population (Table 2).

Table 2: Age distribution and growth rates of population for select years, Brazil, 1940 – 2020.

Year	Population (thousands)	Age Distribution (%) Age groups (years)			Growth Rates (%) Age groups (years)			
		0-14	15-64	65+	0-14	15-64	65+	total
1940	41,165.3	42.6	55.0	2.4				
					2.16	2.46	3.17	2.35
1950	51,941.8	41.8	55.6	2.6				
					3.26	2.85	3.43	3.04
1960	70,070.5	42.7	54.6	2.7				
					2.86	2.83	4.32	2.89
1970	93,139.0	42.6	54.3	3.1				
					1.37	3.11	5.39	2.48
1980	119,002.7	38.2	57.7	4.0				
					1.04	2.37	3.40	1.93
1991	146,825.5	34.7	60.5	4.8				
					-0.52	2.18	3.78	1.36
1996	157,079.5	31.6	63.0	5.4				
					-0.65	1.45	3.19	1.02
2020	200,306.3	21.2	69.8	9.0				

Sources: 1940 to 1991: Brazilian Demographic Censuses – IBGE; 1996: Brazilian Population Count – IBGE; 2020: (IBGE, 1997B).
Note: The population projection for 2020 refers to the latest released by IBGE. It does not take into account the results of de 1996 Population Count. The growth rates refer to the mean annual geometric growth rates calculated for each period.

After the first decade of the next century, the aging process is expected to become still more intense. By that time, the cohorts born between 1945 and 1965, who benefitted from the drop in mortality rates but still experienced a period of high fertility rates, will reach the ages of 65 and above. Between 1996 and 2020, the population 65 and older is expected to increase by an average annual rate of 3.2 percent, while the total population will increase by about only 1 percent per year, and the population under 15 will experience a decrease in absolute numbers. By the end of this period, the population 65 and older will be around 9 percent of the total population (IBGE, 1997B). Although this proportion is still far below those of the more developed countries, it will mean a jump from about 8.4 million elderly in 1996 to about 18 million in the year 2020[1] (Table 2).

Regional Differentials between the Southeast and Northeast

Brazil is a country of contrasts. This holds true not only in physical terms, but also in regard to human and social aspects. Indeed, the magnitude of social inequalities has constantly been regarded as one of the main characteristics of Brazilian society (Wood and Carvalho, 1994). Although social inequalities can be observed at any level, they are particularly evident at the regional level, especially if we compare the Southeast with the poorest Northeast region of the country[2].

[1] These figures refers to the latest population projections released by IBGE, which do not take into account the results of the 1996 Population Count held in Brazil. Since the population growth rate obtained from the 1996 Count was lower than expected, and the proportion of elderly population was higher than expected, the speed of population aging in the next 25 years will probably exceed the one implicit in table 2.

[2] Brazil is subdivided into five administrative regions (macro-regions) based on the states' limits.

The Southeast is the most important Brazilian economic region. It includes the states of São Paulo, Rio de Janeiro, Espirito Santo and Minas Gerais. Although its area corresponds to less than 11% of the Brazilian territory, its population of more than 67 million people represents almost 43% of the country's total population (IBGE, 1996). The region has experienced a huge process of urbanization that dates from the first half of this century. By 1980, 82.8% of the region's population lived in urban areas, a proportion significantly higher than the 67.6% observed for the country as a whole. By 1996, these proportions had increased to 89.3% in the region, and 78.4% in the country (Table 3).

Table 3: Urbanization rates, Brazil, Southeast and Northeast regions, 1960 – 1996.

Region	Urbanization Rates (%)				
	1960	1970	1980	1991	1996
Brazil	44.7	55.9	67.6	75.6	78.4
Southeast	57.0	72.7	82.8	88.0	89.3
Northeast	33.9	41.8	50.5	60.7	65.2

Sources: 1960-1991: Brazilian Demographic Censuses – IBGE; 1996: Brazilian Population Count – IBGE.
Note: The urbanization rate refers to the proportion of population living in urban areas.

The Southeast is not only the country's most industrialized region, but the one with the highest agricultural productivity. It is responsible, alone, for almost half of the total Brazilian Gross Domestic Product (Moreira, 1995). Moreover, the region includes the two largest Brazilian metropolis – the cities of São Paulo and Rio de Janeiro – and has the country's best transportation network. Trading

activities with other regions consist basically in importing food, raw materials and labor force, and exporting services and manufactured products.

The Northeast region – including the states of Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe and Bahia – on the other hand, presents the lowest social and economic development indices among all Brazilian regions. Its area corresponds to 18% of the Brazilian territory, while its population of about 44.7 million inhabitants accounts for 28.5% of the country's total. The urbanization process in the region started later than in the Southeast, and its urbanization index – 65.2%, according to the 1996 Population Count (IBGE, 1996) – still remains lower than the country's total (Table 3).

Most of the Northeastern territory belongs to a geographic region called "Sertão" – almost the entire area known as "Polígono das Secas" (dry poligonon) is located in the "Sertão" – marked by extensive periods of scarce rainfall. The dry weather affects the quality of the soil, making it excessive thin and inappropriate for agriculture. Although the climate represents an important obstacle to the region's development, the main problem, however, is the uneven distribution of the region's land and income. While resources and technology have been available to larger landowners to construct dams to set through most droughts, the choice left to small and subsistence producers has been to leave their properties.

In fact, longer periods of dry weather have generally been followed by intensive out-migration from the "Sertão," either to the coastal area of the Northeast region or to other regions, especially the Southeast. Given the low

capacity of the coastal area's economy to absorb all those migrants, the number of economically excluded people, living in very poor housing conditions has increased, extending urban poverty and lowering the region's social indices. Although considerable industrial growth took place in the Northeast region during recent decades, particularly after the 1970s, this process has never been consolidated[3]. Most industries in the Northeast are, indeed, subsidiaries of industries based in the Southeast, which were attracted to the region through fiscal incentives given by local governments, and by the availability of cheaper labor. Since the region's consumption market has never been able to absorb a significant share of the local production, most of the region's industrial products are usually exported to the Southeastern market, making the economy of the Northeast strongly dependent on the Southeast.

A recent study of the United Nations Program for the Development – UNPD – points to the dramatic differences in socioeconomic development that still persists between the Northeast and Southeast regions of the country. It presents a series from 1970 to 1996 of the Human Development Index[4] (HDI) calculated for Brazilian regions and states, and a series from 1970 to 1991 of the Municipal Human Development Index (MHDI) calculated for Brazilian

[3] Indeed, a decreasing trend has been observed in the more recent period in the industrial growth index of the Northeast region (Moreira, 1995).

[4] The Human Development Index (HDI), developed by the United Nations Program for Development (UNPD) has been calculated for countries since 1990. It includes three characteristics expected to be involved in the human development process – *longevity*, expressed by the life expectancy; *education*, expressed by both the adults literacy rate and the enrollment rate in the three levels of schooling; and *income*, expressed by the per capita GDP. The index ranges from 0 (zero) to 1 (one). Values under 0.5 indicate low human development, values between 0.5 and 0.8 indicate intermediate human development, and values above 0.8 indicate high human development (PNUD, IPEA, FJP and IBGE, 1998).

municipalities[5] (PNUD, IPEA, FJP & IBGE, 1998). Although the Northeast shows the highest relative increase in HDI between 1970 and 1996, the value of the index at the end of this period still was the lowest among all Brazilian regions. At the same time, even after losing the top rank to the South region in 1991, the Southeast region continued to have an HDI much higher than that of the Northeast (Table 4). On the other hand, while 92.9% of the Northeast's municipalities – where 61.8% of the region's population lived in 1991– were classified in the lowest category of the MHDI (under 0.5), only 13.7% of the Southeast's municipalities – where 4.0% of the region's population lived in 1991 – were classified in this lowest category.

The considerable differences in human development levels between Northeast and Southeast become clearer if each socioeconomic indicator used to calculate the HDI – literacy rate, per capita GDP and life expectancy – are observed separately. As shown in Table 4, these indicators have historically remained below the country's means in the Northeast, and above the country's means in the Southeast. According to more recent data, the life expectancy in 1996 was 67.6 years in Brazil, 68.8 in the Southeast and 64.5 in the Northeast; the literacy rate among adults was 88.3% in Brazil, 91.3% in the Southeast and 71.3% in the Northeast; and the adjusted per capita GDP was U$6,491 in Brazil, U$8,843 in the Southeast and U$3,085 in the Northeast.

[5] The MHDI adapted for municipalities considers years of schooling instead of registration rate, and per capita family income instead of per capita GDP.

Other studies also reinforce this socioeconomic imbalance between the regions. Using data from 1991, Medici and Agune (1993) showed large regional discrepancies regarding the proportion of urban households with adequate infrastructure in terms of water supply and sewage service: 82.9% in the Southeast, and only 34.3% in the Northeast. Lopes (1993), on the other hand, demonstrated that regional disparities persist even at the level of larger urban areas: in some metropolitan areas of the Northeast, poverty rates are higher than 50%, contrasting sharply with rates between 20 and 25% in the Southeast.

Table 4: Adults literacy rate, per capita GDP and human development index for select years, Brazil and Regions, 1970 – 1996.

Year	Brazil	Regions				
		Southeast	Northeast	North	South	Center-west
		Adults Literacy Rate (%)				
1970	67.0	77.1	46.1	63.0	76.5	67.5
1980	74.7	83.5	54.1	69.4	84.2	76.5
1991	80.6	88.2	63.5	75.9	88.7	83.9
1996	85.3	91.3	71.3	79.3	91.1	88.4
		Per Capita GDP (R$)				
1970	2,315	3,472	868	1,302	2,170	1,591
1980	4,882	6,981	2,021	3,068	5,235	4,271
1991	5,023	6,867	2,360	3,516	2,237	5,575
1996	6,491	8,843	3,085	4,705	6,865	7,073
		Human Development Index (HDI)				
1970	0.494	0.620	0.299	0.425	0.553	0.469
1980	0.734	0.795	0.483	0.595	0.789	0.704

1991	0.787	0.832	0.557	0.676	0.834	0.817
1996	0.830	0.857	0.608	0.727	0.860	0.848

Source: (PNUD, IPEA, FJP and IBGE, 1998).

Infant mortality and income are also good indicators of the contrasts between the two regions. In 1990, the infant mortality rate in the Northeast – 88.2 infant deaths out of every thousand children born – was almost three times greater than the rate observed in the Southeast – 30.0 deaths per thousand children born – and almost twice as high as the rate for the entire country – 49.7 infant deaths per thousand children born (IBGE, 1997B). According to the 1996 Brazilian National Household Survey (PNAD-96), on the other hand, the average monthly nominal income of employed people 10 years and older was more than two and a half times greater in the Southeast – R$477.00 – than in the Northeast – R$185.00 (IBGE, 1997C).

Population aging in the Southeast and Northeast regions

In 1980, the Northeast and Southeast regions together accounted for 72.8 percent of the total Brazilian population and 77.1 percent of Brazilian elderly population (65 and older). From 1980 to 1996, the total population of both regions grew by a rate lower than that of the country as a whole, decreasing their participation in the country's total population to 71.2 percent. In comparison with the country as a whole, the speed of population aging during this period, was higher in the Southeast and lower in the Northeast. As a result, the proportion of the Brazilian elderly population found in the two regions decreased to 75.1 percent (Table 5). According to the 1996 Brazilian Population Count (IBGE,

1997A), however, the Northeast and Southeast regions remain as those with the highest proportions of individuals 65 years and older – 5.5 percent in the Northeast and 5.8 percent in the Southeast (Table 6).

Table 5: Distribution of total and elderly populations by regions for selected years and population growth rates for the period 1980-1996, Brazil, 1980, 1991 and 1996.

Regions	1980		1991		1996		Growth rate
	absolute	(%)	absolute	(%)	absolute	(%)	1980-1996
			Total Population (thousands)				
Brazil	119,002.7	100.0	146,825.4	100.0	157,079.6	100.0	1.75
Southeast	51,734.1	43.5	62,740.4	42.7	67,003.1	42.7	1.63
Northeast	34,812.4	29.3	42,497.5	28.9	44,768.2	28.5	1.58
Others	32,456.2	27.2	41,587.5	28.4	45,308.3	28.8	2.11
			Elderly Population (thousands)				
Brazil	4,770.4	100.0	7,091.7	100.0	8,435.2	100.0	3.63
Southeast	2,167.7	45.4	3,224.9	45.5	3,872.8	45.9	3.69
Northeast	1,514.3	31.7	2,150.4	30.3	2,462.3	29.2	3.08
Others	1,088.4	22.9	1,716.4	24.2	2,100.1	24.9	4.19

Sources: 1980 and 1991 Brazilian Demographic Censuses – IBGE; 1996 Brazilian Population Count – IBGE.
Note: The growth rates are presented in percents and refer to the mean annual geometric growth rates calculated for the specified period.

Population aging in the Southeast has resulted basically from important decreases in the fertility rate and continuous increases in life expectancy. In the Northeast, on the other hand, where fertility and mortality rates still remained relatively high until 1980s, population aging has been primarily associated with

high out-migration rates of its young-adult population. Table 7 illustrates this situation for the periods 1986-91 and 1991-96: while life expectancy remained higher and the total fertility rate remained lower in the Southeast than in the Northeast, out-migration rates remained higher and immigration rates lower in the Northeast than in the Southeast.

Table 6: Age distribution of total, urban and rural populations, Southeast and Northeast regions, 1980, 1991 and 1996.

Age	Southeast			Northeast		
Group	Total	Urban	Rural	Total	Urban	Rural
			1980 (%)			
0-14	34.1	32.6	41.4	43.4	40.4	46.5
15-64	61.7	63.1	54.9	52.2	55.2	49.2
65+	4.2	4.3	3.7	4.4	4.4	4.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
			1991 (%)			
0-14	31.2	30.5	36.6	39.4	36.8	43.4
15-64	63.6	64.3	58.7	55.5	58.2	51.5
65+	5.2	5.2	4.7	5.1	5.0	5.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
			1996 (%)			
0-14	28.4	27.8	33.5	35.6	33.3	39.7
15-64	65.8	66.3	61.3	58.9	61.2	54.7
65+	5.8	5.9	5.2	5.5	5.5	5.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Sources: 1980 and 1991 Brazilian Demographic Censuses – IBGE; 1996 Brazilian Population Count – IBGE.

As a consequence of the higher levels of out-migration and fertility in the Northeast than in the Southeast, the dependency ratio[6] in the Northeast has remained consistently higher than in the Southeast (Table 7). It is likely, however, that population aging in the Northeast and Southeast regions will soon result primarily from the same demographic mechanisms. First, because migration movements has decreased all over the country in the more recent periods (IBGE, 1997A); second because the gap in fertility rates among the regions has sharply decreased over the time (BEMFAM, 1997).

Table 7: Selected demographic indicators, Southeast and Northeast regions, 1980, 1991 and 1996.

Indicators	Regions	
	Southeast	Northeast
Life Expectancy (years)		
1980	64.3	57.7
1991	67.7	62.7
1996	68.8	64.5
Total Fertility Rate (children per woman)		
1980	3.2	5.8
1991	2.4	4.0
1996	2.2	3.1
Immigration Rate (%)		
1980-91	2.27	0.79
1991-96	1.82	0.86
Out-migration Rate (%)		
1980-91	1.06	3.09
1991-96	0.93	2.69
Dependency Ratio		
1980	62.2	91.6
1991	57.1	80.1

[6] Ratio between the number of population in activity ages (from 15 to 65) and the sum of the younger (zero to 14 years old) and older (65 and more) population.

	1996	52.0	69.6

Sources: 1980 and 1991 Brazilian Demographic Censuses – IBGE; 1996 Brazilian Population Count – IBGE; (PNUD, IPEA, FJP and IBGE, 1998); (IBGE, 1997A); (Bemfam, 1997).
Notes: The total fertility rate for the Southeast/96 refers to the state of São Paulo. The immigration rate refers to the ratio between the population living in the region at the end of the period who did not live in the region at the beginning of the period and the population living in the region at the end of the period. The out-migration rate refers to the ratio between the population living out of the region at the end of the period who lived in the region at the beginning of the period and the population living in the region at the end of the period plus the population living out of the region at the end of the period who lived in the region at the beginning of the period. The dependency ratio refers to the number of people less than 15 years old plus people 65 years and older for every 100 people between 15 and 64 years old.

Chapter 2: Living Arrangements of the Elderly in the Northeast and Southeast Regions

Introduction

The lack of formal support provided by an adequate public welfare system makes much of the elderly in Brazil dependent, either partially or exclusively, on the informal support granted mainly by the immediate family. It would explain, for instance, the higher proportion of elderly living in extended families in Brazil compared with more developed countries, a trend found in other developing countries. Co-residence in the latter usually plays a primary role in providing informal support to the elderly.

Although co-resident family members may represent only a partial set of an elderly individual's kin, and co-residence may not necessarily imply sharing of resources within households, living arrangements of the elderly have been the main focuses of an important segment of the literature on intra-family support exchanges. One reason for that, suggest De Vos and Holden (1988), is because the sharing of physical space is highly related to sharing other things. Moreover, information on relationships among household members is becoming a standard item in population and housing Censuses, while more complete information on family members has been gathered only in surveys that are costly, dependent on sporadic funding, and that have not been systematically conducted.

Coresidence between elderly parents and adult children is still very common in Brazil. This phenomenon, however, is neither uniform over the different regions of the country nor regarding social-economic and demographic

characteristics of the elderly population. A comparison between frequencies of coresidence in the Southeast and Northeast regions shows significant pattern and trend variations over the period from 1980 to 1991.

According to the 1980 Brazilian Demographic Census, the proportions of individuals age 65 and older living with at least one child in 1980 were approximately 53.9% in the Northeast and 54.8% in the Southeast[7]. Although these overall figures look similar to each other, coresidence among married and males was significantly higher in the Northeast than in the Southeast, while coresidence among unmarried and females was significantly higher in the Southeast. For married elderly males, for instance, the proportions living with children were 64.0% in the Northeast and 58.4% in the Southeast, while for unmarried elderly female, the proportions were 58.5% in the Southeast and 49.6% in the Northeast (Table 8).

The fact that married elderly are more likely to live with a child in the Northeast than in the Southeast may be due primarily to demographic conditions rather than needs or preferences. Since fertility rates have been substantially higher in the Northeast than in the Southeast, the married elderly in the Northeast are more likely than in the Southeast to still have young, dependent children[8].

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[7] The way data were collected in the 1980 Census does not allow to calculate the exact proportion of elderly living with children. Details are discussed further in this section.

[8] In fact, the age structure of the co-resident children with married elderly in 1980 was significantly younger in the Northeast (56.9% under age 20, being 34.7% under age 15) than in the Southeast (38.7% under 20, being 17.5% under 15).

Table 8: Percent of elderly living with children according to marital status and sex, Southeast and Northeast regions, 1980 and 1991.

Sex	1980			1991		
	Northeast (1)	Southeast (2)	Gap (1) – (2)	Northeast (3)	Southeast (4)	Gap (3) – (4)
			Married Elderly			
Male	64.0	58.4	5.6	65.7	55.8	9.9
Female	49.4	45.3	4.1	51.4	46.3	5.1
Total	59.4	54.2	5.2	60.9	52.4	8.5
			Unmarried Elderly			
Male	42.2	46.1	-3.9	44.8	46.5	-1.7
Female	49.6	58.5	-8.9	53.6	56.5	-2.9
Total	47.8	55.5	-7.7	51.5	54.2	-2.7
			Total Elderly			
Male	58.7	55.1	3.6	61.6	53.5	7.6
Female	49.6	54.7	-5.1	52.8	53.1	-0.3
Total	53.9	54.8	-0.9	56.7	53.3	3.4

Sources: 1980 and 1991 Brazilian Demographic Censuses – IBGE.

On the other hand, it is intriguing that unmarried elderly are more likely to live with a child in the Southeast than in the Northeast. If we assume that unmarried elderly are more likely to be in need of support from their children than are the married elderly, and realize that a much higher proportion of elderly females than males are unmarried[9], one would have expected higher levels of coresidence with children among the unmarried elderly female in the Northeast rather than in the Southeast, given its poorer socio-economic conditions. This

[9] In 1980, about 68 percent of the elderly female in the Southeast and Northeast regions were unmarried, against about only 24 percent of the elderly male. In 1991, these percents slightly dropped to 65 percent among females and 23 percent among males.

important disadvantage of the Northeastern elderly regarding to the Southeastern, in terms of support received from their children through coresidence, would suggest the existence of determinants other than just the needs or preferences of the elderly relative to their living arrangements in the Northeast[10].

