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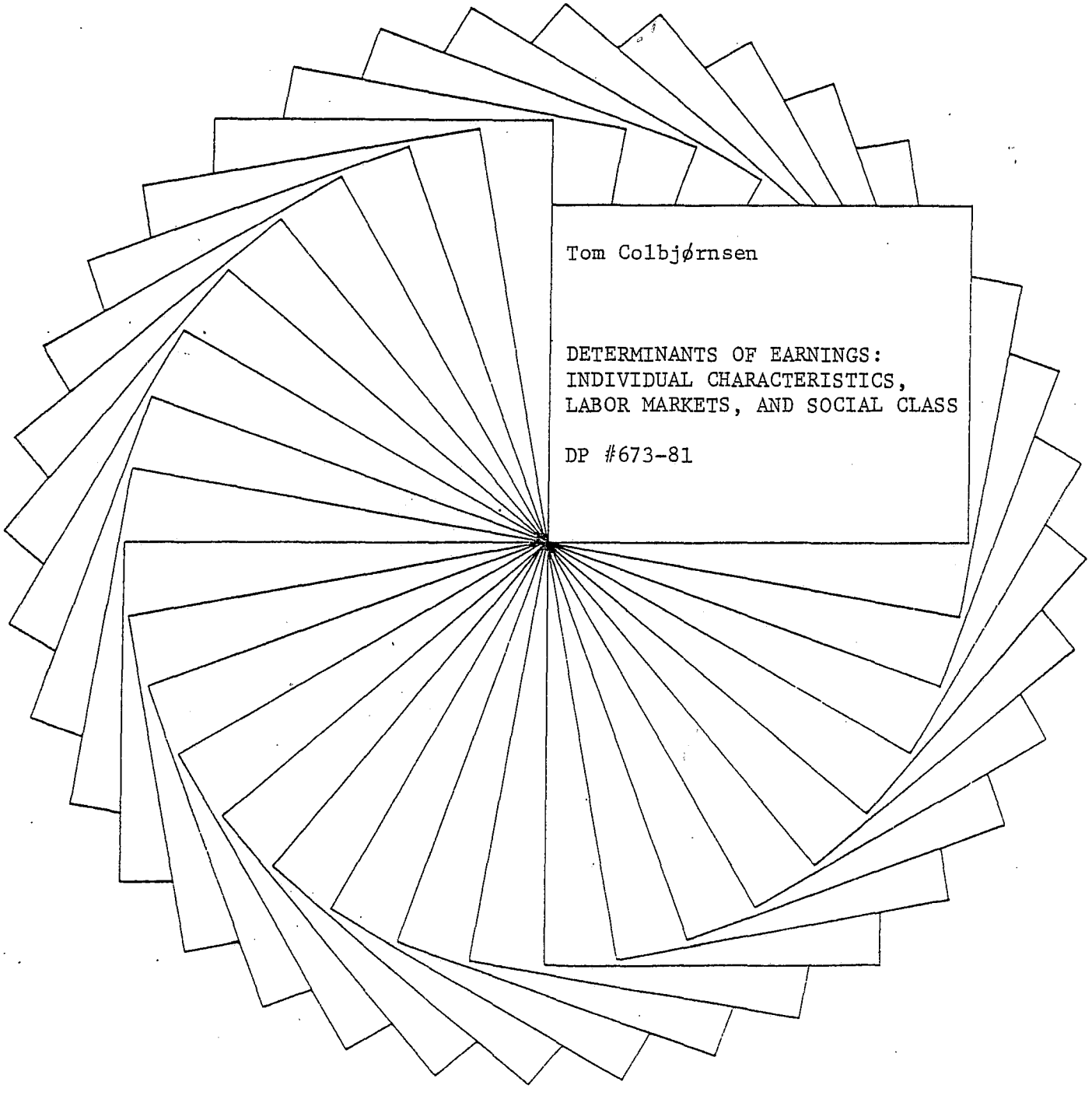

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DETERMINANTS OF EARNINGS:
INDIVIDUAL CHARACTERISTICS,
LABOR MARKETS, AND SOCIAL CLASS

DP #673-81

DETERMINANTS OF EARNINGS: INDIVIDUAL CHARACTERISTICS, LABOR MARKETS, AND SOCIAL CLASS

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September 1981

Paper prepared while the author was a Visitor at the Department of Sociology and the Institute for Research on Poverty at the University of Wisconsin-Madison, 1980-81. Core support for the research was from the Department of Social Welfare in Norway; other support came from funds granted to the Institute for Research on Poverty by the Department of Health and Human Services, pursuant to the provisions of the Economic Opportunity Act of 1964; and by the Center for Demography and Ecology at the University of Wisconsin-Madison, which has core support from the National Institute for Child Health and Human Development.

I especially benefited from comments from W. Lee Hansen and Robert M. Hauser. The content of the paper is, however, my sole responsibility.

Abstract

This paper discusses how structural forces add to, or interact with, individual resources in the determination of earnings among males in the Norwegian labor market. To gauge individual resources, the background characteristics considered are social background, education, experience, stability, health, and number of hours put into the labor market per week. To gauge structural forces, the variables used represent market forces (in two forms: forces tending to equalize job advantages and disadvantages, and forces related to supply and demand for labor power), mechanisms within firms which restrict free competition for jobs (which I term "internal labor market"), and processes related to social class. A causal model is constructed on the basis of several hypotheses concerning how all these factors influence earnings. The data are from a 1973 random sample of all Norwegian men aged 17 to 70 in the labor force. The analysis demonstrates that it is worthwhile to build models which integrate different research traditions: sociology (status attainment models), neoclassical economics, Marxist class analysis, and institutional economics. The results indicate, among other things, that higher social background elevates earnings, primarily through education; that market forces affect earnings to some extent; that restriction of competition for jobs raises earnings of those located inside the internal labor market; and that processes of social control give managers and supervisors higher earnings than workers.

INTRODUCTION

The fundamental hypothesis underlying this paper is that the distribution of earnings can be looked upon as generated through the interaction of two sets of factors: first, the background characteristics that individuals bring to the labor market--education, sex, social background--and second, the distributive processes that operate in the labor market, whose effects can be called structural in the sense that they exert influence on earnings independent of the characteristics of the individuals involved (Wright, 1979:60). An example of these distributive processes are market forces. The task of modeling the processes that generate the distribution of earnings can then be said to consist of modeling how such structural effects add to or interact with individual background characteristics in the determination of earnings. At the abstract level, this kind of model can be illustrated as in Figure 1.

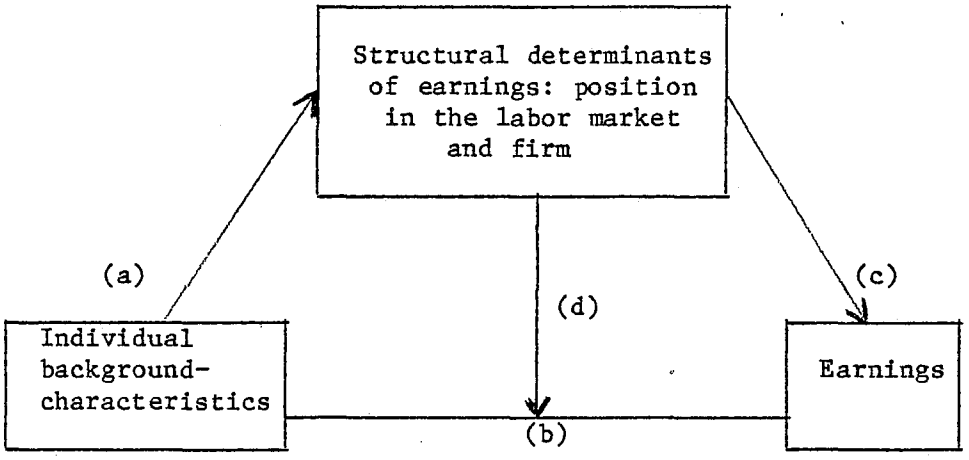

Figure 1. Basic model for analysis of income determination processes.

The figure illustrates the causal logic of the model-building strategy that will be used in this paper. To give substantive content to the model, several research traditions can be drawn upon: status attainment models in sociology, neoclassical economics, institutional and economic sector models that have been used by both economists and sociologists, and Marxist class analysis.

In the literature, these approaches have to a large extent existed separately, and in some cases, have been presented as competing approaches. Without arguing against the possibility that some aspects of the different traditions may be mutually exclusive, I shall here make a case for the position that earnings are determined by the simultaneous operation of several different forces. The strategy that I follow in the next section is to integrate insights from different traditions into the same model in order to capture these different processes.

A MODEL FOR THE DETERMINATION OF EARNINGS

Individual Background Characteristics

A. The effect of social background. A basic aim of status attainment research is to reveal the relative influence exerted by ascribed and achieved individual characteristics on people's attainment of socioeconomic rewards such as occupational status and earnings (Blau and Duncan, 1967; Sewell and Hauser, 1975; Featherman and Hauser, 1978). An important aspect of this question is that it focuses on the degree of equal opportunities and openness in the stratification system within a society.

One type of ascribed characteristic that has received attention is the socioeconomic standing of the family that a person is born into.

