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EDUCATION AND THE LABOR MARKET IN LATIN AMERICA

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## PART ONE

### INTRODUCTION AND MAIN RESULTS

The Pilot Projects have made significant contributions to the debate regarding the relationship between education and the labor market in Latin America. These studies, in a manner of speaking, are part of a third phase in a controversy which started with the dissemination of the uncritical, and often non-empirically based, theory of human capital and its implications for policies of economic growth, as well as other social policies. As we know, these propositions were the object, in a second phase, of rebuttals, which, without questioning the methodological aspects of the theory of human capital, denied the empirical evidence employed in its conclusions and flatly opposed the political implications of this theory. The result was a situation in which the importance of furthering the debate on the fundamental questions was recognized, along with the need for a better and more detailed knowledge of the empirical evidence, and a more careful analysis of the methodologies employed.

The Pilot Projects were designed with these propositions in mind. Their contributions, therefore, are important to the extent that careful and serious analysis is crucial in the development of works which see, to contribute in some way to the eminently political discussion concerning government decisions. In the course of this process, the projects collected a valuable mass of data on education and the labor market in Latin America, obtained in various contexts and composed of quantitative and qualitative information which in any case will be very useful for

future undertakings.

They also produced a very rich and in context theoretical discussion about the principal explanations which have tried to account for the relation between education and the labor market; a very enlightening discussion of the methods of obtaining empirical evidence, one which was up to date and technically sophisticated; a very important and unusual discussion on the conclusiveness of the empirical evidence obtained, and which serves as a basis (although ideological) for the political and empirical decisions reached was, for us, perhaps the most important result to emerge from the projects.

As they could not fail to do, in one way or another, all the researchers used the tool of earnings functions for support, relating this variable to variations in age and schooling. Additional controls were introduced in the basic relation in order to identify more carefully the specific contribution of education. The result, generally speaking, was to refute the apparent and earnings questioning the basic suppositions of current thought on the supposedly key role of education in the process of mobility in the labor market. The studies accomplish this by pointing out the absence of necessary stability in the relations between education and earnings or mobility, such that they could be unequivocally interpreted for the formulation of economic policies.

The documents reviewed here illustrate the need for complementation between the procedures of aggregation and simplification commonly adopted in the examination of the "contribution" of education to social welfare. They also point out the importance of such variables as socioeconomic origin, employment situation, area of activity and others which, although they could be coherently included in earnings functions which try to relate variations in education to improvements in salary or occupation, also destroy the interpretative facility of the contribution of education. There is ample evidence here that

workers with more education have higher earnings. However, there is also evidence that level of education depends fundamentally on family income and that the worker's occupation, on entering the labor force, determines the prospects of mobility.

The most detailed analyses of the relations of employment in Santiago(Chile) and Salvador(Bahia) reveal the multiple and disparate ways in which education contributes to the process of selection and promotion of workers within companies. These studies emphasize the importance of organizational models connected to the characteristics of the firm (size, position in the market structure, technological basis, tradition of labor relations, etc.) in the use these companies make of the educational attributes of their labor force.

In summary, the Pilot Projects reinforce the importance of the educational process in connection with production and with remuneration for labor. Furthermore, by focusing on heterogeneity in the educational process as well as in the productive structure, they emphasize the limitations of generalistic approaches, be these of apologetic inspiration (i.e., the ingenuous translation of equally ingenuous models of the theory of human capital) or critical (in other words, the simplistic identification of rigid "dualisms" in the labor markets).

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PART TWO

THE DEBATE ON EARNINGS FUNCTIONS AND THE EMPIRICAL EVIDENCE

I. THE ECIEL PROGRAM AND THE PILOT PROJECTS<sup>1</sup>

One of the Projects in the ECIEL Program is "Project Education", whose overall objective is to investigate the relationship between education and society in countries in Latin America.

Within this general thematic focus, two types of studies have been carried out:

i) Studies on the costs and determinants of the educational system and on the determinants of schooling. These works describe the functioning of the educational system, taking it as the dependent variable.

ii) Studies referring to the relation between education and the labor market in different contexts. These works take the formal educational system as an independent variable, concentrating on the effects of education on various question in the labor market.

These last studies are the Pilot Projects, which seek to gather evidence in Latin America on the relationship between education and society postulated by alternative theories (complemen

tary or disjunctive) about education and the labor market.

Most of the empirical studies on the relationship between the subsystem and other subsystems or the overall system, have used statistical models which assumed production functions (be they of earnings or of others).

These studies can also be classified as "black box" models, in other words, they intend to predict output based on the knowledge of the presence or absence, and amount, of inputs used. The process of converting the inputs into the final products, and the reasons for the associations found are, in principle, beyond the scope of the empirical findings.

It is for this reason that many of the conclusions reached using black box production functions are only capable of providing descriptive evidence, or, at best, a prediction, always assuming that the relation between the variables and the context of their interaction will remain constant over time.

Therefore, many of the descriptive or at most predictive findings, when used to support theories which would attempt to formulate an explanation (in other words, postulate the mechanisms of the conversion of inputs to products, the ways of combining different factors, and the contingency of the rules postulated in space and time) invariably turn out to be weak and equivocal, providing poor evidence for the theoretical content of rival explanatory theories.

The intention of the Pilot Projects was consciously established as that of transcending studies which were merely descriptive or predictive. Given their exploratory nature, these studies hope to determine the applicability of general theories in various areas in space and time, and to question the concept of the singularity of combination and types of inputs, destined to produce a product which is also univocal.

Another important intention of the Pilot Projects is to study the question of reference in light of various methods of empirical approach, nevertheless different from the production functions.

## II. THE PILOT PROJECTS AND THE UNDERLYING DEBATE

Carried out in different countries, in different labor markets, and using dissimilar methods of empirical investigation, the Pilot Projects attempt to consider the various prevailing alternative theories relating to education and the labor market, the alternative methodologies used to obtain evidence, and the relation between the methodologies and the descriptive and/or explanatory theories in question.

The Pilot Projects plan to test, in different contexts in the Latin American region, the predictive efficiency and the explanatory power of the alternative theories.

These alternative theories refer to themes such as: education and economic growth; education and marginal productivity; education and salary or income; education and income distribution; education and employment; education and labor migration; education and mobility, whether occupational or social.

The alternative methodologies include single-equation production functions; recursive systems of equations; case studies; in-depth interviews; analysis of association through tables; covariance analysis; and Markov series.

With respect to these topics and with these methods of

empirical confirmation, the propositions of the theory of human capital and alternative theoretical propositions are evaluated in light of the theoretical conclusiveness of the empirical evidence obtained using the various methodologies.

Subsequently, we will spend some time on each of the Pilot Projects, describing the labor market to which they refer, the theoretical content under discussion, the material propositions investigated, the methodology used to obtain evidence and the results obtained.

### III. EDUCATION AND THE LABOR MARKET IN MEXICO CITY<sup>2</sup>

The Center for Educational Studies (CEE) carried out its Pilot Project under the leadership of Carlos Muñoz Izquierdo, Alberto Hernandez Medina and Pedro Gerardo Rodriguez M..

This study plans to reproduce findings reached in more developed societies in the specific context of the Mexican labor market, attempting to see how much is "explained" by the groups of variables or the variables most frequently employed in the classic strategies for the investigation of status of status attainment.

Status attainment is seen through a sequential recursive chain of variables and groups of variable which, to a certain extent, "produce" a certain level of status.

The process of status attainment is classified by educational status attained, initial occupation, current occupation,

and economic status, which are the points of concentration of the analysis of this process.

#### A. Methodology

The methodological analysis involves a classical path analysis, and an analysis of communalities, which is innovative in relation to some of the classical studies, as well as with respect to some Latin American replications of these.

Path analysis concentrates on the prediction of the variance of dependent variables, by means of a system of recursive equations which is analyzed using the following indexes of association: a) Coefficient of Determination ( $R^2$ ) to analyze the degree to which the model explains or accounts for the covariance of the dependent variable and the ensemble of the independent variables. b) Pearson's Coefficient ( $r$ ), to measure the degree of covariance of an independent and dependent variable (also called "total effect" of the independent on the dependent, attributing direction and causal effect to the covariance). c) Beta regression coefficient, which measures the direct independent effect of the independent variable on the dependent, the other endogenous variables in the model being held constant. d) Difference of  $r$  minus Beta, which measures the indirect effects, or, in other words, the effects of the variables which entered into the direct relation, subtracting the ones isolated by the betas (or total minus direct independent effect

This analysis is the most classical, implanted in social investigation on status attainment by the influential work of Blau and Duncan,<sup>3</sup> which assumes interval level in the measurement of variables, a normal distribution of the accumulated frequencies, additivity of the covariances, linearity of correlation, homoscedasticity of the variances, validity of the transversal data for longitudinal inferences, statistical independence between

the endogenous and residual variables, and perfect recursivity.

For an analysis of the theoretical and analytical implications of these suppositions, and other theoretical - statistical - methodological problems, see Rafael Bayce.<sup>4</sup>

However, the path analysis is complemented by the Mexican authors by another procedure: the analysis of the communality which seeks to identify, not the direct or indirect isolated-effects of the individual variables, but the joint covariance of two or more variables on the dependent. The unit to identify for its effect is now a covariance.

We feel that this analysis complements the path analysis on several points of great theoretical importance: given that the methodological model used, - with independent variables whose combination and or addition is considered as a mixture of inputs - assumes a theoretical knowledge of the relevancy of the inputs for the production of a result (dependent variable), the theoretical problem with respect to these "production functions" is doubled, to wit; the correct specification of the important inputs, and the correct specification of the proportion in which they must be summed or combined for the production of the final product.

Although path analysis provides quantitative estimates of the isolated influence of each input and of the means by which each product is obtained, this method (of the "black box" variety), overlooks the fact that different combinations of inputs (and not only their sum) are responsible for the final output. Therefore the analysis of the communality intends, by emphasizing interaction more than addition, to indicate the different impact that various combinations of variables have on the product which is to be explained.

This analysis of the communality is absent from most classical literature which considers the relationship between

education and society, and the process of status attainment; its use is a valuable contribution of this Pilot Study, since the performance of the inputs in the elaboration of the end product is implicitly thought to be contingent to the variety of ways in which they are combined (that is, of techniques of production, a major problem in the debate between neoclassicists, Keynesians, and Marxists in economics, and which is carried over to the basic issue of the Pilot Studies).

#### B. The Macrocosm of Reference

One of the theoretical hypotheses which led to the conception of the Pilot Projects was the belief that the relationship between education and the labor market (basically, the relations between education, employment, occupation, income, vertical and horizontal mobility, and growth) were not unique nor univocal, but depended on specific characteristics of different labor markets, determined in space and time. Also, the focalization of the social relations of production was implicitly seen as important, in view of works which only emphasized the technical context of production.