From 1980 to 1991, trends in elderly-children coresidence followed different paths in each region. While in the Northeast the proportion increased from 53.9% to 56.7%, in the Southeast the percent decreased from 54.8% to 53.3%. These overall changes in coresidence levels affected the different sex and marital status subgroups of elderly in very distinct ways according to each region. Among the married, the important difference in coresidence levels between regions already observed in 1980 became still greater in 1991 in the favor of the Northeastern elderly. Among the unmarried, on the contrary, the difference in the favor of the Southeastern elderly significantly decreased during the period. Taking the extreme cases, while the gap in co-residence levels in the favor of the Northeast increased almost 5 percent points during the 1980 decade in the case of married males – from 5.6 in 1980 to 9.9 in 1991 – in the case of the unmarried females the gap in the favor of the Southeast decreased 6 percent points – from 8.9 in 1980 to 2.9 in 1991 (Table 8).

If, on the one hand, the rise in coresidence levels among unmarried females in the Northeast suggests an important lowering in its disadvantage relative to the Southeast regarding support received from children, the increase in

[10] This could be associated with some sort of "threshold" effect. That is, below some poverty level, families simply cannot take in the elderly.

coresidence levels among married males, on the other hand, could suggest rather a strengthening of the relationship between coresidence and children's need of support. Are the elderly in the Northeast getting more support from their children through coresidence, or are the poor conditions of the children the leading force responsible for the increase in coresidence levels? What are the main reasons for these changes? Do the differences between regions remain after controlling for the effects of socio-economic and demographic characteristics of the elderly? These and other questions related to the patterns, trends and regional differences in the living arrangements of the elderly in the Northeast and Southeast regions of Brazil are investigated in this chapter.

Determinants of Living Arrangements

Multivariate analyses of the living arrangements of the elderly have emphasized benefits and costs associated with different arrangements (DaVanzo and Chan, 1994; Knodel et al. 1991; Martin, 1989), pointing out "the apparent interplay of constraints and preferences" (Casterline et al., 1991). Findings show that the propensity of a parent to live with a child seems to depend both on the need for co-residence of the parent and the position in the life course of the children.

A similar framework is used in this analysis. The living arrangement of an elderly individual is assumed to be the outcome of a series of decisions taken by a number of people over a considerable period of time, that is heavily influenced by factors such as changes in marital status, employment history, savings and investment, migration, housing, and health related behavior. At a given moment

in time, an individual is subject to various constraints with respect to the range of living arrangements available, she/he will have a set of preferences as to which arrangements are better than others, and these, in turn, will be juxtaposed with the constraints, resources, and preferences of the members of the elderly person's network of kin.

Preferences for different living arrangements result from the balance between costs and benefits of coresidence, and may be influenced by cultural norms and values. It is frequently contended that in emphasizing individualism in modern societies and family obligations in more traditional societies, cultural values, separate from economic and demographic structures, may influence both a preference for independent living arrangements in modern societies, and a preference for intergenerational coresidence in traditional societies.

Burr and Mutchler (1992) state that cultural norms regarding family roles and filial responsibility usually play a part in decisions regarding living alone, maintaining headship, and the move to an institution when necessary. Again, the issue is not just one of the preferences of the elderly individual or couple, but it also involves the preferences of the various available kin and all of the normative pressures to which they may be subject. Moreover, the relevant norms and/or preferences relate not only to whether an elderly person should live alone or with a child, but also to the sex, marital status, birth order, parity, and employment of the child she/he should live with.

The benefits of coresidence for both elderly parents and adult children may vary from companionship and emotional support, to physical and financial

support. Children may be able to provide goods and services to their elderly parents, which is especially important for those who are in poor health, who are older, or who are poor. Parents, on the other hand, may be able to provide help with child care or with other household services. Coresidence may also represent important savings on the housing costs. The housing market determines the cost of various living arrangements, and creates incentives for an individual to remain in or to move out of a particular living arrangement. By living together, elderly parents and adult children can share housing expenses, which is especially relevant when the costs are high or increasing, as is the case in many developing countries.

Among the costs usually associated with coresidence, one that is often emphasized in the literature is the loss of privacy for both the elderly and the other members of the household. Many studies, especially in the U.S., have found a positive relationship between economic resources and independent living, suggesting that, whenever feasible, elderly people prefer to purchase goods and services that otherwise coresiding children may provide. In other words, higher income would allow the elderly to "purchase privacy and independence." Another cost frequently associated with coresidence, from the stand point of the elderly, is the decline in social status after losing control of economic resources to their adult children (Martin, 1990). From the stand point of the other members of the family, on the other hand, the literature generally emphasizes the burden that physically or mentally impaired elderly would represent for coresiding caregivers – typically a daughter.

The primary constraint on the choice of living arrangements refers to the size and composition of one's kinship network. A consistent finding in the literature about the factors associated with different types of living arrangements among the elderly is that kin availability is a strong predictor of shared-living arrangements. Having more living children has been reported as increasing the probability of living with children instead of living alone in regions where coresidence with adult children is common, as in Asia (Chan and DaVanzo, 1991; Martin, 1989; Andrews et al., 1986; Casterline et al., 1991), and where coresidence is much less common, as in US (Easterlin et al., 1992). Although some argue that one child usually takes the role of primary caregiver (Horowitz, 1985), it seems reasonable to assume that the more adult children an aging parent has, the more support and assistance they can potentially obtain (Eggebeen, 1992).

Not only the kin size, but also the age and gender structure of the family may affect the elderly's household composition. The children's age is an important predictor of the direction of the parent-children resource flows, and hence affects their decisions of coresidence. Younger adult children, for instance, may be more likely to live in their parent's home because they are still in school, unmarried, or financially unable to set up independent households. In this case, coresidence would simply be part of the normal life course rather than strategy for old age support (Domingo and Casterline, 1992; Knodel, et al., 1992). In Brazil, as in most developing countries, children typically remain in their parent's home until they marry. As children become older and better established, however, their

aging parents may be more likely to coreside with them in order to get some sort of support.

Gender composition of the children may affect coresidence in many ways. Daughters, for instance, usually marry at younger ages than sons, thus leaving the parent's home sooner. Daughters also seem to be more likely than sons to return to the parent's home after a broken marriage. On the other hand, it may be more likely for an older parent (mothers in particular) to live with a married daughter than a married son, given the traditional role of the women as the older parent's caregiver.

A second set of factors that constrain living arrangements are those related to financial and physical feasibility. Much of the substantial literature on the living arrangements of the elderly in US has focused on the marked trend of couples and individuals to live on their own rather than with their children or other kin (Beresford and Rivlin, 1966; Michael et al., 1980; Lesthaeghe, 1983; Pampel, 1983; Mutchler and Burr, 1991; Kamarow, 1995). Explanations for that extend from the decline in fertility, that has lowered the number of available children with whom elderly people can reside, to the rising income levels that have enabled the elderly to "purchase" more privacy, passing through cultural changes such as the rise of individualism and the decline in family-centered values. In any case, some basic conditions are required for the elderly to live independently. Former research has shown that disability, illness, and advanced age are often associated with a reduced likelihood of living on one's own.

Feasibility is usually stated in terms of the ability of the elderly person or couple to live independently, but it also bears on the ability of kin to accommodate an elderly relative in their own household, or to live with an elderly parent or relative. That is to say that some adult children may not be well enough, or have enough time or financial resources to be able to invite a parent to live with them. Alternatively, lack of resources may well induce a child to remain in or to move into the household of their elderly parent(s).

Data and Methods

Data

The data used to explore the determinants of living arrangements of the elderly in the Northeast and Southeast regions were drawn from the 1980 and 1991 Brazilian Demographic Censuses. For the 1980 Census, IBGE (Brazilian Institute of Geography and Statistics) – the Institution responsible for Brazilian Censuses – used a 25 percent sample to obtain the more detailed and disaggregated socioeconomic information. Due to the impossibility of most users in assuming the operational costs of a sample this large, IBGE elaborated and made available for public use two sub-samples from the 25 percent sample: one including about 3 percent of the Census universe, and the other especially designed for analyses at more aggregated geographic levels including about 0.8 percent of the universe. The latter sub-sample was used in this study.

Two levels of stratification were defined for the 0.8 percent sub-sample. The first was a geographic stratification, constituting the *natural stratification* of the sample design. The second was the *final stratification*, taking into account

characteristics of the household such as urban/rural situation, size, type and condition of occupation, and the age groups of the head of household. The natural stratification included only 35 selection areas, constituted by the 9 metropolitan regions, 9 complements for the states in which the metropolitan regions were located, and the 17 remaining states. Since this sample was originally designed to allow for analyses at the state and metropolitan area levels, the size, selection and expansion were made independently for each natural stratum. Therefore, the population size of a given region (constituted by a set of states) reflects the number of states in that particular region rather than its population size relative to other regions. Because the number of states in the Northeast region is twice as large as in the Southeast, the Northeast's sample size is greater than the Southeast's, although the elderly population in the Southeast was significantly greater than in the Northeast.

In the case of the 1991 Census, the smallest sample available for public use is the 10 percent. Given the limitations imposed by the available computation resources to deal with a sample of this size, a randomized 8 percent sub-sample was drawn from the 10 percent sample, resulting in a sample with about 0.8 percent of the Census universe. This procedure is expected to have no important impact on the final results, since the method of analysis employed does not require large samples. Moreover, a comparative analysis between the sample and the sub-sample showed extremely similar distributions[11]. In contrast to the 1980 sample, the Southeastern elderly population in the 1991 sample is larger than the

[11] The differences never surpassed 0.4 percent points.

Northeastern, since the size of each region relative to the country total was the same in the sample as it was in the original population.

Method

A multivariate analysis was performed in order to determine the influence of selected covariates on the living arrangements of the elderly – particularly with respect to the levels of co-residence with adult children – and to explore variations in trends and patterns of the elderly's living arrangements across the Northeast and Southeast regions, and over the 1980 decade. The analysis used the multinomial logit specification for the probability distribution across possible households (Retherford and Choe, 1993; Demaris, 1992). Thus, given the K_i possible household structures that an older individual faces, the probability that he will be observed in the k^{th} such household is expressed by:

$$P(Y_i = k) = \exp(\sum_{j=0}^{J} X_{ij}\beta_{jk}) \; / \; \sum_{m=1}^{K} \exp(\sum_{j=0}^{J} X_{ij}\beta_{jm})$$

where X_i is the column vector of the J covariates that describe the i^{th} elderly individual, and β_k is the line vector of the coefficients associated to the J covariates for the k^{th} household structure. As in logistic regression with a binary response, the β_k parameters are estimated by maximizing the likelihood function for the sample responses on the dependent variable[12]. In the case of multinomial logistic regression, this function expresses the conditional distribution on the living arrangements, given the predictor set, in terms of the parameters in the k-1 equations.

[12] A discussion about logistic regression with binary response can be found in Chapter 3.

The estimated coefficient of a specific variable in the logistic regression measures the increase on the logit P resulting from a one-unit increase in this particular variable, controlling for the others. In other words, it provides an estimate of the log odds of each variable adjusting for all other variables included in the model. Since all variables in this study were transformed into dummy variables, their coefficients represent the increment to the logit associated with each category of a specific categorical variable relative to the reference category for that variable[13].

Because considerable variation in living arrangements existed with regard to marital status, separate analyses were performed for married and unmarried elderly[14] whenever it was possible. As Table 9 shows, most of the elderly in the Northeast and Southeast were still married in 1980 and 1991, although a significant proportion of them were already widowed. Only a small proportion were divorced or never married. Differences in marital status, however, were great between sexes. While about three fourths of the elderly males in both regions were still married, only one third of the elderly females were married. The

[13] See more about the interpretation of dummy variables in logistic regression in Chapter 3.

[14] The separate analysis according to the marital status is especially important in studies where the primary focus is on intergenerational support flows. Considerable research on the elderly has focused on the link between both marital status – especially widowhood – and support offered and/or received, under the assumption that this feature is a critical dimension when considering determinants of well-being. As it will be seen in the next chapter, widowed parents are generally reported as receiving more assistance than giving to their children, while married parents are reported as giving more than receiving assistance. Consistent with these findings, Potter et al. (1995), in a recent study of living arrangements of the elderly in urban Mexico, suggest that unmarried parents are most benefited from coresidence with adult children, while children are most benefited from coresidence with their married elderly parents.

proportion of widows among females, on the contrary, was almost four times greater than the proportion of widowers among males.

Table 9: Distribution of elderly according to marital status and sex, Southeast and Northeast regions, 1980 and 1991.

Marital Status		Northeast (%)		Southeast (%)	
		1980	1991	1980	1991
Total					
	Married	52.9	55.8	49.7	51.7
	Widow	31.6	29.7	38.1	34.9
	Single	9.0	7.6	7.0	7.9
	Divorced	3.8	6.9	3.0	5.5
	Not declared	2.7	---	2.2	---
	Total	100.0	100.0	100.0	100.0
Male					
	Married	75.8	78.0	72.8	74.6
	Widow	13.8	12.7	16.9	14.6
	Single	5.1	4.6	6.1	6.1
	Divorced	3.1	4.7	2.9	4.7
	Not declared	2.2	---	1.3	---
	Total	100.0	100.0	100.0	100.0
Female					
	Married	31.8	35.7	29.2	32.9
	Widow	47.8	45.2	56.7	51.3
	Single	12.5	10.2	8.1	9.4
	Divorced	4.5	8.9	3.1	6.4
	Not declared	3.8	---	2.9	---
	Total	100.0	100.0	100.0	100.0

Sources: 1980 and 1991 Brazilian Demographic Censuses – IBGE.

In addition to the separate analysis for married and unmarried elderly, a separate analysis was performed for unmarried elderly females with living children. This subgroup deserved special treatment because data about the number of living children, a variable consistently reported as influential on the living arrangements of the elderly, are gathered exclusively for women in Brazilian censuses. Moreover, as noted elsewhere in this study, unmarried females usually constitute the elderly subgroup with most tangible needs, in particular of financial support. The reason for considering only the unmarried women with living children, on the other hand, is because the main focus of the study is exactly on the elderly-children co-residence dimension[15].

The first step of the analysis, for both married and unmarried elderly, was to fit separate models for each region and period, in order to determine the net effects of each covariate on the elderly's living arrangement structure, giving special attention for regional variations of these effects over time. The second step was to fit separate models for each region, in which data from both periods – 1980 and 1991 – were pooled together. In this case, an additional covariate representing the reference year was included in the model, in order to check for variations in coresidence levels occurring in each region over the 1980s, net of the effects of selected socioeconomic and demographic factors.

The third step was to fit separate models for each period, in which data from both regions were pooled together. These models included an additional covariate representing the region – Northeast or Southeast – in order to check for

[15] Of the total female sample, 53 % were unmarried with living children.

regional differences in co-residence levels for each period, net of the effects of selected socioeconomic and demographic factors. Finally, a series of models were fit exclusively for unmarried females with living children, in order to check for regional differences in co-residence levels among this particular subgroup over time, and to determine the net effects of selected covariates on these levels, in particular the effect of kin availability on the probability of co-residence with adult children.

The statistical software used to fit the multinomial logistic regressions was STATA. The procedure used was m-logit. Tests were performed in the modeling process to check for interactions between predictor variables, and those that were significant were included in each model. The goodness-fit global tests were significant for the entire set of regressions[16].

The response variable

The household structure of the elderly was inferred from a question concerning the relationship of each individual member to the head of the household. Given the myriad of possible combinations among household cohabitants, it was necessary to restrict, for analytical purposes, the set of household composition outcomes. Typical indicators of household arrangements among the elderly are headship rate, relationship with the household head, co-residence with children, and family household type (De Vos & Holden, 1988).

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[16] The test is a model chi-squared statistic equal to –2LogL, where L is the likelihood function. The null hypothesis is that all J(k-1) parameters included in the K-1 logit equations are simultaneously equal to zero. The alternative hypothesis is that at least one of these parameters is non-zero.

The typology of living arrangements used in this analysis emphasizes co-residence with children. It distinguishes between elderly who: a) lived alone, b) lived only with their spouse, c) lived with a married child, d) lived with an unmarried child (but not with a married child), and e) lived with other relatives or nonrelatives. This categorization follows a scheme devised by Shanas et al. (1968)[17], that has been widely used in the gerontological literature (see examples in DeVos & Holden, 1988).

As expected, practically all elderly living alone were declared to be unmarried, and all living with a spouse were declared to be married. Consequently, the outcome "living alone" was excluded from the 'married' models, as well as the outcome "living with spouse only" was excluded from the 'unmarried' models. For the 'married' models, the reference category of the response variable was "living with spouse only," against which all other categories were compared. For the 'unmarried' models, on the other hand, the reference category was "living alone." Since information on living children is not available for males in Brazilian Censuses, as noted before, only the 'female' models included the number of living children as an explanatory variable.

An important feature of this classification is its focus on a relationship that does not need to be tied to the headship designation, but only to the presence or absence of a child of the elderly individual in the household. It eliminates the problem of uniformity and ambiguousness in identifying the household head

[17] Shanas et al. Identified five categories: lives alone (or with spouse only, if married), lives with married child, lives with unmarried child, lives with relative, and other. In this study, the last two categories were merged.

(Armstrong, 1978), associated with any scheme relying on headship for comparative analysis.

This scheme, however, entails some operational, methodological, and conceptual limitations. A first operational limitation refers to the presence of a servant and/or his or her dependent in the household. This situation should not be used as a basis for moving a person from the first or second categories to the last one; but it may have occurred in this study. These cases, however, are assumed to be of little significance. Only about 6 percent of the "others" living with an elderly classified as 'living with other' were servants or their dependents in both the 1980 and 1991 samples.

A second operational limitation refers to the classification of the categories 'living with (married or unmarried) children'. This classification is straightforward only when the elderly individual is classified - regarding to the head of the household - as the head him/herself or the spouse. In the cases where the elderly were classified as a child, other relative, aggregate, lodger, servant, or servant's dependent (7.3% and 5.9% in the Northeast, and 6.8% and 5.8% in the Southeast, respectively for 1980 and 1991), it was impossible to find if they were or were not living with their own children. In these cases, the elderly were classified as 'living with other' under the risk of misclassifying some of them that, indeed, were living with a child[18].

[18] This error is expected to have little significance. First, because the cases in which the elderly were not classified as head, spouse, parent, or parent-in-law are rare. Second, because in most of these cases the elderly were single, what decreases their chances of having children.

On the other hand, because the variable 'relationship with the head' did not distinguish between parent and parent-in-law in the 1980 Census, then it is possible that some elderly in 1980 were misclassified as living with children when, indeed, they were actually living only with their son/daughter-in-law. Finally, there may be also a few cases of elderly "spouses" classified as living with children that, indeed, were living with their spouse's (the head of the household) children, but not with children of their own.

The methodological limitation refers to the lack of information about living children for elderly males, what makes it impossible to identify those with no surviving children. Therefore, a positive probability of co-residence with children may have been assigned to elderly with no surviving children in many models. Even for females, for whom the information on living children was available, the lack of information on the marital status of their children also imposes a limitation on this kind of analysis. In this case, for example, a positive probability of living with a married child may have been assigned to elderly women without any married children. This limitation, however, is generally intrinsic to the studies of living arrangements using secondary data sources, since data on the actual availability of kin and the structure of the extended family network are usually available only in special household surveys of the elderly.

Finally, the proposed scheme has two other limitations that could be classified as conceptual. The first is that, as the parent-child relationship has precedence in the hierarchical classification of living arrangements, elderly persons classified as living with their children may also have other relatives or

non-relatives in the household. As a consequence, important characteristics of the household structure as, for instance, the presence of a grandchild, are missed in this scheme. An alternative scheme would be to distinguish the elderly's households according to the number of co-resident generations - in particular, elderly parents, adult children, and grandchildren (Ramos, 1987). The 1980 Census, however, did not discriminate grandchild from other relatives, making it impossible even to consider using this alternative classification.

The second limitation refers to the heterogeneity the category 'unmarried child' could entail. He/she could be, for instance, a never-married young child who always lived with his/her parent(s), and who probably will leave the parent's home in the near future; or he/she could be a never-married child who is delaying marriage in order to take care of his/her parent(s); or he/she could be a divorced/widowed child returning to parent's home, sometimes with his/her own children.

An alternative scheme proposed by De Vos and Holden (1988), distinguishes between the elderly who share a household with their own never-married children and those who share a household with their own currently married or formerly married children. The author labels the first living arrangement "simple" and the second "complex". This classification, however, may not be appropriate for analysis concerned with the direction of support flow between co-resident generations. It is reasonable to assume that formerly and never-married children are both more likely to receive and less likely to give support for a co-resident elderly parent than are currently married children.

Therefore, It seemed more appropriate to distinguish between married children and unmarried children in general. In any case, the huge majority (around 90%) of the unmarried children living with elderly parents in both the 1980 and 1991 samples were never-married[19].