This factor may have importance for earnings for two reasons. First, there may be mechanisms of occupational and social inheritance at work that give children whose parents are of "higher" social standing an advantage in later life, irrespective of their other characteristics. This may be called the direct effect of social background on earnings. Second, the social well-being of the family may be of importance for the social and psychological processes which influence children's abilities, aspirations, motivations, etc., and hence their later educational and occupational attainment. This may in turn influence their earnings, and may be referred to as the indirect effects of social background. Earlier research has shown that in industrialized societies, social background is still of importance for socioeconomic achievement, and that it works both directly and indirectly. As far as earnings are considered, however, research from both the United States and Norway has shown that the main influence seems to be indirect (Sewell and Hauser, 1975; Hernes and Knudsen, 1976). Hence, we will expect to find that higher social background influences earnings mainly by indirect means, especially through education.[1]

B. Education. In both sociological and economic research, education is supposed to be one of the main determinants of earnings. In economic human capital models, education is supposed to affect earnings because it influences a person's productivity in the labor market (Mincer, 1974). Other economists, those known as screening theorists, claim that education influences earnings because it gives access to jobs with training possibilities and advancement opportunities, which in turn leads to higher earnings (Arrow, 1973; Thurow, 1975). In sociological status attainment research, education is supposed to influence earnings both

because it regulates access to jobs with different payments and because it influences earnings within the same kind of jobs (Sewell and Hauser, 1975). However, a compelling theory of the relationship between occupation and earnings has not yet been spelled out by sociologists who work within this tradition (Featherman and Hauser, 1978:290).

Again, I will argue that this pluralism in theoretical traditions partly reflects the fact that education influences earnings through several different social and economic processes. First, education may influence earnings because it is an important ingredient in screening processes that allocate people to positions that have different earnings levels. Second, within the same type of positions, earnings may still vary because people have different productivity levels. Here the human capital theory may be useful, because it gives insight into what factors influence productivity; among them education plays a chief role. Finally, in accordance with the status attainment literature, I will expect to find education an intervening variable between social background and earnings (e.g., Sewell and Hauser, 1975). This means that one of the reasons why high social background may lead to higher earnings is that high social standing of parents facilitates the educational attainment of their children.

C. Experience. A person's experience is one of the basic explanatory variables in human capital earnings functions (Mincer, 1974). The reason for this is that experience is considered to reflect abilities learned on the job--that is, skills acquired through on-the-job training. Since investments in on-the-job training will be less profitable as a person grows older, it may be expected that the effect of experience on earnings decreases with age, since the rate of return on such investments

will be reduced as the person gets older. Hence, from this theory we should expect to find a nonlinear effect of experience on earnings, where the positive effect of experience on earnings decreases, and even might become negative, with age. This is also what typically has been observed in cross-sectional data.

However, other explanations are available for explaining the concave form of the experience-earnings function. One focuses on possible cohort effects. The point is that the economy is supposed to undergo changes in the sense that occupations and industries with higher productivity and wages will have an increasing share of the total work force. Since people's mobility potential decreases with age, young and middle-aged persons will be recruited to such positions to a larger extent than older people. If we, for the sake of simplicity, think of the work force as consisting of only three cohorts, young, middle-aged, and old, and the theory about structural changes in the economy is right, it is possible to observe a concave experience-earnings function in cross-sectional data for the whole work force, even if earnings are increasing steadily over the life cycle for members of a given cohort. This is illustrated in Figure 2.

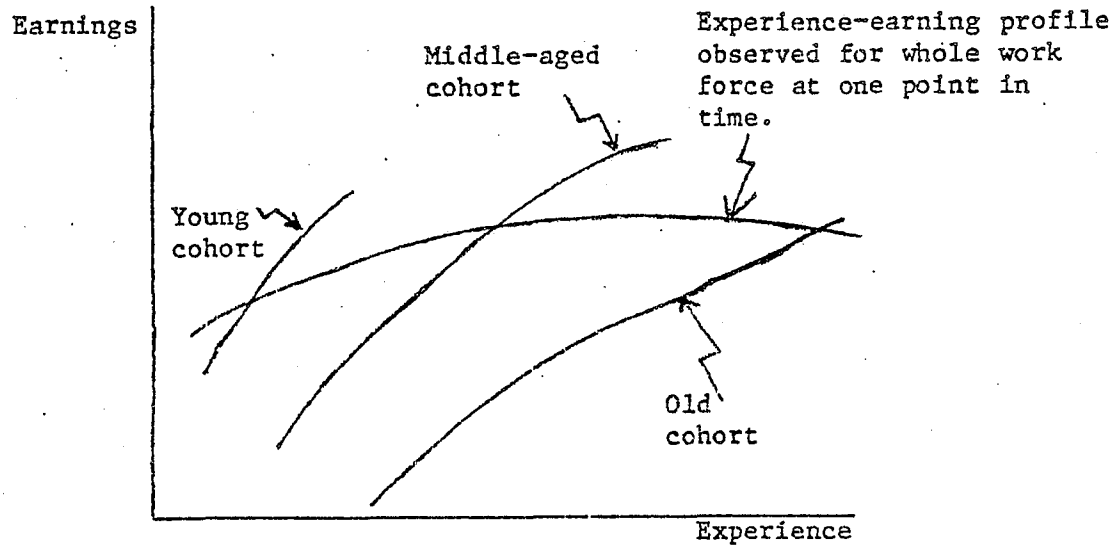

Figure 2: Cohort interpretation of concave experience-earnings profile.

Sørensen (1977) has offered another theoretical explanation for the shape of the experience-earnings function: the vacancy competition model. Here, changes in socioeconomic attainment over the life cycle are regarded as generated through movement in an opportunity structure where vacancies are created when someone leaves the labor force. By making certain assumptions about this structure, a concave age-earnings profile can be predicted.

Hence, at least three different theoretical explanations can be given for the typical observation that the experience-earnings function is concave toward origo in cross-sectional data. With the data at hand, however, it is not possible to discriminate empirically between these theories.

D. Effect of stability. Another variable that may influence a person's productivity in the labor market is stability (longevity on the job) in the firm in which a person is working. The reason for this is

that the longer the person stays in the firm, the greater the possibility for acquiring firm-specific skills. Furthermore, stability is a condition for being able to take advantage of possible wage increases that follow from seniority rules, etc. Hence, I expect to find that the longer a person has stayed with the same firm, the higher are the earnings. Stability may also be a screening device which gives access to the internal labor market in the firm, and hence influences earnings indirectly. I shall return to this last point later.

E. Health. A person's health may affect a person's productivity in the labor market. In neoclassical economic theory, a person's health is regarded as part of the total stock of an individual's human capital. In the same way as schooling and on-the-job training, a person's health is supposed to be affected by investment decisions: to stay in good health, a person must be willing to pay for recreational facilities, take the necessary time to engage in activities that are good for one's health, such as jogging, etc. (Schultz, 1961). Another reason may be that persons with health problems may find it more difficult to move to areas where the wage level is higher, or acquire new training that gives access to better-paid occupations. Whatever the reasons, it seems plausible to postulate that a person's health is an important determinant of productivity in the labor market, and therefore also will affect earnings. Since health is partly a function of age, this thesis can only be tested when age is controlled for. In this paper, age is captured in the model by labor force experience, a variable that is highly correlated with age, at least for men.

F. Amount of work put into the labor market. Education, experience, and health are all variables that are supposed to affect earnings because

they reflect differences in the quality of the labor power supplied in the labor market. However, the quantity of labor power may also be of importance. The more time a person spends working in the labor market during a certain period, the higher his earnings will usually be. Hence, I expect to find that earnings are an increasing function of the amount of work put into the labor market.

Structural Sources of Differences in Earnings

So far the hypotheses put forward have been restricted to the individual characteristics that for different reasons may affect earnings. I shall now turn to different social processes that are not tied to individuals, and whose effects on earnings cannot be reduced to the effects of the characteristics of the individuals involved. Three types of processes will be discussed: market forces, institutional mechanisms that restrict free competition for jobs, and processes of social control within firms.

A. The effects of market forces. The classical analysis of how market forces may affect earnings was conducted by Adam Smith. In a famous passage in Wealth of Nations he wrote:

> The whole of the advantages and disadvantages of the different employments of labour and stock must, in the same neighborhood, be either perfectly equal or continually tending to equality. If in the same neighborhood, there was any employment evidently either more or less advantageous than the rest, so many people would crowd into it in the one case, and so many would desert it in the other, that its advantages would soon return to the level of other employments.... Everyman's interest would prompt him to seek the advantageous, and to shun the disadvantageous employment. (Smith, 1776; quoted in Reynolds et al., 1978:43).

What Smith here discusses is often referred to as the principle of equalizing differences: If market forces are allowed to work, the different advantages and disadvantages related to a job will tend to sum to zero. This means that differences in earnings may compensate for differences in nonmonetary aspects of work. Hence, from this we will expect to find that in countries like Norway, where the market mechanism at least to a certain extent is supposed to match persons and jobs, working conditions which represent a disadvantage will be compensated for by higher earnings.