In the case of this Pilot Project, carried out in Mexico City (Mexico), the environment for which these conclusions are valid is the modern sector of manufacturing industries, in the urban area of the Mexican capital. Specifically, the electrical, foodstuffs, and pharmaceutical industries, in that order, were privileged in the sample. Both sexes are represented, the clear differentiation in results by sex being one of the study's strongest conclusions.

The average age is between 29 and 33, which is important when we consider that, according to the classical findings of the economists (essentially, Mincer<sup>5</sup> and his concept of the "overtaking

point"), at this age economic benefits of education have not yet been fully born out, which could diminish the education-earnings relation found in the model.

The companies are large and medium-sized. In the large firms, the employees included are predominantly from the upper-middle stratum, while in the medium-sized companies, the personnel selected come primarily from the lower-middle range on the occupational hierarchy.

In the middle-sized firms, as a logical consequence of the distribution of the cases in the occupational hierarchy, the employees for the most part are descended from fathers who were manual workers in medium-sized firms, while in the large companies, it is more common to find employees whose fathers had non-manual occupations.

The educational average, of employees in large firms as in medium-sized ones, is much higher than that of the population of the city, and, moreover, of the country, for the same age and sex segments, which, in a high unemployment situation as is the case in Mexico, would indicate to the authors the presence of overeducation of the employees, required as a means of filtering access to scarce employment.

As for the distribution of the sample by region of origin, the higher the age, the higher was the proportion of persons originating from the provinces among the men, while the women were clearly of urban origin, as a rule from the Federal District (Mexico City).

## C. Theoretical and Comparative Discussion of the Results

### 1. Preliminary Analysis

In a preliminary analysis, the authors of the Project eliminated some of the variables initially hypothesized as influential, but which later turned out to be of little explanatory importance.

One of them is the public-private dichotomy of the formal institution of education attended. The comparative irrelevance of the private or public character of the institution attended is, at first glance, surprising, and contradicts some findings in educational and economic literature. A review of the contradictory results would not be pertinent in this case, since the characteristics of the entire educational system in space and time determine the composition of the supply of education by both the public and private sector, and, also, the composition and strength of the demand for certain types of education in such a way that, in reality, abstract comparisons would be meaningless.

In any case, to refer to more similar social systems, some studies in Latin America have demonstrated the importance of the public-private dichotomy, in isolation and when combined with the rural, semi-urban, or urban setting. For example, the work of Rivarola, Corvalán y Zúñiga for ECIEL on Determinants of Educational Performance in Paraguay,<sup>6</sup> stratifies the sample using this dichotomy, because they found in it a relevant a priori discrimination for the discernment of performance.

The results prove them right. In effect, at all the levels analyzed, whether in performance in Science or reading, and in all areas, the differences in performance between private and public schools are consistently similar: performance is better in the private schools, a tendency which remains constant over geographical area and socioeconomic strata.

Also, Morales and Pinell-Siles, in their study of "Costs and Determinants of Schooling in Bolivia",<sup>7</sup> for ECIEL, found that the public-private division is the variable most closely associated with capital outlays this expenditure being much higher in private establishments. Furthermore, the private schools, in terms of preventing students from dropping out of school, is noticeably higher for similar socioeconomic categories.

Jacques Velloso, in his study on "Socioeconomic Origin and School Performance" in Argentina<sup>8</sup> for ECIEL found significant differences, using the private-public dichotomy as a replacement for better inputs in terms of teachers, directors, and equipment. The findings indicate that at the primary level, the private or public character of the school has no influence. However, at the secondary level, performance in reading presents a clear differential favoring students in private schools. This differential is also found, and is larger, in tests of performance in science.

Isaura Belloni and Glaura Vasques, in their study for ECIEL of Determinants of Schooling in Belo Horizonte (metropolitan region)<sup>9</sup> found a high level of association between schooling and attendance of public institutions. This apparent anomaly is explained by the authors, who argue that given the high average level of schooling in the sample, the influence of enrollment in universities(public) must be responsible for the finding.

Perhaps the absence of association found in the Pilot work to which we referred is due to the fact that in the case of Mexico, associations are sought between the type of school attended and the type of occupation exercised, while in the other studies in Latin America, the relation is studied as a possible differential in academic performance, a variable which could present a higher correlation with the type of establishment, to the extent that, the type of occupation held is not so much a function of the institution attended, as it is a result of the type of course and the amount of schooling. Another variable that the Pilot

Project in Mexico City did not find to be relevant was the phenotype of the respondent in relation to his first job, keeping age, occupation of the father, and education constant. Phenotype is used as a proxy-variable for race and the fact that no relation has been found between this proxy-variable for race and the first job is surprising, since the covariance between race and varied dimensions of status, even when some of these are held constant, is known.

We do not know of any other studies in Latin American in which this variable has been studied, with the possible exception of the recent work by Carlos Hasenbalg on Discrimination in Brazil,<sup>10</sup> and the publication of ECIEL on "Costs and Determinants of Schooling in Brasilia".<sup>11</sup>

As a classical predecessor in connection with this point, Jencks<sup>12</sup> included a similar indicator, genotype of the respondent, which is a better measure than is phenotype, from the ethnological point of view, although this is more questionable in terms of social stigmatization and its possible consequences for the attainment of status.

It is very interesting to note the discussion during which a justification is given for the elimination of informal education as an influential variable in the process of status attainment.

In this respect, having consulted the final report and a preliminary statement of this same Pilot Project for Mexico City, the following conclusions can be established:

- Neither the individuals with technical courses, nor those who had completed course in companies in which they previously or presently worked, had experienced greater occupational mobility. This discovery will be discussed at greater length when we consider the Pilot Project by Fernando Tagle in Chile.

It is worth adding that on-the-job training is one of the variables which is considered to be highly explanatory by the theorists of the theory of human capital (primarily Gary Becker)<sup>13</sup> and according to which the formation of human capital is an important component in economic development, an explanatory factor in economic status attainment and a determining factor in many phenomena in the labor market.

The Pilot Project of Mexico City, contrary to the findings which are moderately corroborative of the theory of human capital (like Mincer), decided to forego the consideration of the variables of human capital, with the exception of formal education.

The Initial Report and the Final Report concluded that non-formal habilitation and training are an extra-curricular complement for individuals with more education, and not an equivalent substitute for formal education in the production of status attainment in the labor market.

The hypothesis that formal education sets the limits of trainability for the labor force, and therefore, limits occupational and economic vertical mobility, seems to be favored by this brief analysis.

The results of the Pilot Project for Mexico City are similar to those obtained earlier by Thomas La Belle in Ciudad Guyana, Venezuela.<sup>14</sup> This author tested the influence of the mother's education, formal education, age, and education outside of school in determining the monthly earnings of salaried employees and wage earners.

Besides obtaining a low figure for explained variance, the author found a clearly greater influence of age and formal education; the education of the mother showed considerable influence, although smaller, and the variables of education outside of school showed negligible influence on monthly earnings. Only hours of

study in courses within the company which were not related to production showed a slight effect.

It is worth mentioning here a very important finding of La Belle: the fact that the low variances explained by the totality of the variables included becomes high when the salaried employee-wage earner dichotomy is included in the regression, which is a good argument in favor of the concepts espoused by Gorz<sup>15</sup> and Braverman,<sup>16</sup> which uphold a point of view about the labor market which is different from the explanation proposed by the theory of human capital, but which does not receive any special corroboration in this part of the Pilot Project.

Finally, the authors of the study for Mexico City decided to eliminate from future analysis some measures of attitude which in a first instance did not prove to be influential in the causal chain of status attainment, although they suggested the instrument of measurement could be responsible for the lack of relevancy of these indicators to a greater extent than the theory which suggested the inclusion of the same in the design of the project.

Later we will return to the discussion of the theoretical tradition and reasons which lead to the inclusion of psychosocial variables as factors in models of status attainment. Presently, we can only stress the importance of the author's observation that the instrument of measurement, be it the operationalization, the definition, or the specification of the relation between the variables can be responsible for the presence or absence and for the strength of the association found in the empirical verification.\*

This observation seems particularly important because it is a very common fallacy in the interpretation of empirical results to conclude, by using them, things which go well beyond.

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\*Note: this finding coincides with data outlined and analyzed by Ricardo Lima, in another Pilot Project which will be reviewed shortly.

that which the data would permit. Sometimes, as in the case which Muñoz and his colleagues pointed out, it is the design of the investigation or the instrument of measurement which is largely responsible for a result which is attributed to the explanatory power of this or that theory supposedly tested by investigation. Regarding this, see Rafael Bayce.<sup>17</sup>

## 2. Path Analysis

The principal results obtained through path analysis will be reviewed in light of sociological and economic literature, as well as in view of the results achieved in other Latin American studies relating to the same phenomena.

Before continuing, we should clarify that that the results obtained in Mexico City are not as far-reaching as those which have emerged from the classical studies, because the regressions were run over groups divided by sex and our age brackets. That is, instead of having one  $R^2$ , one Beta, one  $r$  and a difference Beta minus  $r$  for each equation or variable, we have 8  $R^2$ , 8 Betas, 8  $r$ , and 8 differences Beta minus  $r$  to evaluate. Instead of an overall sample to analyze, we have 8 subsamples, each with its respective results.

a) Determinants of Schooling - The first dependent variable, years of education or schooling, is explained using a production function whose independent variables or inputs are father's occupation, father's education and mother's education.

The variance explained or predicted by education varies between 48.4% for men age 37 and older, and 26.7% for women who are 37 and older. The percentages are stable in the case of

the equations for women, when age varies, and increase with age in the equations relating to men.

Generally speaking, the mother's education, the father's education, and the father's occupation, in that order, incide separately with varying strength in the determination of schooling. The total and direct effects of the independent variable indicate the greater relative importance of the mother's education, as opposed to the father's, and of both over father's occupation.

In spite of the fact that the results were produced by different independent variables, which at times refer to different dependent variables, and although the samples were not stratified by age and sex in conjunction, it is instructive to compare the explained variance of the equation and the order of importance of the effects of the isolated variables, using the study in Mexico City and the paradigmatic studies of status attainment in sociological literature.

i) The Coleman Report.<sup>18</sup> Used 6 variables of socioeconomic origin, 11 variables which referred to school equipment and curriculum, 7 which referred to the teaching staff, and 5 with regard to the student body. Variance explained: 26% on the average. Dependent variable: educational achievement measured by tests of verbal ability.

ii) Blau-Duncan.<sup>19</sup> Two independent variables: father's level of education, as well as the mother's. Dependent variable: education measured by number of years of schooling. Variance explained: 26%, as in the case of the Coleman Report.

Can this result be considered a confirmation of the previous one? Obviously not, since it is the product of different independent variables, different dependent variables, and different samples and populations.

