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THE BRAZILIAN FAMILY IN THE LABOR FORCE, 1978-1988: A STUDY OF LABOR SUPPLY

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ABSTRACT

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In this paper the family but not the individual is the unit of analysis and of observation.The family is considered central for labor participation decisions and for the assessment of the welfare of their members.This paper aims at a better understanding of how individuals who pool resources in the context of a family share labor force participation decisions.

This study covers the years of 1978, 1983, 1986 and 1988.The source of data is "Pesquisa Nacional por Amostra de Domicilio-PNAD" (Household Survey) for those years.The unit of observation is the family living in an urban household in the metropolitan areas of the Northeast (Recife, Fortaleza, Salvador) and of the Southeast (Rio, Sao Paulo and Belo Horizonte).The regional differences are included in the analysis to assess whether spatial disparities affect the outcomes in terms of family labor force participation decisions.Families are classified by the sex of the head.

The paper is divided into two parts.The first one provides an analysis of the trends on labor force participation rate, unemployment and income for the family classified according to the status of its members in the labor force (Sections II, III and IV) over the period 1978-1988.The second and most important part specifies a cross-section family labor force participation model for 1988 in order to test the hypothesis that a lowering of head's income(income-effect) and an increase in family unemployment(unemployment-effect) rise the labor supply of family members(Section V).

The model presents evidence, after controlling for a set of features which influences labor force participation decisions, that there are significant income and unemployment effects in the labor supply response of Brazilian families to adverse economic conditions.This finding applies, in general, to the metropolitan areas of the Northeast and of the Southeast.However, the income -effect is stronger in the Southeast and the unemployment effect more important in the Northeast.The income -effect is strong among the very poor and weakens as the head's income increases.The unemployment effect is more generalized across head's income but, nevertheless, gets weaker as income grows.

For all families and either for families headed by men or by women, evidence points out that a drop in head's income or an increase in family unemployment will drive up family labor supply.

KEY WORDS: Brazil, Labor Supply, Labor Force, Labor Force Participation

THE BRAZILIAN FAMILY IN THE LABOR FORCE: 1978-1988: A STUDY OF LABOR SUPPLY

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I. INTRODUCTION

Studies on labor supply usually take demographic groups with similar characteristics as their concern. Thus, there are studies which consider the group of women in a given age interval, e.g., as the aim of their analysis (see Killingsworth and Heckman, 1986; Sedlacek and Santos, 1990). In this paper, the *family but not the individual* is the unit of analysis and of observation. The family is considered central for labor participation decisions and for the assessment of the welfare of their members. Within the household, decisions are taken with regard to market and domestic work. Such decisions affect all family members, their current and prospective income, their relationship with the market and its well-being. This paper aims at a better understanding of how economic units who pool resources share labor force participation decisions.

Sections II to IV of this paper study the patterns of labor force participation, unemployment and income of families living in the metropolitan areas of the Northeast and of the Southeast of Brazil. Households are classified according to the sex of the head. Thus, information is available for the pool of households and for those headed by men and by women.[1] Section V develops a family labor supply model so as to assess how variations in head's income or in family unemployment affect the participation decisions of family members other than the head (spouse, children, relatives and others).

This study covers the years of 1978, 1983, 1986 and 1988. The source of data is "Pesquisa Nacional por Amostra de Domicilio" -- PNAD (Household Survey) for those years. The unit of observation is the family living in an urban household in the metropolitan areas of the Northeast (Recife, Fortaleza and Salvador) and of the Southeast (Rio, Sao Paulo and Belo Horizonte). We measured a set of characteristics for each and every family contained in the sample.[2] Thus, the concepts of family labor force participation and of family unemployment which are novel in this paper, e.g., refer to the

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[1]The head of household is the person responsible for the family or that person seen as such by other family members.

[2]The concept of family as used by PNAD is that group of persons linked by ties of parenthood, domestic dependence and norms of social conduct who live in the same household unit. A single-person household is also considered to be a family. The latter was excluded from the analysis because we are interested in assessing how labor family supply stems from cross-effects among family members.

members of the household as a whole. Thus, the family is the unit of analysis and of *observation*. Every measurable trait for each family generates an unit of observation for a given variable.[3]

The households included in the sample were only those whose head was in the labor force and which were occupied by a single family.[4] As members of the family we considered the head, spouse, children, relatives and others. In this last group are not included domestic servants and their children. Their exclusion from the sample stems from the fact that they do not, usually, participate in family decisions or share the same budget constraint.

The classification of families according to the sex of the head is based, for the purpose of this paper, on the assumption that the vulnerability of families to adverse economic and labor market conditions depend on the sex of the head. Either single-member families or those with only the head living in the household accompanied by relatives or others were excluded from the sample. Table 1 shows which types of family were included in the sample.

TABLE 1

Types of Family

Presence of Other Family Members	Headed by Males		Headed by Females	
	Spouse Present	Spouse Absent	Spouse Present	Spouse Absent
Sons/Daughters (only)	Yes	Yes	Yes	Yes
Sons/Daughters & others	Yes	Yes	Yes	Yes
No Sons/Daughters	Yes	No	Yes	No
No Sons/Daughters & no others	Yes	No	Yes	No

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[3]If we take for each and every family contained in the sample:

E as the number of family members (10 years old and over) employed;

U as the number of family members (10 years old and over) seeking for a job;

F as the number of family members 10 years old and over;

then we define:

a = E/F + U/F as the family labor force participation rate and;

d = U/(E+U) as the family unemployment rate.

A person is in the labor force if he/she is either working or actively searching for work in the reference week of the survey. A person is working if he/she is undertaking an economic activity for which: (a) is being paid in money or in kind; and (b)is not being paid but performs tasks at least 15 hours per week helping another member of the household.

[4]The sample was selected by requiring that the head of the household be a member of the labor force. This restriction is due to the traits of the family labor supply model to be shown in Section V. However, this choice will affect the measure of family labor force participation as it will be demonstrated later on.

The types of family included in the sample encompass the dominant forms of household organization in Brazilian society. However, they have grown, over the 1981-87 period, at a slower pace than the total number of households. Over this period, it has been observed an increase in the number of single-person households and of different household arrangements which are not based on family ties (Bilac, 1991).

However, the so called "nuclear family" still accounts for over 60% of the Brazilian households both in urban and rural areas despite the fact that its weight has declined, above all in the cities, since the 1970's.[5] This relative decline, however, is not being offset by the growth of "extended families" since this group is also showing a downward trend.[6] The falling relative importance of "nuclear families" is being off-set by the growth of single-parent families particularly those headed by women as a result of a substantial increase in the number of separations, divorces and of single-mothers (Bilac, 1991).

These transformations in the structure of Brazilian households occurred while the economy underwent wide fluctuations.

Over the period 1978-1988, the Brazilian economy experienced ups and downs in its GNP's growth rate. The year 1978 was the last one of economic prosperity and moderate inflation just before the second oil shock (1979) crisis and the devastating effects of the U.S. monetary policy on Brazil's large foreign debt (Jatoba, 1986 and 1989a). In 1983, the Brazilian economy was at the trough of its major economic slump since World War II. The short-lived Cruzado Plan was set in motion in 1986 when the country went through an unprecedented and brief economic boom under stable prices which led to high levels of employment and labor income. Finally, 1988 was marked by a new and unsuccessful attempt to stabilize prices which had been initiated in 1987. Therefore, there were major economic fluctuations in the level of aggregate demand over this period. The impact of such changes on the growth and composition of employment demand has been more extensively investigated in the Brazilian economic literature than its impact on the supply side of the labor market. It is still not well known how these economic fluctuations affected the supply of labor by families and their welfare.

[5]The sociological concept of a "nuclear family" encompasses a set of traits. It is a social sub-system highly specialized that, given its well defined functions, sustains multiple relationships with other social sub-systems and with the whole of society. It is also a social group with a well structured core bonded by marriage, that acknowledges bilateral parenthood and which sets different sexual and social roles for their members.

[6]The concept of "extended family" is not an alternative to the concept of "nuclear family." It can be taken as different timings or transitory moments over the life path of a nuclear family that it can swell or shrink at different periods of its life cycle. Thus, a nuclear family at one moment of the life cycle can be transformed into an extended family at other moment of the cycle. Furthermore, it can be fragmented again in multiple nuclear families later on. The two concepts are not mutually exclusive but represent different timings of the family life cycle.

Brazil has one of the widest regional income disparities in the world. The Northeast is a relatively poor region as compared with the Southeast. In 1988 per capita income in the former was 28.5% of the latter. The Northeast always ranks last in comparison with the other four macro-regions (South, Southeast, Center-West and North) in almost all social indicators. In 1990, data from PNSN (Pesquisa Nacional sobre Saude e Nutricao) show that 49.22% and 76% of all Brazilian urban and rural poor (defined as people living in households where family per capita income was less than half minimum wage per month) were, respectively, located there.[7] This paper also evaluates how the regional differences affect the outcomes in terms of family labor force participation decisions.

This paper contains six sections besides this Introduction. Section II describes the trend in the labor force participation rate of the family according to the status of their members in the household (spouses and children). Section III shows how unemployment has affected Brazilian families during this period. In section four the paper discusses the level and structure of household income. In Section V, a family labor force participation model is specified to test whether a lowering of head's income and an increase in family unemployment might affect the supply behavior of family members. This is a cross-section model and it applies only to 1988. It describes how cross-person adjustments are being made within families. In Section VI, we provide a summary of the findings and some conclusions.