Another aspect of market forces that may affect earnings is that there may be disequilibrium between supply and demand in different segments of the labor market (Fleisher and Kniesner, 1980:160-166). If there are shortages of labor in some segments, wages may rise to pull workers into these kinds of jobs. In the same way, a surplus of workers in some segments may put a downward pressure on the wages there. In short, earnings may be a function of the relationship between supply and demand for labor power in different segments.

In sum, market forces may affect earnings in two ways: first, through the principle of equalizing differences; second, because the relationship between supply and demand for labor may vary throughout the labor market.

B. Institutions restricting free competition for jobs. One of the most important disagreements in the history of labor economics has been whether market models are sufficient to capture the structural sources of variation in earnings (McNulty, 1980). Those who are often referred to as institutional economists claim that mechanisms other than the market exert effect, and must be built into models of earnings determination.

They emphasize institutions that restrict free competition for jobs and bring forces other than supply and demand into play--collective bargaining, seniority, informal custom, etc. (see Piore, 1979). The effects have also been considered by sociologists (Sørensen and Kalleberg, 1981).

In this paper I will focus on one such restriction on free competition: internal labor markets. This concept refers to the fact that employers may give priority to their own employees over outside applicants when vacancies in the firm are filled. Internal labor markets thus reduce the degree of open competition for jobs, since whether or not the person already belongs to the firm becomes a screening mechanism. This also means that the forces of supply and demand are restricted in their influence on earnings; instead, seniority, collective bargaining, and informal custom may be of great importance.

It seems reasonable to expect that internal labor markets will influence earnings for several reasons: First, due to the restricted competition, the workers may be in a stronger position vis-a-vis employers when bargaining for wage increases. Second, stability (longevity in the firm) among workers is often higher in internal labor markets, a fact which may facilitate collective action among workers and which also may strengthen their bargaining position. Finally, management may use higher wages as part of a motivational system to integrate the employees in the company in order to obtain a stable work force. I therefore expect to find that internal labor markets increase the earnings of people involved in such arrangements.

One could also consider that there may be interaction between education and internal labor markets, experience and internal labor markets,

and stability and internal labor markets. It is possible to argue that education, stability, and experience give a higher payoff within such institutional arrangements than in external markets, which in turn would be a result of different distributive mechanisms. The reason for this could be that employees within internal labor markets, due to better bargaining position and other wage determination mechanisms, would be able to bargain wage agreements granting not only higher wages, but also higher payoffs to education and experience and to stability. On the other hand, this tendency may be counterbalanced by the tendency within many collective agreements to treat everyone involved the same, despite differences in individual characteristics. Because of such counterbalancing forces, it is difficult to make a priori predictions about whether to expect to find such interaction effects.

Finally, internal labor markets may be mechanisms that intervene between earnings on the one hand and education, experience, and stability on the other, thereby making part of the influence of these variables indirect. This is due to the fact that education, stability, and experience may serve as screening devices in the sense that they are often supposed to reflect differences in self-discipline, learning capacity, etc.--factors which are important for getting access to the internal labor market in the firm (Doeringer and Piore, 1971).

The internal labor market may, therefore, be an important determinant of earnings differentials: it represents a relevant institutional force other than the market mechanism, and it contains selection processes that transmit part of the effects of education, stability, and experience on earnings.

c. Processes of social control. Processes of social control within firms may be of importance for earnings, although this has not been much discussed in the literature. In more recent works, however, especially by Marxists who work from a class-analytic perspective, the topic has started to get more attention (e.g., Wright, 1979; Edwards, 1979). I will not undertake a complete analysis of the relationship between the class structure and income determination; I will instead focus on how one important aspect of class relations--positions within authority relationships in the company--may affect earnings.

Managers and supervisors, who themselves are employees, may be looked upon as being in a contradictory location between the workers and the capitalist class (Wright, 1979). For this reason, the control strategies that are used by owners towards managers and supervisors may differ from that used against workers:

> Managers ... must provide responsible and creative behavior, not simply conformity. Repressive control mechanisms are thus likely to be counterproductive, and so the social control of managers is likely to rely heavily on a structure of inducements: regular pay increases, career ladders, increasing fringe benefits over time, and so on (Wright, 1979:89).

From this it follows that processes of social control may influence earnings in the following way: since managers/supervisors are involved in control systems in which economic inducements play an important role, while persons without authority are controlled through more repressive devices, it seems reasonable to expect that managers/supervisors will have higher earnings than workers, even when controlled for background characteristics such as education and experience.

It has also been argued that it is reasonable to expect an interaction effect between education and social class on earnings in the sense

that managers/supervisors will receive higher payoff from their education than workers (Wright, 1979:90-91; 100-102). The reason for this is as follows: people with authority are more often than workers in a managerial hierarchy which affords possibilities for promotions accompanied by pay increases. Since education can be supposed to serve as an important criterion when promotions are distributed, it follows that people within a managerial hierarchy on the average will have higher payoffs to their education than those who are not on such a ladder.

Social class can also be expected to transmit some of the effects of education on earnings. The reason for this is that education may prepare people for positions with authority tied to them, and hence give access to jobs with higher earnings (Bowles and Gintis, 1976).

From a neoclassical economic viewpoint, it is usual to interpret the effect of authority on earnings as a result of differences in productivity--that is, a person who controls the work of other employees is supposed to be more productive on the job than others (e.g., Rødseth, 1977:47). From that perspective, an eventual effect of class, which remains after individual productivity characteristics have been controlled for, can result from misspecification of the model in the sense that not all individual traits that are relevant for productivity have been held constant. If this is the case, the structural effect of class will be biased upwards. In the econometric literature, this problem is referred to as the problem of selection bias. The data at hand do not permit us to go very deeply into this question. We are not in a position to make a critical test that discriminates between the class and productivity explanations for why authority affects earnings, nor do we have enough information to say that we have controlled for all

relevant productivity characteristics of the individuals. We are left with two possible explanations for why having control over the work of others may increase a person's earnings.

Summary of the Theoretical Arguments

The theoretical arguments outlined above are summarized graphically in Figure 3. The single-headed arrows symbolize additive and interactive causal effects that will be tested. Additive effects are the ones that lead from one variable to another, and interactive effects are symbolized by arrows going from a variable to an effect. The double-headed curved arrows between the exogenous variables symbolize that these variables are allowed to correlate, but that there will be no assumption made about causality in these cases. As far as the intervening structural variables are concerned, the correlations between them that have been drawn into the figure are partial; that is, correlations between the residual variance in these variables that are not accounted for by the specified effects coming from the individual background characteristics.

The model in Figure 3 can be seen as a substantive elaboration of the abstract causal framework presented in Figure 1. The exogenous variables in Figure 3 represent the individual background characteristics that people bring to the labor market, while the intervening variables represent the structural forces. Figure 3 models how these two sets of variables add to or interact with each other in producing the earnings distribution.

It is possible to argue that more relationships between the exogenous and the intervening variables should have been specified in the model. For example, both amount of work and education may influence the rela-