The model used in the Pilot Projects, as we can see, is much closer to that of Blau-Duncan than to that of Coleman, which includes variables of origin, but also considers variations in school equipment, curriculum, teaching staff, and student body, besides using a different definition of educational achievement. In this sense, the Blau-Duncan model has been more influential, despite ignoring variables which could better explain the learning context properly speaking. It is worth pointing out, however, that the consideration of variables relating to the school, teachers, and students as such does not remove the model from its characterization as a "black box". The elimination of factors which could explain education would be typical of the models of status attainment which have been more widely received and applied: in this sense, in spite of being a dependent variable in recursive models, education is considered as an independent predictive variable, whose only antecedent is a very incomplete consideration of socioeconomic origin, with considerable error of measurement and in light of a very doubtful model of relation to other variables in the design.

Other Latin American studies have included variables relating to schools and the teaching staff, location, and type of school in explanations of educational attainment, taking learning and performance as the dependent variable and not only the years of schooling.

iii) Jencks.<sup>20</sup> Five independent variables: intelligence quotient at age 11, genotype, average family I.Q., average family education, and father's occupational status. Dependent variable: like Blau-Duncan, years of formal schooling. Variance explained: 37%. This model integrates intellectual ability into the explanation, another variable which is lacking in the equation of the above-mentioned Pilot Project, although its influence is discussed at length in the literature.

iv) Sewell-Haller-Portes.<sup>21</sup> These are the authors who

include psychosocial variables as explanatory of a process of status attainment, because they consider the relation with "significant others", attitude and aspirations, to be responsible for the transformation of inputs into occupational products. Their independent variables: mental capacity in the second year of high school, and an index of socioeconomic status with variables which cover education, occupation, status perception and perception of support for one's education. Dependent variable: Position in class rank. Variance explained: 50%. As we can see, this is another heterogeneous study which is difficult to compare in terms of results, because of the dissimilarity of the variables considered, and differences in the reference macrocosm.

Approaching the Latin American context, we first refer to the work, which has already been mentioned, of Morales and Pinell-Siles in Bolivia. Although the authors hypothesize that the influence of geographic area (urban-rural) and the type of establishment (public-private) are relevant and although the differential analysis shows them to be correct, the communality analysis has some similarities with the Pilot Project of Mexico City which must be pointed out: in effect, in the explanation of overaging and in the explanation of cognitive achievement in reading and sciences, the most important variables are sex and the education of the mother, two variables whose influence was also stressed by the Project in Mexico City, although educational attainment was measured in a different way.

It is important to note that the indicators of family income do not show any relation with the achievement level, nor does the student/teacher ratio, although spending per student does, especially in the urban setting. The lack of influence of the levels of family income in Morales and Pinell-Siles can be discussed using the previously mentioned work by Belloni and Vasques on the metropolitan area of Belo Horizonte, where the authors found that family income and spending on education are the variables which best explain schooling, and that the

importance of family income rises with the educational level attended. The educational level of the head of the family is shown to be of secondary importance, and occupation has surprisingly little importance.

In another study to which reference has already been made, that of Velloso for Argentina, an important influence was attributed to an index of socioeconomic status composed of the educational status of the parents, father's occupation, comforts in the home, and the consumption of durable goods. This influence is more important in elementary school and increases with the grade level attended, although its influence is surpassed in determining performance in high school by the type of school, whether public or private, in which the student is enrolled.

A study done by Jorge Sanguinety for three important Latin American cities (Lima, Peru; Asunción, Paraguay; Maracaibo, Venezuela)<sup>22</sup> shows an important influence of the mother's education in all cases and an inconclusive importance of paternal earnings, since this factor is important in Maracaibo, important only for some age brackets in Lima, and of no significance in Asunción. The number of children in the family has no importance as an explanation. The dependent variable in this case is, as in our pilot study, the years of schooling.

Mention remains to be made of the work, already cited, by Rivarola, Corvalán, and Zúñiga in Paraguay and another study by María Echart de Bianchi and Rodolfo Manuelli in urban and suburban schools in Buenos Aires, Argentina.<sup>23</sup> The findings indicate a clear influence by the father's occupational status, as well as the importance of variables related to the school and the teacher in some cases interacting with socioeconomic origin. Similar findings in Paraguay, concerning the training of the teaching staff, their teaching experience and attitudinal variables, call attention to the absence in the Mexico City model of variables having to do specifically with the school or the teaching staff, and of variables of intellectual capacity which have demonstrated

their influence in classical models for more developed countries, as well as for models investigated in less developed nations.

Very recently, there also appeared a work on Brazil conducted by Alberto de Mello e Souza,<sup>24</sup> who used years of schooling as the working definition for the education variable, and who also constructed an index of scholastic progress based on actual and potential education. He found that the educational level of the mother is the most influential variable, followed by family size and age. Family income and the occupation of the head of the family become more important as age and the educational level attained increase, which occurs with the mother's educational level as well. With respect to the progress index, the size of the family seems to be the most important variable, followed by maternal education, family income, and the age of the head of the family.

The work of Jose Pastore<sup>25</sup> refers to the overall influence of paternal status in the years of the child's schooling in a table which shows very clearly a high correlation between the variables. However, the author does not quantify his findings neither in the tables nor further on in the regression analysis, since he regresses all the independent variables against only one dependent variable, which is current occupational status.

The absence of scholastic variables, of variables relating to intellectual ability, and to the teaching staff, as well as the conceptualization of the variable to be explained as being years of schooling (and not a specific measure of performance) brings into question whether the model, whose final dependent variable is income, is not more closely tied to assumptions having to do with the theory of human capital, rather than alternative theoretical assumptions.

In effect, if the important point is not so much the quality of learning as it is the amount of time of successful exposure to teaching (years of passing schoolwork), then what is

crucial is the amount of time spent in education, rather than the quality of the product (as could be measured by tests of performance or class rank). The quantitative results of the model cannot discriminate clearly between alternative explanations of the relationships encountered, such that the emphasis on the number of years spent in schooling can be seen as conducive to greater productivity (human capital) or to a better socialization of the labor force in order to reproduce the relations of production.

The theory of human capital would find it perfectly logical that the variables of socioeconomic origin were responsible for part of the variance in schooling—since this theory claims that it is the spending on human capital which increases marginal productivity, and brings about the growth of production and of remuneration according to it. The cost-benefit of spending, related to the initial endowments, is the basis for judgement in allocating spending.

It is not, therefore, the findings of influence by socioeconomic origin which are the rebuttal to the theory of human capital as such, although a good measure of socioeconomic origin could increase its explanatory importance to the point that it would become advisable to try to change natural endowments rather than trying to equalize occupational opportunity to balance the chances of status attainment.

The arguments against the theory of human capital relating to education and the labor market are more deeply rooted in criticism of the relationship postulated between education-occupation-earnings-growth-employment-mobility, than in the emphasis on the influence of original endowment of resources although a correct measurement of these could change the importance which could be attributed politically to the modification of the distribution of educational opportunity or to the modification of the distribution of pre-requisites for educational qualification. Moreover, as Morales points out, the variables linked to the

qualification of the schools, their resources and teaching personnel, can be seen as part of socioeconomic background, rather than as future influences.

However, a correct measurement of the natural endowment of talents would not necessarily imply any approval for direct redistributive measures, since equality of opportunity could be attempted by means of equalizing educational opportunity, which would lead to occupational and income equality, in the final analysis. By this intragenerational means, the intergenerational inequality would be reduced, by means of a circular process.

The study in Mexico City showed that socioeconomic origin has some weight as a determinant of the amount of schooling acquired, with different results according to age and sex. If a greater quantity of variables relating to origin had been included (and related amongst themselves and with future variables in the sequence in a way which was neither additive nor linear), perhaps the "explained variance" would have been greater. If the dependent variable had been scholastic performance, then perhaps those variables relating to the location, the type of schools, its resources, and characteristics of the teaching staff and students might have been even more influential.

It becomes clear, therefore, that socioeconomic origin incides strongly in schooling, and that this influence could be even greater if other variables (dwellings, social network of contacts, neighborhood, etc.) could have been included, if the model of relation had been different and if the dependent variable had been defined in such a way as to address more truly the qualitative product of schooling.

It also becomes clear that neither is the theory of human capital seriously questioned by this finding, nor are direct income redistribution policies an obvious solution starting from

this discovery.

We will now consider the effects of education, seen as an independent variable, in path analysis.

b) Determination of the First Occupation -- Of the classical models, the only one which introduces the variable "first occupation" is Blau-Duncan, accentuating the similarities between the two models, which has already been pointed out. The Mexico City model accounts for an amount of "explained variance" between 24.6% and 45.3% according to the eight subsamples analyzed.

Education is the most important variable in predicting first occupation, considering either its total effect ( $r$ ) or its direct isolated effect (Beta). Second place in importance corresponds to the father's occupation and third is paternal education for the men and maternal for the women. As is the case with the education variable, there are differences by age, since the model is more explanatory for intermediate ages, having, therefore, a curvilinear tendency, as opposed to the linear tendency seen previously. Contrary to the case of education, sex does not play a part in the amount of variance explained.

We are not acquainted with Latin American studies which have systematically studied first occupation as an explained or as an explanatory variable, with the exception of the very recently published work of Jose Pastore (op.cit.) for Brazil, taking as a data base a survey conducted in various homes. This analysis makes clear the large influence that education has in the determination of initial occupational status and also the clear correlation between premature entry into the labor market and the social origin of the worker, which in turn is related to the final social status which will be attained.

The large influence of the first occupation on subsequent

occupation of the workers, as will be seen later, provides indicators which favor the theory of segmentation of the labor market, which hypothesizes that there are barriers to occupational mobility between certain strata, through the creation of internal markets or obstacles to the entry into them, with vertical mobility being reduced, particularly compared to the one within strata or segments. Later, we will also refer to the role of education in social mobility between segments or within them, as well as to the issue of education's role as a requisite for admission or for occupational or economic promotion.

Two complementary findings in the work done in Mexico City are the integration of women in the labor market who have lower educational levels than men and the increment of the educational level required for entry into an occupation over the course of time. This last phenomenon could be connected to the devaluation of education (see Bourdieu),<sup>26</sup> a way of devaluating its marginal return, and which can clarify facts such as the reduction of the disparity of the distribution of schooling which exists in almost all societies simultaneously with an increase in the disparity of income distribution. This logic can also clarify important findings by Alejandro Toledo, who noted the increase of the education-occupation relation and the reduction of the occupation-earnings relation, with the net result of diminishing the relation between education and earnings in Peru from 1961 to 1972.

In sum, the importance of education and of socioeconomic origin is stressed and the theoretical importance of the variable will depend on the type and degree of occupational mobility in the labor market, since the segmentationist hypothesis assumes rigidity in mobility due to the crystallization of segments of the labor market. The hypothesis of human capital, on the other hand, assumes perfect competitive mobility, with perfect elasticity of substitution between segments of the labor market. Later, we will see what evidence there is in this respect in the Mexico City study, and in that of Pastore.

c) Determination of Intelligence Quotient - A crucial dilemma in social research is that of specification-identification (see<sup>27</sup>) since often the theoretical specification of the relations between the endogenous variables of the model conflict with the mathematical formulation which would permit the identification of the parameters of the equations which represent the theoretical model being hypothesized. Theoretical specification never produces models capable of identifying the parameters whose precise quantitative estimation is desired. The dilemma consists on either estimating parameters of uncertain identification or renouncing quantitative estimation of even the roughest sort, until possessing the theoretical precision that quantification would require to be reliably valid. For an accurate methodological position, see Alberto Mello e Souza, op. cit.