II. TRENDS IN FAMILY'S LABOR FORCE PARTICIPATION RATES

The family labor force participation rate is defined as the fraction of persons aged ten years and over in the household who are either employed or searching for a job. Such a rate was computed for each family in the sample.

Family labor force participation rate (FLFPR) shows an increasing trend for the metropolitan areas (MA's) of the Northeast (NE) and of the Southeast (SE). The FLFPR rates for the SE are generally higher than for the NE. This may result from the fact that higher wage labor markets absorb, on average, a larger fraction of the family in market work (Table 2).[8] The growth of the FLFPR either for the

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[7]The minimum wage is usually used as a numeraire to measure income in Brazil. The nominal minimum wage rate is increased frequently as a result of inflation. In order to compare income levels over time it is common to use the real minimum wage measured at a given month and year as a yardstick of value. The minimum wage is not taken here as a poverty line although many analysts would consider it as such.

[8]Although market factors may account for higher FLFPR's in the metropolitan areas of the Southeast, it should be stated that if northeastern families have more children between the ages of 10 and 17, then we should expect lower FLFPR's for the MA's of the Northeast because this age group has lower labor force participation rates than the age group over 18. In fact, for urban Brazil in 1987, the labor force participation rate of children aged between 10-17 years old is 30.1% while the rate for the group over 18 years old is 78.6% (FIBGE, 1989b). Since the fertility rate in the Northeast is higher, it is likely that the general age composition of the children of northeastern metropolitan areas will tend to be younger than those of the Southeast. Thus, a demographic factor may also

pool of families or for those headed by men or by women shows, irrespective of the MA, that there has been an intensification of market work by Brazilian households during the period under study. We will inquire into the factors which might account for such increases later on.

The FLFPRs for female headed households are higher than those headed by men.[9] The differences are almost 14 and 11 percentage points, respectively, for the MA's of the SE and of the NE, in 1988. There are reasons to believe that families headed by women have a more intense labor market participation as a result of the absence of the male head. These families are usually broken ones and tend to use more of their members for productive market work than families headed by men as a kind of compensating mechanism to offset the absence of a prime male income earner. Furthermore, the group of female headed households increased its share among the population of women aged between 15 and 54 from 7.7% in 1983 to 9.2% in 1988 for the whole of Brazil (Sedlacek and Santos, 1990). This evidence is an important welfare indicator since this type of family is the one most likely to be linked with chronic poverty and structural deficiencies in its ability to generate family income (Barros and Mendonca, 1990). Households headed by females are a more significant phenomenon in urban areas, particularly the metropolitan ones. In 1984, 9.1% of the families were headed by women in the MA's of Brazil. The figure for the country as a whole was 7.9% (Sedlacek and Santos, 1990).[10]

The labor force participation rate of women aged between 15 and 54 who were heads of household increased from 70%, in 1983, to 72.5% in 1988. These LFPRs are considered to be low given the social and economic conditions of these families and the lack of social policies designed to meet their needs (Sedlacek and Santos, 1990).

The highest FLFPR was found for households in the SE which were headed by women: there, 75% of family members aged 10 years and over were engaged in the labor market.

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account for the difference between the FLFPR's of the two regions. This same demographic trait may affect the growth of the FLFPR since it can rise as a result of fewer or smaller proportion of children between 10-17 years of age. I thank Prof. Glen Cain for calling my attention to this point.

[9]However, not only market forces may account for this difference. The requirement that the head of the household be in the labor force makes the FLFPR for female headed households appear higher, relative to the FLFPR of male headed families, than if we had compared the FLFPRs of all female headed households with the FLFPRs of all male headed families. This would be so if a larger proportion of all female headed families have a non-working head than of all male headed families. Notwithstanding this possibility, in the Brazilian case families headed by women have usually an absent male. Thus, in almost all cases families headed by women have the head in the labor force. In fact, in 1987 all female headed households with the spouse absent and children present accounted 11.9% of the overall number of families which is exactly the same figure for female headed households with the head in the labor force (FIBGE, 1989b).

[10]For the U.S., according to data from the Census Bureau for 1991 published by the *New York Times* (10/5/92, p. B6), the percentage of single-parent households headed by women was 19.3%, 58% and 28.7%, respectively, for whites, blacks and hispanic. These figures are extremely high when compared with the Brazilian ones.

TABLE 2

Metropolitan Areas of the Northeast (NE) and of the Southeast(SE)
Trends in the Flfprs by Type of Household
1978/1988
(in %)

	NE				SE			
	1978	1983	1986	1988	1978	1983	1986	1988
A. Family								
Households (Total)	52.76	55.93	58.18	60.09	56.25	60.89	63.02	62.61
Headed by Men	51.95	55.25	57.67	58.82	55.31	59.80	61.88	61.17
Headed by Women	63.76	64.48	64.51	69.38	70.63	74.05	74.81	75.01
B. Spouses								
Headed by Men	27.47	33.89	37.55	41.54	25.27	33.09	38.47	38.29
C. Children								
Households (Total)	23.41	23.80	27.34	30.08	34.15	36.64	37.61	36.77
Headed by Men	21.84	22.06	26.38	27.20	31.79	34.32	34.91	33.91
Headed by Women	36.98	35.19	36.53	41.78	52.23	52.13	53.82	52.43

Source of Basic Data: PNAD, computations done by the author.

Therefore, the data on Table 2 shows that Brazilian households are increasing their labor force participation. Before we inquire into the causes of this phenomenon, we will decompose the FLFPR in such a way as to reveal the patterns of labor force participation rates of spouses and children. We should recall that, in our sample, household's heads are always in the labor force. The LFPR of family members other than spouses and children will not be our concern at this stage of the analysis. For the time being, the focus of the analysis is only on the labor force participation trends of spouses and children since they constitute the core of family workers other than the head. In the multivariate analysis which will be conducted in Section V we will take into account all other family members.

The spouse's labor force participation rates (SLFPR) -- measured by the ratio between the number of spouses either working or looking for a job and the total number of spouses -- show for families headed by men or women (pool) a substantial increase over the period under study. In the MA's of the NE this rate went up from 27.47% to 41.54% between 1978 and 1988 (an absolute variation of almost 15 percentage points). Similar figures for the MA's of the SE are 25.27% and 38.9% at each end of the period. As can be seen in Table 2, in 1988, the SLFPR of the MA's of the NE surpassed the one from the SE. This means that in 1988 a larger fraction of spouses were engaged in the labor market of the MA's of the NE than in the MA's of the SE. It is likely that the increasing process of impoverishment

in an already destitute region might be pushing the spouses towards the labor market at a rate which is higher than in MA's where the labor market is more attractive in the sense that it offers better jobs and wages. However, Sedlacek and Santos (1990) report that the married women's LFPRs are not necessarily associated with the region's development level since these rates were in 1984 around 34-36% for the MA's of Sao Paulo, Curitiba and Belo Horizonte and around the 40-43% mark for the MA's of Fortaleza, Salvador and Porto Alegre.

The majority of households are headed by a husband with wife present. However, in those headed by women the male is generally absent. Thus, most of the increase in the SLFPR is really attributable to the increasing labor force participation of married women.[11] In fact, for families headed by men the LFPR of married women (in the broad sense of the term) has shown a steady upward trend similar to that presented for the households as a whole. Furthermore, it shows that married women in 1988 were more often participants in the labor markets of the MA's of the NE than their counterparts in the MA's of the SE.

Sedlacek and Santos (1990) report for 1989 that married women aged between 15 and 54 years accounted for 56% of the Brazilian female population and for about 47% of working women. Furthermore, they state that for Brazil as a whole the labor force participation rate among married women (between ages 15 and 54) grew from 34.4% in 1983 to 39.7% in 1988. This represented an additional 1.9 million workers over the stated period. Such an increase is considered to be one of the most important structural changes observed for the Brazilian labor market in recent times. Married women workers in comparison with women who are heads of households are, on average, younger (35 against 39 years) and have shorter working hours per week (37 against 42 hours).

Children's labor force participation rate (CLFPR), measured by the ratio of children age 10 years and over employed or seeking for a job to the total number of children in the same age range, increases slightly for the MA's of the SE as we take households either headed by men or women. In fact, between 1978 and 1988 the CLFPR grew from 34.15% to 36.77 (Table 2) but the figure for the latter year was almost one percentage point lower than for 1986 (37.61%). However, for the MA's of the NE the trend is much steeper although these rates are overall lower than those found for the MA's of the SE showing that higher wage labor markets may have greater power to attract not only the adults but also the youth

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[11]The SLFPR trend for the pool of households is determined by the behavior of the SLFPR for households headed by men. The SLFPR for women's headed households does not have much meaning because the male partner is either absent or disabled. There are very few cases in which the male partner is present and engaged in the labor force as a secondary family worker.

as well. This finding is an indication that favorable labor market conditions might be playing a more important role in determining CLFPRs than family poverty.[12]

Notwithstanding this finding, the absolute change of the CLFPR for the MA's of the NE was of almost 7 percentage points, a variation considerably larger than that found for the MA's of the SE (2.6%) over the entire time span. This means that the speed at which the children are entering the labor market in the MA's of the NE is higher than for the more developed metropolitan areas of the SE. This might be determined by the economic conditions of the former region which is drawing child's labor at an increasing rate to the market as a means of offsetting chronic poverty and temporary falling family's income. Barros and Mendonca (1990, Table VII, p. 14) reports for 1988 that average earnings for teenager workers in the MA of Recife were only .57 minimum wage per month. Furthermore, 78.9% of them lived in households where family per-capita income was less than one minimum wage.