The explanatory variables

An ideal set of covariates should include variables capable of measuring preferences and constraints vis-a-vis household structure. Unfortunately, due to the lack of information in Census data concerning the characteristics of the elderly's kin, the health status of the elderly, objective measures on housing markets, and subjective elements involved in the process of decision-making on living arrangements, the analysis is restricted to the influence of a limited number of demographic and social-economic covariates.

The demographic covariates include: a) Sex (male/female), b) age, c) urban/rural residence and d) number of living children. The social-economic covariates include: e) years of schooling, f) income, g) household ownership (owned/not owned by a member of the household); and h) working status (work/not work). Three other variables were included in the models fit

[19] Important differences in marital status, age structure, and gender of the unmarried co-resident children existed according to the marital status of the elderly parent and the region of residence. In the case of the married elderly, 96% of the unmarried co-resident children were never married, against 81% in the case of unmarried elderly. Unmarried children co-residents with married elderly were much younger than those co-resident with unmarried elderly (49% under age 20 for the married, against 12% for the unmarried). The age structure of the unmarried co-resident children in the Northeast was significantly younger than in the Southeast for both married and unmarried elderly, and the proportion of males among the children was higher in the Southeast than in the Northeast.

exclusively for the 1991 sample: i) physical impairment (have/not have at least one); j) residence in metropolitan region (yes/no); and k) time of residence in the municipality (less/more than 20 years).

All these variables were originally categorical or were transformed into categorical variables. Then, each of their categories were transformed into dummy variables to be included in the multivariate analysis. The variable age was sorted into three categories: 65 to 69 years old; 70 to 74; and 75 years and older. The number of living children was grouped into four categories: none; 1 to 2; 3 to 5; and 6 and more. The years of schooling were classified into three categories: none; less than 4; and 5 or more. Personal income was subdivided into five categories: none; less or equal one-half of minimum wage; between one-half and 1 minimum wage, between 1 and 2 minimum wages; and more than 2 minimum wages[20].

Age in this analysis could be thought as a proxy for the elderly's health. Physical impairment, although more directly related with health status should also be taken as another proxy, since it represents only a small dimension of the broad spectrum of elderly's health conditions. The number of living children is taken as an indicator of kin availability, while urban/rural and metropolitan/non-metropolitan residence is intended to indicate higher or lower levels of contact with more "modern" life-styles. Finally, while education and income are more directly associated with the social-economic status of the elderly, house

[20] See Table 14 for a detailed description of the predictor variables included into the models.

ownership and working status would relate more properly to dependency levels of the elderly, both physical and financial.

Some limitations of these variables are worth mentioning. First, as already noted, data on the number of living children are not available for males, which handicaps comparisons between sexes in terms of kin availability. Moreover, not only size, but also the composition of the kin network matters as a determinant of parent-child coresidence (Aquilino, 1990; Wolf and Soldo, 1988). An ideal model should recognize each surviving child as a distinct opportunity for a shared living arrangement, taking into consideration that the probability of living with a specific child is related not only to the attributes of that child, but also to the attributes of that child relative to other surviving children within the family (Wolf and Soldo, 1988).

Second, although the prevalence of some kind of diseases and physical impairments increases considerably at the very old ages, the relationship between age and health status of the elderly is far from being a linear one. Finally, regarding income, it is difficult to depict the meaning of "no income" for married women, since they usually declare themselves to be dependent on their spouses, regardless of social-economic status.

Results

Description of the Samples

The distributions of persons aged 65 and over enumerated in the 1980 and the 1991 Brazilian Demographic Censuses are shown in Tables 10 to 13, distinguishing between sex, marital status, and region of residence. It can be

noticed, in the first place, that the Southeast sample is slightly more female than is the Northeast sample for both periods. Most of the elderly for both regions in both periods were still married. Among the unmarried, the widowed were the great majority. Important variations, however, can be observed from 1980 to 1991 in the marital status distribution of the elderly: while the proportion widowed decreased, a relative increase occurred for married and divorced.

Elderly in the Northeast are, in general, older than in the Southeast. In both regions, unmarried elderly are significantly older than married and, among the married, males are significantly older than females, reflecting the tendency of males to have younger spouses. Among the unmarried elderly, however, males are slightly older in the Northeast, but slightly younger in the Southeast.

Although urban residence levels increased from 1980 to 1991 in both regions, the proportion of elderly living in urban areas still remains much greater in the Southeast than in the Northeast. Also regarding urban residence, there is an important sex differential observed among the unmarried: while the proportions male and female are practically the same among the married elderly, a significantly greater proportion of females than males is observed among the unmarried. It could be reflecting a situation in which elderly females, unlike males, used to move from rural to urban areas (probably to live with a child who had already left the countryside) after widowing. The same pattern found for urban/rural residence is observed for metropolitan/non-metropolitan residence in the 1991 sample. Proportions living in metropolitan areas are greater in the

Southeast than in the Northeast, and among females more than males in the particular case of the unmarried.

Table 10: Distribution of elderly by select variables according to marital status and sex, Northeast, 1980.

Variables	Total	Married		Unmarried	
		Male	Female	Male	Female
Sample size	14,817	5,336	2,479	1,691	5,311
(%)	(100.0)	(36.0)	(16.7)	(11.4)	(35.9)
Living Arrangement					
Alone	11.57	--	--	35.84	20.88
Spouse only	13.73	23.20	32.15	--	--
Unmarried child	42.61	58.45	43.24	26.79	31.43
Married child	11.30	5.51	6.17	15.43	18.19
Other	20.79	12.84	18.43	21.94	29.50
Total	100.00	100.00	100.00	100.00	100.00
Age (years)					
65-69	41.28	45.18	54.46	32.70	33.93
70-74	28.38	28.97	28.40	26.73	28.30
75 and more	30.34	25.84	17.14	40.57	37.77
Total	100.00	100.00	100.00	100.00	100.00
Residence					
Urban	53.77	49.29	49.13	46.66	62.70
Rural	46.23	50.71	50.87	53.34	37.30
Total	100.00	100.00	100.00	100.00	100.00
Working status					
Not working	19.67	39.06	4.11	23.30	6.29

Currently working	80.33	60.94	95.89	76.70	93.71
Total	100.00	100.00	100.00	100.00	100.00
Household ownership					
Not owned house	22.63	20.54	19.24	27.14	24.87
Lives in owned house	77.37	79.46	80.76	72.86	75.13
Total	100.00	100.00	100.00	100.00	100.00

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(continuation Table 10)

Years of schooling					
None	75.50	72.37	77.52	79.60	76.38
Less than 1 until 4	20.90	23.28	19.53	17.80	20.15
5 and more	3.60	4.35	2.95	2.60	3.47
Total	100.00	100.00	100.00	100.00	100.00
Income (minimum wages)					
None	18.24	2.16	70.06	5.17	14.27
Until _	46.99	40.94	23.19	54.39	62.01
_ to 1	20.03	29.24	4.65	25.00	16.35
1 to 2	7.87	14.83	0.69	9.80	3.59
More than two	6.87	12.83	1.41	5.64	3.78
Total	100.00	100.00	100.00	100.00	100.00
Living children					
None	21.04		13.47		24.57
1 or 2	17.10		15.49		17.85
3 to 5	25.67		25.94		25.55
6 and more	31.03		42.48		25.68
Not declared	5.16		2.62		6.35
Total	100.00		100.00		100.00

Source: 1980 Brazilian Demographic Census – IBGE.

Table 11: Distribution of elderly by select variables according to marital status and sex, Southeast, 1980.

Variables	Total	Married		Unmarried	
		Male	Female	Male	Female
Sample size	7,888	2,623	1,250	964	3,051
(%)	(100.0)	(33.3)	(15.8)	(12.2)	(38.7)
Living Arrangement					
Alone	11.65	--	--	32.05	19.99
Spouse only	16.82	31.26	40.56	--	--
Unmarried child	38.67	51.01	36.72	23.55	33.63
Married child	16.18	7.36	8.56	22.51	24.88
Other	16.68	10.37	14.16	21.89	21.50
Total	100.00	100.00	100.00	100.00	100.00
Age (years)					
65-69	42.33	48.46	56.40	33.30	34.15
70-74	27.84	27.72	27.76	29.67	27.40
75 and more	29.83	23.83	15.84	37.03	38.45
Total	100.00	100.00	100.00	100.00	100.00
Residence					
Urban	79.23	76.59	76.96	71.68	84.82
Rural	20.77	23.41	23.04	28.32	15.18
Total	100.00	100.00	100.00	100.00	100.00
Working status					
Not working	85.50	69.00	97.52	81.33	96.07
Currently working	14.50	31.00	2.48	18.67	3.93
Total	100.00	100.00	100.00	100.00	100.00

Household ownership					
Not owned house	33.25	29.51	28.08	40.66	36.25
Lives in owned house	66.75	70.49	71.92	59.34	63.75
Total	100.00	100.00	100.00	100.00	100.00

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Years of schooling					
None	49.12	40.31	50.60	53.73	54.62
Less than 1 until 4	39.74	45.92	38.51	37.76	35.57
5 and more	11.14	13.78	10.89	8.51	9.80
Total	100.00	100.00	100.00	100.00	100.00
Income (minimum wages)					
None	20.13	1.95	71.93	7.09	18.59
Until _	24.42	18.51	13.79	32.12	31.51
_ to 1	21.74	21.80	7.78	26.49	25.98
1 to 2	12.84	20.08	2.81	14.81	10.09
More than two	20.86	37.66	3.69	19.50	13.82
Total	100.00	100.00	100.00	100.00	100.00
Living children					
None	16.14		11.36		18.09
1 or 2	21.32		23.36		20.49
3 to 5	30.16		30.24		30.12
6 and more	29.44		33.52		27.76
Not declared	2.95		1.52		3.54
Total	100.00		100.00		100.00

Source: 1980 Brazilian Demographic Census – IBGE.

Table 12: Distribution of elderly by select variables according to marital status and sex, Northeast, 1991.

Variables	Total	Married		Unmarried	
		Male	Female	Male	Female
Sample size	20,286	7,508	3,805	2,120	6,853
(%)	(100.0)	(37.0)	(18.8)	(10.4)	(33.8)
Living Arrangement					
Alone	9.96	--	--	32.31	19.50
Spouse only	13.68	21.39	30.75	--	--
Unmarried child	45.28	61.97	44.97	25.42	33.30
Married child	11.45	3.68	6.47	19.39	20.28
Other	19.62	12.96	17.82	22.88	26.92
Total	100.00	100.00	100.00	100.00	100.00
Age (years)					
65-69	37.09	40.62	49.62	25.99	29.71
70-74	26.91	28.41	28.70	25.24	24.79
75 and more	36.00	30.98	21.68	48.77	45.50
Total	100.00	100.00	100.00	100.00	100.00
Residence 1					
Urban	56.69	52.43	52.12	51.46	65.52
Rural	43.31	47.57	47.88	48.54	34.48
Total	100.00	100.00	100.00	100.00	100.00
Working status					
Not working	80.07	59.46	94.74	78.58	94.97
Currently working	19.93	40.54	5.26	21.42	5.03
Total	100.00	100.00	100.00	100.00	100.00
Household ownership					
Not owned house	15.54	14.40	12.00	21.94	16.82
Lives in owned house	84.46	85.60	88.00	78.06	83.18
Total	100.00	100.00	100.00	100.00	100.00
Years of schooling					
None	71.48	69.30	72.38	76.83	71.71
Less than 1 until 4	24.02	26.05	23.92	19.82	23.16

5 and more	4.50	4.65	3.71	3.35	5.14
Total	100.00	100.00	100.00	100.00	100.00

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Income (minimum wages)					
None	11.19	1.34	42.68	2.95	6.66
Until _	33.81	27.58	27.55	37.24	42.89
_ to 1	35.93	39.76	24.78	41.69	36.30
1 to 2	11.64	18.28	3.54	11.86	9.01
More than two	7.42	13.03	1.45	6.25	5.12
Total	100.00	100.00	100.00	100.00	100.00
Living children					
None	14.18		7.25		18.02
1 or 2	16.55		14.90		17.47
3 to 5	25.00		26.12		24.37
6 and more	32.37		41.00		27.58
Not declared	11.91		10.72		12.56
Total	100.00		100.00		100.00
Physical impairment					
None	94.96	95.59	97.58	91.56	93.87
At least one	5.04	4.41	2.42	8.44	6.13
Total	100.00	100.00	100.00	100.00	100.00
Residence 2					
Metropolitan area	12.03	10.01	9.33	10.66	16.17
Non-metropolitan	87.97	89.99	90.67	89.34	83.83
Total	100.00	100.00	100.00	100.00	100.00
Time of residence					
Less than 20 years	18.12	18.11	15.95	19.25	18.97
20 years and more	81.88	81.89	84.05	80.75	81.03
Total	100.00	100.00	100.00	100.00	100.00

Source: 1991 Brazilian Demographic Census – IBGE.

Table 13: Distribution of elderly by select variables according to marital status and sex, Southeast, 1991.

Variables	Total	Married		Unmarried	
		Male	Female	Male	Female
Sample size	28,607	9,551	5,234	3,128	10,694
(%)	(100.0)	(33.4)	(18.3)	(10.9)	(37.4)
Living Arrangement					
Alone	11.95	--	--	31.43	22.78
Spouse only	20.11	35.87	44.48	--	--
Unmarried child	39.25	50.69	39.03	25.10	33.28
Married child	14.05	5.12	7.22	21.42	23.21
Other	14.64	8.32	9.27	22.06	20.73
Total	100.00	100.00	100.00	100.00	100.00
Age (years)					
65-69	39.83	45.28	52.50	32.45	30.91
70-74	26.97	28.01	28.60	24.62	25.92
75 and more	33.21	26.71	18.90	42.93	43.16
Total	100.00	100.00	100.00	100.00	100.00
Residence 1					
Urban	85.84	83.46	84.62	80.02	90.26
Rural	14.16	16.54	15.38	19.98	9.74
Total	100.00	100.00	100.00	100.00	100.00
Working status					
Not working	86.44	72.60	96.33	81.23	95.47
Currently working	13.56	27.40	3.67	18.77	4.53
Total	100.00	100.00	100.00	100.00	100.00
Household ownership					
Not owned house	22.26	19.99	19.87	25.27	24.67
Lives in owned house	77.74	80.01	80.13	74.73	75.33
Total	100.00	100.00	100.00	100.00	100.00

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Years of schooling					
None	40.12	32.06	41.35	42.26	46.10
Less than 1 until 4	44.69	49.53	44.08	44.69	40.66
5 and more	15.19	18.41	14.58	13.04	13.24
Total	100.00	100.00	100.00	100.00	100.00
Income (minimum wages)					
None	16.25	1.71	60.84	5.38	10.37
Until _	23.09	16.89	14.55	27.86	31.38
_ to 1	20.83	20.97	11.44	25.85	23.86
1 to 2	17.63	22.93	6.96	18.33	18.10
More than two	22.16	37.50	6.21	22.58	16.30
Total	100.00	100.00	100.00	100.00	100.00
Living children					
None	13.67		8.25		16.32
1 or 2	23.64		24.88		23.03
3 to 5	28.77		31.49		27.45
6 and more	23.86		26.96		22.34
Not declared	10.06		8.46		10.87
Total	100.00		100.00		100.00
Physical impairment					
None	95.47	96.02	97.50	91.98	95.00
At least one	4.53	3.98	2.50	8.02	5.00
Total	100.00	100.00	100.00	100.00	100.00
Residence 2					
Metropolitan area	40.55	38.36	39.09	34.88	44.87
Non-metropolitan	59.45	61.64	60.91	65.12	55.13
Total	100.00	100.00	100.00	100.00	100.00
Time of residence					
Less than 20 years	18.72	18.54	17.10	21.07	18.99
20 years and more	81.28	81.46	82.90	78.93	81.01
Total	100.00	100.00	100.00	100.00	100.00

Source: 1991 Brazilian Demographic Census – IBGE.

Substantial differences between sexes, marital statuses, and regions exist with respect to income. Elderly females, in general, receive lower income than males as well as unmarried elderly compared to the married. Elderly females are more likely than males to not have any income at all, specially among the married, who often declare themselves dependent exclusively on their husband's income. Although a higher proportion of elderly in the Southeast has no income, especially in the case of unmarried females, a higher proportion in the Northeast is concentrated in the lowest category of income. However, a generalized growth in income levels has been detected over the period 1980-91 that apparently decreased the income gap between sexes and regions, since it was mostly concentrated in the Northeast and among the women[21].

Regarding the number of living children, the results point toward inaccuracies in data quality that could impose limitations on the comparative analysis of the effects of kin availability. First, the proportion of missing values in the 1991 sample is much higher when compared with the 1980 sample, suggesting some kind of data collection problem in 1991 for this question. Second, the high proportion of Northeastern unmarried females (about 25%) reporting not having any living children in 1980 could indicate underreporting for this particular sample.

[21] This increase in income levels (measured in terms of minimum wages) do not necessarily means an improvement in life conditions of the elderly. An assessment of the changes in purchasing power of the minimum wage during the period would be necessary in order to drawn such a conclusion.

Taking those limitations into consideration, which would lead one to avoid comparative analysis of frequencies over time as well as between regions in the case of unmarried elderly females, the data show high numbers of living children in general, but especially among married women, as a reflection of the extremely high fertility rates prevailing in the past. Taking the particular case of married elderly females, to whom between region analysis of frequencies seems to be suitable, the almost 50% higher proportion with 6 or more living children in the Northeast clearly reflects the higher fertility rates of that region compared with the Southeast.

In terms of schooling, the differences between regions are astonishing. Proportions of elderly without formal education are almost twice as high in the Northeast as in the Southeast, while proportions with more than 4 years of schooling in the Southeast are three times higher than in the Northeast. Although a generalized improvement in education levels occurred over the period 1980-1991, it was more intense in the Southeast than in the Northeast, widening the education gap of the elderly population between the two regions. In the Southeast, schooling is clearly higher among married as compared to unmarried, and among males than females. Sex and marital status differences in schooling among the elderly in the Northeast are not as clear.

Many more elderly men than women were working in both periods, in both regions and regardless of marital status. Labor force participation, in general, was higher among the married than the unmarried, and in the Northeast than in the Southeast, especially in the case of the unmarried elderly. Also, higher

proportions of elderly living in owned-houses[22] can be found among the married and in the Northeast. These proportions showed an increase over the period of analysis, particularly in the case of the Southeast. Regarding migration movements of the elderly, the proportions in the 1991 sample living for less than 20 years in the municipality of residence were quite similar, regardless of the region, marital status or gender of the elderly. These same similarities are well-founded in the case of incidence of physical impairments, although in this particular case, a slightly higher proportion can be seen among the unmarried as compared to the married elderly.

Finally, regarding living arrangements, males are, in general, more likely than females to live with an unmarried child or with spouse only, while females are more likely to live alone, with a married child, or with other relatives or non-relatives. For both sexes, living with an unmarried child is more likely among married than unmarried, while living with a married child is more likely among the unmarried. For both periods, elderly in the Northeast are more likely than in the Southeast to live with unmarried children and with other relatives or non-relatives, while elderly in the Southeast are more likely than those in the Northeast to live with spouse only and with married children. The proportion living alone, that was quite similar in 1980 for both regions, became higher in the Southeast in 1991. As previously noted, co-residence with children, in general, is

[22] Note that this variable do not indicate that the house necessarily is owned by the elderly. It means that the house is owned by any member of the household.

higher in the Northeast among male and married elderly, and higher in the Southeast among female and unmarried elderly.

Effects of the Covariates on the Living Arrangements of the Elderly

The selected demographic and social-economic covariates proved to be, in general, important predictors of the living arrangements of the elderly. The net effect of each one of them is discussed below:

Age

The effects of age on the living arrangements of the elderly were similar in the Southeast and Northeast. In both regions, the higher the age of the elderly, the lower the probability of co-residence with unmarried children among married elderly, and the greater the probability of co-residence with married children among the unmarried elderly (Tables 15 to 18). The strong negative relationship between age and the probability of living with an unmarried child instead of with spouse only for married elderly, reinforces the idea that co-residence with an unmarried child would be related more properly with an earlier stage of the normal life cycle, rather than to needs or preferences.

In the case of unmarried elderly, on the other hand, the effect of age, taken as a proxy for health conditions, would be more properly related with needs and preferences. If we assume that the older the elderly (and, consequently, the poorer their health conditions) the greater their need for co-residence, and take into account that the availability of unmarried children decreases sharply with the age of the elderly, the strong positive relation between age and co-residence between

unmarried elderly and married children could be understood as a strategy for dealing with the elderly's needs.

Table 14: Definitions of variables used in the models of living arrangements of the elderly.

