HUMAN AND SOCIAL CAPITAL WITHIN BRAZILIAN FAMILIES: SOME CONTRARY FINDINGS

By *Carlos ARIEIRA* and *Kingsley HAYNES*

INTRODUCTION

The purpose of this paper is to investigate the relationship between family background and children's achievement levels. The path model developed in this research has as intermediate variables "children's education" and "children's work experience". The family background (exogenous) variables are indicators of access to financial, human, and social capital.

Many social scientists and policy makers consider that investment in education is a major strategy in poverty reduction. Also, children may either remain in their present socioeconomic status or may rise on the ladder of social mobility depending on several relevant variables. These variables are, on the one hand, related to family background and, on the other hand, related to the child's own accomplishments, that is, ability applied to opportunity.

The main hypothesis is not only that more years of schooling and higher earnings are intrinsically related but also that family patterns of size and structure are relevant in explaining the success of children as measured by their income. This is not a new idea. Since the 1960s research such as the Coleman Report (Coleman, 1966) and many others (see Coleman 1991; Astone 1991) has emphasized that family

structure, involvement of the parents in educational achievement, and educational achievement itself is central to future life chances.

Coleman (1988) measures achievement (or lack thereof) utilizing a logistic regression model where the "the lack of achievement" variable is the dropout rate from high school and the explanatory variables are indicators of the theoretical concepts of financial capital, human capital, and social capital in the family. In his model, family background - represented by indicators of these three forms of investment - is assessed as the cause of the dropout rate of U.S. school children.

In our research in Brazil we follow Coleman's framework with relevant operational modifications. One of the changes is that while in Coleman's model the dependent variable is dropout rates of high school, in our model it is the children's later earned income. The other difference is that the explanatory variables are not only related to the family's background but also to the child's through "number of years of education" and "work experience". In this and in Coleman's model part of the family's background is the parents' human capital (that is, the parents' educational level) and social capital in the form of "time … with the child" (Coleman, 1988: S110).

By incorporating measures for number of children (as an indicator of social capital), parental education, and parent's income we measure internal competition for resources and multiple levels of demonstration effects by different members of the family unit. It is believed that this larger perspective on the family may be more

inclusive than other studies and it is thought to be more pertinent to the cultural context of Brazil in particular and Latin America in general.

Another variation in relation to the Coleman's model is related to the statistical model applied here. Because the dependent variable is not a dummy, as in Coleman's case, we will not utilize a logistic regression approach. Instead we will use a full path analysis methodology which is a generalization and decomposition of the classical multiple regression approach.

THEORETICAL FRAMEWORK

This research draws from the theories of human capital and social capital. Human capital is the accumulation of investments in education, training, and health that raises the productive capacity of people and returns benefits in future times from investments made at a present time (Becker 1975).

Human capital theory was developed by Mincer (1958), Schultz (1971), Becker (1975), Denison (1962), Hansen (1963) and others and has its roots with Adam Smith and other 19th century economists. In Principles of Economics, Alfred Marshall suggests that "the most valuable of all capital is that invested in human beings" (Marshall [1890] 1961: 564).

According to human capital theory, individuals and government invest in education and health in order to improve production; in a similar way capitalists invest in capital goods to increase productivity. Firms invest in human capital if the

discounted net present value is positive and generates a greater return than alternative investments that they can capture. Human capital theory analyzes the economic effects of education and other investments on human capital accumulation both individually and socially and the patterns of returns to that investment (Becker 1975).

Social capital may be defined as the trust and cooperation between individuals that generates beneficial effects for the group involved in the relationship (Fukuyama 1995). Social capital theorists took those assumptions one step further. The framework, adopted in this study, is a version of the rational choice model developed by James Coleman (1990). In Coleman's rational choice model of behavior, the actor's choice is not totally individualistic as in the Becker (1975) model but also socially oriented.

The theory of rational choice is a purposive action model, which incorporates the behavior of actors and the relations between actors (Coleman and Fararo 1992). A basic assumption of the theory is that people act rationally and are in search of optimizing results for their own benefit but in a social context.

In his approach Coleman (1988: S95) takes "rational action as a starting point but rejecting the extreme individualistic premises that often accompany it." The concept of social capital is then possible in this context where the actors are purposive but their goals may be both directed to their self-interest and also to altruistic interests (e.g. see Fukuyama's (1995) development of cooperation and trust).

The purposes of rational choice theory in sociology are twofold: to illuminate, at the macro level, the behavior of social (or institutional) structures, and to explain this, at the micro level, through the behavior of actors in the system (Coleman and Fararo 1992). In the present study the actors are members of the institution of the family, that is, parents and children.

In Coleman (1988) the rational action model is briefly discussed and empirical analysis is performed on data with dropouts from high school. In our research the analysis is not on the negative aspect of children's exit from high school but on the children's positive capacity for income generation.