Child's labor is nowadays an important issue in Brazil's social policy and it is closely connected with another social issue which is the so called "street kids," a name given to identify the thousands of school drop-outs, boys and girls, minors and teenagers, who have taken the streets and boulevards of the major Brazilian metropolitan areas. Barros and Mendonca (1990), for instance, reported that for minors aged between 10 and 17, the labor force participation rate: (a) grows with age; (b) is higher for boys than for girls; (c) is higher for blacks and mixed colored youths than for white ones; (d) is higher for female headed households; (e) is higher the lower the per capita family income and; (f) is higher for MA's where better wages and employment conditions prevails.

For male headed households the CLFPR shows a pattern similar to that found for the complete set of households. The CLFPR are higher in the MA's of the SE but its growth is faster among the MA's of the NE.

However, in female headed households the CLFPR is higher than in male headed ones. This finding is expected since the children in this type of family are usually poorer than in that headed by men. The children tend to help the mother to earn additional income due to the absence of the prime male income earner. Furthermore, the mean children's age in female headed households is higher than in male headed ones and, since labor force participation increases with age, a higher CLFPR among the former households is due to the fact that minors among those families are older (Barros and Mendonca, 1990, p. 11). For the MA's of the SE, the CLFPRs are higher and quite stable over the period. However, these rates for the MA's of the NE also increased more rapidly as compared with those of the

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[12] Children includes minors aged between 10 and 17 as well as adult children aged over 18. There are two traits which also affect the inter-regional differences in CLFPR as well as its behavior over time. The first is the school enrollment rate and the second the fertility rate of young women aged between 15-19. An increase in both which is likely occurring in Brazil would have opposite effects on the CLFPR.

MA's of the SE. Thus, in 1988, almost 42% of the children living in families headed by women were either employed or looking for a job in the MA's of the NE.

Therefore, the observed trends in the labor force participation rates of families taken as a group, as well as of individual household members classified by their family status, show that there has been an increasing entry of members of the household, other than the head, into the Brazilian metropolitan labor markets. During the process of economic development, it is presumed that the level and the composition of the labor supply will change in order to adjust to shifts in the level and sectoral composition of output. It is also expected, e.g., an increase in women's labor force participation rates (Schultz, 1990). Youth labor force participation rates, notwithstanding, should go down as a result of higher school enrollment. In the Brazilian case, the labor force participation rate of minors increases with age but also the rate of non-school attendance (Barros and Mendonca, 1991).

Even for the women's case there are questions pending about the causes of such a fast rise in labor force participation rates. The observed decline of 18.6% between 1980 and 1983-1986 in the fertility rate of Brazilian women is obviously a likely structural factor pushing up their labor force participation rate.[13] However, we are not concerned here about the structural determinants of increases in the labor force participation rate of Brazilian women among which changes in the fertility rate is a major one. Our argument in this paper is that economic adversity has fostered women's labor force participation. The 1978-1988 period was marked by a deep economic slump in 1981-1983, high inflation rates, a foreign exchange crisis associated with the debt problem and two unsuccessful heterodox stabilization attempts (Cruzado and the Bresser Plans). As a result of compounded problems the Brazilian economy grew during this period at a rate far below its historical growth path (7% per year).

The outcomes of a poor decade of economic performance were higher unemployment rates and a sharp drop in real income. Besides, as a result of inflation and the continuing operation of long standing structural mechanisms, income inequality reached unprecedented levels in a country which already had one the most unequal income distributions in the world. Thus, during this period the country faced an increase both in absolute and relative poverty. Our hypothesis is that the observed increase in FLFPR is much more related to these phenomenon than to the structural changes associated with the long-term development process experienced between World War II and the end of 1970's. In other words, it might be related more to short-term (or mid-term) economic fluctuations than to long run changes induced by economic development.

Therefore, we will assess in the following two sections how the economic crisis of the late seventies

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[13]The data for 1983-1986 come from the BENFAM/DHS(1987) survey. From 1970 to 1980 (census data) the fall in the fertility rate was 25%.

and of the eighties affected the unemployment and income of the Brazilian families living in the MA's of the SE and of the NE.

III. FAMILY UNEMPLOYMENT

The family unemployment rate (FUR)-measured by the ratio of the number of people aged 10 and over who are seeking employment and the number of persons in the family (age 10 and over) who are in the labor force is displayed in Table 2. The FUR increases in 1983, the worst year of the recession, declines in 1986, the booming year of the Cruzado Plan and rises again in 1988. The FURs for 1988 are higher than 1983 only for the MA's of the NE. In the case of the southeastern MA's the FURs were below the 1983 figures. In "normal" or booming years the FUR is higher in the MA's of the NE as a result of structural unemployment. In 1983, however, the FUR is higher for the MA's of the SE which were the ones hardest hit by the recession. These areas concentrate the bulk of economic activity in Brazil and are, therefore, more sensitive to economic fluctuations than the less industrialized MA's of the NE.

Table 3 also shows that the FUR is higher among female headed households than in male headed households. This means that members of this kind of household have more difficult to get into the labor market. It is also likely that they face lengthier unemployment periods as compared to household headed by men. Besides, this is not a cyclical phenomenon. It is treated in the literature as a structural trait of female headed households.

Disagregating the unemployment rate by head's income we find that the unemployment rate is higher the lower is the head's income (Table 4). For 1988, the rate of family unemployment for households whose head earned up to one minimum wage was 7.77 and 3.46 times higher, respectively in the MA's of the SE and of the NE, than for households where the head secured 10 m.w. or more per month. It stands out that the gap between the two FURs is much larger for the MA's of the SE.

We shall now proceed to describe how the unemployment rates of heads, spouses and children have behaved over time.

Data on unemployment of the heads show that the jobless rate (unemployed heads as a fraction of the total number of heads in the labor force) is higher among families headed by women than in those headed by males. It is striking that the unemployment rate of female heads of household reached as high as 5.10% for the MA's of the SE. The general trend for the 1980's, particularly in the later years of the decade, is of increasing unemployment among the heads of households.

TABLE 3

Metropolitan Areas of the Northeast (NE) and of the Southeast(SE)
Family Unemployment Rates
1978-1983
(in %)

	NE				SE			
	1978	1983	1986	1988	1978	1983	1986	1988
A. Family's UR								
Households (Total)	3.08	4.62	3.14	5.67	2.01	6.03	2.37	3.33
Headed by Men	2.79	4.38	3.03	5.32	1.81	5.69	2.28	2.97
Headed by Women	6.31	6.83	4.03	7.95	4.85	9.96	3.17	6.51
B. Head's UR								
Households (Total)	1.58	3.29	1.63	3.45	1.00	3.99	1.47	2.10
Headed by Men	1.69	3.24	1.59	3.30	1.14	3.94	1.50	2.00
Headed by Women	2.78	3.71	2.69	4.44	2.48	5.10	1.15	3.86
C. Spouse's UR								
Headed by Men	4.00	3.52	3.84	3.98	3.42	4.42	1.90	2.38
D. Children's UR								
Households (Total)	8.93	13.42	9.22	16.78	5.77	15.62	6.19	9.10
Headed by Men	8.24	12.73	9.63	17.23	5.45	15.37	6.16	8.05
Headed by Women	13.67	14.58	7.87	15.44	7.45	16.80	6.47	11.36

Source: PNAD's/FIBGE.

TABLE 4

Metropolitan Areas of the Northeast (NE) and of the Southeast(SE)
Family's Unemployment Rate for the Pool of Families across Head's
Income
1988
(in %)

Head's Income in Minimum Wage Units	NE	SE
Below 1 m.w.	7.69	6.69
From 1 up to 2 m.w.	2.88	1.70
From 2 up to 5 m.w.	2.69	1.43
From 5 up to 10 m.w.	3.38	1.04
Over 10 m.w.	2.22	0.86

Source: PNAD's/FIBGE.

The spouse's rate-measured by the ratio of spouses looking for a job to those engaged in the labor market-is chronically higher among the northeastern households, with the exception of the recession year of 1983, than elsewhere (Table 3). This behavior is determined basically by the pattern observed for male headed households for reasons we have already explained above. (That is why Table 3 shows the SURs only for men's headed households.)

As far as the unemployment rate of children (CUR-measured by the fraction of children 10 years old and over who are seeking jobs) is concerned, the data shows these rates to be higher than those for spouses. This is in accordance with the common knowledge that unemployment is more widespread among youths than adults. The same pattern found for the SUR shows up again. The CURs are higher-except in 1983-for the MA's of the NE. It should be stressed that the CUR for male headed households living in the MA's of the NE reached a figure as high as 17.23% in 1988. In fact, all 1988 CUR figures for the latter MA's were higher than in 1983 when the economy was at the trough of the recession which had started in 1981. All these figures indicate that in metropolitan urban Brazil a high and growing proportion of the child labor force is jobless. A comparison between 1978 and 1986 which were prosperous years seems to point out that CURs seems to have reached a higher level in the mid 80's than in the late 70's.

These findings points to the fact that there has been an increasing unemployment trend among Brazilian metropolitan families during the 80's. However, unemployment seems to be hitting more the children than the spouses. It is likely that at times of economic difficulties family's strategy might just be placing the children first rather than the spouses into the labor market. We shall see next how household income behaved during the period 1978-1988. Later we will assess how changes in family's unemployment and in head's income affect the labor supply decisions of spouses, children and other family members.