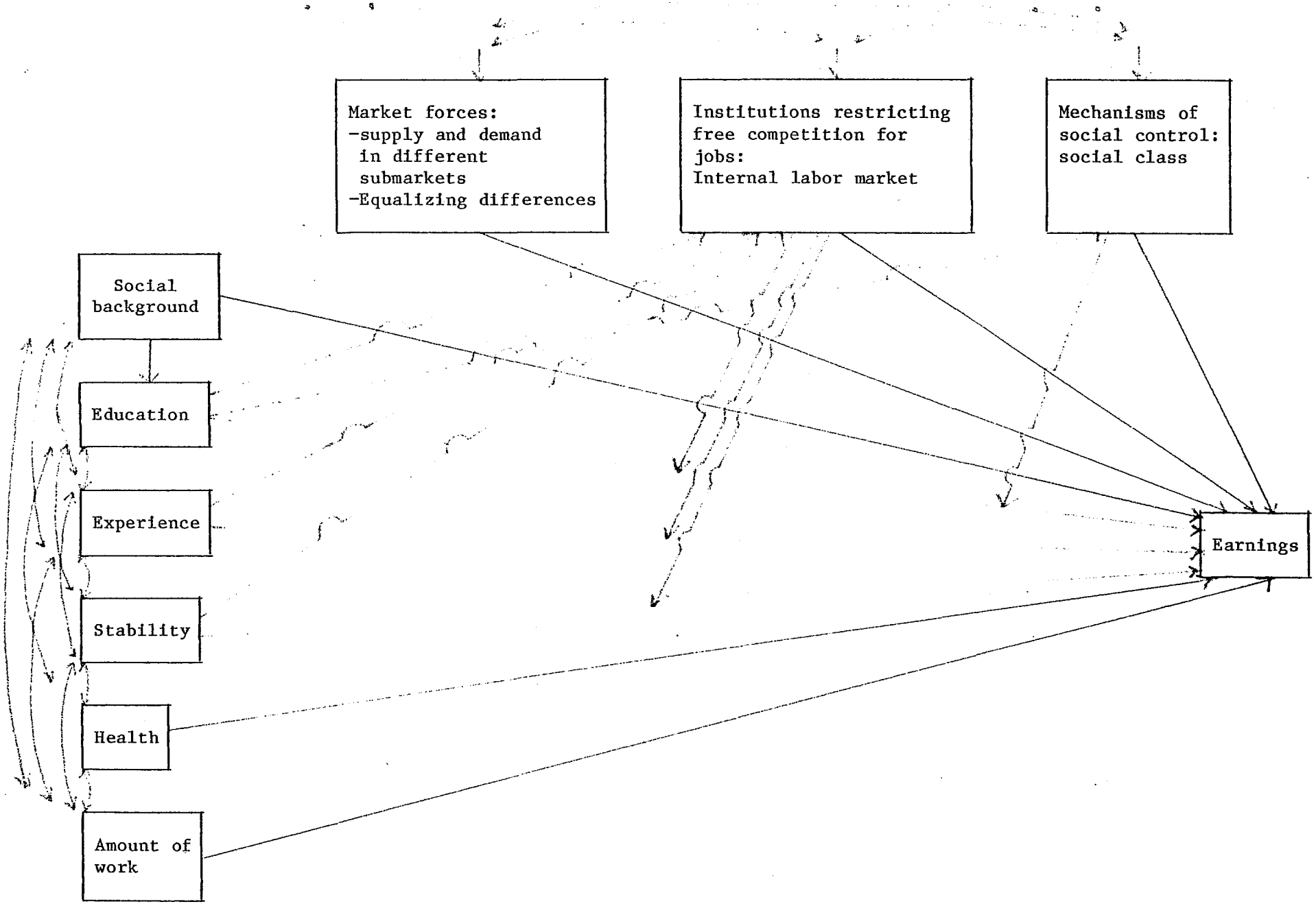

Figure 3. Theoretical model for income determination process.

tionship between supply and demand in different segments. However, I find it hard to come up with a causal theory for such relationships that fit into the recursive framework in Figure 3. I have therefore allowed all individual and structural variables between which no causal relationship is postulated to correlate freely. This also means that the recursive model used is just identified. (On identification in recursive models, see Duncan, 1975:44-50.) For simplicity of presentation, such correlations have not been drawn in Figure 3.

A few additional comments should be made before proceeding with the empirical analysis. First, the model can be said to be multi-processual, or multi-factoral, as it is often called in the economic literature (Lydall, 1976). It incorporates different types of social processes that all are expected to influence earnings. As discussed earlier, these processes have been described by different disciplines. The intergenerational transmission of socioeconomic inequality--that is, mechanisms through which social background affects earnings--has mainly been discussed within the sociological status attainment literature. Neoclassical economists have done research on how human capital factors, amount of work, and market forces influence earnings. The effects of institutional arrangements that restrict the working area of market forces have been analyzed by institutional economists and by sociologists, while the effects of social control have been discussed mainly by Marxist analysts. The model in Figure 3 represents an effort to integrate the insights from these different traditions.

Second, many of the theoretical arguments that lie behind the model in Figure 3 are the same as those used by researchers who take a "sectoral approach" to the study of inequality. As the name indicates, the relevant processes at the structural level are here represented

through a sectoral categorization of the economy. One approach that has been used in the literature recently is that of the "dual economy" tradition, which divides the economy into a core and a periphery (e.g., Tolbert, Horan, and Beck, 1980). The strategy used in this paper is different in the sense that the relevant processes are represented as directly as possible through a set of variables. The reason is that I do not think that anybody so far has come up with a sectoral classification that reflects all of the various earnings determination mechanisms represented in Figure 3. It seems to me to be more appropriate to represent the processes as directly as possible (see also Featherman and Hauser, 1978:484).

THE MODEL IN STRUCTURAL EQUATION FORM

To estimate and test the model in Figure 3 by ordinary least square regressions, it must first be translated into a set of structural equation models.

Model 1: $Y = \alpha_1 + \beta_1 X_1 + \varepsilon_1$

where Y = earnings,

X_1 = social background,

α_1 = constant term, β_1 = regression coefficient,

ε_1 = stochastic error term.

The regression coefficient in this model will give the total effect of social background, measured in the form of occupational status, on earnings. In technical terms, this total effect is the reduced form coefficient which sums up the several direct and indirect paths through which social background influences earnings (Duncan, 1975: 61). As such, it

says nothing about the relative size of the indirect and direct effects. In Figure 3, I have assumed that social background influences earnings indirectly though education. I have, however, also assumed that there will be a small direct effect. This is supposed to reflect motivations and aspirations instilled by the family in which the person grew up, as well as mechanisms of direct occupational inheritance, which will partly influence earnings independently of education. To analyze these direct and indirect effects, we have to estimate the following model:

$$\underline{\text{Model 2}}: \quad Y = \alpha_2 + \Sigma\beta_i X_j + \varepsilon_2 \qquad i,j = 1,2$$

where X_1 = social background,

X_2 = education.

Following the logic outlined by Alwin and Hauser (1975), the indirect effect of social background through education can be identified as the reduction in the regression coefficient for social background (X_1) that follows from including education (X_2) in the model; that is, the difference between β_1 in Model 2 and in Model 1.

The next step is to include the experience terms in the model. This is done by first adding the linear term that relates years of experience to earnings. Then, to find out whether the curve is concave toward origo as postulated, we have to add a second-order polynomial which is obtained by adding the term Experience × Experience. To test for the significance of this last term, it is most convenient to use the hierarchical strategy, that is, to test whether the increment in explained variance (R^2) that follows from the inclusion of the polynomial is statistically significant (Cohen and Cohen, 1975:216-217). Then, to test whether the curve is concave, we have to determine whether the sign of the regression coef-

ficient for the second-order polynomial is negative. To accomplish all this we must estimate the following models:

Model 3: $Y = \alpha_3 + \Sigma\beta_i X_j + \varepsilon_3 \qquad i,j = 1, \ldots, 3$

Model 4: $Y = \alpha_4 + \Sigma\beta_i X_j + \varepsilon_4 \qquad i,j = 1, \ldots, 4$

where X_1 = social background,

X_2 = education,

X_3 = experience,

$X_4 = X_3^2$.

The next step will be to test whether the other individual background characteristics included in the model in Figure 3 have the postulated effects. To find that out, we must estimate the following model.

Model 5. $Y = \alpha_5 + \Sigma\beta_i X_j + \varepsilon_5 \qquad i,j = 1, \ldots, 6, 10$

The new variables are defined as follows:

X_5 = health,

X_6 = amount of work,

X_{10} = stability.

Except for the relationship between social background and education, we assume no causal relationship among these variables. To the degree that the variables are correlated, this is allowed for, and the OLS regression makes it possible to estimate the net effect of each variable in the model—that is, to control for the eventual influence of the other variables in the model on the relationship being considered.

If we look at Figure 3, social background, health, and amount of work are not presumed to be involved in any screening mechanism in the labor

market, and are therefore not presumed to have any indirect effect through the variables that tap income determination processes at the structural level. Hence, the effects of these variables are not supposed to change to any large extent when we later add the structural variables to the model. However, education, experience, and stability are all presumed to influence earnings, both directly and indirectly. Therefore, the regression coefficients in Model 5 for these last three variables should be looked upon as total effects, or reduced form coefficients, and not as an estimate of the direct paths from these variables to earnings in Figure 3.

In the next step the structural variables are included. Since I make no assumption about causal relationships among these variables, they are added simultaneously. The model that is estimated is the following:

$$\underline{\text{Model 6}}: \quad Y = \alpha_6 + \sum_{ij} \beta_i X_j + \varepsilon_6 \qquad i,j = 1, \ldots, 13$$

where the new variables added are the following (more extended definitions appear in the next section):

X_7 = physical working conditions,

X_8 = stress,

X_9 = inconvenient working hours,

X_{11} = tightness in occupational labor market,

X_{12} = internal labor market,

X_{13} = social class.

Since this model includes all the variables, it estimates all the direct additive effects that are postulated in Figure 3. This means that it

estimates the direct effects that are obtained before the interaction terms are included.

By comparing the change in the regression coefficients for the individual background characteristics when going from Model 5 to Model 6, one gets a first impression of how much, if anything, of the effects exerted by the variables are transmitted through the structural variables (Alwin and Hauser, 1975). However, to get a more accurate picture of this transmission, I will regress internal labor market (X_{12}) and social class (X_{13}) on the individual background characteristics.

To estimate the indirect causal effects of individual background characteristics through the relevant structural variables, we simply multiply the effects on the different paths that lead from the actual variable to earnings. This procedure is legitimate for both standardized and unstandardized estimates (Heise, 1975).[2] To get the necessary effects for calculating indirect effects in this way, we estimate the parameters in the following two models:

Model 7: $X_{12} = \alpha_7 + \Sigma\beta_i X_j + \varepsilon_7$

Model 8: $X_{13} = \alpha_8 + \Sigma\beta_i X_j + \varepsilon_8$

Finally, the postulated interaction effects in Figure 3 must be tested. By an interaction effect, I refer to the phenomenon that two or more variables may account for the variation in the dependent variable over and above any additive combination of their separate effects (Cohen and Cohen, 1975:292). Or, put another way, over and above the variation that the variables account for additively, they may have a joint effect. What this joint effect means substantively is that the variables operate conditionally: the effect of one independent variable on the dependent

variable is conditioned by, or varies with, the value for some other independent variable.