Variable	Definition
FEMALE	Coded 1 if respondent is a woman
AGE_2	Coded 1 if respondent is in the age group 70-74 years old
AGE_3	Coded 1 if respondent is in the age group 75 and more
RURAL	Coded 1 if respondent lives in rural area
MET	Coded 1 if respondent lives in metropolitan area
MIG20	Coded 1 if respondent lives in town for less than 20 years
NCHILD_2	Coded 1 if number of living children is 3 to 5
NCHILD_3	Coded 1 if number of living children is 6 and more
OHOUSE	Coded 1 if respondent lives in an owned house (by any member of the household)
WORK	Coded 1 if respondent is currently working
INCOM_1	Coded 1 if respondent has no income
INCOM_3	Coded 1 if respondent has income between _ and 1 minimum wage
INCOM_4	Coded 1 if respondent has income between 1 and 2 minimum wages
INCOM_5	Coded 1 if respondent has income greater than 2 minimum wages
EDU_1	Coded 1 if respondent had no formal education
EDU_3	Coded 1 if respondent has 5 or more years of schooling
HANDICAP	Coded 1 if respondent declared having any physical impairment
NE	Coded 1 if respondent lives in the Northeast
YEAR91	Coded 1 if respondent belongs to the 1991 sample

Table 15: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, Northeast, 1980.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.286***	-0.294*	0.012	-0.083	0.097	0.079
AGE_3	-0.653***	-0.095	0.024	0.044	0.337***	0.084
FEMALE	-0.627***	-0.078	0.106	0.600***	0.336***	0.793***
RURAL	-0.221***	-0.481***	0.018	-0.165*	-0.378***	-0.190*
WORK	0.266**	0.125	0.333**	-0.259*	-0.871***	-0.166
OHOUSE	-0.015	0.320*	0.106	0.388***	0.451***	0.512***
INCOM_1	0.604*	1.265***	-0.647	-1.032*	-0.012	1.010**
INCOM_3	0.167*	-0.012	-0.189	0.166	-0.132	0.022
INCOM_4	0.351**	-0.032	-0.156	0.816***	0.237	0.282
INCOM_5	0.514***	0.438	0.452*	0.750***	0.267	0.428*
EDU_1	-0.413***	-0.446**	-0.380***	-0.158	-0.127	-0.258**
EDU_3	0.093	-0.043	0.215	-0.044	-0.255	0.549*
FEMALE*INCOM_1	-0.345	-1.307**	0.673	1.651**	1.250**	-0.442
OHOUSE*INCOM_1				0.916**	0.897**	1.051***
INTERCEPT	1.358***	-1.134***	-0.495**	-0.440**	-0.886***	-0.751***

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'; and for education is 'less than 5 years of schooling'. See Table 14 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 16: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, Southeast, 1980.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.146	0.188	0.109	-0.206	0.057	-0.086
AGE_3	-0.420***	-0.088	0.151	0.021	0.350**	0.042
FEMALE	-0.830***	-0.771**	0.372*	0.567***	0.119	0.321**
RURAL	-0.176	-0.066	-0.035	-0.173	-0.068	0.019
WORK	0.539***	-0.034	0.271	-0.162	-1.159***	-0.108
OHOUSE	0.238**	0.631***	0.465***	0.647***	0.884***	0.707***
INCOM_1	0.338*	0.579*	-0.121	-0.958*	-0.985*	-0.213
INCOM_3	-0.068	-0.065	-0.095	0.317**	0.166	0.405**
INCOM_4	-0.142	-0.178	0.360	0.097	-0.311	0.139
INCOM_5	-0.167	-0.535*	0.309	0.221	-0.495**	0.092
EDU_1	-0.110	-0.271	0.114	-0.064	0.135	-0.087
EDU_3	-0.563***	-0.537*	0.216	-0.657***	-0.459*	0.064
FEMALE*INCOM_1				1.974***	1.997***	0.830*
OHOUSE*INCOM_1				1.089**	1.228**	1.353***
INTERCEPT	0.569***	-1.515***	-1.849***	-0.540**	-0.759***	-0.878**

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'; and for education is 'less than 5 years of schooling'. See Table 14 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 17: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, Northeast, 1991.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.382***	-0.146	0.152	-0.177*	0.300***	0.076
AGE_3	-0.752***	-0.031	-0.047	-0.113	0.591***	0.117
FEMALE	-0.662***	0.176	0.032	0.709***	0.414***	0.598***
RURAL	0.005	-0.072	0.013	-0.068	0.261***	-0.040
MET	0.442***	0.454*	0.120	0.433***	0.612***	0.255*
MIG20	-0.046	0.071	-0.069	0.146	0.690***	0.135
HANDICAP	0.239	0.384	0.141	0.305*	0.573***	0.685***
WORK	0.442***	0.057	0.263**	-0.064	-0.887***	0.042
OHOUSE	-0.012	-0.148	-0.053	0.625***	0.507***	0.440***
INCOM_1	0.201*	-0.103	-0.053	0.945***	1.464***	1.567***
INCOM_3	-0.039	-0.148	0.026	-0.018	-0.070	-0.003
INCOM_4	0.202*	0.093	0.108	0.182	-0.228	0.002
INCOM_5	0.190	-0.296	0.193	0.179	-0.429*	0.103
EDU_1	-0.211**	-0.245*	-0.023	-0.287***	-0.081	-0.284**
EDU_3	-0.370*	-0.622	0.232	-0.277	-0.155	0.320
INTERCEPT	1.368***	-1.256***	-0.551***	-0.456**	-1.379***	-0.636***

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'; and for education is 'less than 5 years of schooling'. See Table 14 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 18: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, Southeast, 1991.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.326***	0.002	-0.026	-0.066	0.240**	0.064
AGE_3	-0.528***	0.085	-0.046	-0.038	0.685***	0.116
FEMALE	-0.610***	-0.009	0.004	0.689***	0.186	0.494***
RURAL	0.201**	0.355**	0.115	-0.249	0.031	0.007
MET	0.113*	0.070	0.078	0.171**	0.256***	0.137*
MIG20	0.025	0.301**	-0.047	0.173*	0.775***	0.152*
HANDICAP	0.020	0.255	0.393*	0.097	0.297*	0.999***
WORK	0.491***	-0.192	0.308*	0.058	-0.468***	0.349***
OHOUSE	0.258***	0.213*	0.216*	0.848***	0.847***	0.710***
INCOM_1	0.594**	1.213***	0.876**	-0.378	0.208	0.631
INCOM_3	-0.213**	-0.287*	0.007	-0.153*	-0.274***	-0.218**
INCOM_4	-0.211**	-0.156	-0.193	-0.203**	-0.289***	-0.308***
INCOM_5	-0.387***	-0.537***	0.102	-0.422***	-0.815***	-0.373***
EDU_1	0.063	0.064	0.207**	0.072	0.083	-0.040
EDU_3	-0.322***	-0.378**	0.289**	-0.482***	-0.632***	0.204*
FEMALE*INCOM_1	-0.519*	-1.280***	-0.990**	1.104**	0.366	0.013
WORK*MET	0.011	0.640**	-0.024			
FEMALE*OHOUSE				-0.457**	-0.140	-0.438**
FEMALE*RURAL				0.580***	0.701***	0.291
OHOUSE*INCOM_1				0.362	0618*	0.670**
INTERCEPT	0.432***	-1.960***	-1.873***	-0.449***	-1.077***	-0.820***

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'; and for education is 'less than 5 years of schooling'. See Table 14 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

This supposition is reinforced by observing the effect of physical impairments in the models fit for the 1991 sample (Tables 17 and 18). According to these models, physical impairments have no significant influence on the probability of co-residence between unmarried elderly and unmarried children nor between married elderly and children in general. The only effect of this variable was to increase the probability of co-residence between unmarried elderly and married children (and also with others in the case of the Southeast), bolstering the idea that this is the most dependent form of living arrangement for the elderly.

Sex

The probability of co-residence with children is significantly higher among males in the case of married elderly, and among females in the case of unmarried elderly. In the first case, the lower probability of co-residence among females is basically due to the fact that women used to marry younger than men. Therefore, at any stage of the life cycle, the mean age of the children used to be higher for mothers than fathers and, of course, the older the children the greater their chances of leaving their parent's home.

In the second case, the higher probability of co-residence with children among unmarried females than males, even after controlling for income, would either indicate a greater emotional attachment between mothers and children than between fathers and children, or reflect cultural norms where children are expected to take care of elderly parents, a feeling usually stronger in the case of a widow than a widower.

Place of residence

Besides showing a significant pattern in each region, the effects of urban/rural residence experienced important alterations over the period 1980-1991. Living in rural areas in 1980 decreased the probability of co-residence with children in the Northeast (Table 15), but had no significant effect in the Southeast (Table 16). This result probably reflects the higher incidence of parent-children detachment in the Northeast than in the Southeast due to rural to urban migration.

In the 1991 sample, the effect of living in rural areas on co-residence with children in the Northeast disappeared for married elderly and become significantly positive for unmarried elderly, especially regarding co-residence with married children (Table 17). At the same time, the effect of rural residence in the Southeast became significantly positive for married elderly in general and unmarried females in particular[23] (Table 18). The changes in the Northeast can be due, at least in part, to the reduction in the levels of rural to urban migration. In the Southeast, the changes could be a reflection of the important declines in urban co-residence involving married children and married elderly, pointing to the increasing propensity for independent living arrangements of the urban elderly, especially those who where married.

Regardless of this particular decline in the Southeastern urban areas, the probability of co-residence, in general, was higher among elderly living in metropolitan areas for both regions (Tables 17 and 18). The significant positive effect on co-residence with unmarried children for both married and unmarried

[23] As indicated by the interaction between the variables FEMALE and RURAL in Table 18.

elderly suggests a delay in children's departure from their parent's home[24], probably due to the higher costs of living and especially of housing prevalent in metropolitan regions[25]. It could also be indicating longer times spent by children in school and university. The increase in the probability of co-residence with children among married elderly, on the other hand, might also be motivated by the high housing and living costs of metropolitan areas, and the need to double up. The important positive effect on co-residence between married elderly and married children of the interaction between economic activity of the elderly and metropolitan residence (Table 18) reinforces this interpretation.

Income

The effect of income level of the elderly on their household structure differs greatly from one region to the other and over the time. Moreover, the interactions involving this variable present in most models clearly indicate a lack of uniformity of its effect across the levels of other variables.

The effect of no-income is of little explanatory power in the case of married elderly because a large proportion of married elderly females living independently (with spouse only) are usually classified as not having any income, although they can count on their spouse's income[26]. In the case of the unmarried

[24] It also could be related with increasing cases of children returning to parent's home after a broken marriage.

[25] This supposition is reinforced by the positive effect of house ownership, especially in the Southeast. The availability of an owned-house (owned either by the elderly or by the children), seems to exert attraction between generations to live together, probably to avoid the costs of living apart that would fall over one or both of them, and that are generally higher in metropolitan than non-metropolitan areas.

[26] In fact, 93% of the elderly who declared not having any income in the sample are female, 67% of which were married.

elderly, the important interactions between no-income and female (Tables 15, 16 and 18), on the other hand, indicate that no-income tends to increase co-residence with children only for elderly females[27].

Higher levels of income seem to have had an opposite effect on living arrangements in each region. In general, the greater the income of the elderly, the higher the probability of co-residence with unmarried children in the Northeast, and the lower the probability of co-residence with married children in the Southeast (Tables 15 to 18). In other words, while higher income of the elderly tends to split generations in different households in the Southeast and increase the probability of independent living arrangements, in the Northeast it tends exert a power of attraction between generations, increasing the probability of co-residence.

The relationship between high income and high co-residence with unmarried children in the Northeast could mean a delay in children's departure from parent's home when the situation is advantageous for them. In this case, it could be said that children are the most benefited from co-residence with their elderly parents. The negative relationship between income and co-residence with children in the Southeast, on the other hand, would be the consequence of the preference of elderly from this region for independent living arrangements[28]. As

[27] The interaction was not significant in the 1991 model of the Northeast (Table 17). In this case, lack of income tends to increase co-residence for both males and females.

[28] It is worth noticing that these cases do not necessarily reflects only interests and preferences of the elderly. The interests and preferences of the children also play an important role. For instance, an elderly woman economically able to live alone could prefer to live with a child, but the child, who does not have an interest in co-residence, knows that his/her parent can afford to live apart. On the other hand, a child could want to have his/her parent living with him/her, but the parent might prefer to live apart, and he/she has the economic autonomy for doing so.

can be inferred from the interactions included in Tables 22 and 23, however, the effects of income experienced important modifications from 1980 to 1991. The positive effect of higher income on co-residence decreased significantly in the Northeast, while the positive effect of no-income lost significance in the Southeast.

Economic activity

Working status affects co-residence in distinct ways, according to the marital status of the elderly. Among the married, it increases the probability of co-residence with unmarried children, while among the unmarried it decreases the probability of co-residence with married children (Tables 15 to 18).

Assuming that any kind of work requires a certain level of physical autonomy and imparts a certain level of financial autonomy—important pre-conditions for living independently—it can be presumed that economic activity increases the elderly's ability to exercise their preferences in terms of living arrangements. Therefore, the strong negative effect of this variable on co-residence between unmarried elderly and married children indicates a preference of the elderly for independent living arrangements when this option is feasible. On the other hand, the strong positive effect on co-residence between married elderly and unmarried children suggests that greater economic stability of parents stimulates a longer stay of the unmarried children in the parent's home.

Education

The effect of education on living arrangements of the elderly was different in each region. While in the Southeast, higher levels of education decreased the probability of co-residence with children, the same effect in the Northeast was caused by no education. In the case of the Southeast, the lower levels of co-residence among more educated elderly could be associated, here again, with preference for independent living when the conditions are given. In the case of the Northeast, however, the reasons associated with the lower levels of co-residence among elderly with no formal education are not quite clear. It might be the case that an education gap between illiterate parents and more educated children imposed important barriers to inter-generation co-residence, regardless of needs or preferences.

Kin availability[29]

Consistent with previous research, kin availability, operationalized in this study by the number of living children of each unmarried elderly woman, proved to be an important predictor of the probability of co-residence with children. However, the effects of this variable varied greatly between regions and periods. The interactions included in the models presented on Table 19, involving the variable distinguishing between the year of the sample and the variables associated with the number of living children, indicate an important reduction in the effect of kin availability on co-residence, especially with married children. As

[29] As noticed elsewhere in this study, models including kin availability as an explanatory variable were fit only for unmarried females.

suggested by the interactions found in the models in Table 20, involving the variable distinguishing between regions and the variables associated with the number of living children, this situation was particularly evident in the Northeast region.

The fact that a larger number of living children increases the probability of an elderly woman living with an unmarried child – the huge majority of them never-married, as shown elsewhere in this study – could be related to the stage of life cycle in which single children co-reside with parents. This situation is particularly frequent in countries like Brazil where fertility rates have been extremely high in the near past, and children used to live with parents until they marry. On the other hand, the fact that co-residence with married children was less affected by the number of children in 1991 as compared to 1980 (Table 20), might indicate a situation in which living arrangements are increasingly becoming a result from the balance between needs and preferences. In the first place, it suggests a preference for co-residence with unmarried instead of married children. Moreover, it clearly indicates that, in this case, factors other than kin availability, such as health conditions and economic needs, are playing a more important role in the decision concerning co-residence.

Table 19: Estimated coefficients from multinomial logistic regressions of living arrangements of unmarried elderly female with living children on selected covariates, including year of the sample, Northeast and Southeast, 1980 and 1991.

Covariates	Northeast			Southeast		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.220**	0.143	0.046	-0.130	0.177*	-0.008
AGE_3	-0.219**	0.375***	0.075	-0.102	0.590***	0.179*
INCOM_1	1.390***	1.907***	1.300***	1.156***	1.170***	0.933***
INCOM_3	0.094	-0.119	0.127	-0.001	-0.218**	0.080
INCOM_4	0.625***	0.078	0.458**	-0.076	-0.390***	-0.047
INCOM_5	0.650***	-0.019	0.806***	-0.320***	-0.947***	-0.031
NCHILD_2	1.480***	1.148***	-1.132	1.159***	0.925***	-0.737***
NCHILD_3	1.710***	1.060***	-0.203	1.617***	0.986***	-0.673***
YEAR91	1.162***	1.373***	-0.278*	0.653***	0.682***	-0.695***
YEAR91* NCHILD _2	-1.305***	-1.365***	0.044	-0.608***	-0.763***	0.644***
YEAR91* NCHILD _3	-1.188***	-1.257***	0.024	-0.662***	-0.794***	0.330
INTERCEPT	-0.528***	-1.118***	0.162*	-0.323**	-0.543***	0.160

Notes: The reference category for living arrangement is 'living alone'. The reference category for age is '65-69'; for income level is 'until _ minimum wage'; for living children is '1 or 2'. See Table 14 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 20: Estimated coefficients from multinomial logistic regressions of living arrangements of unmarried elderly female with living children on selected covariates, including region of residence, Northeast and Southeast, 1980 and 1991.

Covariates	1980			1991		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.127	0.104	0.083	-0.203**	0.191*	-0.033
AGE_3	-0.044	0.364***	0.146	-0.217***	0.558***	0.115
INCOM_1	1.563***	1.843***	1.318***	1.005***	1.128***	0.918***
INCOM_3	0.275**	-0.060	0.317***	-0.073	-0.234**	-0.046
INCOM_4	0.347*	-0.182	0.379**	0.032	-0.295**	-0.042
INCOM_5	0.302*	-0.283	0.435**	-0.274**	-0.915***	0.028
NCHILD_2	1.358***	1.078***	-0.339***	0.558***	0.165*	-0.083
NCHILD_3	1.714***	1.081***	-0.320**	0.969***	0.201*	-0.324**
NE	0.038	-0.329***	0.395***	0.418***	0.198	0.545***
NE* NCHILD _2				-0.374**	-0.385**	0.001
NE* NCHILD _3				-0.469**	-0.428**	0.126
INTERCEPT	-0.666***	-0.743***	-0.225*	0.383***	0.117	-0.499***

Notes: The reference category for living arrangement is 'living alone'. The reference category for age is '65-69'; for income level is 'until _ minimum wage'; for living children is '1 or 2'. See Table 14 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

The effect of kin availability on the probability of living with others varied greatly according to the region. In the Southeast, a greater number of living children decreases the probability of an unmarried elderly woman living with others, while in the Northeast the effect was not significant (Table 19). These findings suggest that elderly in the Southeast, more than in the Northeast, prefer to live independently rather than with others, and the larger the number of living children to give logistic support, the higher their chances of exercising this

preference. Worth noticing, however, is the important reduction in significance of this relationship in the Southeast over the period 1980-1991[30], suggesting a decrease in the elderly's capacity to exercise their preferences.

Regional Patterns of Co-Residence in 1980 and 1991

Tables 21 and 22 present, respectively for 1980 and 1991, the coefficients from the models that included data from the Northeast and Southeast samples pooled together. The data show that the pattern of co-residence was practically the same in both periods. After controlling for the effects of age, sex and income of the elderly, the probability of co-residence between married elderly and unmarried children remained significantly higher in the Northeast and significantly higher in the Southeast between unmarried elderly and married children. For both married and unmarried elderly, the probability of living with "others" remained significantly greater in the Northeast. The greater probability of co-residence with unmarried children among Northeastern elderly could be explained by their larger number of children, what would increase their chances of having, at any age, younger unmarried and dependent children.

Table 21: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, including region of residence, Northeast and Southeast, 1980.

[30] As shown by the coefficient of the interaction terms in Table 19.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.258***	-0.075	0.020	-0.099	0.147	0.053
AGE_3	-0.615***	-0.048	0.014	0.083	0.451***	0.110
FEMALE	-0.724***	-0.415**	0.177	0.736***	0.523***	0.678***
INCOM_1	0.333***	0.353*	-0.044	0.965***	0.925***	0.711***
INCOM_3	0.240***	0.037	-0.060	0.238**	-0.051	0.170*
INCOM_4	0.427***	0.029	0.206	0.437***	-0.248	0.235*
INCOM_5	0.122	-0.409*	0.346*	0.164	-0.703***	0.165
NE	0.413***	-0.179	0.550***	-0.012	-0.561***	0.165*
NE*INCOM_1				0.005	0.683**	0.556**
NE*INCOM_5	0.778***	1.292***	0.505**	0.675**	0.997***	0.660**
INTERCEPT	0.517***	-1.318***	-1.259***	-0.492***	-0.535***	-0.783***

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'. See Table 14 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Assuming that married elderly are generally in better financial, health and emotional conditions than the unmarried, and for this reason they are in a position to give more and receive less support from their children than are the unmarried elderly, it can be concluded that children are the most benefited from the elderly-children co-residence in a substantially greater proportion of cases in the Northeast than in the Southeast. Assuming, on the other hand, that married adults are more economically and emotionally stable than the unmarried, and for this reason in a position to give more and receive less support from their elderly parents as compared with the unmarried, the conclusion is that elderly tend to be

the most benefited from the elderly-children co-residence in a substantially greater proportion of cases in the Southeast than in the Northeast.