There are two distinct modes of thoughts related to social action. One is the economic point of view that considers the actors as individuals motivated by goals that maximize their benefits (maximizing utility). The other is the sociological viewpoint that "sees the actor as socialized and action as governed by social norms, rules, and obligations" (Coleman 1988: S95). In Coleman's framework these two viewpoints are necessarily combined: purposive action is composed of individual and social action.

Coleman's (1988: S97) theory "is to import the economist's principle of rational action for use in the analysis of social systems proper, including but not limited to economic systems, and to do so without discarding social organization in the process." As his model follows from this framework so does our use of the concept of social capital. Social capital is only possible in a setting where it "

…constitutes a particular kind of resource available to an actor" (Coleman 1988: S98).

Although social capital is difficult to measure, three indicators are proposed and incorporated in Coleman's model (Coleman 1988): "number of children in the family", "both parents in the household", and "parents work outside the home". Coleman (1988: S111) defends the use of these variables because "social capital within the family that gives the child access to the adult's human capital depends both on the physical presence of adults in the family and on the attention given by the adults to the child." As Coleman (1988) explains operationally this means the greater the number of siblings, the less attention parents can give to each child. Also as Astone (1991: 309) notes in general: "children who live with single parents or stepparents during adolescence receive less encouragement and less help with school work than children who live with both natural parents, and parental involvement has positive effects on children's school achievement."

Human capital and social capital are important to the children's intellectual (and overall) development. However, human capital would appear to be less effective in the children's development if social capital is not also present. If parents make use of their human capital but do not socialize children in the home, development is not maximized.

In Coleman's model these independent social capital variables are added to the human capital indicators ("parent's education" and "parent's occupation"). Also a

third concept of financial capital is added with indicators such as “parent’s income” and “family’s possessions”. The three constructs belong to the family’s background and measures how they relate to achievement of the next generation.

METHODOLOGY

The main hypothesis in this study is that there is a causal relationship between a family’s background variables and their children’s achievement. This relationship can be positive or negative depending on the indicator utilized and the direction of its impact in the model.

In most social research there are typically two fundamental issues to be addressed: “ the first problem is concerned with the measurement properties – validities and reliabilities – of the measurement instruments. The second problem concerns the causal relationships among the variables and their relative explanatory power” (Joreskog and Sorbom 1996: 1). Depending on the particular study the issue to be addressed could be of the first type, or the second, or both. In this research it is the second type, that is, what is being assessed is the causal relationship between the variables.

The relevance of path analysis is that the estimates of the path coefficients provide not only the direct effects of the independent (potentially intervention) variables on the target (or dependent) variable but also the indirect effects. By analyzing the coefficients in the path diagram the researcher is able to evaluate the

maximum possible effect of alternative potential policy interventions and how such interventions might generate changes in the target variable. With such estimates in hand and after the computation of the total possible effect of intervention on the dependent variable the policy analyst will be able to prioritize potential interventions and evaluate the effectiveness of such interventions based on their maximum estimated effects.

In this research there are two levels of causation (see figure 1). In the first level there are the intermediate variables ("children's education" and "children's work experience") and in the second level there are the exogenous variables ("parent's education", "parent's income", and "number of children"). The dependent variable is children's income. Consequently, figure 1 presents not only the direct paths of the exogenous variables on the dependent variable but also indirect paths through the two intermediate variables. Figure 1 also presents the paths of the two intermediate variables on the dependent (policy or target) variable.

In this research path analysis is performed with the use of the software "Interactive LISREL version 8", distributed by Scientific Software International (SSI). The initial data analysis is done with the software SPSS 7.5 for Windows 95 where contrary to SPSS, "Interactive LISREL" provides the significant test for the coefficients on the indirect effects path links.

[FIGURE 1 ABOUT HERE]

THE DATA

The data used in the analysis are derived from *Pesquisa Nacional de Amostra de Domicílios* (PNAD). These household surveys are carried out by the *Instituto Brasileiro de Geografia e Estatística* (IBGE). This is the Brazilian government agency responsible for all censuses and official statistical surveys including the Consumer Prices Indexes.

The PNADs are annual surveys with occasional special supplements on selected topics (health, fertility, migration, and others). A process of "cleaning"[1], re-coding and validation was performed on the 1996 data set.

The PNAD surveys comprise all the regions, and are representative of the population at the state level, for both urban and rural areas.[2] The PNAD survey uses a stratified two-stage sample methodology based on the coverage of the demographic census. The first stage is the selection of census areas, the second is the selection of households within these areas. The size of the survey for 1996 is 105,059 households and 331,263 persons (IBGE 1996).

[1] This process included checking and re-coding missing values, and checking for inconsistencies and outliers.