It is possibly at this moment that the study in Mexico City could be questioned, since in the course of trying to identify parameters in the system of equations, it postulates this system as recursive and, by establishing I.Q. as subsequent to the first occupation in the causal sequence, it includes education and the first occupation as earlier factors in the determination of I.Q. which, although measured during adulthood while engaged in the current occupation, can hardly be attributed to the two prior variables, theoretically.

As we saw earlier, some studies (Sewell-Haller-Portes, Jencks) include tests of intellectual ability, however their tests truly use as precedents in time variables such as occupation and income. Nor do they commit the dangerous error of trying to establish an order where no clear order exists, running the risk of finding relations which are theoretically empty or spurious.

The lack of confidence in the proposed equation, in our understanding, diminishes the value of the quantitative findings which lead to an "explained variance" in an interval of 24.6% to 40.1% and the principal influence of education in the same (dubiously postulated as an antecedent). The influence of paternal

occupation in the male samples, and of paternal education and the first occupation among the women follow them in order of predictive importance. This last case seems to be of clear spuriousness, in that it is difficult to imagine how the first occupation can decisively alter someone's I.Q.

d) Determination of the Attitudinal Profile - The model for Mexico City integrates types of explanatory variables which belong to the paradigmatic works within the tradition of the empirical studies on status attainment. Starting from the basic methodology of Coleman, the study adopted the methodology of Blau-Duncan and its causal order, and added the income variable and intellectual capacity, like Jencks. However, they also included attitudinal variables postulated by supporters of the Wisconsin model, whose paradigm is the work of Sewell-Heller-Portes.

These authors hypothesized that the transformation of status inputs into other status products was mediated by psychosocial type variables which could explain it. Thus, the influence of the interaction with "significant others", which, along with other variables of origin, would produce aspirations and attitudes regarding education, occupation and other dimensions of status which were conceptualized as the intervening variables which truly accounted for the relation between inputs and products, the variables which would open the "black box".

This predication on intervening psychosocial variables which would purport to explain the process of production of the status structure is characteristic of the Wisconsin model. However, the explanatory importance of these variables has been questioned recently by representatives of this model, now in a stage of self-criticism.<sup>20</sup>

The study in Mexico City adopted this type of variables and introduced them in the analysis, with causal posteriority

to variables of origin, years of schooling, first occupation and I.Q. The authors had to discard some irrelevant variables, but they maintained "disposition to accept risks", "disposition to accept risks on the job", "identification with the company", "modernism", "internalization of entrepreneurial values" and "interest in work". Curiously, these intervening attitudinal values, in the Wisconsin line, can be related to models on education and society in the line of those authors who see the school as an agency of socialization of fundamental non-cognitive values and as reproducing the relations of production within the general reproduction scheme of the capitalist order.

In effect, these attitudinal variable included by the Mexico City Project, conceptualized "à la Wisconsin", are very similar to the type of variable and concepts to which Gintis<sup>29</sup> refers when he predicates the basic contribution of the school to the appearance of functional attitudes for the reproduction of the relations of production.

Formal education is the most important predictor in the appearance of these attitudes, although the intelligence quotient helps to define the presence of an attitude amenable to risk acceptance at work. The inclusion of the "modernism" attitude is perhaps a throwback to the controversy which revolved around political socialization (Almond,<sup>30</sup> Holsinger,<sup>33</sup> etc.).

Notwithstanding, the predictive influence of these attitudes seems to be low, except in the case of "disposition to accept risks at work".

e) Determination of Occupational Attainment - Jencks extends the principal explanatory objective in the Blau-Duncan style models, and in the Wisconsin model, to earnings, a relation which the economic models will emphasize. The education-occupation-earnings relation is perhaps one of the most commonly used

relations in the various Pilot Projects.

Despite the fact that differences in variables, models of relation and populations make comparisons of dubious scientific utility - without the possibility of going into detail - in any case it is worthwhile to enumerate briefly the "explained variance" by the classic studies of Blau-Duncan, Sewell-Haller-Portes and Jencks. Blau-Duncan: 42%. Independents: occupation and paternal education, years of schooling, first occupation. Jencks: 25%. Independents: I.Q. at age 11; genotype; family I.Q.; average family education; paternal occupational status: intellectual ability between the ages of 18 and 25 years; years of schooling. Sewell-Haller-Portes: 34%. Independent: I.Q. in second year of high school; index of socioeconomic status (outlined earlier), class rank.

Two studies in the Latin American area deserve mention: that of Alejandro Toledo for Peru,<sup>34</sup> and that of Jose Pastore for Brazil, *op. cit.* Toledo, using occupational status of the father, area of location, sex, age, marital status, and years of schooling, found two important phenomena: a) An increase in the predictive power of the model since 1961 (19.5%) to 1972 (50.4%), truly significant and basically attributable to an increase in the net (beta) influence of schooling on occupation in this period (from .028 to .156), although the effect of sex and area of location are also appreciable.

Pastore achieved an explained variance of 42.7% for his model with Brazilian data for 1973. In this model, the most influential variables in the determination of occupational status are years of schooling and age. In third place, comes first occupation and in fourth, paternal occupational status. The influence of age is explainable if we take into account the fact that the occupational scale was constructed using as a working basis the economic profitability of the occupations, which explains the influence of age, given its high correlation with earnings.

The results for Mexico City indicate that the variables of origin and I.Q. have no appreciable direct isolated effect. Formal education and the first occupation are the strongest determinants, with the total and isolated effects of the first occupation being strongest for women. In the case of men, on the other hand, formal education is the most influential total and direct determinant, possibly reflecting the much smaller range of occupations open to women.

In any event, it is important to remember that the sample of the Project is relatively young (average age 32 years), such that the relation between the first occupation and future occupations is inflated, in that the probabilities of occupational turnover are smaller than would be true of an older population sample.

On the other hand, 32 years is perhaps the average age of the labor force in the modern industrial sector in Mexico, which makes the sample more representative.

This result, therefore, is not conclusive proof regarding the inelasticity of substitution of labor nor a firm indicator of segmentation of the labor market, as could be argued at first glance, based on the mere appraisal of the high correlation between first and present occupations.

f) Determination of Earnings - Finally, we come to the analysis of the determinants of earnings. Reviewing the classical literature rapidly, it can be said that only starting with Jencks did sociological models begin to include economic variables in their models, in the same way that economic models began to include non-economic variables in their explanations, in accordance with the cross-fertilization of sociology and economics,<sup>35</sup> or better, the emergence of interdisciplinary explanations of mobility stratification and status attainment. However, Jencks only accounted for 12% of the disparity of income using his path model,

and thus derived his recommendations of an equalizing policy, which were more controversial than the model itself.

The economists managed, in their search for useful predictions, to reach much greater explained variances, by the introduction of variables on the demand side, variables connected to the model of human capital, and also to other models of conceptualization of education. In effect, the most meticulous filtration and adjustment of the variables relating to the supply of labor, by Ribich and Murphy,<sup>36</sup> did not achieve a particularly good performance in terms of "explained variance". However, Freeman,<sup>37</sup> with a model which included variables from the demand for labor side and their interaction with supply, had better results, as did Becker and Chiswick.<sup>38</sup>

It was not until a study by Jacob Mincer<sup>39</sup> that the distribution of earnings was explained in 60%, using different statistical models and the inclusion of variables such as years of work experience, rates of return, spending on post-school education, proportion of expenditures to earnings at the beginning of the labor experience, and the period of net positive spending discounting costs. The number of years of schooling only explained 10% of the variance.

Mincer and Chiswick,<sup>40</sup> and also Chiswick,<sup>41</sup> finally managed to surpass 85% of explained variance. To do so they considered number of years of schooling, - standardized in equivalent-years of other inversions - size and variance of the rate of return, covariance between rate of return and the volume of alternative spending; and the variance in the distribution of employment. However, good results were also obtained by Taubman and Wales<sup>42</sup> and by Rawlins and Uhlman<sup>43</sup> using assumptions which derived to a larger extent from the theory of "screening" or of "credentialism". The work of Campbell and Siegel,<sup>44</sup> and of Galper and Dunn,<sup>45</sup> taking education merely as an item of consumption, also achieved excellent results from the point of view of predictions.

These considerations subsequently lead us to basic questions regarding the unequivocal nature of the evidence, whether the theories are complementary or mutually exclusive, and on the methodological requisites necessary for meaningful scientific comparisons.

However, we shall now move to some of the Latin American studies, guided by the analysis by Claudio de Moura Castro<sup>46</sup> and Jacques Velloso<sup>47</sup> in Brazil, who show how some of the assumptions based on theoretical premises derived from the theory of human capital have a certain basis in developed countries like the United States but are of doubtful usefulness in interpreting the situation of less developed countries like Brazil and perhaps others in the area.

First, the work of Toledo in Peru which found, before anything else, - and in contradiction to the explanatory equation of occupational attainment - a marked drop in the explanatory power of the model of economic attainment from 1961 to 1962 (32.9% to 11%). Secondly, sex and location are the most influential variables, followed by current occupation. Schooling has a very small, but growing influence. Thirdly, he registered the growing effect of variables of origin on variables of attainment.

Opposite conclusions seem to have been reached by Gary Fields<sup>48</sup> in Colombia. Confirming other findings analyzed earlier, he confirms the importance of socioeconomic origin in the determination of educational level. However, his conclusions with respect to the determinants of earnings indicate to him a much greater influence of individual characteristics (of which the most influential is earnings) over those of origin. Much time would be necessary to explain how his conclusions are fallacious at various points in the analysis.

Much more correct are the conclusions which Jacques Velloso reaches in his study, finding that inequality of earnings can be predicted at 50% by including average rates of return for

schooling and experience, inequality of spending, age and job stability. Of these 50%, variations of spending on education and the average rates of return account for 79% of the variation and age for 16%. Since these results apparently corroborate the theory of human capital, Velloso introduces conditions according to which other variables from the demand side would influence the results which policies based on the manipulation of the characteristics of the supply could conceivably obtain. Furthermore, even recognizing the results which could fit the theory of segmentation of the labor market, he concludes that his study cannot discriminate between the explanatory efficiency of both theories.

In the case of the Pilot Project of Mexico City, present occupation is the best predictor of earnings for men and women; in second place is formal education and in third is I.Q. These results coincide more closely with those of Toledo, since Velloso did not include occupation or occupational stability in his study. However, the Betas obtained by the Center for Educational Studies in Mexico City are much greater than those obtained by Toledo in Peru. It could be that the elimination of area of location in the Mexican study and the control by sex increased the predictive efficiency of occupation in the case of the Pilot Project.