Table 22: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, including region of residence, Northeast and Southeast, 1991.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
AGE_2	-0.373***	-0.013	0.078	-0.130**	0.261***	0.024
AGE_3	-0.704***	0.021	-0.055	-0.131**	0.618***	0.041
FEMALE	0.805***	-0.050	-0.026	0.652***	0.394***	0.396***
INCOM_1	0.246***	0.047	-0.021	0.155	0.233*	0.472***
INCOM_3	-0.050	-0.261**	0.016	-0.074	-0.226***	-0.081
INCOM_4	0.058	-0.139	-0.079	-0.022	-0.294***	-0.090
INCOM_5	-0.284***	-0.644***	0.215**	-0.410***	-0.973***	-0.050
NE	0.621***	0.164**	1.033***	-0.001	-0.220***	0.263***
NE*INCOM_1				0.666**	1.130***	0.949***
NE*INCOM_5	0.572***	0.264	0.066	0.682***	0.451*	0.405**
INTERCEPT	0.752***	-1.682***	-1.549***	-0.075	-0.481***	-0.473***

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'. See Table 14 for variable definitions. Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Historically, social-economic conditions have been unfavorable in the Northeast compared with the Southeast, reflecting directly on the poorer conditions of the respective elderly populations. We expected, therefore, that the greater needs of the elderly in the Northeast would be translated into higher levels of elderly-children co-residence favorable to the elderly in this region. But, in fact, the contrary situation was observed.

One explanation for this paradox has to do with the financial conditions of an important fraction of the adult children in the Northeast, who were in even worse conditions than their parents who could, at least, count on a meager pension/retirement and on the ownership of their house. This situation not only reduces the children's capacity for giving support to their elderly parents through co-residence, but also makes the elderly a source of some kinds of support for them, including co-residence. This suspicion is reinforced by observing the interactions included into the models presented in Tables 21 and 22 – between the variable that distinguishes the region of residence and the variable associated with a higher level of income – which clearly express the importance of the elderly's resources in the formation of two generation living arrangements. The significantly greater probability of co-residence with "others" in the Northeast, on the other hand, could, at least in part, result from the reduced ability of the children to provide support. In this case, other relatives or non-relatives would be assuming the supporting role traditionally assigned to the children.

Trends in Probability of Co-residence during the 1980s

In spite of the fact that the elderly-children co-residence pattern remained practically the same from 1980 to 1991, important variations in trends of co-residence took effect over the 1980 decade. Tables 23 and 24**,** which display the coefficients from logistic models that included data from the 1980 and 1991 samples pooled together, reveal that, controlling for the effects of sex, age and income, co-residence among the elderly decreased in general in the Southeast, and increased in the Northeast.

Table 23: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, including year of the sample, Northeast, 1980 and 1991.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
FEMALE	-0.759***	0.023	0.053	0.754***	0.542***	0.710***
AGE_2	-0.366***	-0.192*	0.088	-0.126*	0.265***	0.080
AGE_3	-0.756***	-0.046	-0.049	-0.040	0.559***	0.092
INCOM_1	0.298***	0.006	0.003	0.923***	1.514***	1.322***
INCOM_3	0.132**	-0.084	0.036	0.060	-0.117*	0.015
INCOM_4	0.493***	0.130	0.180*	0.475***	-0.124	0.208*
INCOM_5	0.858***	0.909***	0.837***	0.553***	-0.172	0.577***
YEAR91	0.194***	-0.048	0.092	0.109*	0.295***	0.062
YEAR91*INCOM_5	-0.421**	-1.175***	-0.485*			
INTERCEPT	1.038***	-1.517***	-0.690***	-0.416***	-1.151***	-0.612***

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'. See Table 14 for variable definitions. Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

In the case of the Southeast, the probability of co-residence for married elderly decreased significantly with respect to married children and other relatives/non-relatives, categories of living arrangement that typically indicate some level of dependence of the elderly. Even though this situation points towards improvements in the general conditions of the elderly, given the apparently greater feasibility of independent forms of living arrangements, these results should be taken cautiously since no important reductions in co-residence levels were observed among the unmarried elderly. In fact, the probability of co-residence was affected differently among the unmarried elderly according their

income level. As indicated by the coefficients of the interaction term included in the models in Table 24, the probability of co-residence with children among the unmarried elderly decreased significantly over the decade only for those with no income. In this case, it would suggest that other strategies for providing support for elderly parents by adult children would be taking the place of co-residence.

Table 24: Estimated coefficients from multinomial logistic regressions of living arrangements of the elderly on selected covariates, including year of the sample, Southeast, 1980 and 1991.

Covariates	Married Elderly			Unmarried Elderly		
	Unmarri. Children	Married Children	Other	Unmarri. Children	Married Children	Other
FEMALE	-0.798***	-0.324**	0.034	0.617***	0.347***	0.274***
AGE_2	-0.327***	0.064	-0.013	-0.113*	0.188**	-0.008
AGE_3	-0.610***	-0.001	-0.042	-0.077	0.577***	0.043
INCOM_1	0.199**	0.209	-0.059	0.728***	0.862***	0.629***
INCOM_3	-0.101	-0.248*	-0.040	-0.009	-0.204**	-0.009
INCOM_4	-0.095	-0.223*	-0.077	-0.089	-0.337***	-0.098
INCOM_5	-0.300***	-0.677***	0.210*	-0.330***	-0.944***	-0.026
YEAR91	-0.074	-0.390***	-0.416***	0.011	-0.028	-0.082
YEAR91*INCOM_1				-0.545**	-0.621***	-0.121
INTERCEPT	0.841***	-1.218***	-1.111***	-0.110	-0.383***	-0.316***

Notes: The reference category for living arrangement is 'living with spouse only' in the case of married elderly and 'living alone' in the case of unmarried elderly. The reference category for age is '65-69'; for income level is 'until _ minimum wage'. See Table 14 for variable definitions. Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

The probability of co-residence in the Northeast, on the other hand, increased significantly, from 1980 to 1991, between married elderly and unmarried children, and between unmarried elderly and married children.

Interestingly, these types of living arrangements are supposed to have opposite meanings, benefiting children the most in the first case, and benefiting elderly the most in the second case. The increase in the probability of co-residence between married elderly and unmarried children reinforces the idea that children are delaying departure from their parent's homes, probably in their own interest. However, it is worth noticing, in this case, the important reduction in the effect of married elderly's income on co-residence that took place over the decade, as indicated by the coefficients of the interaction term included in the models presented in Table 23. With regard to the rise in unmarried elderly-married children co-residence levels, it is not clear if it can be interpreted as an increase in the amount of support provided to the elderly. As it will be seen further on in this study, there is room to suppose that children in the Northeast are the most benefited in a substantial proportion of these cases too.

Chapter 3: Support Transfers between Elderly Parents and Adult Children in São Paulo and Fortaleza

Introduction

Mutual aid and exchange relations among kin have historically insured survival in old age. While family functions have been increasingly replaced by the public sector during the twentieth century in the more developed countries, reducing the central role families play in supporting the elderly, that is not the case in most of the less developed countries (United Nations, 1994; Daatland, 1990; Lillard &Willis, 1997). The lack of capacity of public welfare systems in these countries to provide formal support to the elderly still makes the family the main reference for old age support.

In the particular case of Brazil, where the social security system is characterized by both lack of coverage and poor services, kin still serve as the exclusive resource for economic assistance and security for much of the Brazilian elderly. In spite of this situation, however, it is important to keep in mind that the support flow in Brazil is far from being just one way. The pernicious consequences – concentration of wealth, increasing unemployment, and the expansion of poverty – of the cyclical periods of economic crisis experienced by the country have led large numbers of adult children to become dependent, in some way, on their elderly parents' resources. Therefore, one may find an important top-down flow of support between generations within the family, in addition to the ascending flow of support from adult children to elderly parents.

As has been shown in the preceding chapter, the probability of co-residence with adult children among the elderly groups assumed to be in the greatest need of some sort of support – the unmarried and females – was higher in the Southeast region than in the Northeast. The literature on the determinants of the living arrangements of the elderly lends credence, in general, to the hypothesis that personal income has a positive effect on independent living, while age, family size, housing deficits, and disability have a negative influence (Schwartz et al., 1984; Bishop, 1986; Aquilino, 1990; Spitze et al., 1992). Thus, regardless of the characteristics of the elderly subgroup, one would expect to find higher rates of independent living in the Southeast and higher intergenerational co-residence in the Northeast, where fertility rates have been higher historically, public health services and social security coverage have been scarcer, housing deficits have been larger, and socioeconomic disadvantage at the individual level has been flagrant[31].

Although co-residence represents an important dimension of the support exchange system between generations – as seen in the prior chapter – family support is not restricted by household boundaries. Rather, information on the complete set of family members, whether they live together or not, is critical to getting a whole picture of the elderly's family relations. In this sense, the question that arises is if the lower levels of intergenerational co-residence in the Northeast are offset by other kinds of support, especially from non co-resident children.

[31] A brief discussion about the regional differences can be found in the Introduction to this study.

The obstacles to addressing this question start with the lack of the necessary data. Secondary data sources such as Demographic Censuses or National Household Surveys provide some insight about living arrangements of the elderly. Only especially designed surveys for the study of the elderly, however, provide information on the elderly's full kin set. Since surveys of this kind are practically nonexistent in Brazil at the national or regional levels, the analysis on family transfers is restricted to the city level. More specifically, the comparative analysis is carried out between two urban samples, one relative to São Paulo, the capital city of São Paulo state in the Southeast region, and the other relative to Fortaleza, the capital city of Ceará state in the Northeast region.

In the case of São Paulo, the data were extracted from a survey conducted in 1994 by the Department of Geriatrics and Gerontology of the São Paulo Medical School (Escola Paulista de Medicina) (Ramos, 1992). Despite being focused primarily on epidemiological aspects, this survey also gathered some information about support transfers to the elderly. In the case of Fortaleza, a survey was conducted specifically for this study. The fieldwork in Fortaleza took place during the first half of 1997[32].

In connection with the general question of whether support from non co-resident children offsets the lower levels of intergenerational co-residence in the Northeast, the specific questions addressed in this chapter include: What kind of assistance do the non co-resident children give to elderly parents? In which cases are the elderly most likely to receive family assistance? Are the effects of these

[32] See Data section in this chapter for more details about São Paulo and Fortaleza surveys.

factors similar in São Paulo and Fortaleza? Are there gender differences among the elderly in terms of support received? Are there gender differences among the children in terms of support given to the elderly parents? Do elderly parents give support to adult children? What kind of support do they give? What factors contribute most to this situation? Do the elderly in Fortaleza receive more family support than in São Paulo? Do the children who out-migrated from the state of Ceará send financial support to their elderly parents left in Fortaleza?

In order to answer these questions, the chapter is organized as follows. After this introduction, a brief review of the most frequently addressed hypotheses about the motives inducing intergenerational support transfers are presented. The next section presents the findings of previous studies on intergenerational support transfers that provided the basis for the multivariate analyses carried out in the subsequent sections of this chapter. A description of the data sources and methodology comes next, including comments on both the response and explanatory variables and the statistical methods used for fitting the data. Then, the results are discussed, having divided them into three major subsections. The first includes a descriptive analysis of the samples, followed by an initial approach to the magnitude of the support flows and an assessment of the correlation between the different dimensions of support. The second subsection explores the support transfers from adult children to elderly parents in a comparative fashion between São Paulo and Fortaleza, while the third contains a more exhaustive analysis of intergenerational support exchanges, based

exclusively on the Fortaleza data, including all dimensions and directions of the intergenerational support exchanges.

Motivation for Intergenerational Support Transfers

Several hypotheses have been developed concerning the motivation for the exchange of informal support between generations within the family. In a recent study, Lillard and Willis (1997) presented a brief review of the most frequently mentioned versions of these hypotheses. One of them, which they call the "old age security hypothesis," emphasized the difficulties in finding a reliable outlet for saving for old age in developing countries. In a context where "financial institutions are primitive, property rights are insecure, the currency is subject to inflation, and government social security schemes, private pensions, and health insurance are nonexistent" (pp. 115), the theory asserts that children represent the only chance for common people to have any security in their old age, even though they are risky investments since they can die, be economic failures, or be disloyal. This hypothesis suggests that fertility should decline as economic development takes place since parents can rely increasingly on market and public sector methods for old age transfers, decreasing, thus, the economic benefits of having children.

An alternative theory, which the authors call the "parental repayment hypothesis", emphasizes borrowing rather than saving constraints. Considering the scanty mechanisms available in the market for individuals to borrow against their future income, the theory postulates that "there is an implicit family capital market in which parents finance human capital investments in their children

through a combination of grants and loans and, in return, children implicitly repay the loan component by providing old age support for their parents" (Lillard and Willis, 1997; pp 116).

Another hypothesis frequently addressed is the so called "altruism hypothesis" advanced by Becker (1974, 1991). According to this view, altruistic feelings of family members toward one another would explain many aspects of family behavior. One aspect would be, for instance, the efficient allocation of family resources by an altruistic 'head of household', providing family members with "the benefits of consumption-smoothing over the life cycle and across uncertain states of the world that otherwise would require actions such as borrowing and lending or the purchase of market insurance" (Lillard and Willis, 1997; pp 117). In this context, it is assumed that the more altruistic the household head, the greater the investments in children's education through gifts, i.e. without requiring future repayment. As noted by Lillard and Willis (1997), however, it is hard to empirically distinguish between transfers that arise because of altruism and transfers that reflect, more properly, efficient contracting among family members.

Much of the recent work on family support transfers, however, uses social exchange theory as the conceptual framework. Rather than consumption-smoothing motives, these alternative models of intra-family transfers are based on exchange. In other words, these studies address, in general, the reciprocity in support relationships between the elderly and their family (Lee, 1985; Antonucci, 1990). In this context, the dual roles of individuals both as care providers and

receivers are emphasized, as it is in the interest of the individuals to assume both roles in their social interaction. This kind of reasoning is assumed to hold in the case of the family support transfers addressed in this study, since the exchange of support between parents and children in Brazil seems to last throughout the life cycle of the family members, as if there existed an intergenerational contract stipulating the respective roles of the family members at various stages. Traditional norms, both internalized and enforced by social pressures, seem to reinforce this situation by serving as a major motivating force for exchange of support between parents and children.

Empirical Background

Prior studies on support exchanges in Brazil are scarce. A significant amount of empirical research, however, has already been developed in different regions, such as the United States and the East and Southeast Asia. In general, these studies have demonstrated the importance of the traits of both the parental and filial generations for family interaction. They also have shown the difficulties that a distance separating parents and children can impose on intergenerational interaction, and that needs increase as resources and health diminish with age. Having a number of children, on the other hand, has provided the elderly more opportunity to help and be helped. All those findings constituted important insights for the analyses developed in this chapter, particularly with respect to the selection of the explanatory variables included in the intergenerational support transfers models.

The support given and received by both parents and children is often associated with marital status. In general, research shows that widowed aging parents tend to receive more assistance from their adult children than do married parents (Lopata, 1979; Stoller and Earl, 1983). Rossi and Rossi (1990), in particular, found that widowed parents tend to receive more assistance than they give to their children, while married parents tend to give more assistance than they receive. Presumably, widowed are more needy than married individuals, and therefore less in a position to offer assistance to children[33]. Married sons, on the other hand, are less likely to be engaged in support exchanges with their elderly parents, while parents are more likely to provide financial assistance to previously married daughters (Hoyert, 1991). Lang and Brody's (1983) study shows that middle-aged unmarried daughters gave three times more help to their elderly mothers than married daughters.

Besides marital status, other characteristics of the family are often associated with different patterns of support. The number and parental status of adult children are generally found to be important determinants of intergenerational exchange. The number of currently living children is expected to improve the likelihood of assistance exchange (Hoyert, 1991). Adult children who are parents of small children, on the other hand, are more likely to be receiving help from their parents than adult children at any other life stage, and less likely to give assistance to their parents (Eggebeen and Hogan; 1990).

[33] Much of the advantage in assistance received by the widowed, of course, is because of their greater tangible needs. When controls for functional disability or economic needs are introduced, widow's and widower's higher levels of support are greatly reduced (Crimmins and Ingegneri, 1990; Morgan, 1983).

Gender of both elderly parents and adult children is another dimension which researchers have often linked with the likelihood of intergenerational support exchanges. From the perspective of the children, daughters of older parents have been reported as providing larger, more diverse amounts of assistance than do sons (Spitze and Logan, 1990; Coward and Dwyer, 1990; Rossi and Rossi, 1990; Lee, Parish and Willis, 1994). Because elderly females are both unmarried more frequently than elderly males and less likely to have any source of income, they are, in general, more in need of assistance, particularly financial assistance, than elderly males (Harris, 1975; Rossi, 1986; Wolf and Soldo, 1988). Moreover, women tend to be more emotionally attached to their children and, hence, they are expected to be more frequently involved in intergenerational support exchanges than elderly male (Shi, 1993).

The need for support has been closely related with decreased mobility (Worobey and Angel, 1990; Speare et. Al., 1991). The lower the mobility, the less independence can be expected of the elderly and the greater the need for support, particularly co-residence. Another common finding in the literature on family support of the elderly is that the balance of support exchange is likely to be affected by declines in resources, which both decrease the ability to provide, and increase the need for receiving assistance. Greater income, for instance, has been shown to enhance the chance of remaining financially independent (Dowd, 1980). Elderly who have less income are expected to provide less and receive more financial support. Lillard and Willis (1997), on the other hand, have found evidence in Malaysia that money transfers from children to parents are contingent

on the incomes in the child's household. In this sense, the authors argue that the direction of monetary transfers between non-coresident parents and children in Malaysia is mainly from the younger to the older generation, a result that "is in sharp contrast to the pattern of transfers from parents to children that is found in the United States … , where employer provided pensions, health insurance, and public social security and Medicare have replaced the family" (Lillard and Willis, 1997, p.134).

Support transfers that involve caregiving to the elderly are often reported as requiring close proximity. In these cases, it is important to take into account not only demographic but also geographic availability of adult children. Lin and Rogerson (1995), for instance, found that a higher propensity to migrate leads to a greater intergenerational dispersion, while an intimate intergenerational relationship pulls a distant relative closer. Several other investigators have also reported that the geographic distance between parents and their offspring is the fundamental determinant of interaction between them (Crimmins and Ingegneri, 1990; Kivett and Atkinson, 1984). Proximity, they argue, determines not only the type of interaction but also the frequency of interaction. Given the high out-migration levels of the Northeastern population, the relationship between distance separating elderly parents and adult children, and support exchanges between them, is of particular interest in this study.

Data and Methods

Data

The São Paulo survey

The data used to explore the informal support transfers involving the elderly in the city of São Paulo were drawn from a survey carried out in 1994. It was part of the "Longitudinal Study on an Elderly Population Residing in the Municipality of São Paulo", a research project carried out by a multi-professional team from the Reference and Training Center of the Geriatrics and Gerontology Sector of the Paulista Medical School (Escola Paulista de Medicina) (Ramos, 1992). This project received operational support from both the State Secretariat of Health, and the Social Service Department of the Catholic University (PUC) of São Paulo. The technical support, on the other hand, came from both the Epidemiology of Aging Unit of the London School of Hygiene and Tropical Medicine, and the Center for the Study of Aging of Duke University.

The Longitudinal study consisted in a four year follow-up of the elderly population (65 years and older) living in "Vila Clementino", a neighborhood of São Paulo city with low levels of internal migration, where the population is mostly concentrated in the middle range of the socioeconomic scale. The design of the project required that all elderly individual previously enumerated in the neighborhood should be interviewed at home twice, at the beginning and at the end of the study.

Although the main objectives of the longitudinal study in São Paulo were epidemiological in character – i.e. to follow the biological and functional aging

process of individuals living into the community – the instrument used to gather information took the necessary care to include complimentary data on demographic and socioeconomic characteristics of the elderly, as well as several aspects related to different forms of informal support exchanges. The data used in the present dissertation were drawn from the 1,668 interviews done in 1994 during the first phase of the household survey.

The Fortaleza survey

The survey in Fortaleza – which received financial support from the Population Council and the Population Research Center's center grant from the Mellon Foundation, and operational and technical support from the School of Public Health (Faculdade de Saúde Pública) of Ceará state – was especially designed and executed for this dissertation. It was carried out between the months of March and May 1997, and consisted in applying a questionnaire to a sample of nine hundred individuals 65 years and older residents in the city of Fortaleza[34]. An important feature of this questionnaire is that besides gathering information related to the elderly themselves, it also gathered information related to each one of their living children, whether or not they were co-residents. Thus, besides a data set with information about the 836 elderly included in the sample, the Fortaleza survey also yielded a data set with information about their respective 4,800 adult living children (18 years and older).