[2] Only exception is the rural area of the North region (Amazon), which was not surveyed.

4.1 Sub-sample

A sub-sample was selected in order to analyze s children's achievement related to their families' background. The sub-sample has the following characteristics depending on specific values for five variables in the data set. The first sub-sample is the selection of persons categorized as sons/daughters among the members of the family. Because the individuals analyzed should not belong to different generations, our sub-sample includes only persons who are between 15 and 25 years old. These age limits allow us to minimize the probabilities of selecting children who are also parents themselves. We further examine only males because of the impact of gender behavior differences in the labor force.

Moreover, because the majority of the population in Brazil lives in urban areas (78 percent in 1996) we restricted our analysis to those areas. Also the socioeconomic characteristics and labor force participation patterns in rural areas are much different than the ones found in urban areas. Finally, only children with positive total income are selected. In the regression analysis framework the residuals, and therefore the dependent variable, should have a normal distribution. When children with zero income are added to the sub-sample the distribution is not normal (it is even bimodal). Consequently, one of the basic assumptions of the model would not be satisfied.

In this paper we analyze the data for two regions: Northeast and Southeast. The sub-sample size for the Northeast region is 2,682 persons and the size for the

Southeast is 4,312 persons. The Northeast is an underdeveloped lagging region with a major but declining agricultural sector, subject to seasonal droughts and an insignificant industrial sector. The Southeast is the most developed region in Brazil. It has a substantial modern agricultural sector, but it is also highly industrialized.

4.2 Variables

The dependent variable in the model is the naeperian logarithm of the male children's monthly income. Such children's income was standardized for 40 hours/work a week. There are two intermediate variables: male children's educational level and male children's work experience. The intermediate variable "male children's work experience" is not existent in the data set. It was constructed as a function of the children age and education. The formula used is the following:

$$\text{Experience} = \text{Age} - (\text{No. of years of Education} - 6)^3.$$

There are three exogenous variables related to the family's background. The indicator for the concept of the family's human capital is "parent's educational level". This variable is created as the highest educational level among the two parents.[4]

[3] The subtraction of 6 years in the formula is praxis in the literature on the economics of education and compensates for the first six years of a child's life when (s)he is not in school (Psacharopoulos and Ng, 1994).

[4] We could also construct this variable as the average of the two levels of education.

The indicator for family's financial capital is designated by the parents' total monthly income. This is measured by the sum of the father's and the mother's income. Parents' income was not standardized for a 40 hours/work in a week because what we are interested in is the total parent's income available to the family.

Another independent variable is an indicator of the family's social capital. Parental involvement is one aspect of social capital in the family and it is not easily measured unless we create "ad hoc" surveys. Instead we use the proxy "number of children in the family" with the rationale that the more children the family has the less attention it will ultimately give to each individual child.

RESULTS

For comparison, results for Brazil as a whole are presented in Table A.1 in the appendix. The results show that there are no major differences among the coefficients for Brazil, the Southeast region, and the Northeast region.

Southeast Region

The results of the path analysis model for the Southeast region are presented in Table 1. In the path with the exogenous variables pointing to "children's education" two of the exogenous variables have practically the same strength. The variable "parents' education" has a positive effect of 0.28 and "parents' income" has also a positive effect of 0.29. This is much as expected. The other exogenous variable

("number of children") has an effect that is negative and less than half the other two effects (-0.11). This sign is also as expected because the greater the number of children (the lower the social capital) and the lower the children's educational levels.

Roughly the same pattern can be seen with the path of the exogenous variables pointing to "children's work experience". The effect of "parents' education" on "children's work experience" is -0.27 and the effect of "parents' income" is -0.21. The effect of "number of children" is positive but much smaller (only 0.04) although it is significant. The greater the parents' educational level is the lower the child's work experience possibly because there is less need for others sources of income in the family. But the more children in the family the higher the child's work experience because more income is needed to sustain the larger family. This is also as expected.

The path with all variables (exogenous and intermediates) pointing to the dependent variable ("children's income") presents an unexpected result. Among the exogenous variables the strongest effect on child's income derives from "parents' income" (beta coefficient equal to 0.28). Note that this is derived mostly from the direct effect (0.21), with the indirect effect adding only 0.07. However, the second strongest exogenous variable is the negative effect of "number of children" (instead of "parents' education") on child's income. The total effect of "number of children" is -0.09 (the direct and indirect effects are roughly equal). The total effect of "parents' education" is only 0.06 (the indirect effect is 0.04 and the direct is not significant).

The policy variable “parent’s education” has no direct impact on children’s income, the impact is significant but solely indirect. This result is expected because while parent’s education influences children’s education, once the children’s education is given the parent’s education does not significantly influence his income. On the other hand, the direct impact of parents’ income on children’s income may be due to donations (transfers) between generations.