### 3. Analysis of the Communalities

Although path analysis can be obscured in its scientific conclusiveness by all the statistical and theoretical problems relating to the production functions and the input-output model, the virtues of the Mexico City Project are the accumulation of a large mass of varied information about the kinds of variables included by the classical paradigms of sociology in the empirical investigation of the process of status attainment and, also, the suggestion of thinking about the results in terms of alternative theoretical ideas regarding the relationship of education and

the labor market (although this was not done in depth).

Path analysis provides a measurement of the predictive capacity of the equations to account for successive and recursive dependent variables, as well as an estimate of the direct and indirect total effect of the independent variables on the dependent.

The analysis of the communality has made it possible to calculate new estimators: i) The joint contribution of two or more variables to the prediction of a dependent variable. ii) The contribution that the interaction between the two or more variables makes to the prediction. Of course, it is also possible to calculate the aggregated contribution of summed and multiplied influences.

The importance of this analysis lies in the hypothesizing of possible alternative combinations of inputs, depending on the distinct overall populations under consideration. The analysis of interactions permits the supposition of retroactive effects that the recursive doesn't consider, i.e., the modification of the appreciation of the value of education that earnings in a determined occupation can provoke in an individual, altering his decision either to cease or continue studying. It is important to keep in mind the idea that the contribution of the variables is not fixed but changing, and is also a function of the different ways in which the inputs corresponding to different production techniques can be combined, in turn contingent to variations in the overall productive system and the relations of production.

The analysis of the communality of formal education indicates that the strongest combination in the determination of educational status is the education and occupation of the father, although in the case of the women, the education of both parents is the most powerful determinant. The predictive capacity of the model is independent of the age in the feminine samples and decreases with age in the masculine. (Loss of

importance for education of origin as a determinant of educational mobility?)

The analysis of the communality in the determination of the first occupation leads to the following conclusions: i) Formal education is the strongest determinant although its importance tends to decrease sharply as age rises in the female samples, as well as in the male ones, although not as clearly or unequivocally in the latter case. ii) Among the men, the most decisive combination is, without doubt, for all ages, the father's occupation and the education of the subject, while in the female samples, there is no clear rule, since the strongest combinations vary with age and the numbers are often close, such that it is difficult to determine absolutely which is larger.

The analysis of the communality on present occupation, as could be expected, confirms that education is the greatest influence (although decreasing with age) for men and the principal influence for women, increasing with age. The most influential combinations seem to be maternal education, formal education and first occupation in the samples of women, and paternal occupation, formal education and first occupation for the men, although the results merit a more detailed analysis.

#### 4. Conclusions

The Pilot Project for education and labor market in Mexico City makes these central points in our evaluation.

i) A massive collection of data with respect to the variables most often used by the sociological empirical paradigms for the study of social status attainment.

ii) A joint evaluation of the various types of variables used separately by them.

iii) The necessity of confining the results obtained to the overall population of reference; in other words, to the modern industrial labor market of Mexico City.

iv) The fragility of the conclusions which can result from the comparison of the results with earlier or contemporary findings in social literature. In effect, the number, type, definition, and measurement of the variables, the models of relation between them and the various contexts in space and time make it difficult to attribute the differences to specific hypotheses, given the low degree of control over which common factors are held constant and which varying factors could provide a means of discriminating between alternative hypotheses.

v) The need to try alternative methodologies to the input-output model, production functions and path analysis to produce trustworthy and precise results which respect the theoretically postulated relations between the variables.

vi) The utility of the analysis of communality as a means of making the supposed restrictions of path analysis more flexible.

vii) The theoretical ambiguity of the results as a tool for supporting or disproving alternative theoretical interpretations about education and the labor market. Thus, the necessity of searching for crucial data which would distinguish those results as conceivably predictable by one or several theories.

viii) The insufficiency of the explained variance as a test of the adequacy of the empirical model and or the theory which oriented (or should have oriented) the empirical research.

Finally, we must clarify that the relatively long concentration of our report on the Mexico City Pilot Project is due to the classical manner of its theoretical-empirical presentation (that is, with the predominance of the quantitative

description over the theoretical interpretation), which is a starting point for the consideration of the next Pilot Projects which will have no other purpose than that of empirical exploration, obtention of unequivocal theoretical evidence and the elucidation of theoretical alternatives to the informative but insufficient classical theoretical-methodological analysis.

The Pilot Projects which we will review next do not intend to provide a test of explained variance nor of proportional reduction of error in predictions, but rather a theoretical review of alternative conceptualizations to the model of human capital and to the methodological instruments created to test its propositions, which have been extended (as we saw in the last section) with dubious adequacy to test propositions not directly connected to the model from whence they originally came.

The Pilot Projects began from the idea, also shared by the Mexico City Project, that alternative conceptualizations can complement or substitute those related to the theory of human capital, in accounting for the relations of education and labor market.

#### IV. EDUCATION AND THE LABOR MARKET IN RURAL BRAZIL<sup>49</sup>

A team of investigators associated to the ECIEL Program, directed by Simon Schwartzman, began by discussing theoretically some weaknesses in the theory of human capital and, through in depth interviews with rural producers, teachers, and agents of rural outreach, tried to determine what was the explicit perception of the role of education in society by these various rural actors.

The populations selected for the interviews were the towns of Santo Antonio de Platina (North) in the State of Parana and of Bom Jesus de Itabapoana in the State of Rio de Janeiro. This selection was not at random, quite to the contrary. The characteristics of these cities were studied based on the Volume on Homogenous Microregions, corresponding to the IBGE (Brazilian Institute of Geography and Statistics) Census of 1970. They were found to have in common a situation of transition from a subsistence economy to a market economy, in which the subsistence of the family was based on the increasing necessity to earn income by selling labor in the market. These characteristics are crucial in accordance with the theoretical conceptualization of the author, since he states, based on criticisms of the explanation of human capital on Max Weber,<sup>50</sup> Karl Polanyi,<sup>51</sup> and on Hirschmann,<sup>52</sup> that education can be a mechanism of competitive recruitment, be it for the labor market in the Weberian sense, be it for the status system, be for both, to a different extent depending on the historical moment.

In accordance with an enlightening and little known text of Max Weber<sup>53</sup> on stratification and classes, Schwartzman states that the role of education can be different in societies in the process of changing, or in the process of consolidating earlier changes, with emphasis on different competencies (by quotation in the market of goods or by quotation in the market of life style). The economic rationale of "exit", assumed as the sole rationale by the theory of human capital would only be an analytical moment in the study of society and a historical moment peculiar to emerging capitalism. The rationale of the "voice and loyalty" variety, which is socio-political, would be complementary and still predominant in other conjunctures.

The results of the interviews with rural producers and wage earners lead to the following conclusions:

- 1) There is a transition from norms of reciprocal integration and redistribution to market norms.

ii) The invasion by the market economy is reflected not only by the wage earner, who loses the advantages of the ties of patronage without fully acquiring the "labor law" advantages of the new order, but also by the tenant farmer and small land-owner, and even by the large land-owner, within a new system of social, and not only technical, relations.

iii) The perception on the part of the rural population of the changes in progress, convinced of their inevitability and the necessity of instruments in order to adapt to them, brings the rural population to resort to education for them or their children as a means of "self-defense" against the changes. A multidimensional image of education emerges, combining education as an end in itself, as an instrument of communication with the urban world and with the market, as an instrument of intergenerational mobility, and as a means of acquiring a steady job.

iv) However, there is a perception of the direct costs of education, the loss of immediate income implicit in education, and the need to learn a skill beyond the necessity of simply obtaining formal instruction.

In the particular transition situation of the towns studied, education is appreciated as a costly, necessary and complementing instrument of multidimensional adaptation to a new structure, ineluctable and, in spite of everything, better. It is, then, an education for survival in the migration to the city. The perception of the changes and of the means of defending one's self against them is reinforced by the images transmitted by the rural teachers of urban origin, who act according to urban stereotypes with respect to the rural inhabitant, and introduce urban values in the rural milieu.

An analysis of the rural outreach programs and the functioning of the outreach meetings corroborates the impression that these, rather than seeking to improve rural productivity per se, consist of an injection of urbanism in the countryside

and a reinforcement of the tendency to migrate.

Thus, it would be non-sensical to expect the improvement of productivity through education, outside of contextual, political and technological conditions, and the performance of specific research which would assure that education could be more than a mere means of communicating with the market, of survival in it, and of attaining occupational and economic stability through migration to the city.

As we have seen, the methodology of the in depth interviews in a crucial context of proof (transition to market and urban systems) has provided evidence which does not corroborate the affirmation by the theory of human capital with respect to the definite impact of education on productivity. Evidence has also been collected which indicates that economic rationality is only a part of social rationale and is restricted to determined moments and junctures. And economic rationality is part of the foundation for the theory of human capital that sees education as an alternative expenditure.

Schwartzman also places in doubt other findings concerning the interpretation of discoveries which would tend to prove the theory of human capital. On the correlation between education and growth, he argues that the covariance does not exhaust the variation, which remains when education is held constant. On the correlation between earnings and age, he states that "seniority" would have to be held constant if this claim is to be made. The increase in individual earnings correlated to the increase in education does not prove that this is due to an increase in productive capacity, but that the increases correspond to the interaction of supply and demand, various discriminatory practices, and institutional factors which are neither economic nor have to do with education. For education to increase productivity it should be concentrated in technological know-how (not necessarily, we would say) and this same increment should be susceptible to use. The author supports the theory of segmentation of the labor market,

as a basic alternative to a doubtful, conjunctural and partial explanation such as that of human capital.

In conclusion, this Pilot Project not only provides evidence for alternative concepts, to those of human capital, but also points out some of its weaknesses. The empirical evidence is attained by a different methodology (in depth interviews) and the context of proof, in spite of being merely heuristic, refers to a crucial moment for testing the theoretical conception, or, in other words, a situation where the social rationality would be in fullest agreement with the economic one that is implicit to the theory of human capital. However, the explanation can only account in part for the perceptions and motivations of the rural actors.

#### V. EDUCATION AND THE LABOR MARKET IN THE MODERN SECTOR IN CHILE<sup>54</sup>

Under the direction of Fernando Tagle, Elizabeth Lira and Juan Carlos Carvajal, PIIE (Interdisciplinary Program of Investigations in Education) of the Academy of Christian Humanism carried out its study on the modern sector in Chile. As was the case with Schwartzman's work, its character was exploratory and descriptive, seeking to suggest variables and conditioners which could lead to variations in the relations between education and labor market in the modern Chilean industrial sector. This study does not include criticism to the predominant model of analysis of the relations between education and labor market, nor does it theoretically sustain the types of variables and the relations between them that it hypothesizes.