One way to incorporate such interaction effects in the regression model is to construct new terms by multiplying the variables that are believed to have joint effects, and to include them in the regression model (Cohen and Cohen, 1975:291ff.). To test whether these new terms add significantly to explaining the variance in the dependent variable over and above the additive effects, the individual variables involved must be linearly partialled from the product term, since the interaction term is usually highly correlated with the involved variables. The relevant procedure is to enter the variables hierarchically, and then use the incremental R^2 test, just as when testing for polynomials.

To be able to undertake such tests for the interaction terms postulated in Figure 3, we must estimate the following models, and compare the R^2 obtained with R^2 in Model 6.

Model 9: $Y = \alpha_9 + \Sigma\beta_i X_j + \beta_{14}X_{14} + \varepsilon_9$

$i,j = 1, \ldots, 13$. X_{14} = Education × Internal labor market

Model 10: $Y = \alpha_{10} + \Sigma\beta_i X_j + \beta_{15}X_{15} + \varepsilon_{10}$

$i,j = 1, \ldots, 13$ X_{15} = Experience × Internal labor market

Model 11: $Y = \alpha_{11} + \Sigma\beta_i X_j + \beta_{16}X_{16} + \varepsilon_{11}$

$i,j = 1, \ldots, 13$ X_{16} = Stability × Internal labor market

Model 12: $Y = \alpha_{12} + \Sigma\beta_i X_j + \beta_{17} + \varepsilon_{12}$

$i,j = 1, \ldots, 13$ X_{17} = Education × Social class

This completes the model specification necessary to test the hypothesis underlying the theoretical model presented in Figure 3. Now I shall present the variables and data that will be used.

DATA AND VARIABLES

The data used in the analysis are taken from the "Level of Living" study conducted in Norway in 1973-74. This data set consists of a total sample of 2966 respondents, who at that time were representative of members of the Norwegian population who were 17 years old or over (Levekårs undersøkelsen, 1976).

The data used in this analysis consists of a subsample of the original data. First, it is restricted to employed persons (not self-employed or unemployed) who had taxable income in 1973. This is in some way an inconvenient restriction because focusing only on employees reduces our ability to investigate in some depth the relationship between social class and earnings. On the other hand, several of the hypotheses that will be tested are based on theoretical reasoning that applies mainly to employed persons.

Second, the analysis is restricted to men. This is very inconvenient, because it prohibits investigation of possible sex discrimination in the labor market. The reason for doing so is that much research has shown it extremely important to include a measurement of length of experience in the labor market when estimating earnings functions, because experience is a suppressor variable for other important variables in the model--especially education (e.g., Griffin, 1978). The problem in this case is that women on the average have a much less stable attachment to the labor market during their careers than men do. Hence, an

experience variable that is constructed as Age - Education - 6, as in this paper, will not be an appropriate indicator of women's experience, but will serve reasonably well for men. Since I regard it as very important to include an experience term in the models, I decided to include only men in the analysis. It is important, however, that data to be collected in the future contain variables making it possible to construct an experience variable for women.

Finally, the sample was restricted to persons who had taxable income in 1973. This means that persons who were in the labor force at the time of interview but had zero earnings in 1973 were deleted from the analysis. This left a sample of 787 persons as the basis of the analysis./

I also experimented with excluding other groups from the sample. People employed in farming, who worked part time, or who had unusually low earnings (less than 15,000 Norwegian kroner (NKR), or approximately $2500 U.S.--1 U.S. dollar was approximately 6 NKR--in income in 1973) were deleted from the analysis in turn. That deletion did not, however, appreciably change the results that were obtained when the total sample was used. This is not surprising, since these groups are relatively small: 2% are employed in farming, 6% worked part time, and 16.6% had an income less than NKR 15,000. Hence, even if income determination processes are different in these groups as compared to the rest of the employees, there is little reason to expect that their exclusion would influence the results obtained from the total sample. The OLS regression estimates are weighted averages for the different groups, and each group's weight is its relative number in the total sample. With the data at hand it is not possible to perform a statistically sound regression analysis for each of the three groups separately, since they are too small. We cannot,therefore, conclude that farm-employed persons, part-

time workers, or low earners are not involved in different earnings processes, but only that including them in the analysis does not distort the results obtained.

To sum up, we are left with a sample that includes all male employees aged 17 to 70 who had taxable income in 1973. With minor differences, this is also the kind of sample that has been used most in economic and sociological research (e.g., Mincer, 1974; Featherman and Hauser, 1978).

The variables are defined as follows. Earnings is measured as taxable income in 1973. This means that economic rewards other than earnings (rewards that are obtained outside the labor market) probably are included in this measure. Data for the United States show that in 1960 over 90% of average family income consisted of earnings. Even in the top 5% of all families, 87% of income consisted of earnings (Hauser and Featherman, 1977:278). However, there is reason to believe that the average percentage is lower now, as a result of the increase in income transfer programs after 1965. The percentage may also be lower in Norway than in the United States, since income transfers may be used more extensively in the Norwegian welfare state. The effect of this is that the multiple correlations for the models will be underestimated; that is, there will be variation in income that cannot necessarily be accounted for by a model that has been theoretically constructed to explain earnings. I see no reason, however, to believe that this should bias the different estimates obtained, but the statistical efficiency of the estimates will probably be lower as a result of the lower multiple corelations.

Another problem with this measurement of earnings is that income is measured after tax deductions. Even if this makes this income variable

still more imprecise, it may not necessarily alter the ranking of individuals to any large extent. If this is the case, there is no reason to believe that this problem will lead to serious distortions of the results (Labowitz, 1970).

Social background is measured as the socioeconomic status attached to the occupation in which the family's primary supporter worked during most of the time in which the respondent grew up (Skrede, 1971). This definition accords with the status attainment literature, which focuses on occupation as indicator of the family's position in the status hierarchy (Hauser and Featherman, 1977:3-50). A high value of this variable means high socioeconomic background. Education is measured as total number of years of schooling, and varies from 7 to 18 years. Experience is constructed as Age - Education - 6.

The data contain no direct measure of how long the employee has been with the current firm. There is, however, available information on how many other firms the respondent has worked for during the last five years. Hence, stability is measured as a four-graded variable, with a value of 4 for high stability (no other firms) and 1 for low stability (four or more other firms). The higher the value on this variable, the higher the stability. It should be pointed out that this is not an exact measurement of seniority within the firm.

Health is constructed as an additive index where the indicators are whether or not the respondent has had one or more of the following health problems during the last 12 months: drowsiness for several weeks; breathing difficulties even after performing easy work tasks; nervous symptoms; tense muscles; and stomach problems. The items are unweighted.

The higher the values on this index, the more serious the health problems.

Amount of work is measured as the number of hours the respondent worked during the last week before the interview. Ideally, we should also have included a variable that captures the variation in number of weeks that the respondent worked during the actual year: research by Mincer (1974:92) has shown that adding this variable increased the explanatory power of the model to a substantial degree. This information is, however, not available in the data. The consequences of this will be estimates that are less statistically efficient.

The way amount of work is measured introduces randomness in the measurement of this independent variable. Hence, the assumption made in OLS about fixed independent variables are violated. It is assumed that differences between the average amount of work a person puts into the labor market during a week, and the hours worked during the specific week before the interview, are purely random, and not related to other measured or unmeasured factors that influence earnings.

If this is the case, the stochastic element in this independent variable poses no problem to interpretating the results from ordinary least squares (OLS) regression analysis (Pindyck and Rubinfeld, 1976:84).

We now turn to operationalization of the variables that are supposed to capture structural effects on earnings. The influence of compensatory mechanisms will be analyzed by putting into the model three variables that reflect disadvantages related to work. According to the principle of equalizing differences, these disadvantages should be compensated for by higher earnings. The first is physical working conditions, which is an additive index constructed on the basis of whether

or not the respondents experience problems with windy work settings, humidity, dry air, pollution, noise, excessive vibration, or ergonomic problems. In addition, the respondents were asked whether or not they felt their work was physically hard to perform. Since factor analysis is not appropriate for constructing indexes when the indicators are a set of binary variables, the index was constructed by simply adding the variables together (Kim and Rabjohn, 1980:152). The higher the value of this index, the better the physical working conditions.

The second variable reflecting working conditions is stress, a simple dichotomous variable with a value of 1 if the respondent regards his work as free from stress, 0 otherwise. Finally, there is inconvenient work hours, such as shift work. This is also represented through a dummy variable with a value of 1 if the respondent works regular hours, 0 if the hours are inconvenient.

The second aspect of structural effects, the degree of tightness in the labor market, is represented through a variable that has been constructed on the basis of secondary information. From official labor market statistics, I collected information making it possible to construct a variable that reflects the degree of tightness--that is, the relationship between supply and demand for labor power--in the occupational submarket where the respondents work (Statistisk Sentralbyrå, 1974):

$$\left[\begin{array}{l}\text{Degree of tightness}\\ \text{in occupational}\\ \text{submarket, 1973}\end{array}\right] = \frac{\left[\begin{array}{l}\text{Total number of registered}\\ \underline{\text{unemployed}} \text{ in that occupation}\\ \text{during 1973}\end{array}\right]}{\left[\begin{array}{l}\text{Total number of } \underline{\text{vacancies}}\\ \text{registered for that occupation}\\ \text{during 1973}\end{array}\right]}$$

The value on this indicator is attached to each respondent through his occupation. The more tight the labor market, the lower is the value of this indicator.