IV. TRENDS IN HOUSEHOLD INCOME

All income data are measured in terms of the higher real minimum wage of 1983. First, we will analyze household income. Afterwards we will describe the behavior of head's, spouse's and children's labor income.[14]

The drop in real household income was substantial during the 80's. The peak of family income occurred in 1986 for all types of families and in the MA's of both regions. However, the level of real

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[14]Unfortunately, the 1978 data on income cannot be used since it is showing some inaccuracy. Since this error cannot be corrected now, we decided to drop all income information related to 1978.

income in 1988 was below the 1983 figure. For households headed either by men or by women (pool) and located in the MA's of the NE, real labor income fell from 6.47 m.w. to 2.4 m.w. between 1986 and 1988, a drop of 63% in real terms. This was the aftermath of the unsuccessful Cruzado Plan and of the -- at that time -- on going Bresser Plan. A similar fall was observed for the families residing in the MA's of the SE. Household labor income in the SE is higher than in the NE. This result is expected, given the differences in the level of development between the two regions. Notwithstanding, the absolute difference is apparently getting narrower over time (Table 5).

TABLE 5

Metropolitan Areas of the Northeast (NE) and of the Southeast (SE)
Household Labor Income
1983-1988
(in real minimum wages of 1983)

	NE			SE		
	1983	1986	1988	1983	1986	1988
A. Family Income						
Household (Total)	4.64	6.47	2.44	7.08	10.84	3.67
Headed by Men	4.83	6.66	2.59	7.32	11.20	3.80
Headed by Women	2.51	4.78	1.50	4.33	7.08	2.58
B. Per Capital Family Income						
Household (Total)	1.18	1.63	.63	2.02	3.11	1.06
Headed by Men	1.22	1.66	.65	2.07	3.17	1.08
Headed by Women	.77	1.43	.46	1.53	2.45	.88
C. Head's Income						
Household (Total)	3.61	4.97	1.81	5.33	7.66	2.60
Headed by Men	3.80	5.19	1.96	5.58	8.06	2.76
Headed by Women	1.45	2.83	.81	2.32	3.46	1.22
D. Spouse's Income						
Headed by Men	1.68	2.45	1.02	2.44	3.55	1.33
E. Children's Income						
Households (Total)	1.13	1.48	.46	1.72	2.57	.86
Headed by Men	1.16	1.49	.48	1.75	2.68	.90
Headed by Women	.99	1.56	.40	1.54	2.07	.69

Source: PNAD's/FIBGE.

On the other hand, household income is higher among male headed families in comparison with families headed by females. In fact, family income for the latter was in 1988, 58% and 68% lower than the former, respectively, for the MA's of the NE and of the SE. Furthermore, couple's income was in 1983, 2.33 (NE) and 1.75 (SE) times that of female headed families[15] (Jatoba, 1990). Thus the latter have higher labor force participation and unemployment rates and lower income levels. These traits make such a group more vulnerable to recessions.

Family per capita income is a well accepted measure of welfare even though corrections might not be made to account for the presence of children. Table 5 shows that, by this yardstick, there has been a dramatic drop in the level of well-being among metropolitan Brazilian families over the 1983-1988 period. In many cases, household per capita income dropped below the one minimum wage level. This picture is particularly bad for families headed by women since most of them were driven below the poverty line.[16]

As can be seen from Table 5, these same traits are repeated for head's, spouse's and children's income.

Thus, it seems clear that during the period 1978-1988, Brazilian metropolitan families faced increasing unemployment and falling household income.

Despite variations stemming from the sex of the head and from the place of residence, the pattern is about the same: a drop in the welfare of Brazilian households in the largest cities of the country. In Section II, it was apparent that family's labor force participation rates also increased during this period. Although there might have been structural factors pushing these rates upward, it is our hypothesis that part of the increasing number of family members entering the labor market each year are due to adverse economic conditions reflected by high unemployment rates and falling incomes. In the next section we will estimate a model of family labor supply which intends to show that there is a significant income and unemployment effect in the decision making process by which the supply of family members respond to changing labor market conditions.

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[15]In the U.S. the median income for two parent families is about three times that of female headed families (*New York Times*, 10/5/1992, p. B6).

[16]For the U.S., in 1991, it is estimated that almost 50% of all female-headed families with children under 18 live in poverty (*New York Times*, 10/5/92).

V. A MODEL OF FAMILY LABOR SUPPLY: HOW DOES THE FAMILY RESPOND TO CHANGING UNEMPLOYMENT AND INCOME CONDITIONS?

A. Hypothesis

We will attempt to show that: (a) the supply of family workers increases as the income of the head of the household falls (income-effect); (b) this income-effect is subject to diminishing returns, i.e., the higher the head's income the weaker is the income-effect; (c) the supply of family workers increases with family's unemployment rate, and; (d) the unemployment-effect is stronger the lower is the head's income, that is, the unemployment-effect is also subject to diminishing returns.

More analytically, the family labor force participation rate (a_{ij}) depends on head's income (Y_1), on family's unemployment rate (d_0) and on a vector of household characteristics (X), that is:

$$a_{ij} = F(Y_1, d_0, X) \tag{1}$$

where $da_{ij}/dY_1 < 0, \; da_{ij}/d_0 > 0$

and where da_{ij}/dX can be either be greater or less than zero. The second derivative of a_{ij} with respect to Y_1 and d_0 are, by hypothesis, greater and less than zero, respectively.

B. Data and Methodology

These hypothesis will be tested by estimating a multivariate regression model of family labor supply for the MA's of the SE and of the NE. The model uses household survey data from PNAD for 1988. The use of multivariate cross-section analysis based on microdata brings forth some implications which must be made clear from the start.

First, due to the fact that microdata supplies no information regarding market variables, it is not possible to specify the demand curve faced by any individual family member. This means that there is no information available about the labor market faced by each member of the family unit. The impossibility of generating from microdata information on market wages and unemployment rates is the price we have to pay for working with a larger set of information regarding the economic and demographic traits of individuals and households and for getting a larger sample size. Ideally, the income and unemployment variables should be the market ones. The combination between microdata (providing individual and household characteristics) and macrodata (supplying the labor market conditions) is the ideal since it would be possible to interpret variables such as the open unemployment rate and average wages as exogenous. This is possible when the data feeding the multivariate analysis stems from city aggregate rates. In this case the variables are means of particular attributes for a given city which is the unit of observation for the multivariate analysis. Thus, variables such as labor income (or the wage rate) and

the open unemployment rate would represent pretty well the local labor market conditions. It would be then possible to assess how its variation among cities is associated with labor force participation rates of specific groups (by sex and age), given a set of control variables (inter-city regressions).

Second, the use of microdata overcomes the supply/demand identification problem so common in macrodata analysis.

Third, the use of individual and household data increases the relevance of factors associated with the systems of preferences which, in the case of macrodata, it is usually assumed (heroically) to cancel out.

Fourth, another difficulty arising from the use of cross-section microdata in multivariate analysis stems from the fact that although the members of a given family might allocate their time between market and non-market work based on their expectations (ex-ante) of an economic return for participating in the labor market, the resulting analysis supplies only ex-post measures. The usual assumption to get around this difficult is that the cross-section data pick out the individuals in their equilibrium positions when all expectations have already been met.[17]

The multivariate regression model described below will be estimated: 1) for the households irrespectively of the sex of the head, and; 2) for those classified according to the head's sex. Separating out the types of household according to the sex of the head allows also for different preference systems since income in the hands of women is allocated differently from income in the hands of men (Thomas, 1992).

For each family in PNAD's household file some traits were retained (sex, age, schooling, etc.) and others generated (family labor income and non-labor income, etc). The concept of labor force participation used by FIBGE (either occupied or looking for a job) was utilized to separate out those who were economically active from those who were inactive. Sample sizes according to the sex of the head by region are shown on Table 6.

TABLE 6

Metropolitan Areas of the Northeast (NE) and Southeast (SE)
Sample Size (Number of Households)
1988

	NE	SE
Families Headed by Men	3601 (86.6%)	6813 (89.5%)
Families Headed by Women	556 (13.4%)	797 (10.5%)
All Families (Pool)	4157 (100.0%)	7610 (100.0%)

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[17]This assumption needs to hold on average. It is acceptable that an individual's disequilibrium position be captured by the error term provided that the error term is "well behaved."

Male headed households account for about 87-90% of the sample size. Filters were applied to the entire PNAD's household file so that we could build our database (working household file) with certain characteristics (household geographical location and traits). Thus, we excluded all non-urban households, all urban non-metropolitan ones, households with multiple-families, non-nuclear households, as well as all non-agricultural metropolitan households where the head was not economically active. After all these subtractions from the PNAD household survey, we were left with a sample that accounts for about 20% of the original sample size in each of the regions.

C. The Regression Equation

The specification of the regression equation is as follows:

$$a_{ij} = F(Y_1, Y_f, E_f, NCF, A, d_0, F_1) \tag{2a}$$

for $i = 0$ female headed households;

$i = 1$ male headed households;

$i = 2$ households headed by men and by women (pool);

$j = 0$ for all head's income

$j = 1$ according to head's income brackets measured in minimum wage units (up to 1, 1-2, 2-5, 5-10, 10 and over), where:

a_{ij} = family's labor force participation rate as defined before for type of family (i) and by head's income bracket (j);

Y_1 = head's labor income;

Y_f = family's non-labor income;

E_f = variable which indicates the schooling of family members who are in the labor force;

F_1 = variable which indicates the family's sexual composition measured by the fraction of women among the family members aged 10 years and over.