The Project intended to study the effect of schooling

on the processes of hiring and internal promotion, in companies in the modern Chilean sector, also focusing on the factor which could cause education and other criteria to have a larger or smaller incidence in hiring and promotion, whether occupational or in terms of salary. These processes and the relative importance of schooling in them are thought of in terms of: i) The type of technology used in the productive process (handicraft, assembly line, or automated); ii) The type of ownership of the company (multinational, state-owned, private); iii) The historical development of the plant; iv) The degree of formalization and centralization of personnel policies; v) The size of the labor force hired.

The reference environment is the modern sector of the manufacturing industry, as was the case with the Pilot Project on Mexico City. Within this general environment the companies which were most representative in their market of products were considered, seeking a wide spectrum of production technologies. The personnel selected for the study were directly connected to productive activities, in which the correspondence of the qualifications for the job with school prerequisites was low, and the impact of on-the-job-training was great. The information about criteria which governed hiring and firing of the personnel selected was obtained through interviews conducted during visits to the plants, selecting the key positions and examining as much as possible data in the company's personnel files. The ten firms studied were analyzed one by one, in terms of their own individual identity. However, to study the relative importance of qualifications in hiring, promotion, and pay, regression analysis was used.

As can be seen, the analysis in Chile posits as the phenomenon to be explained that which is considered explanatory in other studies. In other words, the possible influence of schooling for hiring and/or promotion of the labor force is hypothesized to be dependent on other factors and not only on its own efficacy. The importance of the criteria at the firm's

discretion is made relative to this or that category within the explanatory variables hypothesized. This study intends to be a relativization of the importance of the criteria of age, seniority and schooling to the larger context of the labor market and the particular necessities of the organization, demand, and control of the companies.

The basic findings would be as follows:

i) At a more aggregated level, schooling explains 47% of the variance of salaries.

ii) However, this does not imply that education is the determinant of hiring or promotion.

iii) When a dichotomy is drawn between workers directly engaged in production and salaried employees, the percentage "explained" in the subsample of directly productive workers is considerably lower than that "explained" in the variance of salaried employees (middle management, supervisory personnel, etc.). A reference to the suggestion of Claudio de Moura Castro<sup>55</sup> is inevitable here, regarding the benefits of education for administration, bureaucracy and decision-making, rather than strictly productive ones.

iv) The variance explained by the increment of schooling is born out starting from a determined minimum level of schooling.

v) In four of the companies, all large, with average schooling superior to elementary school, large disparity in pay, job evaluation, explicit criteria and legal differentiation between wage and salary earner, schooling is significant in explaining salary variance (from 26 to 69%).

vi) In four companies, medium sized, without a formal system of job evaluation and informal promotion and hiring policies, (except in one), seniority (in 3) and age (in one)

were shown to be significant. In three of the four companies in which non educational criteria for remuneration, the level of earnings was fixed by the supply of work and promotion statutes.

vii) In the three remaining firms, there is no influence of any criteria for hiring and promotion. In two companies, the scholastic requisities are minimized because they are thought to be unnecessary for the tasks available, and because there is no internal job career to offer. In the other firm, educational prerequisites for entrance are maximized, but promotion to high level jobs, which are open to the external market, do not depend on schooling.

viii) The influence of the type of technology could not be verified, given the small number of cases, but remains a useful variable to consider, according to the study.

— In summary, the Pilot Project for Chile, without explicitly questioning the dominant model of human capital, relativizes the conclusions which can be drawn from data with regard to it, making the results contingent on variables such as manual or non-manual occupation; size of the firm; type of ownership; type of technology; formalization of criteria; tradition of the company; and type of product. This is to say that we are warned against an excessive generalization of the relations in the market place, since statistical associations, which are contextualized in the wider market and with variables from the demand side, would be spurious and theoretically empty if they were considered in isolation from the context which gives them meaning.

Without seeking to deepen its propositions theoretically, and without aspiring to prove them, this work opens the way for the Pilot Project which we will next consider, better articulated theoretically, more directly combative in conceptualization and more ambitious from the point of view of the empirical evidence and its relations to theory.

VI. EDUCATION AND THE LABOR MARKET IN THE TRADITIONAL URBAN  
MARKET OF BAHIA, SALVADOR (BRAZIL)<sup>56</sup>

The work done by Ricardo Lima focuses on a labor market different from that focused by earlier authors (modern urban manufacturing, rural agricultural): here, the object of the study is the traditional urban market, the great absorber of rural migration, with the functions of providing a stabilizing economic influence and of socialization in social and technological values according to the classical theory of two-step migration.

As we have seen, behind the theoretical and methodological variety of the Pilot Projects, there is the latent idea that the relationship of education to society can vary according to different labor markets, of which those presenting the most clear and distinctive characteristics would be modern urban industrial, rural agricultural, and the supposedly intermediate traditional urban.

Lima operationalizes and articulates both methodologically and theoretically empirical hypotheses and conceptual foundations which Tagle had suggested for the Chilean case, but more carefully and at greater length. Lima also expands on the criticisms that Schwartzman had directed to the explanation of human capital and brings up empirical hypotheses which could serve as a test for alternative theories on education and the labor market.

The contents of the Project will be reviewed based on the following items: a criticism of the predictions of the theory of human capital; the proposal of alternative conceptualizations; the derivation of a hypothesis which would support its theoretical proposition; the methodology and the data; some important results.

A. Criticism of the Prediction of the Theory of Human Capital

i) Lima indicates evidence that education does not provide a particularly clear increment to individuals' cognitive abilities.

ii) He questions the correspondence between the requisites for the performance of an occupation and the qualifications or educational level.

iii) He also challenges the correspondence between the increment in education and the increase in productivity.

iv) As a consequence of the denial of conclusive evidence regarding the relations mentioned, Lima questions the theoretical meaning of the education-income correlation, proposing alternative explanations to that of human capital (screening, market signalling, credentialism, ideological reproduction, special socialization). He also criticizes the value of the coefficients obtained for education and antecedent variables, from the point of view of the error of measurement and of the spuriousness of the coefficients of the variables posterior in time to the antecedents, whose effect they could absorb in predictive models composed of only one equation.

v) He questions the assumptions of free competition of labor, of free choice of expenditures, of the equality of information for the calculation of the profitability of expenditures, the stability of the rates of return, and the univocality of the contribution of education for the eventual reduction in income disparities.

## B. Proposal of Alternative Conceptualizations

The Project proposes alternative conceptualizations based on a belief in the segmentation of the labor market (in different segments according to circumstances, although basically two, in the dual variation) in opposition to the homogeneity which was supposed by the model of human capital.

Using a combination of theoretical explanations, Lima manages a coherent conceptualization regarding the appearance and establishment of plural labor markets.

In effect, using ideas from Doeringer and Piore,<sup>57</sup> he affirms that segmentation is the product of an adjustment in the distribution and remuneration of manpower and its qualification to the characteristics of the demand which the companies face. From the diversity of situations which the firms confront comes the internal hierarchization which the internal markets introduce and promote for reasons of control and efficiency.

Using concepts from Harrison and Victorisz,<sup>58</sup> the diverse dynamics of "centers" and "peripheries" with regard to technological progress are postulated as a reinforcement for the opposite impact that technological innovation would have in the primary and secondary segments of the labor market. According to the neoclassical hypothesis, through the adoption of techniques which are more labor intensive, wages would rise as a consequence of the increase in the demand for manpower; the alternative hypothesis would suppose a stagnation of wages due to the low productivity inherent in the use of techniques which were more labor intensive. The two lines of thought also see opposite effects following the adoption of techniques which are capital intensive. According to the neoclassicists, salaries would fall as a consequence of the decline in the demand for labor; according to the dualist, wages would increase as a consequence of the increment in productivity.

The progressive leveling of salaries is the overall consequence, in the neoclassical hypotheses, of the inclusion or exclusion or technological progress in different activities or sectors. The progressive disparity of wages would be the consequence of this process according to the dualists, who would thus explain the deepening of segmentation due to the selective introduction of capital intensive technology in the segments.

Using ideas from Reich, Gordon and Edwards,<sup>59</sup> the earlier explanations of segmentation and of the mechanisms which exacerbate it are permeated by a concept which affirms the functional unification of segmentation and its intensification. In effect, segmentation, based on the interests of the capitalists in increasing profits (original segmentation, increased by various types of reinforcement) serves not only to maintain the rates of accumulation and profit, but also to maintain and strengthen the control that the class of owners and their associates hold over the social relations of production, dividing to conquer, limiting aspirations through the establishment of segments and legitimizing authority and control through segmentation and the installation of internal labor markets with their own rules.

C. Derivation of Hypotheses which would support the  
Theoretical Proposition

In accordance with the alternative conceptualization, various empirical occurrences could provide specific support for the same.

1) The discovery of effective segmentation which belongs significantly to the same overall universe (that is, functional segmentation for the reproduction of the system).

ii) Evidence of the mechanisms of reinforcement which deepen segmentation (see previous page, reference and Harrison and Vietorisz).

iii) Evidence that the mobility is produced within the segments, and not so much between them.

iv) The recognition that education is a requisite for access to differentiated segments rather than a factor of mobility within the same.

v) Evidence that the criteria of hiring do not emphasize cognitive characteristics of the labor force, but rather stress the non-cognitive ones, thus underlining the greater importance of trainability and of adequate socialization of the labor force, rather than its specialization or competitiveness.

vi) To a certain extent, evidence that the characteristics of the supply of labor are less influential in determining phenomena in the labor market (income, mobility, employment, migration, and growth) than are the characteristics of the demand for manpower and the properties of the market for products and of the companies, although the interaction of supply and demand is recognized as an important factor in the explanation of phenomena in the labor market.

These would be the crucial hypotheses which could corroborate or prove false, the theory which Lima postulates as being more adequate than that of human capital.

#### D. Data and Methodology

Ricardo Lima using secondary data on Argentina, Brazil, Mexico and Venezuela, first attempted to test several affirmations.

The data referred to Buenos Aires, Rio de Janeiro, Mexico City and Caracas. The models of analysis were single regression equations with variables of socioeconomic origin, formal education, training and experience, and other contextuels, such as area of location. The results of this inquiry are outlined below:

i) The existence of dual segmentation in the labor market was verified, and confirmed by the Chow test.

ii) The model is found to have a low predictive capacity for forecasting intergenerational mobility.

iii) There is still smaller predictive capacity in terms of forecasting intragenerational mobility.

iv) Having calculated an earnings function, the existence of segmentation (indicated by the dependence of earnings on different variables or by distinct combinations of the same) is confirmed in three of the countries studied. The segmentation would seem to be dual in Venezuela and Mexico but multisegmented in the case of Brazil.

This would seem to be reasonable confirmation of the hypothesis of segmentation and also of the variables relating to individual characteristics of the worker to account for the phenomena having to do with inter-and intragenerational mobility in occupation and earnings.

For this reason the author decided to concentrate on the collection of data on structural and institutional factors which would provide information on the characteristics of the market for products, the firms, their technologies, their bureaucratic organization and the criteria for recruitment, selection, hiring, training, training, promotion, and firing used by the companies, so as to better understand the mechanisms of mobility.