One problem with this indicator is that it probably underrates the tightness for certain occupations. The reason for this is that some type of vacancies are registered at the public job services offices to a lesser extent than others. So far there is little empirical knowledge of this, and the measure should therefore be looked upon with some skepticism.

Internal labor market is also an unobserved variable. The indicators used to represent it are two dichotomous variables: whether the respondent is a member of a union or not, and whether or not the firm in which he works has more than 50 employees. The first indicator taps to what degree there are possibilities for collective action among the employees, a factor that can be assumed to facilitiate the emergence of an internal labor market (Sørensen and Kalleberg, 1981). The second indicator is intended to measure existence of promotion ladders and varying job opportunities within the firm, since this can be assumed to be dependent upon firm size. The relationship between the theoretical construct (internal

labor market) and its empirical indicators are presumed to be of the following type:

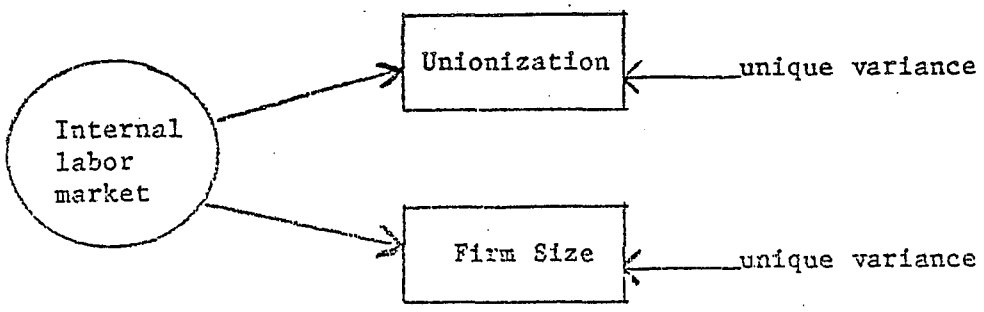

Figure 4: Relationship between internal labor market and its empirical indicators.

This model is logically similar to the classical factor analytic model. It implies that the variance in the indicator variables can be divided into a common and a unique part, and that the common part can be accounted for by a common, underlying causal factor which in this case is supposed to be internal labor market. Hence, the argument is not that unions and firm size are pure reflections of internal labor markets--obviously they are not. The argument is rather that it is the variation that these indicators have in common that reflects the existence of internal labor markets. Hence, to the degree that these indicators are present simultaneously it is reasonable to postulate the existence of an internal labor market.

The variable was constructed by simply adding together the two binary indicators. This gives us a construct with three values that express the degree to which the three indicator variables appear together. The higher the value, the larger is the restriction on free competition for jobs. Hence, this variable expresses internal labor markets as a

phenomenon which can vary in degree, and not as an either-or phenomenon. This variation by degree is consistent with empirical investigations that have shown that there are no clear-cut boundaries between internal and external labor markets (Blackburn and Mann, 1979:26-27).

The last variable is social class. This is represented through a simple dummy variable with a value of 1 if the respondent has authority over other employees as part of his work, 0 otherwise. This variable is supposed to tap whether the person is in a managerial/supervisory hierarchy or not.

Finally, I have constructed one polynomial and four interaction terms. The first is a second-order polynomial constructed by calculating (Experience × Experience). This term is included to test the hypothesis that the effect of experience on earnings decreases with age. The interaction terms are (Education × Internal labor market), (Experience × Internal labor market), (Stability × Internal labor market), and (Social class × Education). To try to avoid problems of multicollinearity when including these terms, I have measured Experience and Education as departure from their means (Cohen and Cohen, 1975:227). Since OLS estimates of the regression slopes are insensitive to such linear transformations of the variables, this does not pose any problems in the tests of the hypothesis. The constant terms will be affected, but they play no substantive part in the analysis conducted here.

DATA ANALYSIS AND DISCUSSION OF HYPOTHESIS

Before going into the analysis, a comment should be made on the form of the earnings function. In economic analysis, the usual procedure is

to use a semi-logarithmic earnings function. This means that the slope parameters will measure the proportionate change in earnings that follow from a one-unit change in the independent variable considered, other variables held constant. The reason for the popularity of this form in economic analysis is partly that under some circumstances the effects can be interpreted directly as rates of return to investments. This is the substantive focus of human capital analysis (Mincer, 1974). Other advantages of the semi-log function are that it is invariant with respect to global price and productivity changes, and that it seems to have several nice statistical properties (Hauser, 1980:703).

In sociological research, however, it has been more usual to use an additive, linear earnings function. This means that the focus of analysis is on the amount of money people receive in return for their background characteristics, and the amounts that are tied to different positions. For the research problem at hand, I think this is the most interesting question and will therefore stick with the linear version (see also Wright, 1979:250).

Table 1 displays the bivariate correlations, the number of units, means, and standard deviations. We see from this table that the largest amount of missing data is in the "amount of work" variable (X_6). The reason is that there were some respondents who were temporarily absent from work during the week before the interview, that is, during the week through which the number of hours worked were measured, resulting in a loss of 8.1% of the respondents. However, by assuming that only random factors influence the loss of units on this and the other variables, something which does not seem unreasonable, I have decided to to use the pairwise inclusion strategy[3] when dealing with missing data. This stra-

Table 1: Pearson Product Moment Correlations, Number of Units, Means and Standard Deviations for Variables in the Analysis.

		Y_1	Y_2	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}
Y_1:	Income	1.00																		
Y_2:	LN Income	.81	1.00																	
X_1:	Social background	.17	.09	1.00																
X_2:	Education	.37	.24	.39	1.00															
X_3:	Experience	.11	.17	-.14	-.34	1.00														
X_4:	(Experience)^2	-.30	-.32	.00	-.11	.04	1.00													
X_5:	Health	-.04	-.02	-.03	-.12	.15	-.05	1.00												
X_6:	Amount of work	.08	.07	-.02	-.07	.05	-.05	-.01	1.00											
X_7:	Physical working conditions	.24	.16	.18	.38	-.06	-.06	-.18	-.08	1.00										
X_8:	Stress	-.20	-.18	-.07	-.11	-.02	.13	-.17	-.05	.07	1.00									
X_9:	Inconvenient work hours	.00	.01	-.07	-.08	-.03	-.07	.00	.08	-.13	-.07	1.00								
X_{10}:	Stability	.20	.27	.01	-.03	.31	-.07	.02	.03	.03	-.04	-.12	1.00							
X_{11}:	Tightness in labor market	-.26	-.29	-.15	-.28	.00	.05	-.01	.01	-.23	.12	-.03	-.11	1.00						
X_{12}:	Internal labor market	.21	.26	-.01	.02	.14	-.11	.03	.01	-.11	-.08	.16	.17	-.16	1.00					
X_{13}:	Social class	.38	.30	.17	.36	.01	-.23	.04	.03	.16	-.23	-.01	.14	-.18	.07	1.00				
X_{14}:	Educ. × Int. lab. market	.35	.21	.33	.86	-.26	-.12	-.09	-.03	.33	-.08	-.09	-.03	-.21	-.03	.30	1.00			
X_{15}:	Exp. × Int. lab. market	.07	.09	-.11	-.29	.79	.11	.15	.03	-.06	-.02	-.05	.27	.02	.10	.02	-.32	1.00		
X_{16}:	Stability × Int. lab. market	.23	.28	.00	.00	.23	-.12	.04	.00	-.09	-.08	.10	.42	-.18	.93	.12	-.04	.22	1.00	
X_{17}:	Class × education	.37	.23	.29	.77	-.15	-.09	-.09	-.04	.29	-.05	-.09	-.03	-.24	.04	.29	.70	-.14	.03	1.00
N		787	787	758	786	786	786	787	723	778	778	787	783	770	783	787	782	782	779	786
Mean		39964.3	10.45	-.02	.00[a]	.00[a]	203.0	.66	42.15	15.32	.55	.17	3.42	1.00	1.05	.41	.04	1.58	3.73	.53
St. dev.		20067.19	.62	.91	3.03	14.26	189.8	.98	9.58	2.36	.50	.38	.90	.43	.77	.49	4.11	17.62	2.96	2.22

[a]These means are zero becaue the variables are measured as departures from their means. The means on the original variables were 10.188 (Education) and 25.601 (Experience).

tegy has the advantage of not throwing away as much information as would be the case if all cases which lack information on one or more variables were deleted. I also ran the analysis using the last strategy, but that did not change the results. Hence, for reasons of statistical efficiency, I stuck with the pairwise inclusion strategy.

Table 2 gives the estimated regression coefficients for Models 1-6. Table 3 presents the standardized solutions for the same models. I will discuss these results in light of the hypothesis developed earlier.

A. Individual background characteristics. From Model 1 in Table 2 and Table 3, we see that social background has a significant total effect on earnings: A one-unit increase in the occupational status of the main supporter of the family in which the person grew up leads on average to an increase in income per year of NKR 3,802 (NKR in 1973 values). The corresponding path coefficient is .172, which in this case means that about 3% of the variation in income can be explained by social origin. This cannot be said to be a very strong relationship. Hence, even if the social background of a man puts certain constraints on how much he is able to earn, these constraints cannot be said to be very deterministic.