The two strongest effects on children’s income are derived from the intermediate variables. The strongest intermediate variable is “children’s education” with a total effect of 0.53. The other intermediate variable (“children’s work experience”) also has a strong total effect with a beta coefficient of 0.39. We will show that the coefficient of “children’s education” in the Southeast region is greater than for the much poorer Northeast region.

[TABLE 1 ABOUT HERE]

The indirect effects in Table 1 (Col. 4) are the sum of the indirect effects through the two intermediate variables (“children’s education” and “children’s work experience”). Table 2 separates these effects into two components for each of the exogenous variables. Note that the indirect effect through “children’s education” is much greater than the indirect effect through “work experience”. If these two

components had the same sign the indirect effects would be much stronger than they are in this model.

[TABLE 2 ABOUT HERE]

In summary, as expected the two intermediate variables (children's education and work experience) have the appropriate sign and present the strongest effect on the children's income. Among the exogenous (family's) variables the strongest, by far, is parent's income. However, the second strongest exogenous variable is not parent's education (as we expected) but number of children in the family. This suggests that this social capital indicator is stronger than the parents' human capital indicator but both are weaker than access to financial resources (parent's income).

Northeast Region

The results of the path analysis model for the Northeast region are shown in Table 3. In the path of the exogenous variables on the intermediate variable "children's education" the strongest effect derives from the "parents' education". This effect is positive and strong with a value of 0.34. The next variable in terms of strength is "parents' income" with a coefficient of 0.31. The social capital indicator ("number of children") has a much weaker effect. The effect of this variable on children's educational level is negative and it is less than half the effects of the other

exogenous variables (-0.13). With few exceptions these findings mirror our earlier one in Southeast Brazil in terms of variable signs and magnitudes.

[TABLE 3 ABOUT HERE]

The path of the exogenous variables on the other intermediate variable ("children's work experience") has a similar pattern described for the first intermediate variable just mentioned. The strongest impact on "work experience" is "parents' education" with an effect of -0.32. The effect of "parents' income" is only half this value (-0.16). However this effect is more than twice the effect of the social capital indicator. That indicator measured by "number of children in the family" has an effect of only 0.07.

In the path of all variables on "children's income" the strongest variables are the two intermediate variables: "children's education" and "children's work experience". The total effects from these two variables are 0.47 and 0.32 respectively.

From the exogenous variables the strongest total effect (as in the Southeast region) is derived from "parents' income" (0.34). From this total, the largest portion, 0.24, is derived from the direct effect, the remainder (0.09) is derived from the

indirect effect. Surprisingly the "number of children's" variable has a total effect (-0.13) which is higher (in absolute value) than the total effect from "parents' education" (0.11). Regarding parents' education both indirect and direct effects are roughly the same. For the "number of children" the direct effect (-0.09) is more than twice the indirect effect (-0.04).

The total indirect effects in Table 3 (col. 4) are the total indirect effects, that is, they are the sum of the indirect effect through "children's education" and "children's work experience". Table 4 splits the total indirect effects into its two parts. Note that due to the stronger effect of the variable "children's education" the portion of the total indirect effect through this variable is much higher than the indirect effect through "work experience". Also note that because the indirect effects related to the two intermediate variables have opposite signs (for example, -0.06 and 0.02 for number of children) the strength of the total indirect effect (-0.04 for number of children) is reduced to below that of the indirect effect through education alone. We note that signs are as expected and the level of effects are similar to our findings reported for the Southeast Region in Table 2.

[TABLE 4 ABOUT HERE]

In summary, in the Northeast the two intermediate variables (children's education and work experience) present the strongest effect on children's income. Among the exogenous (family's) variables the strongest, by far, is parent's income. However, the second strongest exogenous variable is not parent's education (as we expected) but number of children in the family.

POLICY PRIORITIZATION

This section evaluates the results of the estimates of the coefficients of the path models and discusses how these might be relevant to policy. The relevance of path analysis methodology for policy making is that it provides estimates not only of the direct effects of the exogenous variables on the dependent variable but also the indirect effects through the intermediate variables. In most cases the indirect effect is weaker than the direct effect. But it may be the case that some of the variables possess a weak direct effect but a strong indirect effect. From a policy-making perspective it is important to prioritize the intervention variables where the sum of direct and indirect effects is the greatest.

The impacts of policy are also of long or short term depending on the exogenous or intermediate variable that we are analyzing, that is, it does not depend on the methodology of path analysis itself. Actions on most or all of the variables in this research have mainly a long-term effect.

This section explores the critical reason for using a path model as a tool for policy analysis. The analysis of the results of path coefficients estimates is crucial in its implications for policy. Through the analysis of coefficient estimates, an assessment can be made of which variables have the greatest effect on the target variable and what is the maximum amount of those effects.