NCF = indicates the family size (number of members in the family);

A = indicates the age structure of the family measured as the ratio of members aged less than 10 and those aged 10 years and over;

d_0 = family's open unemployment rate as it was previously defined.

The model specification is based on the Theory of Labor Supply (Killingsworth, 1983), on the empirical evidence of how family workers other than the head respond to a fall in household income (Mincer, 1966; Cain, 1967) and on the hypothesis which permit us to draw on the concept of family labor force participation rate (FLFPR) instead of the concept of hours of work as a measure of labor

supply. In other words, if we assume nT to be the total number of hours available for a family of size $\underline{n}$, where $\underline{T}$ is the maximum number of hours available for each family member, we get $nT = \Sigma h_i + \Sigma \ell_i$ where $\underline{h_i}$ is the number of hours devoted to market work and $\underline{\ell_i}$ the number of hours allocated to non-market activities (domestic work, leisure, etc.) by a member of family $\underline{i}$. Thus, the FLFPR can be written as $a_{ij} = \Sigma h_i / nT$ where $0 \leq a_{ij} < 1$ which can be interpreted as the probability of the family as a whole to be in the labor force.

The specification of the empirical model, although based on The Theory of Labor Supply, should not be interpreted as being derived from a structural model of family labor force participation. In other words, it should not be taken as a reduced form of a family labor supply determination model. The specification shown below has been inspired by Labor Supply Theory which suggested the identification, definition and measurement of the relevant variables and by what we know, as shown in the relevant literature, about its sensitivity to economic fluctuations. It is, therefore, an exercise of multivariate analysis which aims at testing an association -- if any -- between the decision of a family to engage its members in the labor force and labor market conditions. In other words, it aims at a better understanding of how an economic unit, like a household, who pool resources share their labor force participation decisions when confronted to adverse income and employment conditions.

Family's labor force participation and its sensitivity to aggregate demand should vary across income levels. It is our hypothesis that lower income families have a differential response to a drop in household income or to an increase in family's unemployment in comparison with higher income households. In other words, the labor force participation decisions of families faced with particular economic and labor market conditions will vary across head's income levels. Low income families are expected to have a stronger response in terms of labor supply to external economic shocks than better off families. Thus, regressions will be run for different head's income levels (up to one minimum wage, 1-2, 2-5, 5-10 and 10 and over) so as to test this hypothesis.

Given the simultaneity in the labor supply determination of each family member, many authors have assumed a "one group at a time" approach so as to get around this difficult theoretical and methodological problem. This assumption, however, implies that labor force participation decisions are taken in an arbitrary and rigid sequence such as the one by which the labor force participation decision of wives only occur after everybody else in the household is already in the labor market. In this paper we will make a similar assumption. In fact, a more simple and straightforward one. The analysis of FLFPR will consider the variations in the supply of family members given *that the household head* is already in the labor force. This means that other family members can only follow the head in their participation decision and never take the lead. This assumption is simpler and more realistic. It is simpler because we take the

group of family workers, other than the head, as a whole. It does not matter the sequence by which the individual family members enter the labor force (wives and then children, etc. or any other combination). It is obviously realistic because of the inherent responsibilities of the head as prime income earner in the labor market.

The labor force participation rate of family members other than the head is -- according to studies undertaken for the U.S. -- sensitive to the business cycle (Mincer, 1966; Cain,1967). Mincer (1966, p. 10) states, for example, that: "To sum up: positive cycle sensitivity (net 'discouragement effect') is readily discernible in the annual behavior of the secondary labor force. So is the added worker response in some of the low-income groups."

This group's higher cyclical sensitivity is revealed by the degree to which it responds to transitory variations in wages and income. This response is based on the greater flexibility of the group's time allocation to market work. Thus, it is not just a simple coincidence that many of the so called disguised unemployed are found frequently among family workers other than the head. This results from the inverse relationship between the labor force cyclical sensitivity of this group and its attachment to the labor market. This segment is less dependent on the labor market since their components do not have the responsibilities of the family's head and, at the same time, have greater flexibility to replace market by non-market activities. Since the family's head is always in the labor force, any variations in the FLFPR should be attributable to variations in the labor force participation rates of other family workers.

The dependent variable is continuous in the interval $0 \leq a_{ij} < 1$ since in our sample the household head is always in the labor force.

The independent variables account for the economic, demographic and educational characteristics of the family. The variable Y_f measures the family's non-labor income, E_f, F_1, NCF and A account for the demographic and educational traits of the household while the head's earnings and family's unemployment are represented by Y_1 and by d_0. It should be said again that the choice of variables was based on Labor Supply Theory and on the accumulated empirical evidence which over the last thirty years has enriched the literature on labor force participation (Mincer, 1962; Cain, 1966; Pencavel, 1986; Killingsworth and Heckman, 1986; Gronau, 1986 and Ashenfelter and Heckman, 1973).

The variables accounting for the family's non-labor income and by the demographic and educational household characteristics are only control variables. We do not intend to analyze each of the corresponding coefficients. We will focus our analysis on the coefficients of the head's income and family unemployment variables. They should provide a measure of what we have denominated, respectively, as the income and unemployment effects. First, it is expected that the family labor force participation

rate varies inversely with the head's income which is taken as an exogenous variable.[18] A negative coefficient for this variable means that a drop in the head's income as a result of a recession, for instance, would lead to an increase in the labor supply of the other family members (income-effect). If we assume that the family unemployment rate also reflects the impact of economic fluctuations on the household and, in addition, that it is negatively correlated with the cyclical deviations of labor income from its permanent values, then the coefficient of the FUR variable should indicate how the labor supply of family workers respond to an increase in family's unemployment. If positive, increases in FUR will lead to a growing supply of family workers. Conversely, a negative coefficient means that an increase in FUR leads to a quit in job search. Thus, family workers would just leave the labor force and the FLFPR would drop. The response of the family to increasing unemployment is likely, nevertheless, to differ across the head's income level. Therefore, our analytical experiment will pay special attention to the sign, magnitude and statistical significance of the head's income and family's unemployment coefficients.

The other variables' coefficients will not be of concern here since we are not testing the determinants of family labor force participation. Notwithstanding this fact, it is expected that the coefficients of the control variables will assume the following signs. First, the non-labor income is a component of household income. If we assume that non-market activities increases with household income then it is expected that the coefficient sign will be negative. Schooling increases the opportunity cost of leisure. If the rate of return to education is positive, then the FLFPR should increase with the educational attainment of the family members. The variable which measures the family's gender composition attempts to capture the effect on FLFPR stemming from the fact that a household is predominantly female. The empirical evidence available shows that families in which women are a majority face more hardship in the labor market and are more vulnerable to adverse economic conditions. It may well apply here the same principles which explain why women, as a group, have a lower LFPR than men. Thus, we expect the coefficient on the gender variable to be negative. The family size is a measure of how its dimension can affect FLFPRs. Since this measure includes all family members, it is expected that the bigger the family, the lower its labor force participation should be. Furthermore, the age structure of the family is also an important determinant of its labor force participation. It is likely that families overwhelmingly made up of adults will have a higher labor force participation than the ones in which children are a majority. Thus, we expect the sign to be negative. The A variable indicates the

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[18]In order to take head's income as exogenous we assume that time spent at work is exogenous. It is easier to consider the head's wage as such. The head's labor earnings depends on how much time the head works. In the Brazilian case, time spent at work, specially among wage earners, it is not a matter of choice. It is institutionally determined.

children/adults proportion in each family. On the one hand, families with a higher A might be induced to increase its labor force participation so as to earn more income to face the cost of raising and educating their children. Although, it is also possible for the contrary to happen since the spouse and/or other members may have to stay at home to care for children who are 10 or less years of age, we expect the first effect to predominate and, therefore, the sign of the A variable should be positive.

However, coefficient signs might be influenced by forces which oppose one another. Preference systems and substitution-effects stemming from both labor and non-labor income and its corresponding income-effects, including those associated with the endowment of family resources, might determine signs different from the ones we specified above (Bowen and Finegan, 1969, p. 20). Thus, coefficient signs may change across types of families and its economic status measured by the level of head's income.

D. Problems Associated with the Specification of the Independent Variables and the Regression Equation

The use of multivariate analysis for studies on labor force participation faces specific methodological difficulties which are discussed next. Standing and Sheehan (1978, p. 4), for instance, have classified these problems in four broad categories:

(i)   those arising from the sample choice;

(ii)   those stemming from the functional form of the regression equation;

(iii)   those resulting from the inclusion or exclusion of variables, and;

(iv)   those arising from the attempt to measure theoretical concepts from the information made available to the researcher.

With regard to the first set of complications, PNAD data does not show problems other than the usual ones found in any household survey. As a matter of fact, measured by international standards, data from PNAD provide both in quality and quantity the necessary information for the analysis.

The functional form of the regression equation is linear. The regression model is additive and, therefore, it does not take into account how the interaction between the independent variables might affect the FLFPR.