[34] Sixty-four out of the nine hundred scheduled interviews were missed. Some of them because it was not possible to find the elderly even after three attempts. Others, because the interviews were interrupted before finishing (by the elderly themselves or by any other member of the household), and for some reason were not resumed later. Others, because the information given (in general by members of the household other than the elderly) was considered not consistent or reliable.

The design of the questionnaire is similar to those applied in other countries, taking into account, however, the particularities of the Brazilian context and, more specifically, the Northeastern context. Besides the specific questions about different forms of support transfers involving the elderly, the questionnaire also covered several other topics such as the household structure, kin availability and structure, economic and health conditions, labor force participation, activities of daily living (ADL), and instrumental activities of daily living (IADL).

A two step stratification procedure was used to obtain the elderly sample in Fortaleza[35]. The first step consisted in ranking the five districts of Fortaleza (Parangaba, Messejana, Mondubim, Antônio Bezerra and Fortaleza) according to the average head of household income, the percent of households with adequate sanitation conditions, the average level of education, and the mean number of persons per bedroom[36]. Then, the five districts were classified according to the sum of the ranks obtained for each socioeconomic indicator, and two districts were selected: one in the mid-range of the socioeconomic scale (Parangaba), and the one positioned at the bottom of the scale (Antônio Bezerra).

In the second step, the neighborhoods included in each of the selected districts were ranked according to the same socioeconomic indicators previously used to rank the districts, and then classified according to the same methodology used in the case of the districts. Based on this classification, four neighborhoods

[35] This same procedure had already been used before, in a survey carried out by the Public Health School of the University of Ceará which purpose was to trace a multidimensional profile of the elderly living in Fortaleza-CE.

[36] The data used to calculate these indicators were drawn from the 1991 Brazilian Demographic Census.

were selected: the two positioned in the mid-range of the socioeconomic scale among those belonging to the district with intermediary socioeconomic conditions, and the two positioned at the bottom of the scale among those belonging to the district in poorer socioeconomic conditions.

Finally, the census tracts of each selected neighborhood were identified, and three of them were selected in each neighborhood through a random process proportional to the number of households. Special sectors such as business areas, and parks were previously excluded from this selection process. In each census tract selected, the interviewers were instructed to visit every fourth household – starting from a pre-defined point – to check for the presence of elderly individuals and apply the questionnaire once they were identified[37].

Limitations of the data for comparative purposes

The Fortaleza survey provided information for investigating several aspects of the intergenerational flow of informal support involving the elderly. In particular, the data allowed for exploring both the effects of socioeconomic and demographic characteristics of the elderly on their propensity to give and receive support from adult children, and the effects of socioeconomic and demographic characteristics of the adult children on their propensity to receive from and give support to elderly parents.

[37] In the cases of more than one elderly person living in the same household, one of them was randomly selected. In the cases that no elderly was found in the selected household, the interviewers were instructed to go to the next household (and not to the fourth household) until finding an elderly individual.

The survey undertaken in São Paulo, on the other hand, was of more limited extension in terms of intergenerational support transfers. Because it neither collected information about support given by the elderly, nor identified the children who gave support to their parents, the comparative analysis between São Paulo and Fortaleza was restricted to the support received by the elderly, taking exclusively the elderly's characteristics into account.

There are other limitations of the data sets that also impose a handicap to the comparative analysis between the two cities. In the first place, the sampling design was different in each survey. Moreover, the surveys were carried out in different periods, and important economic changes took place in the intercoming years. While the survey in Fortaleza was held in a time of stable economy, for instance, the survey in São Paulo was held in a time of huge inflation, making it difficult to establish comparable categorizations for income variables. Finally, it was necessary to be aware about a few important conceptual differences. In the case of money and articles of necessity, for instance, the survey in São Paulo recorded only exchanges between non co-resident elderly parents and adult children, while in Fortaleza the exchanges were recorded regardless of the residence status of the different generations.

Methods

Multivariate logistic regression models of the involvement (yes/no) of the elderly in giving or receiving on each dimension of exchange were adjusted in order to assess the influence of selected characteristics of the elderly on support transfers with adult children. The effects of selected characteristics of adult

children on support transfers with elderly parents, on the other hand, were estimated by adjusting a set of conditional logistic models of the involvement of the children in giving or receiving on each dimension of exchange.

The multivariate logistic regression models of the involvement of the elderly in support exchanges with their adult children can be expressed by the equation

$$\text{Log } \Omega = \alpha + \beta X,$$

where: Log Ω = Ln[P/(1-P)] = Logit P (log odds);

P = P (Y = 1 / X) = Conditional probability that an elderly who presents the characteristics defined by the vector X is engaged in a particular dimension of support transfer with an adult children;

α = Constant term;

X = vector of the explanatory variables associated with the elderly;

β = vector of the coefficients associated with the explanatory variables included in X.

The method used for estimating the parameters β was maximum likelihood, which, in a very general sense yields values for the unknown parameters which maximize the probability of obtaining the observed data (Hosmer and Lemeshow, 1989). The interpretation of the logistic regression coefficients is related to the case of linear regression. The estimated coefficients for the independent variables in a linear regression represent the slope or rate of change of the dependent variable per unit of change in the independent variable. The estimated coefficients of the logistic regressions in this study, on the other

hand, can be viewed as the effect of a one-unit increase in a particular predictor associated with the elderly on their log odds (logit P) of being involved in support exchanges with children, controlling for all other predictors in the model. In other words, the coefficients represent additive effects of the explanatory variables on the Logit P. Because the predictor variables in this study were all categorical, they were transformed into dummy variables[38]. In this case, the coefficients of the dummy variables measure the increment to the logit associated with specific categories of the original qualitative variable. In particular, if one exponentiates a dummy coefficient, one recovers the estimated odds ratio for those in the category of interest versus those in the reference category.

Since β is a monotonically increasing function of the odds ratio [P/(1-P)], and the odds ratio in turn is a monotonically increasing function of the probability P, any change in β corresponds to a change in P of the same direction. Thus, one can also interpret the coefficients β as indicators of the effect of predictors directly on the probability P associated with the outcome variable.

The conditional logit regression modeling used to estimate the effects of selected characteristics of adult children on their probability of being involved in support exchanges with elderly parents differs slightly from conventional logistic regression modeling. In this case, the data are stratified and the probability function is calculated relative to each stratum in a choice-model framework. The

[38] For a categorical variable with say n categories, one category is taken as reference and $(n-1)$ dummy variables are created from the remaining categories and included into the model.

stratum in this study was defined as the children set for every elderly with at least two children[39].

The conditional logit regression models of the involvement of adult children in support exchanges with their elderly parents can be expressed by the equation

$$P(Y_i = 1) = \exp\left(\sum_{j=0}^{p} X_{ij}\beta_j\right) / \sum_{m \in S_i} \exp\left(\sum_{j=0}^{p} X_{mj}\beta_j\right),$$

where: X_{ij} = j^{th} explanatory variable associated to i^{th} child of the S_i stratum;

β_j = coefficient associated to the j^{th} explanatory variable;

S_i = i^{th} stratum, i. e. the children set of the i^{th} elderly;

m = number of children in the i^{th} stratum.

The numerator in the above equation represents the probability of a particular child being involved in a given dimension of support exchange with elderly parents, while the denominator accounts for the probability of each one of his/her brothers and/or sisters being involved in exchanges of the same nature.

The multivariate analysis begins by fitting models for each dimension of support received by the elderly from their adult children in a comparative fashion

[39] Although the software used to fit the conditional logit models (Stata's clogit) is suitable to estimate probabilities in situations where only one positive outcome exists per stratum, it also handles cases of strata with multiple positive outcomes – which occurs in this study, especially regarding the material transfer dimension (more than one child giving and/or receiving support from the same parent). In these cases, Stata uses an approximation. The accuracy of this approximation is a function of the proportion of multiple positive outcomes to the number of strata. The index (a-1)/n is suggested, where a is the average number of positive outcomes per stratum, and n is the average stratum size. This index should not exceed 0.2. In this study, the index was 0.07 for the 'receiving support material' dimension, and of 0.10 for the 'giving material support' dimension.

between São Paulo and Fortaleza[40]. The first step was to fit separate models for São Paulo and Fortaleza, in order to assess for regional differences in the net effects of the covariates. The second step was to fit models in which data from both samples – São Paulo and Fortaleza – were pooled together. In this case, an additional covariate representing the city of residence was included into the models, in order to check for city variations in the propensity of receiving support from adult children, net from the effects of selected socioeconomic and demographic factors.

The second stage of the multivariate analysis involves a more complete investigation on the different dimensions of support exchanges in Fortaleza, including all directions of the flow of support between elderly parents and adult children. The first step was to fit models for each dimension of support received by the elderly, in order to assess the effects of selected characteristics of the elderly on their propensity of receiving support from their children. The second step was to fit models for each dimension of support given by the elderly in order to assess the effects of the same selected characteristics of the elderly on their propensity of giving support to their children[41]. The third step was to fit models for each dimension of support given by adult children, in order to assess the effects of selected characteristics of the children on their propensity of giving support to their elderly parents. Finally, the last step consisted in fitting models

[40] Since the study deals with intergenerational relationships, elderly without living children were excluded from the multivariate analysis.

[41] Due to the scarcity of cases in which elderly parents reported giving functional support to adult children, this dimension of the elderly to children support transfer was excluded from the multivariate analysis.

for each dimension of support received by adult children, in order to assess the effects of selected characteristics of the children on their propensity of receiving support from their elderly parents.

The statistical software used to fit the bivariate logistic regressions was SAS. The procedure was logistic regression. For fitting the conditional logistic regressions, STATA was used. Tests were performed in both cases to check for interactions between predictor variables in each model. As in the case of the multinomial logistic regressions performed in the previous chapter, the goodness-fit global tests were significant for the entire set of regressions[42].

The response variable

Intergenerational support is measured by distinguishing three dimensions of exchange – material, functional and instrumental. For each of the three dimensions of exchange, giving and receiving support were separately ascertained. Material support includes either money or material resources such as food, clothes, and domestic utensils. In the case of Fortaleza, the elderly respondents were classified as exchanging material support if they or their spouses[43] were reported giving or receiving a gift or a loan of any amount in the previous 6 months, including the payment of bills, medical insurance, education, rent or mortgage. In the case of São Paulo, the elderly respondents were classified

[42] The test is a model chi-squared statistic equal to –2LogL, where L is the likelihood function. The null hypothesis is that all J(k-1) parameters included in the K-1 logit equations are simultaneously equal to zero. The alternative hypothesis is that at least one of these parameters is non-zero.

[43] Married elderly males tend to participate more directly in money exchanges that affect both they and their spouses. In order to avoid missing this information from married elderly females respondent, it was decided to include material support received or given by the spouses.

as receiving material support (they were not asked about giving support) if they reported receiving regularly (without specifying a previous period of time) any amount of money or material resources exclusively from non-coresident people.

The functional support received by the elderly was measured by the assistance they reported receiving in activities of daily living (ADL) which include taking a shower, dressing, eating, laying down, siting, standing up, walking, going out home, and using the bathroom. The elderly respondents were classified as receiving functional support if they reported receiving at least one of the ADL listed above. The instrumental support received by the elderly, on the other hand, was measured by the assistance they reported receiving in instrumental activities of daily living (IADL) which include preparing one's meal, going shopping, doing soft housework, doing heavy housework, and taking care of one's finances. The elderly respondents were classified as receiving instrumental support if they reported receiving at least one of the IADL mentioned above.

In addition to the functional and instrumental support received, the elderly respondents in Fortaleza were asked to report any functional and instrumental support given. They were classified as giving functional support if they reported giving assistance in at least one activity of daily living (as previously defined) to an unhealthy or impaired person in the previous 6 months. Similarly, they were classified as giving instrumental support if they reported giving assistance in activities such as taking care of children's or relative's household, shopping for

children or relatives, taking care of children's or relative's business, and child-caring at any time during the previous six months.

For each support exchange with adult children reported by the elderly in Fortaleza, the child who gave or received support was identified among the entire kin set as if the children themselves were respondents of a survey reporting their engagement in support exchanges with their elderly parents. Therefore, the involvement (yes/no) of adult children in support transfers – material, functional and instrumental – with elderly parents in Fortaleza could be treated as the response variable in the models fitted to assess the influence of children's characteristics on such exchanges.

The explanatory variables

The selection criteria for including covariates into the multivariate analysis were based on both the theoretical foundation and the empirical background discussed earlier. The set of covariates includes socioeconomic and demographic characteristics of the elderly and their adult children as well as indicators of the health status of the elderly and the geographic distance between generations.

The demographic characteristics of the elderly included in the models fitted to estimate their involvement in support exchanges with adult children were age, sex, marital status, number of living children, and co-residence with children. Income, education, working status (yes/no), and ownership of the house (yes/no) were selected as their socioeconomic characteristics, while physical impairments (yes/no) were taken as indicator of their health status. Besides the dichotomous

variables, all other variables were also subdivided into categories and then transformed into dummy variables[44].

Age was subdivided into three categories – 65 to 69, 70 to 74, and 65 and over. Marital status also considered three categories – married, widowed, and other. Given the differences between fertility levels of the elderly in São Paulo and Fortaleza, the categorization of the number of living children used in the comparative analysis between the two cities (none, one, two, three, and four and more)[45] was different from the categorization used for the analysis performed exclusively in Fortaleza (none, one and two, three to five, and six and more). Three categories were considered regarding the co-residence with adult children – not living with children, living with at least one unmarried child but no married child, and living with at least one married child.

Because the Brazilian economy dramatically changed from a period of huge inflation in 1994 – when the São Paulo survey took place – to a period of relative stability in 1997 – when the Fortaleza survey was carried out – different categorizations (not directly comparable) had to be adopted for income levels in each case. In general, the categories were called - none, level 1, level 2, and level 3. For the elderly in Fortaleza, level 1 means an income less than or equal 1 minimum wage, level 2 means more than 1 until 3 minimum wages, and level 3 means more than 3 minimum wages. In the case of São Paulo, level 1 means less

[44] See Table 32 for a detailed description of the predictor variables included into the models.
[45] This categorization was used only for comparative purposes. A better classification – which took into account the large number children associated with northeastern elderly – was used in the multivariate analysis for Fortaleza.

than or equal a nominal amount of three hundred thousand cruzeiros, level 2 an amount between three hundred thousand and one million cruzeiros, and level 3 an amount greater than one million cruzeiros. It did not make sense to use a classification based on the number of minimum wages for São Paulo due to the disjuncture between inflation and minimum wage adjustments at the time the survey was held. Finally, the elderly were classified in terms of education as having no formal education, having some elementary education (up to 4 years of schooling) and having more than elementary education (more than 4 years of education).

The demographic characteristics of the adult children included in the models fitted for Fortaleza to estimate their involvement in support exchanges with elderly parents were age, sex, marital status and number of living children. The socioeconomic characteristics selected were working status (yes/no), while the place of residence was taken as an indicator of the geographic distance between the two generations. Age and number of living children were included as continuous variables. All other characteristics were taken as categorical variables and then transformed into dummy variables. The categories for marital status were single, married and other. Regarding the place of residence, the children were classified relative to their elderly parents as living in the same household, living in the same neighborhood, living in another part of the city, living in another city of Ceará state, and living out of Ceará state[46].

[46] See Table 34 for a detailed description of the predictor variables included into the models.

Results

Description of the Samples

The distributions of individuals aged 65 and over enumerated in the samples from Fortaleza and São Paulo are shown respectively in Tables 25 and 26. These same tables display for each category of the predictor variables, the proportion of elderly who received support from adult children, distinguishing between the different types of support. In addition, Table 27 provides, in the particular case of Fortaleza, the proportions of elderly who gave support to adult children.

A comparative analysis between Tables 25 and 26 shows that the sample in Fortaleza is younger, slightly more female and less educated than the sample in São Paulo. Although the proportion of elderly with no income is lower in Fortaleza, the proportions of elderly in the higher categories of income are greater in São Paulo. While the proportions single and married are higher in São Paulo, the proportions widowed and divorced are higher in Fortaleza.

Huge differences between samples exist regarding living arrangements and the number of living children. Compared to Fortaleza, a proportion twice as high of elderly in São Paulo lives alone, and an almost four times greater proportion lives with spouse only. Correspondingly, a much higher proportion in Fortaleza lives with children, especially unmarried children. The proportion in Fortaleza with four or more living children, on the other hand, is more than three

times greater than in São Paulo[47]. The proportions of elderly who were economically active are quite similar in both samples.

Table 25: Sample distribution and proportion of elderly who received support from adult children according to selected attributes and type of support, Fortaleza, 1997.

Attributes of the Elderly	Sample Size		Percent Receiving Support		
	Absolute	(%)	Material	Functional	Instrume.
Total	836	100.0	32.3	15.4	26.0
Age (years)					
65-69	289	34.6	29.1	8.7	16.6
70-74	231	27.6	33.3	10.0	17.7
75-79	164	19.6	32.3	25.0	36.0
80 and more	152	18.2	36.8	26.3	45.4
Sex					
Male	259	31.0	22.8	8.1	19.3
Female	577	69.0	36.6	18.7	28.9
Marital status					
Single	50	6.0	8.0	6.0	8.0
Married	359	42.9	30.6	10.0	21.4
Widowed	364	43.5	35.7	21.7	32.7
Divorced	62	7.4	41.9	17.7	27.4
Living children					
None	44	5.3	--	--	--
1 or 2	115	13.8	12.2	11.3	20.0
3 to 5	253	30.3	30.0	16.2	24.9

[47] Different categorizations of living arrangements were used in Tables 25 and 26 in order to keep data more illustrative.

6 to 8	221	26.4	42.1	18.1	31.2
9 and more	203	24.3	42.9	17.2	30.5
Living Arrangement					
Alone	64	7.7	34.4	9.4	20.3
Spouse only	55	6.6	32.7	3.6	9.1
Unmarried child	447	53.5	33.8	17.7	28.6
Married child	139	16.6	25.9	22.3	34.5
Other	131	15.7	32.8	8.4	17.6

(continue next page)

(continuation Table 25)

Income (minimum wages)					
None	73	8.7	41.1	16.4	19.2
Until 1	408	48.8	35.0	18.4	35.0
1 to 3	197	23.6	33.0	10.7	18.8
More than 3	144	17.2	20.1	11.8	13.9
Education					
None	320	38.3	29.4	17.5	32.8
Basic	413	49.4	35.8	14.3	24.5
More than basic	100	12.0	26.0	12.0	8.0
Working status					
Currently working	102	12.2	22.5	2.9	6.9
Not working	734	87.8	33.7	17.2	28.6

Source: see Data section in Chapter 3.

Table 26: Sample distribution and proportion of elderly who received support from adult children according to select attributes and type of support, São Paulo, 1994.

Attributes of the Elderly	Sample Size		Percent Receiving Support		
	Absolute	(%)	Material	Functional	Instrume.
Total	1,667	100.0	19.5	6.1	12.2
Age (years)					
65-69	488	29.3	15.2	0.6	4.9
70-74	417	25.0	18.7	1.4	4.8
75-79	387	23.2	19.4	7.0	13.7
80 and more	375	22.5	26.1	17.3	28.3
Sex					
Male	575	34.5	16.3	1.9	5.2
Female	1,092	65.5	21.2	8.2	15.8
Marital status					
Single	151	9.1	0.7	0.0	1.3
Married	850	51.0	17.9	2.0	5.8
Widowed	609	36.5	26.6	13.3	23.8
Divorced	57	3.4	17.5	5.3	12.3
Living children					
None	251	15.1	--	--	--
1	300	18.0	13.3	4.3	11.7
2	435	26.1	21.1	5.3	10.8
3	317	19.0	23.0	9.1	17.0

4 and more	364	21.8	32.7	9.9	18.4

(continue next page)

(continuation Table 26)

Living Arrangement					
Alone	225	13.5	35.1	3.6	7.6
Spouse only	405	24.3	22.2	1.0	2.5
Unmarried child	577	34.6	15.9	10.1	19.8
Married child	182	10.9	13.7	15.9	30.8
Other	278	16.7	14.0	0.7	2.2
Income (R$1,000.00)					
None	338	29.5	24.5	7.7	12.4
Until 300	486	33.7	26.3	8.6	18.7
300 to 1,000	462	21.2	18.2	5.4	9.7
More than 1,000	381	10.2	7.9	2.1	6.6
Education					
None	364	28.8	23.9	10.7	20.9
Basic	837	26.9	21.5	6.1	12.3
More than basic	465	15.1	12.3	2.4	5.2
Working status					
Currently working	199	17.1	12.1	0.5	4.0
Not working	1,468	25.0	20.5	6.8	13.3

Source: see Data section in Chapter 3.
Note: Material support excludes co-resident children.