A successful policy depends on the maximum effect an intervention variable can have on the target variable. This is estimated by an evaluation of the path analysis results. The evaluation is for the Southeast and the Northeast regions.

Southeast

The analysis for the Southeast region is based on the estimates shown in Table 1. In the path analysis model, parent's human capital is represented by the indicator "parent's education", parent's financial capital is represented by "parent's income", and family's social capital is represented by "number of children in the family". These exogenous variables have a causal relationship on the target variable "children's income". However this relationship can be either direct or indirect through the intermediate variables "children's education" and "children's work experience".

A policy instrument may be associated with each of the independent variables. For "parent's education" (and children's) one policy instrument might be the government's support of greater access to education, such as a reduction of the costs

of education as incentive to have people increasingly invest in it. Another is support of public education in order to reduce dropout and repetition rates and a third might be to provide public information about the strong relationship between education levels and future income.

For "parent's income" a policy instrument may be tax policies that are parent-friendly, that is, provide tax incentives or extra income for lower income families who keep their children in school. For "number of children" an instrument may be a family planning policy to reduce the number of children in the family although in a strategic sense it would appear the others are more important policy priorities.

Table 5 presents the descriptive statistics for the variables in the model. The standard deviation will be used to evaluate potential policy impacts on children's income.

[TABLE 5 ABOUT HERE]

Table 6 presents the maximum total effects (extracted from Table 1) of the policy variables on the target variable (children's income). The impact on children's income (increase or decrease) is computed using these estimates and the standard deviation of these variables to assess the elasticity of the intervention effect.

[TABLE 6 ABOUT HERE]

The policy variable that has the greatest impact on children's income is "children's education" (beta coefficient of 0.53). This impact can be anything from zero to this maximum of 0.53, depending on how effective the policy instrument is.

The standardized coefficient of 0.53 means that changing children's education by one standard deviation (3.33 years), while holding all other independent variables constant, will change children's income by 0.53 standard deviations, that is, by R$210.17 (0.53 x R$396.54)[5].

The literature on economics of education is well supplied with studies showing the relevance of education for higher income (see Psacharopoulos and Ng 1994; Becker 1975; Birdsall et al. 1996). In this study, the results also show that education has the greatest impact on income. This is the policy variable that potentially generates the greatest impact on the target variable. Two operational constraints are the selection of the actual policy instrument that creates the impact and the appreciation that as education is increased its impact on income is likely to diminish due to decreasing returns.

The second highest impact is of "work experience". An increase of years of work experience has an impact of 0.39 which generates an increase of R$154.65 (0.39*R$396.54) in children's income. However a cautionary note should be struck

[5] The Brazilian currency in 1996 is called "real" (R$).

here because “work experience” in this model is primarily an age variable and hence it is not susceptible to policy intervention.

Table 6 shows that the policy variable with the third highest impact on children’s income is “parent’s income” (0.28), followed by “number of children” (-0.09). Parent’s education has the smallest impact on children’s income (0.06).

An increase of one standard deviation in parent’s income (R$1,278) will generate an increase of 0.28 standard deviations in children’s income, that is, of R$111.03 (0.28 x R$396.54). For “number of children”, a decrease of one standard deviation (1.51 children) will imply an increase of 0.09 standard deviations in children’s income, that is, R$35.69 (0.09 x R$396.54). For the weakest variable “parent’s education” policy intervention will only generate (at most, if totally successful) the effect of 0.06 or R$23.79 (0.06 x R$396.54).

Northeast

Table 7 presents the basic statistics for the variables in the model for the Northeast region. The standard deviations for the variables will be used again to assess the impact of policy making on children’s income.

[TABLE 7 ABOUT HERE]

The analysis for the Northeast region is based on the estimates shown in Table 3. The results in this table do not differ much from Table 1 (Southeast). The reason

to include the analysis for the Northeast is to evaluate if the coefficients of a poor region have the same behavior as that of a richer region.

Different arguments could be made about the expected impact of education. As an economy moves from agricultural to industrial and to service, education and creative powers increase in value. Therefore we may expect that education will have a greater influence in a rich region due to its broader range of opportunities to utilize human capital investments (see Hausmann and Szekely 1999). On the other hand, an alternative argument could be made that in richer states, investments in education will at some point yield decreasing returns.

Table 8 presents the effects related to each policy variable. As for the Southeast, in the Northeast the policy variable that has the greater impact on children's income is children's education (0.47). This means that the impact of children's education can be anything from zero to this maximum of 0.47, depending on the efficacy of policy making.

[TABLE 8 ABOUT HERE]

The standardized coefficient of 0.47 means that increasing children's education by one standard deviation (3.74 years), while holding all other independent variables constant, will increase children's income by 0.47 standard deviations, that is, by R$112.77 (0.47 x R$239.94).