If the regression model is mis-specified either because of omitted variables or because the available ones do not correspond to the correct theoretical concept, then the estimated coefficients, specially the ones which try to capture the effect of economic conditions through the labor market on the family unit, will be biased. Among the variables which are often omitted in studies about labor force participation, we stress the following ones: (a) preferences for market work relatively to non-market activities which

is a source of bias only if the included variables are correlated with preferences; (b) skills and productivity acquired in non-market activities; and (c) many characteristics which are not easily measurable but which affect wages, income and labor supply such as the quality of education, training, on the job experience and physical and mental health. The non-correspondence between the measurable variable and its theoretical concept might generate some difficulties in interpreting regression coefficients. The non-imputation of expected labor income to persons who are inactive but that, nevertheless, could be attracted to the labor market if conditions improved, is one case in which the observed labor income does not match what is required by theory (Heckman, 1974).

Measurement errors, specially those related to income, as well as the usual problem of missing values so common in microdata are typical research problems in studies of labor force participation. As to the former, we dropped from the sample households for which information was missing for any of their members. However, this criterion has the disadvantage of reducing sample size and of biasing the estimated coefficients if the missing values do not represent a random subsample.

E. The Functional Form

The following regression equation was estimated :

$$a_{ij} = m_0 + m_1 Y_1 + m_2 EF1\text{-}8 + m_3 EF9\text{-}11 + m_4 EF12 + m_5 F_1 \\ + m_6 NCF + m_7 A + m_8 d_0 + e \tag{2b}$$

where the variables were already identified previously and $m = 0, 1, ..., 8$ are the parameters to be estimated.[19] Coefficients will be estimated for the pool of families ($i = 2$), for its disaggregation according to head's income brackets ($j = 1$) and for the families headed by men ($i = 1$) and by women ($i = 0$).

It is expected that the coefficient signs should be the following as it was already discussed above: $m_1 < 0$, m_2, m_3, $m_4 > 0$, $m_5 < 0$, $m_6 < 0$, $m_7 > 0$ and $m_8 > 0$. The regression coefficients and statistics are found in Annex Tables 1 and 2.

All regression equations were statistically significant at less than 0.01%. The coefficients of determination (non-adjusted) are quite high if we consider that the unit of observation is the family. If we

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[19]The family members were classified according to the number of years at school: illiterate and less than one year, from 1 to 8, from 9 to 11 and 12 and over. If a member does not fit in one class, then a zero is attributed to him/her; 1 otherwise. Thus, E_f is a vector of dummies: EF0-1, EF1-8, EF9-11 and EF12. Since any of these classes is a linear combination of the others, we have omitted the first class. Thus, the effect of the other variables should be interpreted as being a differential with respect to the first class.

compare these R^2 with those obtained from similar studies done for other countries we find them to stand well (Wery, Rodgers and Peek, 1978; Rodgers, 1978).

The non-labor income variable has been omitted from equation (2b) although it was contained in expression (2a). This variable was left out because it was not statistically significant when we ran the regression equation based on expression (2a). This was due to measurement errors in this variable by PNAD. In fact, this variable is underestimated by PNAD since it includes mostly pensions and retirements funds. Thus it accounts for only a small fraction of total family income. For the MA's of the NE its weight was 15.6% in 1988 for all families (pool). Income stemming from rents, financial and real assets are either understated or not declared at all. Besides, pensions and retirement funds are not considered non-labor income in the strict sense of the term since they are strongly correlated with past labor earnings. This is a typical case in which the measurement of the variable does not correspond to its theoretical nature. We have decided then to drop this variable from the estimated regression equation in spite of its effects over the estimators of the other coefficients, specially over the size of the head's income coefficient. Since there is a positive correlation between non-labor income and head's income and given that the coefficient of the omitted variable would be negative (negative income-effect under the assumption that leisure is not an inferior good), we expect the resulting bias to underestimate the head's income coefficient.[20]

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[20]The direction of the bias can be inferred in the following way. Assume that the regression equation which includes the variable non-labor income is given by:

$$a^0 = q_0 + q_1 Y_1 + q_2 Y_f + q_3 X + E \tag{1}$$

where Y_1 and Y_f are, respectively, the head's income and the non-labor family income, X a vector of control variables and E is the error term. The FLFPR is taken to be a^0. However, the estimated equation was as follows:

$$a^0 = m_0 + m_1 Y_1 + m_2 X + e . \tag{2}$$

If Y_1 and Y_f are correlated, a relationship can be assessed through the following regression equation:

$$Y_f = b_0 + b_1 Y_1 + z . \tag{3}$$

If we place (3) into (1), we get (2), where:

$$m_0 = q_0 + q_2 b_0 \tag{4}$$

$$E = q_2 z + E \tag{5}$$

and

$$m_1 = q_1 + q_2 b_1 \tag{6}$$

or $\quad q_1 = m_1 - q_2 b_1 .$

The theoretical expectation is that $b_1 > 0$, that is, the higher is the head's income, the higher is the non-labor family income. The correlation matrix despite the underestimation of Y_f by PNAD confirms this expectation. On the other hand, we expect $q_2 < 0$, that is, the income-effect to be negative if we take leisure as a non-inferior

We will not analyze the coefficients of the control variables. The reader, if interested can look at Annex Tables 1 and 2. It is enough to say that the coefficient signs were as expected but for the family gender composition variable which in 50% of the cases was not statically significant.

Table 7

**Metropolitan Areas of the Northeast and Southeast
Elasticities of FLFPR with Respect to Variations
in Head's Income (Income Effect)
and Family's Unemployment (Unemployment Effect)
1988**

	Total Elasticity		Semi Elasticity	
	Income	Unemployment	Income	Unemployment
1. Northeast				
All Families (Pool)	−0.0154	0.0114	−0.0092	0.2018
(a) Up to 1 m.w.	−0.1071	n.s.	−0.0658	n.s.
(b) 1−2 m.w.	n.s.	0.0122	n.s.	0.4231
(c) 2−5 m.w.	−0.0637**	0.0112	-0.0374**	0.4159*
(d) 5−10 m.w.	n.s.	0.0166	n.s.	0.4930
(e) +10 m.w.	n.s.	0.0088**	n.s.	0.3972**
Families Headed by Men	−0.0140*	0.0096	−0.0083	0.1804
Families Headed by Women	−0.0116**	0.0135	−0.0079**	0.1703
2. Southeast				
All Families (Pool)	−0.0278	0.0035	−0.0174	0.1063
(a) Up to 1 m.w.	−0.0634*	−0.0041*	−0.0413	−0.0608*
(b) 1−2 m.w.	−0.0798	0.0065	−0.0490	0.3841
(c) 2−5 m.w.	−0.0448**	0.0032	−0.0273**	0.2267
(d) 5−10 m.w.	n.s.	0.0046	n.s.	0.4413
(e) +10 m.w.	n.s.	0.0022**	n.s.	0.2541**
Families Headed by Men	−0.0247	0.0021	−0.0152	0.0706
Families Headed by Women	−0.0264	0.0048**	−0.0197	0.0732**

*Significant at 5% or less.
**Significant at 15% or less.

n.s. Non-significant.
All others were significant at 0.01%.

F. Regression Results

The income-effect is a measure of the labor supply responsiveness of family members to variations in head's income. This measure is provided, "ceteris paribus" by the coefficient m_1 of regression equation (2b). The hypothesis is that this coefficient is usually negative, depending on the head's income

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good. Thus, if $q_2 < 0$ and $b_1 > 0$, then $m_1 < q_1$, meaning that the estimated coefficient is less than the truly one. There is, therefore, an under-estimation of the head's income regression coefficient. In case q_2 or b_1 were zero there would be no bias in the coefficient estimation.

level, that is, for some households, specially those at lower income levels, families should increase its labor force participation rate in response to a fall in head's income. This regression coefficient can also be interpreted as a measure of the direction of the association between the FLFPR and the income of head of the household, isolated the effects of the other variables which supposedly affects labor force participation. Thus, "ceteris paribus" inter-family variations in head's income are negatively associated with variations in their labor force participation rates. It is assumed, therefore, that inter-family variations are a good representation, on average, of a typical family belonging to the group under study.[21]

The analysis of the sensitivity of the FLFPR to variations in head's income becomes more transparent when translated in terms of elasticity. Thus, we will compute two elasticities: one is full and the other a semi-elasticity.In the former case, we measure the proportional variation in FLFPR stemming from a 1% proportional variation in head's income. For the latter case, we measure the absolute variation of the FLFPR, measured in percentage points, resulting from a proportional variation of 1% in head's income.[22] The computed elasticities are shown on Table 7.[23]

First, the income-effect wherever statically significant was negative. Second, it is larger for families whose head earns until one minimum wage. Thus, for this group of families living in the MA's of the NE and of the Southeast the head's income coefficients were -0.1358 and -0.0736. In fact, they are the largest head's income coefficients and are among the highest income elasticities. It should not go unnoticed that the size of the head's income coefficient decreases with income level until the 2-5 minimum wage income bracket. However, for the two last and higher levels of head's income the coefficients are not significant for the MA's of both regions meaning that the labor supply response of family members is nil to variations in head's income for families who are located at the upper income level. For families whose head's income fell in the interval 1-2 m.w. and who were living in the MA's of the NE, nevertheless, the income-effect was surprisingly not significant. The same group for the MA's of the SE had a negative and significant income coefficient.

Notwithstanding the latter finding, the evidence stemming from the multivariate analysis thus far is

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[21]When regressions are run according to a variable (such as head's income) stratified by some criterion (such as minimum wage units), the coefficient of that variable is biased downward. Thus, we expect the head's income coefficient to be under-estimated in the regressions ran across income brackets.