By comparing the regression coefficients for social background in Models 1 and 2, we see that the direct effect of social background on earnings is statistically insignificant when education is included in the model. Hence, from these data it seems reasonable to conclude that social background affects earnings for the almost single reason that higher social background raises the educational attainment of the children, which in turn leads to higher income. We see that, of the total effect of social background estimated in Model 1, only 19.5% is a direct effect, and this effect is not significantly different from zero

Table 2. Regression Coefficients, Models 1-6. Unstandardized Solutions

Variables		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
X_1	Social background	3801.71	739.78	839.33	1161.62	1052.63	707.15
		(4.81)	(.92)	(1.08)	(1.56)	(1.37)	(.96)
X_2	Education		2380.70	2971.02	2732.33	2686.08	1792.45
			(9.82)	(12.12)	(11.59)	(11.04)	(6.69)
X_3	Experience			380.64	382.04	324.59	256.89
				(7.83)	(8.23)	(6.46)	(5.17)
X_4	$(\text{Experience})^2$				-28.34	-27.34	-21.27
					(8.57)	(7.88)	(6.27)
X_5	Health					-777.50	-1035.33
						(1.11)	(1.58)
X_6	Amount of work					160.70	150.99
						(2.38)	(2.32)
X_7	Physical work conditions						801.54
							(2.70)
X_8	Stress						-3405.24
							(2.60)
X_9	Inconvenient work hours						67.28
							(.04)
X_{10}	Stability					2616.14	1653.28
						(3.44)	(2.21)
X_{11}	Labor market tightness						-3710.77
							(2.41)
X_{12}	Internal labor market						3263.86
							(3.84)
X_{13}	Social class						6715.73
	R^2	.030	.140	.205	.275	.295	.360

Numbers in parentheses are t-values (Regression coeff. $\hat{\beta}_i$/est. st. error $\hat{\beta}_i$)
Critical t-values, one-tailed tests[a]: p = .05: 1.645
(with degrees of freedom > 120) p = .01: 2.326

[a]Since we have established clear theoretical expectations about the direction of the relationships, one-tailed tests are most appropriate.

Table 3: Regression Coefficients, Models 1-6.
Standardized Solutions (path coefficients)

Variables		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
X_1	Social background	.172	.034	.038	.053	.048	.032
X_2	Education		.360	.449	.413	.408	.271
X_3	Experience			.270	.271	.233	.183
X_4	$(\text{Experience})^2$				-.268	-.256	-.201
X_5	Health					-.036	-.051
X_6	Amount of work					.077	.072
X_7	Physical work conditions						.094
X_8	Stress						-.084
X_9	Inconvenient work hours						.001
X_{10}	Stability					.117	.074
X_{11}	Labor market tightness						-.080
X_{12}	Internal labor market						.125
X_{13}	Social class						.165
R^2		.030	.140	.205	.275	.295	.360

(t-values are the same for the standardized and unstandarized solutions)

in the statistical sense. This result is consistent with previous research, both from Norway (Hernes and Knudsen, 1976) and the United States (Sewell and Hauser, 1975; Featherman and Hauser, 1978).

On the other hand, it can be argued that when social background is measured by occupational status, there will be a tendency to underestimate its total and direct effect on income. It has been shown that if social background is measured by father's income in addition to occupational status and education, there is a direct link between father's income and son's income (Hauser and Featherman, 1977:288). Hence, it is necessary to build finer measures of social background into the model before more conclusive statements can be made on the relationship between direct and indirect transmission from this factor to earnings, as well as on how deterministic this relationship is. However, as far as father's occupational status goes, it seems to be reasonable to conclude that its effect is mainly indirect, and that it accounts for a relatively small part of the variation in income among Norwegian men.

When education is included (Model 2), the explanatory power increases so that the model now explains 14% of the variance in earnings. In 1973, one extra year of education led on the average to an increase in income of NKR 2,380. The corresponding path coefficient is .360. However, Model 2 probably underestimates the effect of schooling, since education is negatively correlated with experience (-.34). Therefore, if experience is not included in the model, the effect of schooling will be biased downward. To put it another way, experience is a suppressor variable with regard to education (Cohen and Cohen, 1975:87-91). Hence, after the experience terms have been added in Model 4, the effect of education is 14.8% larger than in Model 2: One year of education led in

1973 to an increase in earnings of NKR 2,732. The corresponding path coefficient is .413.

Models 3 and 4 also show that experience, as expected, is strongly related to earnings in a curvilinear way. Table 2 shows that when social background and education have been accounted for, adding a linear and additive experience variable increases the explanatory power of the model from .140 to .205 (Models 2 and 3). And by going from Model 3 to Model 4, we see that adding a second-order polynomial for experience to the model increases the explained variance in earnings from 20.5% to 27.5%. We also see that the sign of the polynomial is negative, which means that the shape of the experience earnings curve is concave towards origo, as we expected.

Before looking more thoroughly at the parameter estimates for the experience terms, it is necessary to include some other variables in the model. There is reason to believe that part of the effect of experience on earnings is due to the fact that people with more experience also are more stable, since experience is a function of, among other things, age, and age is positively correlated with stability. From Table 1 we can see that the correlation between the linear experience term and stability is .31. We therefore have grounds to believe that excluding stability from the model will bias the effect of experience upward.

In Model 5, I have included the last three variables that capture differences in individual background characteristics discussed in the theoretical section of this paper: health, amount of work, and stability. With these variables included, we are able to account for 2% more of the variance in earnings: R^2 increases from .275 to .295. Of the three variables, both stability and hours of work have statistically

significant influence on earnings in the expected direction, although it is evident from the path coefficients in Table 3 that the effects are relatively small. However, health does not influence earnings to a degree that is statistically significant in the way we expected. Several reasons may be given for this result. First, health may not be as important for a person's productivity in the labor market as are more cognitive skills acquired through education and on-the-job training. Second, a person's health may be more important for earnings when payment is based on how much a worker produces rather than on a fixed salary. In Norway, however, 85% of all employees had fixed salaries in the survey data used for this analysis (Levekårsundersøkelsen, 1976:146-147). This number may be even larger when only men are considered, because women are overrepresented in industries where fixed salaries are not used, like the clothing industry. Health may influence earnings in those cases, but there are too few in the sample to let this effect come through. Finally, health may influence earnings primarily because poor health results in absence from work. But since this is, to a large extent, compensated for in Norway by the government, it does not necessarily show up in this analysis, which is based on taxable income. Hence, even if the results tend to show that health is not very important for earnings, the data at hand do not permit a decisive conclusion.

As expected, the effect of experience is reduced when stability is entered into the model. To interpret the effects of experience on earnings, it is important to be aware of the fact that the parameters for the linear term and the polynomial have no separate interpretations; they must be considered simultaneously (Stoltzenberg, 1980:166-168). Hence,

holding constant the other variables in the model, we have to take the partial derivative of earnings with respect to experience:

$$Y_5 = \alpha_5 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_3^2 + \beta_5 X_6 + \beta_{10} X_{10} + \Sigma_5$$

$$(1): \quad \frac{\partial Y_5}{\partial X_3} = \beta_3 + 2\beta_4 X_3$$

$$= 324.59 - 54.68\ X_3$$

The substance of equation (1) is that the effect of one extra year of experience on earnings depends on how many years the person has been in the labor market. Table 4 gives the effects for some selected numbers of years of experience.[4]

Table 4. Effects on Earnings of One Extra Year of Experience at Different Levels of Experience

Years of Experience	Effect on Earnings of One Year Extra Experience (in Norwegian Kroner)
0	1,724
10	1,178
20	631
30	83
40	-463

By setting the partial derivative (eq. 1) equal to 0, and adjusting for the fact that experience has been measured as departure from its mean, it can be shown that the experience earnings curve reaches its

maximum at around 31 years of experience. However, as became evident from the theoretical discussion, the curve does not necessarily mean that each person's individual earnings on the average start to decrease when they have been in the labor market for around 31 years.

In summary, the individual background variables discussed in the theoretical section of this paper account for 29.5% of the variance in income among male employees in the Norwegian labor market. Social background seems to influence earnings almost exclusively through education. Reduced health leads to lower earnings, but the effect is not statistically different from zero at the 5% level. Of the other effects, amount of work seems to be least important, judging by its path coefficient of .077. On the other hand, to investigate the full effect of amount of work on earnings, it would have been necessary to include also number of weeks worked during the year (Mincer, 1974; Hauser, 1980).

So far I have not discussed the possibility that part of the effects of personal background characteristics may be transmitted through structurally conditioned processes in the labor market. As a first step I will discuss the direct effects of these processes on earnings.