The variable "parents' income" is the second in terms of impact on children's income (see Table 8). The increase of one standard deviation in "parents' income" (R$1,471) will generate an increase of 0.34 standard deviations in children's income or R$81.58 (0.34 x R$239.94). This shows the greater importance of parent's income in the poor Northeast region.

Work experience[6], that had the second greatest impact in the Southeast, possesses the third highest impact in the Northeast. The impact of work experience measured in Reals (Brazilian currency) amounts to R$76.78 (0.34 x R$239.94).

The next strongest impact is due to "number of children". Policy intervention on limiting the number of children in the family by one standard deviation (approximately two children) will generate an increase of 0.13 standard deviations in children's income or R$31.92 (0.13 x R$239.94) in this poorer Northeast region.

Parents' education generates the smallest impact on children's income. If parent's education is increased in 4 years (one standard deviation), children's income will only increase 0.11 standard deviations or R$26.39 (0.11 x R$239.94). Consequently, parents' income has a higher impact on children's income than the size of the family or parent's education.

[6] However, remember the comment made earlier that this is primarily an "age" variable and hence is not particularly susceptible to policy intervention.

CONCLUSION

When analyzing the results we should keep in mind that there are differences in cultural traits between Brazil and the United States. Because of these differences a certain caution should be taken when analyzing the results of the model applied to the Brazilian household data.

One cultural trait that is different in the two countries is the spatial proximity of families and relatives and the importance of extended families in Brazil. While in the U.S. nuclear families and relatives tend to live farther away often in different states, in Brazil even nuclear families tend to live closer to their relatives, usually in the same city or town. This potentially generates more access to social capital within the family as other members of the family may step in and assist with children when the parents are busy or temporarily absent. This may explain the small impact of the size of the family (number of children) on children's income.

The focus of this research is on the causal relationships between family background variables and children's human capital on children's achievement. This causal relationship is assessed in the context of path analysis.

The model is composed of three exogenous variables, two intermediate variables, and one dependent variable. The exogenous variables are family background variables, the intermediate variables are the children's educational level and work experience, and the dependent variable is the children's achievement (measured as income). The exogenous variables are indicators of the three concepts

of capital: financial capital (“parent’s income”), human capital (“parent’s education”), and social capital in the family (“number of children”).

By far the most important variable influencing “children’s income” is their educational level. The economics of education literature is rich in research demonstrating the importance of education on higher income. Human capital theory stresses the importance of education to economic growth and that it yields high economic returns (both for the individual and for the society as a whole). This research validates the importance of education for the achievement of Brazilian children in different regions in Brazil.

Family’s background variables are also extremely relevant in explaining a child’s future income. The exogenous variable “parents’ income” is relatively strong while “parent’s education” is significant but generates a much weaker effect on children’s income. The variable “number of children” is not strong, but surprisingly is stronger than “parents’ education” for both regions.

In summary, the path analysis model generated parameter estimates that presented a causal relationship of human, financial and social capital variables on children’s income. This model was replicated for two regions. They presented a fairly consistent result, with the parameter estimates similar in both regions.

Policy prioritization derives directly from the analysis of the coefficient estimates of the path model. By far, the priority should be on investments directly in children’s education. For both regions the variable with potentially the maximum

impact on children's income is their education (impact of 0.53 – Southeast and 0.47 - Northeast). The other variables that are relevant for policy are parent's income (impact of 0.28 for the Southeast and 0.34 for the Northeast), and number of children in the family (impact of -0.09 for the Southeast and -0.13 for the Northeast), in this order. The intervention on parents' education yields the smallest effect on children's income (impact of 0.06 for the Southeast and 0.11 for the Northeast).

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Table 1. Direct, indirect and total effects - Southeast region (1996)

Dependent Variable	Independent Variables	Direct Effects	Indirect Effects	Total Effects
Children's Education	No. of Children	-0.11	--	-0.11
		(-8.46)		(-8.46)
	Parent's Education	0.28	--	0.28
		(17.91)		(17.91)
	Parent's Income	0.29	--	0.29
		(18.62)		(18.62)
Children's Work Experience	No. of Children	0.04	--	0.04
		(2.70)		(2.70)
	Parent's Education	-0.27	--	-0.27
		(16.44)		(-16.44)
	Parent's Income	-0.21	--	-0.21
		(-12.43)		(-12.43)
Children's Income	No. of Children	-0.05	-0.04	-0.09
		(-4.16)	(-4.90)	(-6.36)
	Parent's Education	0.02*	0.04	0.06
		(1.50)	(3.51)	(3.64)
	Parent's Income	0.21	0.07	0.28
		(14.35)	(6.35)	(16.26)
	Children's Education	0.53	--	0.53
		(39.50)		(39.50)
	Children's Work Experience	0.39	--	0.39
		(31.10)		(31.10)

Notes: 1) All estimates are significant at the 5% level or less, except for those with an asterisk ("*"). 2) The numbers in parenthesis are t-values.