This data could provide crucial tests of the relative importance of the characteristics of the work (demand) or of the worker (supply) vis-à-vis the determination of occupational and compensational career. By the same token, the content of the criteria could provide an opportunity for another crucial test with respect to the relative emphasis on cognitive and non-cognitive characteristics of the individuals, related to alternative theories of the social significance of education.

The mechanisms of recruitment, selection, hiring, training, promotion and dismissal and the content of the criteria used to do so, would identify the structure of positions in internal markets or structures which are unarticulated and open to competition.

Auxiliary hypotheses are the postulation of employment structures with easy access and low mobility (secondary segment), as opposed to structures of employment of limited access and high mobility (primary segment). In the former, education and training would be more important determinants of mobility and employment while in the primary sector, experience would be more important than education or training.\*

The methodology proposed by Lima is simple. The first step is the codification of the criteria of recruitment, selection, hiring, training, promotion, and dismissal depending on whether said criteria are more or less characteristic of the operation of internal or external markets. The second step is the definition of vectors of two or more columns representing the different ways in which the companies could utilize the criteria.

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\*Note: the primary segment would be that characterized by stable jobs and standardized work habits, relatively high salaries, technological progress, high productivity, occupational careers, on the job training and promotion by seniority. The secondary segment, on the other hand, would be characterized by high job turnover, relatively low pay, bad working conditions, low productivity, technological stagnation and relatively high unemployment. Little job training and few general abilities are required. Occupational careers are rare, and union membership uncommon.

The third step would be the preparation of multidimensional indexes to define the presence or absence of an internal market according to the combination of the vectors. Finally, contingency tables would be constructed in which the indexes would be crossed with variables thought to be pertinent to the understanding of the presence of the criteria and of the indexes of criteria found.

The preliminary analysis lead to the following results:

i) The initial classification of occupations in 5 strata, when compared amongst themselves in pairs, does not bring forth significant differences of working conditions according to strata.

ii) However, when the strata are divided according to "manual" - "non-manual" categories, significant differences appear, which lends support to the affirmations of Braverman and Gorz, to which the author (Lima) subscribes.

Lima also undertook a preliminary analysis of the data for firms with more than one hundred employees.

#### E. Several Important Results

i) The recruitment criteria most commonly used are: utilization of personnel within the company and internal recommendations, both typical criteria for the presence of an internal labor market.

ii) The most emphasized criteria of selection are previous experience, course of study and employment stability.

iii) Non-cognitive variables are more important than cognitive ones.

i.v) In spite of this general tendency, the importance of cognitive variables increases with the position in the occupational hierarchy (it is important to remember that in his sample, Lima selected the most common positions, which covered the greater part of the labor force, leaving aside many of the higher positions).

v) The criteria for definite engagement most commonly used (punctuality, motivation, respect for the hierarchy and availability) provide strong support for the hypotheses which indicate the socialization in values compatible with the control structure as being the most important for occupational success.

vi) Lima concludes provisionally that all these criteria affirm the predominance of internal labor market criteria in accordance with his hypotheses.

Restrictions to the findings could be made based on the following observations: i) doubts as to whether the companies selected actually belong to the traditional urban sector, as was intended at the beginning of the Pilot Project; ii) the provisional nature of the conclusions reached;\* iii) the high dependence of the results on the attribution of the criteria to organized markets, whether external or internal, which implies a debatable codification of the criteria in this classification; iv) the lack of tests of some the hypotheses, crucial for the corroboration of his ideas.

Notwithstanding, this Pilot Project is both empirically and theoretically sound, intending to test phenomena whose verification or disproof would be important in empirically supporting the explanatory power of alternative theories. It also has the value of placing the critical context within the Latin

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\*Note: Ricardo Lima is presently processing and analyzing this data and we were only able to obtain access to some primary analyses.

American region. Beyond merely suggesting hypotheses, as Schwartzman and Tagle have done, Lima criticizes the dominant theory, proposing an alternative (or complement) which is soundly based, and testing propositions which apparently could prove his criticisms and postulates (although he does not test all the crucial hypotheses).

## VII. EDUCATION AND THE LABOR MARKET IN COLOMBIA<sup>60</sup>

Based on data from 1975, the Socioeconomic Area of the Incorporated Regional Center of Population in Bogota, Colombia, studies the relation between education and urban labor market in Colombia under the direction of B. Kugler, Alvaro Reyes and Martha Isabel de Gomez.

This study is the most comprehensive from the point of view of the macrocosm covered, as well as in terms of the sample selected and the information gathered. Occupational, migrational and educational histories were requested from 3,200 respondents, along with socioeconomic origin, job characteristics, and income. The sample was stratified by city size, sex, educational level and income level.

It must be remembered that one of the underlying premises of the Pilot Projects was the feeling that the relation of education to society could be different according to the diverse labor markets. Previous projects focused on the modern urban sector, rural transitional, and urban traditional. This work seeks (although defining the sectors in a debatable way) to include information which would permit the testing, within a country, of the importance and explanatory power of possible

segmentation of the labor markets.

We saw that the work done in Mexico City aimed to test the importance of the classical variables and models in the investigation of status attainment in the context of Latin America, and modern urban Mexico. The studies on rural Brazil, modern urban Chile, and Salvador, Brazil also planned to discuss the classical methodologies and theoretical interpretative frameworks, suggesting alternative or complementary hypotheses to the same and providing new and possibly crucial evidence for the evaluation of the explanatory power relative to the different formulations. The work on Colombia plans, in its turn, to evaluate what has been achieved by the criticisms directed against the dominant classical explanations.

To cite the authors, Bernardo Kugler, Alvaro Reyes and Martha Isabel de Gomez, at length: "this investigation is motivated in part by the criticism which has been formulated against the use of the theory of human capital... In particular, one of dualisms, segmentation or barriers to the mobility of labor between sectors, which could limit the results obtained based on the theory of human capital, when this theory is applied to the labor market as a whole..."

"To confront some of the criticisms which have been made of the theory, this work has taken the step of analyzing the impact of education in various sectors, identified according to their technological level and degree of social organization of labor. This analysis permits us to inquire if these factors, associated with the demand for labor, provide any additional explanation to the predictions of the theory of human capital regarding the characteristics of the absorption of labor in the productive process, according to level of schooling, and of the income from labor which is obtained".\*

As can be seen, this Pilot Project is the most explicitly polemical. Its intention is to obtain evidence concerning crucial

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\*translated quotation

phenomena for the definition of the degree of explanation of the theory of human capital and the theory of segmentation of the labor markets. Its conclusions are:

i) that the theory of segmentation does not add anything to the explanation which would be obtained by using the variables proposed by the theory of human capital.

ii) that the decrease in the rates of return for schooling over time indicates the existence of substitution between different types of work, a statement which is alien to the segmentationist hypothesis and corresponds to the theory of human capital and neoclassical economics.

iii) with relation to mobility and interaction of markets, the postulation that "the functioning of the market leads to the equalization of prices, in this case of the earnings from labor and the profitability of schooling, in the different sectors".

These conclusions, which will be considered in greater detail later, can be judged to be more positive or less positive depending on the emphasis which is placed on two alternative criteria for forming an opinion as to empirical findings, to wit:

i) If the conclusions of the authors are judged based on the size of the variances explained, and on the regression coefficients found through isolating and holding constant certain variables while carrying out the analysis, then the conclusions of the authors will be difficult to accept.

ii) If the conclusions of the authors are judged based on tests of significance of the differences between coefficients found by separating and holding some of the variables in the study constant, then the conclusions of the authors have more empirical support for their acceptance.

From simply reading the work it is difficult to deduce which of the criteria (1 or 2) was stressed by the authors (a conversation with Alvaro Reyes clarified the fact that the criteria of significance would be predominant in the interpretation of the results).

However, this choice of the level of significance as the fundamental criteria of judgement is not free from doubts, although these cannot be discussed in the context of this review.

We will first consider what our reaction would have been if the criteria of decision had been the  $R^2$ 's, the Betas and their changes through the manipulation of the variables studied, by isolation and holding some of them constant.

Two general comments would be:

i) the authors, contrary to what they have stated, do not prove that the segmentationist hypotheses are irrelevant in explaining the functioning of the labor markets.

ii) the work demonstrates the palpable influence of the variables hypothesized by the theory of human capital - such as the influence of formal education and of experience - in the determination of earnings and performance. However, it is precisely this empirically found covariance which is questioned in its ambiguous theoretical meaning by those who have hoped to complement and/or substitute the theoretical explanation underlying this merely empirical result.

We could critically summarize the principal conclusions of the authors by pointing out that:

i) in breaking down the demand for labor into modern and non-modern sectors, and moreover, into public and private within the modern, and traditional and marginal within the non-modern, differentials of income appear between the sectors

and sub-sectors. This affirmation, which could certainly, *prima facie*, support the segmentationist theory is, however, seen in a distinct way by the authors, since

ii) when the differential by sector is calculated controlling sex, schooling, and experience, the differential in earnings clearly diminishes. Or, in other words, the differentials encountered, and which apparently supported the segmentationist hypotheses, would be spurious when seen from this point of view, since they don't persist when the differences are found holding constant the variables relevant to the theories of human capital. At first sight the argument is persuasive, however, in reality, it can be questioned. A glance at the various charts presented in the work shows that sex, segments, subsegments, education and experience all have some weight in the determination of earnings. The only chart which includes sufficient controls to define the spuriousness of the segmentationist explanation is chart 7, based on which the authors' conclusions do not seem reasonable. In effect, when educational level and sex are held constant, the contribution of the isolated segments is maintained, being large and significant for the female subsample and appreciable and not significant for the male. It should be observed, moreover, that this result is only stated with respect to some of the values of variables studied, since the analysis of women with primary schooling, of men with secondary schooling, and of both sexes with university-level education does not appear in the charts published. That is, the discriminatory effects by segment do not disappear, but rather are maintained, which supports the segmentationist theory and not that of human capital. If they disappeared, they could sustain the theory of human capital.