[22]The full elasticity is given by: $E_y = m_1 \cdot Y^1/a^0$ where m_1 is the coefficient of the head's income variable in equation (1b) and Y^1 and a^0 are the means of head's income and of the FLFPR. The semi-elasticity is given by: $E'_y = m_1 \cdot Y^1$.

[23]The effect of omitting the non-labor income variable from the regression equation is to bias downward the head's income coefficient in all regressions. In those regressions estimated across head's income brackets, the downward bias is double: one arising from the omitted non-labor income variable and the other from the stratification of the head's income variable in minimum wage units.

that lower and intermediate income families are much more sensitive in terms of labor force participation to variations in head's income than any other social-demographic group of families.

For the pool of families the income-effect is negative for the MA's of both regions.

For families headed by men the income effect is also negative and statically significant for both regions.

For families headed by women the income-effect is weaker than in families headed by men. Furthermore, the income coefficient for this kind of family residing in the MA's of the NE is only accepted as being different from zero at a probability of .117 which is quite close to the threshold to which we discarded the coefficients as non-significant. This weaker responsiveness of female's headed households to changes in head's income derives from the fact that they have a high FLFPR, meaning that a large fraction of its members at working age are already in the labor market. As it was seen before, these families have lower earnings and higher unemployment rates when compared to families headed by males.

Briefly, the income effect was not significant in 5 out of the 16 regressions estimated (31.25%) of which four were related to families whose head was earning five or more minimum wages. The only exception and thus far unexplained result concerns the families classified in the 1-2 minimum wage income interval who lived in the MA's of the NE.

A comparison between the MA's of the SE and of the NE points out more similarities than differences. In fact, except for the income group mentioned above, the families for which the income-effects were not significant were the same in both regions (5-10 and 10 and over m.w.). Setting aside the estimates across head's income, it seems, however, that the income's coefficients as well as the elasticities are higher for the MA's of the SE. This means that families living in the more developed MA's of the SE are more responsive to changes in the level of the head's income than the ones living in the MA's of the NE.

Thus, as far as the income effect is concerned the regression estimates show that, overall, a decline in the level of head's income leads to an increase in the supply of other family members. This conclusion, however, does not apply to families (pooled) whose head earns more than 5 m.w. a month in both regions and for the northeastern families whose head's income fell in the 1-2 m.w. bracket. We can state, therefore, that, usually, poor families tend to increase their labor force participation as the income of the head falls. This conclusion also applies, overall, to families headed either by men or by women in both regions and to the pool of families.

The other measure of the responsiveness of labor supply to conditions faced by families as to the status of their members in the labor force, is given, "ceteris paribus," by the coefficient m_8 of regression

equation (2b). It is assumed that the labor force participation decision of family members depends, everything else being constant, on their unemployment-rate.[24] Thus, the unemployment-coefficient points out the direction of the association between the FLFPR and the family's unemployment rate.[25]

It is likely that higher unemployment rates are associated with higher FLFPR, meaning that an absolute variation of 1% in family unemployment would increase the FLFPR by m_8 percentage points. Translating the unemployment coefficient into elasticities makes the analysis easier. Thus, we define a full and a semi elasticity. The latter measures the proportional variation in FLFPR due to a 1% proportional variation in family's unemployment rate.[26] The former measures the proportional variation in the FLFPR stemming from an absolute variation of 1% in the open unemployment rate of the family.

The unemployment-effect was significantly different from zero in 15 out of the 16 regressions. The unemployment-elasticity was nil for northeastern families whose head earned up to one minimum wage (in the pooled regression equation). With the exception of southeastern families whose head also earned until one m.w., all unemployment-elasticities were positive.

For the regressions estimated across head's income the trend, despite some inversions, is for the unemployment-elasticity to decline with the level of head's income. Thus, the weakest unemployment-effects were located among the families who were at the top of the income distribution profile (10 m.w. and over) in both regions. Additionally, these coefficients were only accepted at a 15% or less significance level. In all other cases in which the unemployment-elasticities were positive the acceptance level was at less than 0.01%.

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[24]This is the family's unemployment rate and not the market unemployment rate. Therefore, the proportion of family members who are unemployed among those aged 10 years or more is supposedly a key variable in the participation decision.

[25]A question which needs to be clarified is whether there is a spurious negative correlation between the FUR and FLFPR as a result of the way by which these variables were constructed. The former variable has the family labor force in the denominator and the latter one in the numerator. Would it be possible to occur a spurious correlation? In addition, measurement errors in the enumeration of labor force participants or the omission of variables which are associated with it, positively or negatively, may also generate a spurious correlation. However, the denominator of the FLFPR which is made up by the number of persons who are at working age (10 and over) is less subject to measurement errors because it is easier to identify who is at working age than to know who is in the labor force. Furthermore, all but one unemployment-coefficients are negative and even this solely case can be explained both theoretically and empirically. Nevertheless, if the family's unemployment rate had been measured by the proportion of job seekers with respect to the number of people at working age, then there would be a positive spurious correlation since the labor force participation rate would be equal, by construction, to the unemployment rate plus the occupation rate (or employment rate), that is $a_0 = q_0 + d_0$. The fact that all but one unemployment-coefficient were positive, means that an increase in the FLFPR in response to a rise in family unemployment was enough to offset any negative spurious correlation between the two variables.

[26]The full elasticity is given by: $E_d = m_8 . d^0/a^0$ where m_8 is the coefficient of the family unemployment variable in equation (2b) and d^0/a^0 the ratio between the means of the FUR and of the FLFPR. The semi-elasticity is given by: $E_d' = m_8/a^0$.

For male headed households the unemployment-elasticity were positive and highly significant in both regions. In the regressions for female headed households the coefficients were also positive. However, for southeastern families headed by women the coefficient was only accepted at a 15% or less significance level.

Overall, the unemployment-elasticities are higher for the MA's of the NE. This greater sensitivity of labor supply to unemployment conditions among northeastern families stems from their lower income levels as compared with those from the Southeast. As Annex Tables 1 and 2 show there is a wide regional income gap between the MA's of the two regions. In fact, for all families taken together, the average head's income in the MA's of the NE is almost 70% of the SE. Furthermore, except for recession years, the unemployment rates in the MA's of the NE are always higher. Thus, this state of chronic unemployment in a region of low average income, makes the FLFPR more sensitive to unemployment conditions within the family unit.

Three findings are worth stressing in the analysis of the unemployment coefficients. First, the unemployment-elasticity was either nil (NE) or negative (SE) for very poor families (up to 1 m.w.) meaning that chronic and outstandingly high unemployment-rates either do not affect or discourage the labor supply of family members since most or all of them are already in the labor market. The unemployment rates observed for the families belonging to this lower income bracket are impressively high (see Table 4 and Annex Tables 1 and 2). Such rates act as a signal transmitted from the labor market to the interior of the household unit, discouraging any member to enter the labor market. Second, the sensitivity of the FLFPR to variations in family's unemployment rate is a phenomenon which affects families either headed by men or by women, in spite of the low statistical confidence of the coefficient of the regression equation estimated for female headed households in the MA's of the SE.[27] Third, the degree of responsiveness of the family labor supply to increasing unemployment conditions is higher among northeastern families.

Briefly, the evidence provided so far points out that, overall, the unemployment elasticity is positive. Thus, an increase in unemployment among family members should push them further into the labor market.

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[27]In the regressions which we ran separately for each one of the MA's of both regions (not shown here), we found that the unemployment-elasticity was less frequent, often weaker and statically less trustworthy in families headed by women in comparison with those headed by males because of their already high labor force participation and unemployment rates (Jatoba, 1990).

VI. SUMMARY AND CONCLUSIONS

We have learned that, over the period 1978-1988, Brazilian families pushed its members into the labor market at increasing rates. During the 1980's, a decade of slow and unstable growth, Brazilian families faced unemployment, inflation and falling household real income.

This paper attempts to show that the two phenomena are closely associated. That is, family unemployment and declining real income tend to drive more family members towards the labor market since this is the most handy mechanism by which these families try to halt or offset economic forces which are pushing their well-being downwards. Therefore, there are cross-person adjustments being made within families when they are confronted with economic hardship.

The regression equation model estimated above presents evidence, after controlling for a set of features which influences labor force participation decisions, that there are significant income and unemployment effects in the labor supply response of Brazilian families to adverse economic conditions. These findings apply to families residing both in the more and the less developed metropolitan areas of the country. However, we should highlight that while the income-effect is stronger in the MA's of the SE, the unemployment-effect seems to be more important in the MA's of the SE.

The income-effect is strong among the very poor (up to 1 m.w.) and weakens as the head's income grows up to the 5 m.w. level. For families whose head earns more than 5 m.w. the income-effect is non-existent. For all families (pool) and either for families headed by men or women, the regression results points out that, in general, a lowering of the head of household income or an increase in family unemployment will drive up family labor supply.

The unemployment-effect is more generalized across head's income but, nevertheless, gets weaker as income grows. However, its effect is, conversely to the income-effect, still statically significant among the upper income groups. In all regressions but one the unemployment effect was significantly different from zero. Furthermore, when statically significant all unemployment coefficients but one were positive.

The family labor force participation rate is rising due not only to structural changes in labor market behavior but also as a result of a stagnant economy which is driving up unemployment rates and squeezing family income. Among the family workers, spouses have been increasing their LFPR at a rate faster than the children's although the unemployment rate is higher for the latter group than for the former. The labor force participation rate of the heads of household is high and stable. Head's unemployment, however, also increases during a recession. However, heads of households, given their family commitments, keep on looking for employment and therefore, by definition, are still in the labor force.