Table 2. Contribution of Education and Work Experience to the Indirect Effects – Southeast region (1996)

Exogenous Variables	Education	Work Experience	Total
No. of Children	-0.06	0.02	-0.04
Parent's Education	0.15	-0.11	0.04
Parent's Income	0.15	-0.08	0.07

Source: Based on *Pesquisa Nacional de Amostra de Domicilios*, 1996.

Table 3. Direct, indirect and total effects - Northeast region (1996)

Dependent Variable	Independent Variables	Direct Effects	Indirect Effects	Total Effects
Children's Education	No. of Children	-0.13	--	-0.13
		(-8.65)		(-8.65)
	Parent's Education	0.34	--	0.34
		(17.66)		(17.66)
	Parent's Income	0.31	--	0.31
		(16.14)		(16.14)
Children's Work Experience	No. of Children	0.07	--	0.07
		(3.90)		(3.90)
	Parent's Education	-0.32	--	-0.32
		(-14.68)		(-14.68)
	Parent's Income	-0.16	--	-0.16
		(-7.29)		(-7.29)
Children's Income	No. of Children	-0.09	-0.04	-0.13
		(-5.63)	(-4.26)	(-7.21)
	Parent's Education	0.05	0.06	0.11
		(2.45)	(4.03)	(4.89)
	Parent's Income	0.24	0.10	0.34
		(12.33)	(7.25)	(15.44)
	Children's Education	0.47	--	0.47
		(25.29)		(25.29)
	Children's Work Experience	0.32	--	0.32
		(19.61)		(19.61)

Notes: 1) All estimates are significant at the 5% level or less. 2) The numbers in parenthesis are t-values.

Table 4. Contribution of Education and Work Experience to the Indirect Effects – Northeast region (1996)

Exogenous Variables	Education	Work Experience	Total
No. of Children	-0.06	0.02	-0.04
Parent's Education	0.16	-0.10	0.06
Parent's Income	0.15	-0.05	0.10

Source: Based on *Pesquisa Nacional de Amostra de Domicilios*, 1996.
Note: The differences in the sum are due to rounding.

Table 5. Descriptive statistics - Southeast (1996)

Variable	Minimum	Maximum	Mean	Std Dev
Children's Income	2	12,000	301.93	396.54
Children's Education	0	17	7.65	3.33
Work Experience	0	19	6.31	3.96
No. of Children	1	11	3.08	1.51
Parent's Education	0	17	5.39	3.96
Parent's Income	0	30,700	764.23	1,277.97

Source: Based on *Pesquisa Nacional de Amostra de Domicilios,* 1996.
Note: Based on 4,312 observations.

Table 6. Direct, Indirect, and Total Effects - Southeast (1996)

Policy Variable	Total effects (maximum)	Policy Intervention
Children's education	0.53	R$210.17
Work Experience	0.39	R$154.65
Parent's income	0.28	R$111.03
Number of children	-0.09	R$35.69
Parent's education	0.06	R$23.79

Source: Based on Pesquisa Nacional de Amostra de Domicilios, 1996.

Table 7. Descriptive statistics - Northeast (1996)

Variable	Minimum	Maximum	Mean	Std Dev
Children's Income	4.17	3,363.64	192.09	239.94
Children's Education	0	17	6.23	3.74
Work Experience	0	19	7.81	4.10
No. of Children	1	14	3.77	1.91
Parent's Education	0	17	4.45	4.15
Parent's Income	0	53,800	518.50	1,471.08

Source: Based on *Pesquisa Nacional de Amostra de Domicilios,* 1996.
Note: Based on 2,682 observations.

Table 8. Direct, Indirect, and Total Effects - Northeast (1996)

Policy Variable	Total effects (maximum)	Policy Intervention
Children's education	0.47	R$112.77
Work Experience	0.32	R$76.78
Parent's income	0.34	R$81.58
Number of children	-0.13	R$31.92
Parent's education	0.11	R$26.39

Source: Based on Pesquisa Nacional de Amostra de Domicilios, 1996.