Table 27: Proportion of elderly who gave support to adult children according to select attributes and type of support, Fortaleza, 1997.

Attributes of the Elderly	Percent Giving Support		
	Material	Functional	Instrumental
Total	17.0	0.8	20.8
Age (years)			
65-69	18.7	1.7	27.3
70-74	16.9	0.4	23.8
75-79	18.9	0.6	16.5
80 and more	11.8	0.0	8.6
Sex			
Male	20.5	0.0	10.8
Female	15.4	1.2	25.3
Marital status			
Single	4.0	0.0	12.0
Married	18.4	0.6	17.8
Widowed	19.0	1.1	23.4
Divorced	8.1	1.6	30.6
Living children			
1 or 2	11.3	0.0	20.0
3 to 5	21.7	0.8	23.3
6 to 8	19.9	0.9	20.8
9 and more	14.8	1.5	22.7
Living Arrangement			
Alone	9.4	0.0	6.3
Spouse only	20.0	0.0	16.4
Unmarried child	16.6	1.3	21.5

Married child	21.6	0.7	24.5
Other	16.0	0.0	23.7

(continue next page)

(continuation Table 27)

Income (minimum wages)			
None	11.0	0.0	26.0
Until 1	14.5	1.5	19.4
1 to 3	16.2	0.5	24.9
More than 3	27.8	0.0	16.7
Education			
None	16.6	0.6	15.9
Basic	15.7	1.0	24.7
More than basic	24.0	1.0	21.0
Working status			
Currently working	24.5	0.0	20.6
Not working	15.9	1.0	20.8

Source: see Data section in Chapter 3.
Note: see sample distribution in Table 25.

Taking the 1991 Brazilian Demographic Census as a reference, some important differences exist regarding the sample distributions in São Paulo and Fortaleza. Both samples are older and more female than the Census. As a consequence, the samples present a greater proportion of widowed and a smaller proportion of married elderly than the Census. Although a process of aging and feminization of the elderly population actually took place from 1991 to the date of the surveys, an overrepresentation of woman and older individuals still seems to persists in the samples. One reason for this overrepresentation would be the fact that female and older elderly are more easily found at home to be interviewed

than are male and younger elderly[48]. In any case, an overrepresentation of the older age group may be seen as an asset in this study, assuming there is a positive relationship between needs and age of the elderly people.

Other discrepancies between the samples and the Census, on the other hand, suggest that the socioeconomic conditions of the sample, compared with the total elderly population, would be slightly lower in Fortaleza and slightly higher in São Paulo. In Fortaleza, for instance, the elderly in the sample are less educated than in the Census, while in São Paulo they are more educated. Both the mean number of living children and the proportion living with children, on the other hand, are higher in the sample in Fortaleza and higher in the Census in São Paulo[49]. Although the distributions in terms of income level do not present further significant differences between the samples and the Census, no reliable conclusions can be inferred from that due to the lack of comparability between data sources[50].

The magnitude of the support flows involving the elderly in São Paulo and Fortaleza can be assessed in Tables 28 and 29. In the first place, one notices not only the high intensity of the support flows, particularly in the case of Fortaleza, but also the fundamental role adult children play in this process of support exchanges. More than 46.3% of the elderly in São Paulo reported having received

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[48] Another reason, reported particularly in the case of Fortaleza survey, is that males are in general more hostile to this kind of interview.

[49] The comparison between number of children in the Census and in the samples is not straightforward since the Census get this information exclusively for females.

[50] As stated before in this study, the huge inflation prevalent in Brazil prior to 1995 handicaps comparative analysis between periods in terms of income.

at least one kind of support from adult children (Table 29), while in Fortaleza this proportion almost reaches 70% (Table 28). In the specific case of Fortaleza, the parent to children flow also proved to be of extreme importance. The proportion who declared giving support to children surpassed 52%. The proportion of elderly in Fortaleza involved simultaneously in support flows in both directions, i.e. who gave *and* received any kind of support, was around 34%, while those who participated in either direction, i.e. who gave *or* received support, summed to 87% (Table 28).

Table 28: Percent of elderly involved in support exchanges, according to the type and direction of support, Fortaleza, 1997.

Participation in	Transfer to or from		Elderly	Elderly not	Total
	Children	Other	involved	Involved	
the Support Flow	(1)	(2)	(1) + (2)	(3)	(1)+(2)+(3)
Received Support					
Any	55.0	13.9	68.9	30.1	100.0
Material	37.8	5.9	43.7	56.3	100.0
Functional	15.4	12.2	27.6	72.4	100.0
Instrumental	26.0	14.9	40.9	59.1	100.0
Gave Support					
Any	34.0	18.5	52.5	47.5	100.0
Material	17.0	20.3	37.3	62.7	100.0
Functional	0.8	5.4	6.2	93.8	100.0
Instrumental	20.8	3.5	24.3	75.7	100.0
Gave and Received					
Any	19.4	15.0	34.4	65.6	100.0
Gave or Received					

Any	69.6	17.4	87.0	13.0	100.0

The type of support most frequently received from adult children by elderly parents in both São Paulo and Fortaleza was material, followed by instrumental and then functional. The type of support most frequently given by elderly parents in the specific case of Fortaleza was instrumental, followed by material. The proportion of elderly parents giving functional support to adult children was very small. Particularly in the case of instrumental support, the proportions of elderly giving and receiving support were quite similar.

Table 29: Percent of elderly who received support, according to the type of support, São Paulo, 1994.

Type of Support	Received from		Elderly receiving	Elderly not receiving	Total
	Children (1)	Other (2)	(1) + (2)	(3)	(1)+(2)+(3)
Any Support	30.0	16.3	46.3	53.7	100.0
Material	19.4	4.7	24.1	75.9	100.0
Functional	6.1	7.5	13.6	86.4	100.0
Instrumental	12.2	17.3	29.5	70.5	100.0

Note: Material Support excludes co-resident individuals.

Interestingly, higher proportions of elderly in São Paulo than Fortaleza declared having difficulty in performing activities of daily living, in spite of the significantly higher proportions of elderly who got support from adult children in Fortaleza than in São Paulo. Regarding functional activities, 37.8% of the sample in São Paulo reported some level of difficulty against 33.1% in Fortaleza; regarding instrumental activities the proportions reporting difficulty were of

46.1% in São Paulo and 43.5% in Fortaleza. While, 46.6% of those elderly with difficulty in performing functional activities and 59.6% of those with difficulty in performing instrumental activities received support from at least one child in Fortaleza, only 16.0% and 26.4% of the elderly in São Paulo received such support, respectively for functional and instrumental activities.

The proportions of elderly receiving support in each category of the variables presented in Tables 25, 26 and 27 allow a first approach to assessing the influence of the elderly's attributes on the support transfers with adult children. According to the data, the older the elderly, the more likely they are to receive support, and the less likely they are to give support. The more living children they have, the more likely they are to receive support. The number of living children, however, seems not to affect their likelihood of giving support. The greater the income and the education level of the elderly, on the other hand, the less likely they are to get any kind of support and to give material support in particular.

Elderly females are more likely than males to receive any kind of support and to give instrumental support, while elderly males are more likely than females to give material support. Widowed and divorced elderly are more likely than married and single elderly to receive any kind of support, and to give functional and instrumental support. Elderly who were not working appear to be more likely than those who were working to receive some kind of support and less likely to give material support. In terms of living arrangement, the elderly who live with children are more likely to receive and give functional and instrumental support, while those living apart from children are more likely to receive material support.

Surprisingly, widowed in Fortaleza are more likely than any other marital status category to give material support. This fact seems to indicate that, although of extremely reduced value, retirement pensions of the elderly constitute an important source of family support in Fortaleza.

Correlation between dimensions of support

In order to check for correlation between the different types of support given and received by the elderly parents and adult children, a set of correlation matrixes were calculated and are presented in Tables 30 for São Paulo and 31 for Fortaleza. As expected, receiving instrumental support in both places is highly correlated with receiving functional support, since those with difficulties in performing functional activities of daily living tend also to find difficulties in performing instrumental activities of daily living. In the case of Fortaleza, a slight correlation was also found between receiving material and instrumental support.

An important correlation between giving instrumental support and giving functional support to the elderly was found among the adult children, suggesting that the task of giving support to elderly parents may be concentrated among a few members of the kin set. The high correlation between receiving material support and receiving instrumental support from parents among the children, on the other hand, suggests that also in the opposite direction – from parents to children – the support flow tends to be concentrated among a limited share of the kin set.

The significant negative correlation between giving material support and receiving material support among the children was, of course, expected, since

those in a position to provide this kind of support do not in general need to receive it back from the parents. Surprisingly, however, the lack of significant correlation between giving and receiving support among the elderly suggests that elderly parents get material support from those children in better financial conditions and at the same time give support for those in worse conditions.

Table 30: Pearson correlation coefficients between different types of support received by elderly parents from adult children, São Paulo, 1994.

Support Received by Elderly Parents	Types of Support		
	Material	Functional	Instrumental
Material	1.000		
Functional	0.021	1.000	
Instrumental	0.030	0.658***	1.000

Notes: Material Support excludes co-resident individuals.Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (Prob > | R | under Rho = 0 / N=1,667).

Finally, the important positive correlation between giving functional and instrumental support and receiving instrumental support among the adult children not only puts into evidence the high frequency in which intergenerational support exchanges take place in Fortaleza, but it also suggests a kind of bargain system between older and younger members of the families. Co-residence in this case represents a key factor. As it will be seen further in this analysis, most of the functional and instrumental support exchanges take place between co-resident generations.

Table 31: Pearson correlation coefficients between different types of support, relative to the exchange flows between adult children and elderly parents, Fortaleza, 1997.

Direction of Support	Support Received			Support Given		
	Material	Function.	Instrume.	Material	Function.	Instrume.
Relative to parents						
Support Received						
Material	1.000					
Functional	0.056	1.000				
Instrumental	0.084*	0.404***	1.000			
Support Given						
Material	-0.037	0.009	0.015	1.000		
Instrumental	0.098**	0.009	-0.027	0.050		1.000
Relative to children						
Support Received						
Material	1.000					
Instrumental	0.074***		1.000			
Support Given						
Material	-0.065***		0.015	1.000		
Functional	0.020		0.040**	0.034*	1.000	
Instrumental	0.026		0.035*	0.022	0.344***	1.000

Note: Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (Prob > | R | under Rho = 0 / N=836 in the case of elderly parents and N=4,800 in the case of adult children).

Effects of Elderly Attributes on Support Exchanges with Adult Children in Fortaleza

The effects of select covariates on the propensity of an elderly individual being involved in intergenerational support transfers are estimated by the coefficients presented in Table 33, regarding each dimension of support – material, functional and instrumental – and for both directions of the flow – giving and receiving[51].

Some of the results in Table 33 are consistent with findings commonly reported in studies on intergenerational transfers. One such result is the case of the inverse effect of income on material support transfers according to the direction of the flow – negative for receiving and positive for giving. The inverse effect of age on instrumental support transfers, which is positive for receiving and negative for giving, is also consistent with previous studies. Finally, similar to other places, females in Fortaleza are significantly more involved than males in functional and instrumental support exchanges.

The highly positive effect of physical impairment on receiving functional and instrumental support as well as the negative effect of education on receiving instrumental support were also expected results. Several other results, however, were not anticipated, and seem to be characteristic of Fortaleza and maybe of the Northeast region in general. Although widowhood and number of living children are consistently reported as important contributing factors for receiving support from adult children – especially material support in the case of the kin set size –

[51] The functional dimension was not considered for support given by the elderly due to the rareness of this event.

neither marital status nor kin set size have any significant effect on support transfers between generations in Fortaleza[52].

Table 32: Definitions of the variables related to the elderly parents used in the models of support transfers with adult children.

Variable	Definition
FEMALE	Coded 1 if respondent is a woman
AGE_2	Coded 1 if respondent is in the age group 70-74 years old
AGE_3	Coded 1 if respondent is in the age group 75 and more
MARIT_2	Coded 1 if respondent is widow(ed)
MARIT_3	Coded 1 if respondent is single or divorced
LC_2	Coded 1 if number of living children is 2
LC_3	Coded 1 if number of living children is 3
LC_4	Coded 1 if number of living children is 4 and more
NCHILD_2	Coded 1 if number of living children is 3 to 5
NCHILD_3	Coded 1 if number of living children is 6 and more
ARRANGE_2	Coded 1 if respondent lives with at least 1 unmarried child (but no married child)
ARRANGE_3	Coded 1 if respondent lives with at least 1 married child
INCOME_1	Coded 1 if respondent has no income
INCOME_3	Coded 1 if respondent lives in São Paulo and has an income between Cr$300,001.00 and Cr$1 million or if respondent lives in Fortaleza and has an income between 1 and 3 minimum wages
INCOME_4	Coded 1 if respondent lives in São Paulo and has an income greater than Cr$1 million or if respondent lives in Fortaleza and has an income greater than 3 minimum wages
EDUC_1	Coded 1 if respondent had no formal education

[52] As indicated by the interaction terms involving the variable female and the variables associated with higher numbers of living children in the first model of Table 33, the kin set size has a slightly significant positive effect on receiving material support only in the case of elderly females.

EDUC_3	Coded 1 if respondent has surpassed "primario" level (more than basic education – usually more than 4 years of schooling)
HANDICAP	Coded 1 if respondent declared having any physical impairment
WORK	Coded 1 if respondent is currently working
FORT	Coded 1 if respondent lives in Fortaleza

Table 33: Estimated coefficients from logistic regressions of elderly parents' propensity to be involved in support transfers with adult children, Fortaleza, 1997.

Characteristics of	Support Received			Support Given	
Elderly Parents	Material	Functional	Instrumen.	Material	Instrumen.
INTERCEPT	-0.715	-4.601***	-2.633***	-1.796***	-1.989***
FEMALE	-0.466	0.861***	0.409	-0.128	1.038***
AGE_2	0.161	0.174	0.031	-0.234	-0.232
AGE_3	0.066	0.614	0.988***	-0.241	-1.085***
MARIT_2	-0.134	0.378	0.082	0.154	0.254
MARIT_3	0.086	0.542	0.141	-0.897*	0.389
NCHILD_2	0.037	0.592	0.366	0.643	0.359
NCHILD_3	0.413	0.539	0.550	0.480	0.329
ARRANGE_2	-0.119	0.316	0.582*	-0.277	-0.071
ARRANGE_3	-0.418	1.041**	0.769**	0.138	0.151
INCOME_1	0.224	0.365	-0.625	-0.183	-0.010
INCOME_3	0.171	-0.163	-0.238	0.038	0.359
INCOME_4	-0.720**	-0.079	-0.534	0.577*	-0.117
EDUC_1	-0.428*	0.276	0.273	0.002	-0.550**
EDUC_3	-0.288	0.318	-1.116**	0.373	-0.121
HANDICAP	-0.015	1.414***	0.975***	-0.302	0.265
WORK	-0.370		-1.473**	0.289	-0.001
FEMALE*NCHILD_2	1.246*				
FEMALE*NCHILD_3	1.371*				

AGE_3* ARRANGE_2	1.033*	

Notes: The reference category for age is 65-69; for marital status is 'married'; for the number of living children is '1 or 2'; for living arrangement is not living with children'; for income level is 'until 1 minimum wage'; and for education is 'complete or incomplete basic education'. See Table 32 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Economic activity, on the other hand, which is generally associated with greater financial and physical autonomy of the elderly, did not affect support transfers in the expected way. Although the negative effect of being in the labor force on receiving instrumental support still makes the economic activity a good predictor of physical autonomy[53], the lack of a significant effect on receiving material support suggests a lack of association between work and financial autonomy of the elderly in Fortaleza. This result implies that income coming from economic activity does not make the elderly who work any financially better off than those who do not work. It is related to the fact that elderly who work in Fortaleza are generally out of the social security system, and are probably engaged in low paid jobs, if not underemployed in the informal sector of the economy. The income from work would represent, in most cases, a mere substitute for the lack of retirement pensions.

Another unexpected result found in Table 33 refers to the negative effect of having no education in receiving material and giving instrumental support. This effect has already been mentioned in Chapter 2, where lack of education represented an inhibiting factor for intergenerational co-residence. Although discrepancies in educational attainment between generations are expected to

[53] The working status of the elderly was not included into the model relative to functional support since receiving this kind of support and being working are practically exclusive categories.

represent an obstacle for co-habitation, the reasons why it also represents a barrier for intergenerational support exchanges in Fortaleza, particularly material, still remain uncertain[54].

The effect of the elderly's household structure on their propensity to give and receive support from children – a factor not fully explored in previous studies – proved to be of extreme importance in the case of Fortaleza. As stated earlier in this section, the number of living children has no significant effect on support transfers, particularly receiving functional and instrumental support. In these cases, what seems to count the most is the co-residence with a child. The probability of receiving instrumental and functional support is significantly greater for those elderly living with children than for those not living with children.

In the case of receiving functional support, it is important to notice the differences in the effect of co-residence between married and unmarried children. Co-residence with married children generally implies some sort of functional transfer to the elderly at any age of the elderly (note that age has no significant effect on receiving functional support). The effect of co-residence with unmarried children on receiving functional support, on the other hand, becomes statistically significant only for elderly in the older age groups as indicated by the interaction term between age and household structure in the second model of Table 34. This result is also consistent with the findings of the previous chapter, in which co-

[54] Unfortunately the available data do not allow me to explore explanations for this finding. It would probably demand the use of a more qualitative instrument for collecting data.

residence between elderly parents and unmarried children in the Northeast region tended to be associated with a specific stage of the normal life cycle rather than preferences or needs of the elderly. Of course, this association becomes weaker at the older ages of the parents when needs start playing a more decisive role in the configuration of their living arrangements.

Effects of Children's Attributes on Support Exchanges with Elderly Parents in Fortaleza

The effects of select covariates on the propensity of adult children to be involved in support transfers with elderly parents are estimated by the coefficients presented in Table 35, regarding each dimension of support – material, functional and instrumental – and for both directions of the flow – giving and receiving[55].

As in the case of the elderly, in which females proved to be involved more frequently than males in functional and instrumental support exchanges with adult children, daughters, among the children, were found to be involved more frequently than sons in functional and instrumental support exchanges with elderly parents. Also similar to the case of the elderly, transfers of material support from the stand point of the children were not affected by sex.

The small effect of the age of the children on their engagement in support transfers with their elderly parents suggests that it is a process that lasts for most of their adult life. The only exceptions refer to the chances of giving material support, which slightly increases with the age of the children, and receiving instrumental support which decreases slightly with the age of the children (and

[55] The functional dimension was not considered for support received by the children due to the rareness of this event.

consequently with the age of the parent). These effects, however, were expected since, in the first case, the older the children are, the greater their chances of having attained better economic conditions and being in a position to give material support. In the second case, they were expected because, as shown in the previous section, the older the elderly the lower their capacity to give instrumental support.

Table 34: Definitions of the variables related to the adult children used in the models of support transfers with their elderly parents.

Variable	Definition
DAUGTHER	Coded 1 if child is a woman
AGE	Age of the child in single years
MARIT_1	Coded 1 if child is single
MARIT_3	Coded 1 if child is widow(ed) or divorced
NCHILD	Number of child's living children (elderly's grandchildren)
WORK	Coded 1 if child is currently working
RESID_1	Coded 1 child co-resides with elderly parent(s)
RESID_3	Coded 1 if child lives in other neighborhood of Fortaleza
RESID_4	Coded 1 if child lives in other city of Ceará State.
RESID_5	Coded 1 if child lives out of Ceará State

Note: Child attributes were coded for each surviving child 18 years and older reported by the elderly respondents.

The lack of a significant effect of marital status of the children on their propensity to give support to parents was a surprising result. Given the availability of single children in Fortaleza – resulting from the high fertility rate prevalent in the past in the Northeast region – and taking into account that married children usually have additional concerns relative to their own families, one

would expect a positive effect of being single on the probability of giving support to elderly parents.

Table 35: Estimated coefficients from conditional logistic regressions of adult children's propensity to be involved in support transfers with elderly parents, Fortaleza, 1997.