During a recession: (a) a sizable number of heads of households are loosing their jobs or earning

less;[28] (b) the family labor income is temporarily declining; and (c) to offset such a drop in real income, other family members (spouses, children, relatives, etc.) are entering the labor force. They, however, face an unfavorable labor market where job search can be long and the few available jobs pay low wages. In this situation, to get into the informal sector might be the only way out for this people to earn some income in the short-run.[29] Given that the labor supply of heads, measured by their LFPR is inelastic in the short-run to the business cycle while the supply of spouses, children and other family members present income and unemployment effects which push them into the labor market, it is understandable why the FLFPR rose so steadily during the period 1978-1988 (see Table 2). A long run implication is that income inequality will increase further as poor children are pulled out of school to work prematurely. In 1987, the labor force participation rate of children aged between 10 and 17 living in poor urban households (family per capita income equal or less than half minimum wage per month) was 23.8%. For Brazil as a whole, in that same year, 20.8% of children in the age range 10-17 who lived in poor households worked **only** and 12.4% worked **and** went to school (FIBGE/UNICEF, 1990).

If we compare the Brazilian experience with the empirical evidence available for the U.S., two differences should be highlighted. First, the supply of family workers, specially of married women and children, has a counter-cyclical behavior in the sense that it grows during recessions and diminishes during prosperity. Behind the scenes, both long and short-run economic forces, respond for such behavior. Among the long standing structural problems we stress urban poverty and a very unequal income distribution. In the short-run (sometimes not so short), Brazilians faced during the 1980's an extended economic crisis which has not ended yet. Second, if we denominate the positive unemployment-effect as a special case of the so called added-worker effect, our findings show that the Brazilian case display a labor supply response different from the one found for the U.S. labor market (Cain, 1967). We found, based on cross-section estimates, that the unemployment and income effects explain why the supply of family members rose so sharply during a decade of poor economic performance.

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[28]In 1981, 21.3% of the urban unemployed in Brazil were heads of family. In 1983, this fraction rose to 24.2%. Among men, the proportion of jobless household heads was even larger, i.e., 27.6% in 1981 and 31.6% in 1983 (cf. Jatoba, 1989a, Table III.17, p. 87).

[29]The so called bad jobs which pay only one minimum wage grew at a rate of 20% per year over the period 1981-1983. The similar figures for the Northeast and the Southeast, were respectively, 13.2% and 23.7% (cf. Jatoba, 1989a, Table III.7, p. 73).

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ANNEX TABLE 1

Metropolitan Areas of the Northeast
Multiple Regression Equation: Coefficients and Statistics
Dependent Variable: FLFPR
1988

	All Families (Pool)	Across Head's Income					Families Headed by Men	Families Headed by Women
		Up to 1 M.W.	1−2 M.W.	2−5 M.W.	5−10 M.W.	+10 M.W.		
Intercept	0.5464 (37.905)	0.6343 (31.065)	0.5146 (12.017)	0.4647 (10.241)	0.4925 (5.693)	0.5474 (6.915)	0.5840 (37.427)	0.7290 (16.714)
Y_1	−0.0051 (−6.149)	−0.1358 (−7.722)	−0.0046$^+$ (−0.212)	−0.0126** (−1.437)	−0.0105$^+$ (−1.329)	0.0007$^+$ (0.739)	−0.0042 (−5.315)	−0.0097** (−1.567)
EF 1−8	0.1489 (32.785)	0.1299 (23.084)	0.1940 (19.361)	0.2190 (18.110)	0.2663 (10.133)	0.2050 (3.349)	0.1621 (34.306)	0.1031 (8.242)
EF 9−11	0.1511 (27.689)	0.1426 (15.718)	0.2156 (21.488)	0.2118 (17.499)	0.2895 (13.813)	0.2342 (9.911)	0.1671 (30.234)	0.1049 (5.459)
EF 12	0.1805 (22.596)	0.1572 (6.567)	0.2458 (11.528)	0.2449 (18.804)	0.3104 (14.907)	0.2317 (9.847)	0.1957 (24.595)	0.1155 (3.473)
F1	−.0195$^+$ (−1.045)	−0.0068$^+$ (−0.286)	−0.1642 (−4.057)	0.0117$^+$ (0.260)	−0.1342** (−1.768)	−0.0888$^+$ (−0.962)	−0.1706 (−7.220)	−0.1250 (−2.919)
NCF	−0.0409 (−25.272)	−0.0338 (−16.505)	−0.0451 (−13.422)	−0.0573 (−13.945)	−0.0695 (−9.120)	−0.0910 (−8.213)	−0.0388 (−23.383)	−0.0379 (−7.430)
A	0.1216 (21.323)	0.1015 (13.747)	0.1354 (11.485)	0.1637 (12.285)	0.2116 (9.525)	0.2697 (7.434)	0.1111 (18.105)	0.1802 (12.459)
d_0	0.1215 (7.005)	0.0113$^+$ (0.533)	0.2437 (4.229)	0.2442 (3.568)	0.3001 (2.985)	0.2307** (1.482)	0.1063 (5.767)	0.1162 (2.718)
R^2	0.3718	0.3150	0.5370	0.5821	0.6731	0.7088	0.4103	0.3370
N (1)	4158	2461	792	567	226	108	3601	556
F	306.963	140.980	113.650	97.319	56.108	30.423	312.447	34.816
a^0 (2)	0.6018	0.6137	0.5760	0.5872	0.6087	0.5808	0.5893	0.6825
Y^1 (3)	1.8122	0.4842	1.3976	2.9696	6.8319	18.3359	1.9664	0.8148
d^0 (4)	0.0567	0.0769	0.0288	0.0269	0.0337	0.0222	0.0532	0.0795

(1) Number of observations.
(2) Mean of the dependent variable.
(3) Mean of head's income.
(4) Mean of family's unemployment rate.

All others were significant at 0.01%.
+ N.S. (15% or more).
* 5% or less.
** 15% or less.

ANNEX TABLE 2

Metropolitan Areas of the Southeast
Multiple Regression Equation: Coefficients and Statistics
Dependent Variable: FLFPR
1988

	All Families (Pool)	Across Head's Income					Families Headed by Men	Families Headed by Women
		Up to 1 M.W.	1-2 M.W.	2-5 M.W.	5-10 M.W.	+10 M.W.		
Intercept	0.5327 (50.589)	0.6046 (30.816)	0.5520 (19.975)	0.5413 (20.848)	0.4837 (11.367)	0.5437 (12.805)	0.5697 (50.723)	0.7171 (20.072)
Y_1	−0.0067 (−10.431)	−0.0736 (−4.668)	−0.0348 (−2.537)	−0.0090** (−1.853)	−0.0047+ (−1.139)	−0.004+ (−0.502)	−0.0055 (−8.762)	−0.0161 (−3.909)
EF 1−8	0.1764 (57.140)	0.1400 (30.269)	0.1924 (32.961)	0.2130 (32.770)	0.3001 (23.855)	0.3261 (15.053)	0.1833 (56.284)	0.1360 (16.646)
EF 9−11	0.1787 (46.353)	0.1350 (17.416)	0.1922 (27.104)	0.2298 (34.984)	0.2973 (27.780)	0.2943 (18.920)	0.1872 (47.312)	0.1327 (10.795)
EF 12	0.2095 (43.897)	0.1561 (9.921)	0.1910 (15.541)	0.2469 (32.061)	0.3090 (32.289)	0.3004 (25.478)	0.2186 (45.482)	0.1329 (7.109)
F1	0.0111+ (0.836)	0.0461* (2.190)	0.0017+ (0.068)	−0.0849 (−3.084)	0.0046+ (0.116)	−0.0696** (−1.465)	−0.1371 (−8.314)	−0.0119+ (−0.367)
NCF	−0.0508 (−36.457)	−0.0385 (−17.988)	−0.0539 (−20.978)	−0.0638 (−21.759)	−0.1024 (−21.849)	0.1186 (−19.209)	−0.0465 (−32.661)	−0.0568 (−11.364)
A	0.1148 (25.662)	0.0845 (11.754)	0.1127 (13.127)	0.1379 (15.550)	0.2287 (18.322)	0.2749 (16.767)	0.1043 (21.986)	0.1568 (12.780)
d_0	0.0666 (4.355)	−0.0396* (−1.925)	0.2351 (4.880)	0.1385 (2.707)	0.2718 (3.522)	0.1568** (1.489)	0.0432 (2.625)	0.0548** (1.465)
R^2	0.4451	0.3533	0.4704	0.5732	0.7343	0.7861	0.4618	0.4172
N (1)	7611	2754	2084	1770	660	339	6813	797
F	759.220	187.556	230.449	295.744	225.226	152.100	729.771	70.588
a^0 (2)	0.6265	0.6512	0.6121	0.6108	0.6159	0.6169	0.6122	0.7486
Y^1 (3)	2.6020	0.5609	1.4084	3.0423	6.7455	16.1111	2.7632	1.2255
d^0 (4)	0.0333	0.0669	0.0170	0.0142	0.0104	0.0086	0.0296	0.0651

(1) Number of observations.
(2) Mean of the dependent variable.
(3) Mean of head's income.
(4) Mean of family's unemployment rate.

All others were significant at 0.01%.
+ N.S. (15% or more).
* 5% or less.
** 15% or less.

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