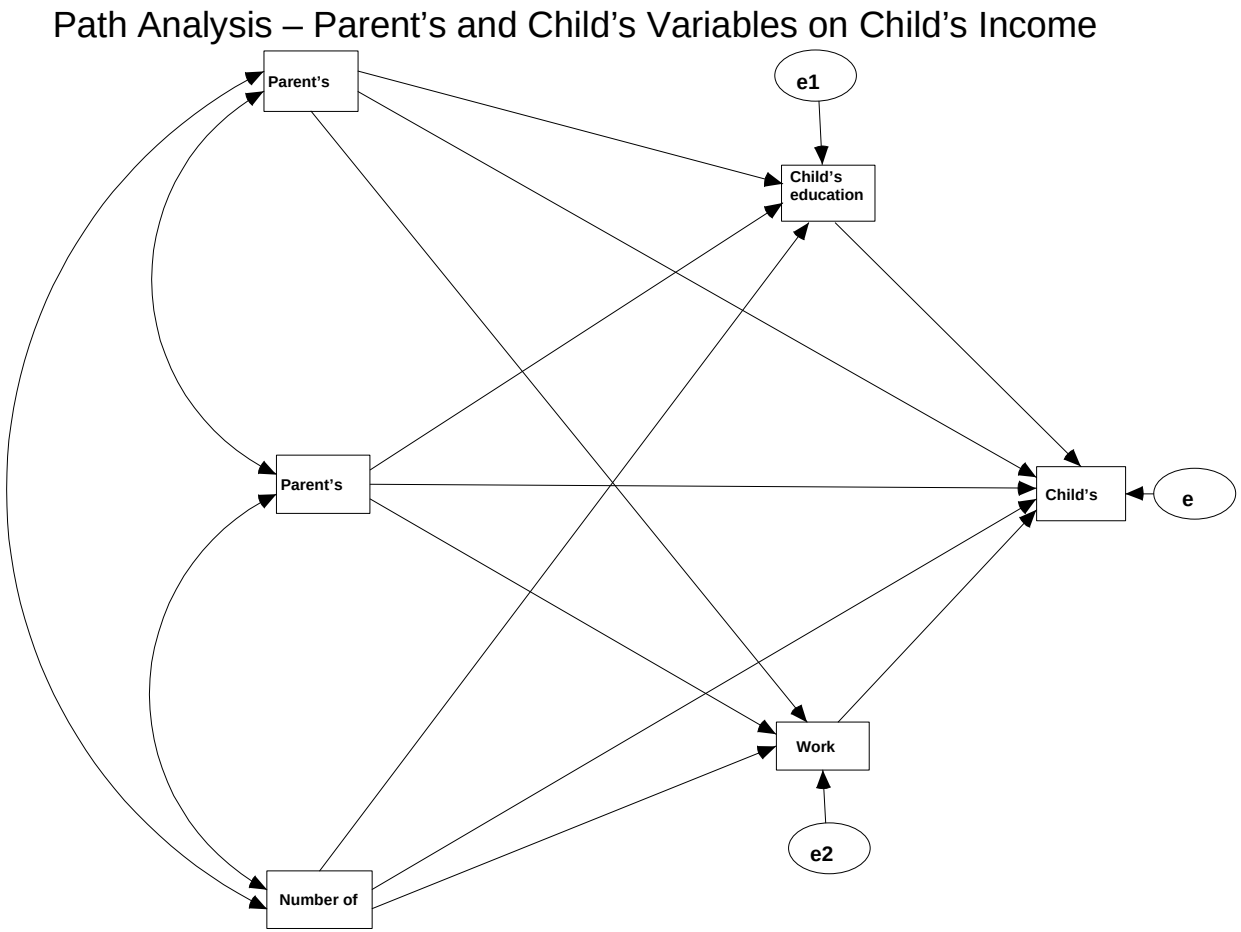

Figure 1.Path Analysis Diagram

APPENDIX A

Table A.1. Direct, indirect and total effects - Brazil (1996)

Dependent Variable	Independent Variables	Direct Effects	Indirect Effects	Total Effects
Children's Education	No. of children	-0.13	--	-0.13
		(-16.67)		(-16.67)
	Parent's Education	0.29	--	0.29
		(29.81)		(29.81)
	Parent's Income	0.31	--	0.31
		(31.64)		(31.64)
Children's Work Experience	No. of Children	0.07	--	0.07
		(8.17)		(8.17)
	Parent's Education	-0.28	--	-0.28
		(-26.10)		(-26.10)
	Parent's Income	-0.21	--	-0.21
		(-19.71)		(-19.71)
Children's Income	No. of children	-0.08	-0.04	-0.12
		(-10.89)	(-8.02)	(-13.80)
	Parent's Education	0.03	0.05	0.08
		(2.78)	(6.89)	(6.98)
	Parent's Income	0.24	0.08	0.33
		(25.89)	(11.78)	(29.92)
	Children's Education	0.52	--	0.52
		(60.66)		(60.66)
	Children's Work Exp.	0.37	--	0.37
		(46.54)		(46.54)

Notes: 1) All estimates are significant at the 5% level or less, but the ones with "*".
2) The numbers in parenthesis are t-values.