Characteristics of	Support Given			Support Received	
Adult Children	Material	Functional	Instrumen.	Material	Instrumen.
DAUGTHER	0.107	0.818**	0.858***	-0.139	3.234**
AGE	0.018*	0.005	0.023	-0.017	-0.052*
MARIT_1	-0.055	-0.010	0.322	-1.200***	-3.926**
MARIT_3	-0.391	-0.573	0.137	-0.086	0.522
NCHILD	-0.032	-0.013	-0.094	0.047	0.194*
WORK	1.290***	-0.465	-0.387	-0.445*	0.229
RESID_1	-0.593**	2.055***	1.645***	-0.121	0.576
RESID_3	-0.105	-0.084	-0.454	-0.217	-0.845**
RESID_4	-0.754**			-0.079	
RESID_5	0.020			-1.298**	
DAUGHTER*AGE					-0.064*
MARIT_1*AGE					0.105**
MARIT_1*RESID_5				2.923***	
NCHILD*WORK	-0.153*				
NCHILD*RESID_1					0.539**

Notes: The reference category for marital status is 'married'; for residence is 'same neighborhood'. See Table 33 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Not only do the married children give more support than expected, but they also receive support much more frequently than single children. In the case

of instrumental support, this result could be an indication that a great share of this kind of support refers to taking care of grandchildren. This hypothesis is reinforced by the important positive effects of both the number of children and the interaction term between the number of children and co-residence on the chances of getting instrumental support in the last model presented in Table 35. In the case of the material support, on the other hand, the result clearly points toward a situation in which the meager income of the elderly has become an important asset for their adult children, in spite of the needs and the poor socioeconomic conditions of the elderly themselves.

As expected, children who work are significantly more likely to give material assistance to their parents and slightly less likely to receive material support from them. The chances of the adult children who work providing material support to elderly parents, however, decline substantially for each additional child of their own. It is clearly expressed by the negative effect of the interaction term between economic activity and number of living children on giving material support in the first model presented Table 35. These results could reflect a kind of competition between grandparents and grandchildren for the financial resources of adult individuals.

The effects of place of residence of the children on their probability of giving and receiving support reinforce the conclusions drafted in the previous section regarding the importance of physical proximity for certain kinds of support to take place. Children who co-reside with elderly parents are significantly more likely to give them functional and instrumental support than

those who live apart. If one considers the important negative effect of co-residence on giving material support, one could conclude that material support would represent a kind of substitute for co-residence or, inversely, that co-residence substitutes for material support. The effect of co-residence, on the other hand, seem not to affect the children's probability of receiving support, except for the previously mentioned case in which the adult children have children of their own.

A final and surprising result from the models in Table 35 refers to the lack of geographic barriers in the case of intergenerational transfers of material support involving the elderly in Fortaleza. Living out of Ceará state does not decrease the probability of adult children providing material support to their elderly parents. In this case, the support refers to monetary remittances from children who have left the state of Ceará to live and work in other parts of the country, but who still mantain ties with their original families. Also the inverse direction of the flow seems not to face geographic barriers. As indicated by the interaction term in the fourth model of Table 35, the chances of single (but not married) children receiving material support from elderly parents do not decrease substantially because they live out of Ceará state. This result suggests that some of the younger children who leave the state, but have not been successful in the new places, can still count on provisional monetary assistance from their parents left in Fortaleza.

Effects of Elderly Attributes on the Probability of Receiving Support from Adult Children in São Paulo.

The effects of selected covariates on the probability of an elderly parent to receive support from adult children in São Paulo are estimated by the coefficients presented in Table 36, regarding each one of the support dimensions considered in this study – material, functional and instrumental.

More frequently than was observed in Fortaleza, the effects of the selected covariates on support transfers in São Paulo agreed with the findings commonly reported in previous research. The only unexpected result was the lack of importance of the economic activity of the elderly on their propensity to receive support. As stated in the case of Fortaleza, economic activity used to be a proxy for physical and financial autonomy and, for this reason, one would expect a decrease in the probability of receiving material and instrumental support among the elderly who work. The same reasons and conditions that lead an small proportion of elderly in Fortaleza to remain in the labor force, however, seem to prevail all over the country, including São Paulo. As is the case in Fortaleza, most elderly who work in São Paulo are probably out of the social security system and engaged in low paid jobs, maybe in the informal sector of the economy.

Consistent with previous findings, on the other hand, elderly females in São Paulo are more likely than males to receive functional and instrumental support, while widow are more likely than married individuals to receive any kind of support. Age has a positive effect on receiving functional and material support, while income has a negative effect on receiving material support. The number of children is positively associated with the probability of receiving support,

especially material support, while education is negatively associated with the chances of receiving material and instrumental support.

Table 36: Estimated coefficients from logistic regressions of elderly parents' propensity to receive support transfers from adult children, São Paulo, 1994.

Characteristics of Elderly Parents	Support Received		
	Material	Functional	Instrumental
INTERCEPT	-1.209***	-7.947***	-4.912***
FEMALE	-0.348	0.906*	0.939***
AGE_2	0.058	0.859	-0.078
AGE_3	0.307	2.868***	1.463***
MARIT_2	0.810***	1.255***	0.752**
MARIT_3	-0.168	0.312	0.358
LC_2	0.769***	0.325	0.036
LC_3	0.955***	1.016**	0.628*
LC_4	1.590***	0.788*	0.452
ARRANGE_2	-1.187***	1.702***	1.684***
ARRANGE_3	-0.993**	1.557***	1.730***
INCOME_1	-0.079	0.559	-0.216
INCOME_3	-0.607**	-0.001	-0.368
INCOME_4	-1.741***	-0.746	-0.448
EDUC_1	0.035	0.114	0.245
EDUC_3	-0.367*	-0.362	-0.527*
WORK	-0.286		-0.150
MARIT_2*ARRANGE_3	-1.163*		

Notes: The reference category for age is '65-69'; for marital status is 'married'; for the number of living children is '1'; for living arrangement is 'not living with children'; for income level is 'until Cr$300,000.00'; and for education is 'complete or incomplete basic education'. See Table 32 for variable definitions.
Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

An important finding in São Paulo refers to the highly significant effect of co-residence on the probability of receiving functional and instrumental support from adult children. This result underscores the crucial importance of physical proximity for the realization of functional and instrumental support transfers from adult children to the elderly, which was also found in the case of Fortaleza. Interesting to notice in the case of São Paulo is the negative effect of co-residence on receiving material support. Although inferences cannot be made regarding an eventual substitution effect between material support and co-residence in the case of São Paulo[56], it seems clear that co-residence with a child inhibits material support from other non co-resident children. As indicated by the substantial negative effect of the interaction term included in the model for receiving material support in Table 36, widowed elderly also have reduced chances of receiving material support when co-residing with children.

Between-City Analysis of the Support Transfers from Adult Children to Elderly Parents in São Paulo and Fortaleza

Taking into account the limitations of the data for comparative purposes – which otherwise has been largely discussed in a previous section of this chapter[57] – the net effects of the city variable[58] on support received by the elderly from

[56] Unlike the Fortaleza survey, the survey in São Paulo did not take into account the material support eventually received by the elderly from co-resident children. Only material support received from non co-resident children were taken into consideration.
[57] See 'Limitations of the data for comparative purposes' in the Data section of this chapter.
[58] Refers to the variable 'FORT' included into the models of Table 35.

adult children are estimated by the coefficients presented in Table 37. According to these results, the probability of receiving support of any kind is significantly higher for the elderly in Fortaleza than in São Paulo, even after controlling for the socioeconomic and demographic covariates. It would suggest that either cultural norms regarding parent-filial obligations are more influential in Fortaleza than in São Paulo or family ties are weaker in São Paulo than Fortaleza.

Of particular interest in Table 37 are the large number of interactions involving the city-variable, which expresses how distinctly some covariates affect intergenerational support transfers in São Paulo and Fortaleza. In general, these interactions translate a situation in which attributes that proved to be important predictors of the elderly's involvement in support transfers with children in São Paulo have practically no effect in Fortaleza[59]. That is the case, for instance, of being older and widowed. While in São Paulo they constitute crucial pre-conditions for receiving functional support, in Fortaleza they have practically no explanatory power[60]. The advantage of elderly female over the male in receiving instrumental support, on the other hand, seems to be less accentuated in Fortaleza than in São Paulo[61]. Co-residence with children also has effect significantly

[59] The only positive effect of an interaction term involving the city-variable refers to the interaction with number of living children in the model of receiving material support. The greater effect of this variable in Fortaleza than São Paulo, however, could be due to the higher mean number of children in Fortaleza than São Paulo for those elderly in the highest category of this variable.

[60] See the negative effect of the interaction terms involving the city-variable with age and marital status in the second model of Table 37.

[61] See the negative effect of the interaction term between the city-variable and female in the third model of Table 37.

greater in São Paulo than Fortaleza on the elderly's probability of receiving instrumental support[62].

What all these findings suggest is that support transfers from adult children to elderly parents is much more widely spread in Fortaleza society than in São Paulo. If, on the one hand, this situation reinforces the idea of the differential effect of cultural norms across the two societies, on the other hand it points towards the need for further research on this topic, in order to identify the effect of factors that were not included in this analysis.

Table 37: Estimated coefficients from logistic regressions of elderly parents' propensity to receive support transfers from adult children, São Paulo (1994) and Fortaleza (1997) samples pooled together.

Characteristics of Elderly Parents	Support Received		
	Material	Functional	Instrumental
INTERCEPT	-1.891***	-7.172***	-4.698***
FORT	0.556***	2.310***	2.323***
FEMALE	0.161	0.854***	1.039***
AGE_2	0.143	0.382	0.019
AGE_3	0.313*	2.529***	1.549***
MARIT_2	0.700***	1.268***	0.350*
MARIT_3	0.124	0.520	0.201
LC_2	0.893***	0.418	0.147
LC_3	1.010***	0.633*	0.507*
LC_4	1.653***	0.598*	0.445*
ARRANGE_2	-0.678***	1.269***	1.717***
ARRANGE_3	-0.890***	1.327***	1.766***
INCOME_1	0.010	0.484	-0.460*
INCOME_3	-0.242	-0.150	-0.362*
INCOME_4	-1.177***	-0.400	-0.560**
EDUC_1	-0.255*	0.130	0.250*
EDUC_3	-0.331*	-0.189	-0.853***
WORK	-0.193		-1.144**

[62] See the negative effect of the interaction terms between the city-variable and the variables that indicate co-residence with married and unmarried children in the third model of Table 37.

MARIT_2*ARRANGE_2	-0.473*		
MARIT_2*ARRANGE_3	-0.777*		
FORT*LC_3	0.497*		
FORT*AGE_3		-1.137**	-0.562
FORT*MARIT_2		-0.869*	
EDUC_3*WORK			1.608*
FORT*FEMALE			-0.711*
FORT*ARRANGE_2			-1.172***
FORT*ARRANGE_3			-1.013**

Notes: The reference category for age is '65 to 69'; for marital status is 'married'; for the number of living children is '1'; for living arrangement is 'not living with children'; for income level is 'until Cr$300,000.00' if living in São Paulo or 'until 1 minimum wage' if living in Fortaleza; and for education is 'complete or incomplete basic education'. See Table 32 for variable definitions. Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Comments

The informal support transfers between elderly parents and adult children were found to be extremely intense in Fortaleza in both directions. This leads to two important assessments. First, the intense flow of support from adult children to elderly parents is a substitute for an important share of support which, in other contexts, would have been transferred to the older members of society through formal mechanisms such as the social security and the public health systems. The intense support flow from elderly parents to adult children, on the other hand, particularly regarding material support, constitutes an example of the perverse consequences for the elderly of an unfavorable socioeconomic context. Not only have their children – their main source of support – gradually lost capacity to provide assistance[63], but also they themselves have remained an important source of support for their offspring well past the time they reach adulthood.

[63] Data from the United Nations Program for the Development – UNPD – show that several social indicators experienced improvements in São Paulo and Fortaleza during the 80s. In both places,

Intergenerational support exchanges tend to retain their importance in Brazil, particularly in the Northeast region where the high fertility rates of the recent past have assured the prevalence of large size families. The availability of informal support for the elderly in the future, however, has increasingly being reported to be challenged by the consequences of the huge demographic and socioeconomic transformations currently being experienced by the Brazilian society. In some sense, the findings in this study suggest that these concerns should be taken seriously.

As seen in the previous analysis, a substantial share of the support received by the elderly is provided by female co-resident children. The time spent by adult women in caring for their elderly parents, however, is supposed to decline sharply as women become more and more engaged in economic activity outside of home. On the other hand, the sharp and countrywide decline of fertility rates will certainly reduce the availability of children for future generations of elderly people, decreasing the chances of intergenerational co-residence. Since the chances of getting functional and instrumental support proved to be highly associated with co-residence, one could expect a reduction in the availability of this kind of support to the elderly.

The same factors pointed to above as inhibitors of intergenerational transfers, i.e. the increasing female participation in the labor force and the lesser

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for instance, the life expectancy and the mean number of years of schooling increased while the illiteracy rate and the infant mortality rate decreased. The economic conditions of the population however seem to be worsened. From 1980 to 1991, the proportion with unsufficient income increased from 5.93% to 11.19% in São Paulo, and from 36.69% to 48.22% in Fortaleza (PNUD, IPEA, FJP and IBGE, 1998).

number of children, also tend to favor exchanges between generations through other kinds of mechanisms. Because they work, the probability of giving material support to elderly parents will substantially increase among females. As the results show, material support is positively associated with the economic activity of the children and does not depend on physical proximity. On the other hand, declining fertility will mean further advantages for the elderly in their competition with grandchildren for the financial resources of their adult children.

Also favoring of the maintenance of high levels of intergenerational support transfers to the elderly are cultural norms and values regarding filial obligations. Such norms are expected not only to persist but also to be constantly reinforced in Brazilian society – particularly among the more traditional communities of the Northeast – as no significant improvements in the formal mechanisms to provide support to the elderly are foreseen in the short and median run.

Conclusion

Although Brazil has had a social security system in place for more than 50 years, as well as schemes that cover certain rural and/or self-employed workers in addition to persons in the more modern sectors, the current economic reality has limited benefits to most retirees. The social security system in Brazil is founded by a tax on the formal labor sector, which has contracted during the periods of economic reversals experienced by the country. As a consequence, most initiatives to ensure the economic well-being of the elderly have conflicted with structural adjustment policies to reduce rather than increase public expenditures, keeping benefit levels constantly behind inflation. There has increasingly been in Brazil – where growing numbers of elderly have become eligible for old-age pensions – an important decline in the purchasing power of pensions and, consequently, a severe deterioration in an older person's standard of living. This lack of an adequate public welfare system makes the family in Brazil a major source of support for the elderly, which explains the extremely high levels of intergenerational co-residence and support transfers to the elderly found in this study.

Both co-residence and support transfers between generations, however, varied greatly over time and across regions, and were moderated by the characteristics, resources, opportunities, and needs of both the parental and filial generations. The influence of socioeconomic and demographic attributes on co-residence in the Southeast region, and on support transfers in São Paulo, were mostly consistent with findings commonly reported in previous research. Co-residence in the Northeast and support transfers in Fortaleza, however, presented a number of unexpected relationships that have not been anticipated in previous studies. One particularly striking finding was the substantial support flow from elderly parents to adult children in the Northeast region. Many elderly people there continue to provide support to their children well into their adult years.

Much of the co-residence in the Northeast was found to be associated more with the needs of the children rather than with the needs of the elderly. While higher income of the elderly splits generations into different households in the Southeast, in the Northeast the income of the elderly stimulates co-residence between generations. The fact that elderly in the Southeast with greater economic resources were more likely to be living apart from their children indicates that at least some of the elderly in Brazil prefer privacy, and once they have the resources to achieve their preferences, they do so. The exercise of this preference by elderly in the Northeast, however, seems to be overridden by the needs of their children. Although extremely modest and often insufficient, the income of the elderly in the Northeast – mostly from retirement pensions – has became an important family asset, in spite of the needs and the poor socioeconomic conditions of the elderly themselves.

Whereas income from retirement pensions tend to be low all over the country, income derived from current employment generally does not make the elderly who work any financially better off than those who not work. The dissociation between work and financial autonomy of the elderly found in this study probably means that the elderly who work in Brazil are, for the most part, not covered by the social security system, and are mostly engaged in low paid jobs, or even underemployed in the informal sector of the economy. The income from work usually represents only a meager substitute for a retirement pension.

Mothers and daughters, in general, proved to be involved much more frequently than fathers and sons in intergenerational support exchanges. This may indicate either a greater emotional attachment between mothers and daughters, or the dissemination of traditional values in which women are more suited for taking care of parents and children[64]. The study also showed the primary role of co-residence in the exchange

[64] In fact, the study showed a strong expectation in this direction. It was asked for the elderly who reported not having any difficulty in performing activities of daily living, the person they expected would eventually

process of informal support between generations, especially support requiring physical proximity such as functional and instrumental activities of daily living. Surprisingly, however, the results indicated no geographic barriers for intergenerational transfers of material support in Fortaleza. Whereas co-resident children often had primary responsibility for the care of dependent parents and were more likely to get instrumental support from them, there is also ample evidence in this study of substantial economic contributions to households by non-co-resident adult children, including remittances of those who had migrated out from the state of Ceará.

In spite of the unexpectedly high levels of support rendered by the elderly to adult children, support received from children still constitutes a crucial dimension of the elderly's well-being, especially in the case of the Northeast region. As the process of population aging in Brazil intensifies, however, the availability of informal support to the elderly in the future will become increasingly jeopardized. At the same time that life expectancy at birth has been improving, fertility has been declining, migration and urbanization have increased, and female labor force participation has risen. These developments, in conjunction with a decline in the economic conditions of the younger generations, have been thought to pose potentially serious problems for parents requiring support in old age. The findings in this study suggest that such considerations should not be completely dismissed, although they should be taken cautiously.

There are many reasons to believe that intergenerational support exchanges will remain important in Brazil, particularly in the Northeast region. Although fertility has declined rapidly in Brazil in recent decades, the effect on the numbers of children that older women have will be felt with a lag. Moreover, declining fertility levels and increasing female participation in the labor force can, instead, constitute stimulating factors for support transfers for the elderly.

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give them support if they needed help in the future. Those who reported a daughter instead of a son accounted for 73.2% in the case of instrumental support and 79.2% in the case of functional support.

The analysis developed in this study to examine the effects of family structural characteristics of both aging parents and adult children on exchange patterns of support adds substantial knowledge in a practically unexplored area of Brazilian socio-demographic research. There remain, however, many unresolved issues. One refers to the extent to which either cultural norms regarding parent-filial obligations or stronger family ties are responsible for the higher levels of intergenerational support transfers found in Fortaleza than in São Paulo, even after controlling for socioeconomic and demographic covariates. Another refers to the unexpected inhibiting effect of no-education on support transfers in the Northeast. Although an education gap between illiterate parents and more educated children would be expected to impose some barriers to inter-generation co-residence, it remains unclear why this situation would also hamper other kinds of support.

Given the huge socioeconomic contrasts in Brazil, another aspect that should deserve special attention refers to the differential aging patterns all over the country. In particular, further research should include rural settings. Because urbanization is driven in large part by youthful migration from rural areas to cities, it influences the age distribution in both sending and receiving areas. Thus, in spite of the increasingly urban nature of today's Brazilian elderly population, rural areas remain disproportionately older than the urban areas of the country.

There has been considerable discussion of the consequences of rural-to-urban migration for family structure and the well-being of the elderly who are left behind in rural areas. A commonly expressed concern is that movement of younger adults to urban areas resulted in the isolation of the aged in rural areas, presumably to the latter's detriment. In this sense, comparative analysis should be performed to investigate how differently intergenerational support transfers operate in urban and rural contexts.

For any one of the above suggested research topics, further investigation will require both the implementation of new data gathering instruments and the elaboration of more refined analytical tools. First, the geographic area of study necessarily needs to be

expanded. Second, data collection has to include information allowing for more qualitative inferences. Finally, more complex models have to be tailored, taking into consideration a larger set of characteristics of the younger generation.

Vita

Paulo Murad Saad was born in São Paulo, SP, Brazil on January 07, 1956, the son of Rosa Rabbat Saad and Murad Salomão Saad. After completing his work at Colegio Rio Branco (High School), São Paulo, SP, in 1974, he entered the University of São Paulo in São Paulo, SP. He received the degree of Bachelor in Statistics from the University of São Paulo in December 1978. During the following years, he was employed as a researcher at the SEADE Foundation of São Paulo. In August 1981, he entered El Colegio de Mexico in Mexico City. In September 1984 he received the degree of Master in Demography from El Colegio de Mexico. He returned to SEADE Foundation in 1984, where he held positions such as Head of the Vital Statistics Sector and Head of the Demographic Indicators Department. During this time he presented a number of studies at scientific congresses, wrote several articles in scientific journals and organized the publication of a book. In August 1992, he entered the Graduate School of the University of Texas and since 1997 he has been employed at the PARANACIDADE Autonomous Social Service Agency in Curitiba, PR, Brazil as an urban development specialist.

Permanent address: Rua Presidente Taunay, 1200 apt. 202, Curitiba, PR, Brazil, 80430-000.

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