In our understanding, the whole study demonstrates that in this macrocosm, with the segments thus defined and with the inclusion of these variables in the design of the regression, both types of variables - those postulated by the segmentationists and those proposed by the supporters of human capital - show influence in the prediction of earnings, resisting the mutually

effectuated statistical controls. A prudent conclusion, then, would be that the theoretical approaches are complementary.

iii) the authors state that a good part of the overall difference between sectors is due to the educational composition of the labor force of each. This is definitely true, but this could also be attributed to any of the other variables as well, since holding any of the variables constant reduces the differentials and breakdowns increase them. The authors claim, moreover, that in comparing the earnings functions between sectors for each educational level the differences which initially appeared were eliminated or minimized. The figures found, initially without controlling educational levels are, 0.123 for men in the modern sector and 0.091 for men in the non-modern sector (see chart 2, 1979). Holding educational level constant (chart 7, 1979), the differential for men in the modern sector becomes 0.077 and for men in the non-modern sector, 0.053. Calculated in terms of percentages, it would seem that the differences have increased, rather than decreased. The same occurs in the case of the women.\* The same could be done with the effect of experience: in effect, the differential between segments increases when educational level is held constant.

iv) the authors state that, - by observing the earnings functions they found - beyond the differences by sex, there were significant differences by educational level. They also said that for men, the coefficients of schooling showed increasing results between primary and secondary levels, and also at the university level. According to table 5, the coefficient definitely rises from primary to secondary, but the alleged growth from secondary school to university does not appear in the chart. In the same table 5 (1979), we see that contrary to the case of the men, the coefficient of performance of schooling diminishes with the educational level for the women. This finding, one

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\*Note: without holding education level constant, in the modern sector: .073, in the non-modern: .081. Holding this level constant, .006 in the modern, .140 in the non-modern.

could speculate, could be seen as contrary to the theory of human capital, by supposing that the influence of factors on the demand side is stronger than that of the factors of the supply side of labor.

v) one last general conclusion of the authors is that in the past, the order of return of the educational levels in Colombia was ascendant from primary to university. The gradual reduction in the rates of return of the secondary level of education, but principally of the primary, leads the authors to infer that a process of redistribution by equalization of prices through market adjustments is taking place, which would be corroborative of the theoretical lines of neoclassical economics. However, although the "profitability" of primary education has diminished, that of the secondary level not only has not diminished, but has increased, according to table 9 (1979). But still, this tendency varies according to sex, since, for the women, the rate of return for primary education continues to be higher than that secondary (see table education 5, 1979). Nor do we know, through the tables, how the evolution of the return on university-level education has taken place, which could influence the confirmation of the tendency indicated by the authors.

vi) for these reasons, more caution should have been exercised in the authors' final conclusion: "The theory of market segmentation at the level of modern and non-modern sectors, as it has been established, becomes questionable, or at least can only be accepted to the extent that the segments are identified with differences in the educational levels, more than with differences in type of technology between the sectors".

In effect, if the criteria used had been the isolation, control and verification of the changes in the size of the  $R^2$ 's and betas, the theory of labor market segmentation would have suffered no disapproval nor detriment to its explanatory power in comparison to the theory of human capital.

However, if the criteria of judgement are the size of the test indexes of the difference of coefficients when some variables are controlled by educational level or educational composition of the labor force of the sector, the conclusions would then support the affirmations of the authors of the study. In this case, some findings seem to provide evidence that does not seem to corroborate the hypotheses of the segmentationists.

Let us consider what some of the important phenomena would be: i) The differences between the modern sector and the non - modern with regard to the effect of education on earnings show lack of statistical significance in the male sample when the educational level is taken into account. That is, by holding educational level constant, the statistical significance of the intersectorial differences that education produces in earnings disappears; ii) In the female sample, the differences are maintained, and even increase, between sectors, when educational level is held constant. The significance is also maintained. However the magnitude of the coefficients indicates a greater return on education in the non-modern sector, a fact which does not seem particularly corroborative of the segmentationists' hypothesis either, since this hypothesis attributes greater productivity to the modern sector; iii) Also, the absence of some subsamples in the data table, which could seem critical for the conclusiveness of some of the findings according to the criterion of the magnitude of the coefficients, is now justified according to the criteria of significance, since the elimination of those combinations of variables which were not significant on a more aggregated level is reasonable.

In summary, the segmentation-human capital selection cannot be decided according to the magnitude of the correlation and regression coefficients, and the "Lazarsfeldian" procedure of analysis used by the authors.

This alternative produces some evidence contrary to the segmentationist hypothesis if the criterion of decision in the

analysis is the magnitude, and presence or absence of significance during the manipulation of the data.

Perhaps the key to the consideration of the evidence presented by the authors is the prickly discussion of the importance given to the tests of significance as the principal criterion of decision, and to what extent other bases for decision can be subordinated absolutely to this principal criterion.

#### VIII. EDUCATION AND THE LABOR MARKET IN MONTERREY, MEXICO<sup>61</sup>

Paulo Vieira da Cunha is responsible for the last Pilot Project in our review. We will restrict ourselves to a few aspects which are notable in terms of the point of view adopted for our study, for three reasons: i) As in the case of Lima's work, we do not have the more recent results in our possession, such that any evaluation of the results would be incomplete. ii) The larger part of his work deals with a discussion of a more appropriate methodology and with the theoretical interpretation which could be given to findings on intergenerational occupational and economic mobility, a theme which we did not yet examine, nor did we examine it while reviewing the work about Colombia.\* However, some theoretical and methodological contributions and some empirical results are important for our discussion.

The data, gathered by Jorge Balan, Harvey Browning and Elizabeth Jelin,\*\* was obtained from the macrocosm of the resident

\*In this preliminary version, we examined the theme of occupational and economic mobility.

\*\*J. Balán, et. al., Men in a Developing Society. Austin: University of Texas Press (1973).

population in the city of Monterrey, Mexico, in 1965. Men between the ages of 21 and 60 were sampled, with an overrepresentation of older men and of those belonging to high socioeconomic strata, to guarantee their presence in the sample for analysis. The sample, of 1803 individuals selected at random, was controlled over 4 age brackets and income strata.

The work can be seen as a discussion of the relations between education and other dimensions of status and mobility in the labor market. In particular, his work lends greater theoretical support to the propositions sustained by Ricardo Lima and empirically elaborates the data with greater statistical sophistication. The author reinforces his ideas, both theoretically and empirically, through the use of various documents.<sup>62, 63</sup> In one of them, he focuses primarily on the definition of the informal sector and of the process and rationality inherent in the segmentation of the labor market.

First, the author provides a theoretical examination which points out the weaknesses of the classical explanation, the strengths and weaknesses of the hypothesis of market dualism and the contribution that segmentationist theory could make to the conceptualization of the informal sector (or sectors).

In this respect, and contradicting hypotheses analogous to that of human capital, in order to explain the causes and effect of technological change - which would set off mechanisms which would exacerbate segmentation - Cunha argues that technological innovation does not originate as much in response to changes in the prices of the factors of production as in response to the effective increase in demand; that economic progress is guided by profit and not by efficiency, such that the goods produced are those which are most profitable and not those which are most desired, nor those which could be most efficiently produced.

Along these same lines, the adoption of technological innovation is due not so much to the relative cost of manpower,

as to the demand for products, its power over the demand and to the degree of access to the new technology. This difference in points of departure and return, in spite of proposing interesting alternatives to the classical explanation of social differentiation, is not sufficient to justify the simultaneous existence of the phenomena which must be explained jointly to account for segmentation i) the origin, ii) the process, iii) the rationale for the domination by segmentation and iv) its perpetuation as such.

In the space available, it will not be possible to summarize all of the reviewed theory, integrated and constructed in support of the segmentationist hypothesis, which is explained by changes in the competitive structure of the system, in the relations of production within the companies of the dominant sectors (appearance of internal labor markets, with productive rationality and control), maintaining and intensifying these as a mechanism of transferring surplus value and of holding down wage levels. In this fashion, positive feedback is opposed to negative in the informal sector and together with differential production, with the transfer of surplus value and with the mutual subordination, generates a segmented state of affairs, with barriers of various types to vertical mobility between segments (crystalization of status) and concentration of mobility within the segments, fundamentally within the ideologically, politically and economically profitable internal labor markets.

In another work, Paulo Vieira da Cunha concentrates on the conceptualization of marginality as a structural phenomenon more than as a distortion of the market: as a phenomenon which tends to structural implantation and permanence, rather than to break-down and disappearance, given its functions within the total market structure in the capitalist system.

In summary, the conceptualization of the author provides the sharpest contrast between the similarities and the differences of the various theoretical frameworks with respect to the functioning of the labor markets, providing the most comprehensive

and articulated attempt at theoretical fundamentation of an alternative conceptualization to the theory of human capital, within the Pilot Projects.

From the methodological point of view, we will only consider his recursive model of status attainment and his use of covariance analysis to determine the occupational categories for his analysis.

With respect to the methodology used, the demonstration that single-equation models, -in which the change from a state  $n$  to a state  $n$  plus 1 over time is a function of attributes measured in terms of characteristics of the supply of labor;-cannot prove that any alternative interpretation of the process of status attainment is any more true than any other, is a crucial point in the author's argument. In effect, which mechanisms produce the degree of attainment and the amount of mobility are questions which are beyond the quantitative result of the equation. The extent to which demand, supply, or their interactions produce the result will never be discriminated by single-equation models. Is a model which includes equations at points in time, and matrices of transition between these points, adequate in evaluating the different contributions of the variables in occupational mobility?

The model employed in the analysis of mobility includes variables of socioeconomic origin (indexed by paternal occupation and education of both parents measured when the sibling was 15); an index of the size of the community of origin and a dummy variable for migratory status; formal education; training (two measurements, for manual and non-manual); three measures of experience (years in the labor force, years in the same occupation; number of subordinates); size of the company and sector of activity.

With reference to the results, several of them are important for the human capital vs. segmentation debate.

i) The author analyzed the age-earnings and experience-earnings profiles according to occupational categories. As was

expected, given the random relation anticipated between some occupations and age, only in a third of the occupational categories did the age-earnings relation appear to be appreciable, with very few exhibiting a non-linear standard of relation. The only occupations in which the usual curvilinear pattern of age-earnings relations appears, is in the extreme upper reaches of the occupational classification. As the author points out, these tendencies are consistent with both theoretical approaches (human capital and segmentationist). An important consequence of the lack of relation between age and earnings according to occupation is the possibility of using the mean of earnings to characterize the occupational groupings.

ii) The study of the experience-earnings relation by occupational categories shows the same absence of association for the majority of the occupational categories and also the same presence of this association, among the higher occupations. However, it is important to note the fact that, in all cases, the height of the curve of the experience-earnings profile is smaller than that of the age-earnings profile. This would imply that the influence of one year of experience is less than that of one year of age in the determination of earnings, although experience is not an unequivocal measure, because at times, experience has a negative influence on earnings, as in the case of a prolonged exercise of a menial occupation, without cumulative experience. Having completed the classification of occupations by analysis of covariance, it is possible to explain the findings using socioeconomic origin and the segmentation of the market in the same way that human capital does by using other variables.

However, the most important findings of this Pilot Project, from the point of view of the discrimination of the evidence in support of the theories of human capital and of segmentation, are with respect to the methodology and the interpretation of the results obtained in the analysis of mobility, with whose important results we are only partially acquainted, and which the author will probably reveal at this

Seminar.

In conclusion, this Pilot Project theoretically expands on the key points of both theoretical approaches, develops the theoretical framework of the segmentationist theory, and defines which evidence and empirical models can produce crucial tests of the complementarity or mutual exclusivity of the theoretical frameworks whose discussion underlies the various Pilot Projects we have reviewed.

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