B. The effects of structural forces. Model 6 in Tables 2 and 3 estimates the direct effects of the structural forces that were hypothesized to influence earnings. Adding these variables increases the R^2 of the model from 29.5% to 36%. If we first look at the effects of the variables that are meant to capture the influence of equalizing differences (X_7, X_8, and X_9), we see that the results are not totally as expected. People who have stressful work are compensated for this to a small extent (the path coefficient is -.084). This is not, however, the

case for inconvenient work hours and difficult physical working conditions: inconvenient work hours do not influence earnings to any statistically significant degree, and physical working conditions have an effect opposite to what one would expect from the theory of equalizing differences. The better the physical working conditions, the higher the earnings (the path coefficient is .094). It is difficult to give any explanation for this positive effect. One possibility is that such conditions are part of a "fringe benefits" reward system; another is that they are a fixed characteristic of jobs that are not part of any reward system at all (e.g., the conditions are technologically determined); a third is that people with high earnings tend to have jobs with better working conditions. Whatever the reason, the analysis shows that the principle of equalizing differences does not work as expected so far as this aspect of a job is concerned. This is consistent with previous research (Kalleberg and Sørensen, 1979:352).

The other aspect of the market mechanism, however--the degree of tightness in the occupational submarket where the respondent works--has an effect on earnings as was expected: the tighter the labor market, that is, the lower the value on this variable, the higher the earnings, even though the size of the path coefficient is small: -.08. Hence, there is evidence that the relationship between supply and demand directly influences earnings. As discussed earlier, however, the size of the coefficient should not be emphasized too much, since there are weaknesses in the operationalization of this variable.

There is also evidence that being in an internal labor market influences earnings in the expected direction: being able to shelter oneself from the market mechanism seems to increase one's earnings, just as we theorized. The standardized regression coefficient is .125.

Furthermore, the processes of social control lead to higher earnings for managers and supervisors than workers: even when education, experience, stability, etc., are controlled for, managers and supervisors made NKR 6,715 more than workers in 1973. The path coefficient is .165.

We have seen that by adding variables which reflect structural forces, we can explain more of the variation in earnings than we could have by focusing only on individual background characteristics. Later, I will discuss the question of the relative size of the influence of these two groups of variables. Now I will turn to the question of interaction effect between individual and structural variables.

C. Interaction effects. In the theoretical part of this paper, I argued that internal labor markets may condition the effect of experience and stability on earnings at the same time that social class and internal labor markets may influence the relationship between education and earnings. As argued elsewhere, the appropriate way to test for such interaction effects is to include the interaction terms after the additive effects have been accounted for, and then test whether the increment in explained variance (R^2) that follows is significantly different from zero. The test statistic is given in, for example Cohen and Cohen (1975:135).

What this procedure essentially does is test whether we explain more of the variation in earnings by allowing the regression slopes for stability, experience, and education to vary for different values on the internal labor market variable, or by allowing education slopes to be different for social classes. The results of the analysis are given in Table 5:

Table 5: F-Tests for Interaction Effects (hierarchical tests)

	Model	R^2	F	P-value
6.	Full additive model	.3596	(baseline model)	
9.	Full additive model + interaction educ./int. lab. market	.3636	4.16	.01 < p < .05
10.	Full additive model + interaction exp./int. lab. market	.3597	.10	p > .05
11.	Full additive model + interaction stab./int. lab. market	.3615	1.98	p > .05
12.	Full additive model + interaction educ./class	.3686	9.49	p < .01

None of the interaction effects increases the explained variance in earnings to a large extent. In particular, the interaction effects related to internal labor markets are small, and two of them are not significant at the 5% level. The education × internal labor market term is significant at the 5% level, but not at the 1% level. Since the sample size is relatively large, which makes it possible for even trivial effects to become statistically significant, and since we did not establish clear theoretical expectations about the interaction effects related to internal labor markets, I conclude that this analysis does not give evidence for such effects.

The interaction term for education and class is somewhat stronger, and since it has better theoretical justification than the other, I find it reasonable to conclude that managers and supervisors get higher payoff to their education than do workers. This is the same result that Erik Wright obtained in an analysis of U.S. data (Wright, 1979). How much

difference there is between the classes can be seen from the prediction equation corresponding to Model 12 (t-values in parentheses):

$$\begin{aligned}(2):\quad \hat{Y} = {} & 18237.11 + \underset{(.99)}{727.32}\ X_1 + \underset{(2.50)}{948.92}\ X_2 + \underset{(4.46)}{225.03}\ X_3 \\ & - \underset{(6.26)}{21.08}\ X_3^2 - \underset{(1.54)}{1002.39}\ X_5 + \underset{(2.72)}{146.81}\ X_6 + \underset{(2.83)}{836.23}\ X_7 \\ & - \underset{(2.85)}{3719.91}\ X_8 + \underset{(.18)}{293.86}\ X_9 + \underset{(2.48)}{1848.50}\ X_{10} - \underset{(2.30)}{3533.72}\ X_{11} \\ & + \underset{(3.78)}{3200.80}\ X_{12} + \underset{(4.74)}{6.675.78}\ X_{13} + \underset{(3.12)}{1395.12}\ X_2{*}X_{13}\end{aligned}$$

Equation (2) is the complete additive model, plus the interaction term, Education × Class ($X_2 \times X_3$). Since class is coded as a 0-1 variable, it can be shown that the regression coefficient for the interaction term is similar to the difference in the regression slope for education in the two classes. In this case, it means that one extra year of education is worth NKR 949 for workers, and NKR 2,344 for managers/supervisors. Hence, this last class receives NKR 1,395 more per year in payoffs for their education than do workers. The effect of education in the additive model was NKR 1,792, a value that falls between those of the two coefficients obtained after taking the interaction into account. (This is what we should expect, since the two classes are of relatively similar size in the sample--58% workers, 42% supervisors or managers). The purely additive model thus obscured the fact that different income determination processes are at work within the two classes.

d. The importance of recruitment mechanisms. By comparing the regression coefficients for the background variables in Models 5 and 6 in Tables 2 and 3, we see that the effects of education, experience, and stability are reduced substantially when the structural variables are

Table 6. Unstandardized and Standardized Solutions for Regression of Structural Variables on Background Characteristics (t-values in parentheses)

Dependent Variables	Independent Variables							
	Social Background (X_1)	Education (X_2)	Experience (X_3)	(Experience)^2 (X_4)	Health (X_5)	Work Hours (X_6)	Stability (X_{10})	R^2
Unstandardized								
Internal Labor Market (X_{12})	-.0017 (.34)	.0152 (1.40)	.0069 (3.03)	.0004 (2.58)	.0092 (.31)	-.0005 (.16)	.1035 (3.06)	.050
Social Class (X_{13})	.0236 (1.18)	.0596 (9.31)	.0036 (2.68)	-.0005 (5.32)	.0306 (.76)	.0022 1.26	.0570 (2.86)	.201
Standardized								
Internal Labor Market (X_{12})	-.01	.06	.13	-.10	.01	-.01	.12	.050
Social Class (X_{13})	.04	.37	.10	-.18	.06	.04	.10	.201

Critical t-values: one-tailed test: p = .05:1.645 p = .01:2.326

(d.f. > 120) two-tailed test: p = .05:1.96 p = .01:2.576

added to the equation. This means that, as expected, some of the effects of education, experience, and stability on earnings are due to the fact that these factors give access to positions which for several reasons have higher income tied to them, or, put another way, part of their effect is due to the workings of recruitment mechanisms in the labor market.

Table 6 gives the unstandardized and standardized regression coefficients for the model where internal labor market and social class are regressed on the individual characteristics (models 7 and 8). In the case of social class, the dependent variable is dichotomous, which makes the classical linear regression model less appropriate, for several reasons (Hanushek and Jackson, 1977:180-187): the estimated model may give predictions outside the 0-1 interval; the error term is heteroskedastic, meaning that standard errors of the parameters may be overestimated and give the significance tests a conservative bias; and, finally, the linear functional form is often less suitable in such cases. On the other hand, we see from the mean and standard deviation on the class variable (X_{13}) in Table 1 that the distribution is not very skewed, and in such cases the linear model is more appropriate than in cases where the distribution is more skewed (Goodman, 1976:91-93). The significance tests must, however, be interpreted with great care because of heteroskedasticity. In addition, the size of R^2 is not a very appropriate measure of explained variance in such cases.

First, we see that, as expected, there are no significant effects from hours of work, social background, and health on internal labor markets and social class. This means that these factors do not play any significant role in this kind of screening mechanism in the labor market.

Turning to experience, we find that part of its effect is transmitted through internal labor markets, just as we expected. The effect of experience is curvilinear. By setting the partial derivative of internal labor market with respect to experience equal to zero, it can be shown that after around 34 years of experience, one extra year of experience on the average reduces the probability of being in an internal labor market. This can be due to the fact that recruitment to internal labor markets takes the form of investment decisions, in which case it can be shown that it is less rational for the firm to hire older instead of middle-aged men. Another explanation is that the distribution of internal labor markets may be tied to structural changes in the economy, and this may result in cohort effects that account for the curvilinear relationship.

Table 6 also shows that there is a curvilinear relationship between experience and social class. This was not anticipated, and it probably means that experience gives qualifications that facilitate recruitment to leadership positions. This is the case, however, only up to a certain amount of experience. It can be shown that the function that relates social class and experience reaches a maximum at around 29 years.

As expected, Table 6 shows that high stability increases the probability for being in an internal labor market, and it also increases the probability for being in a managerial position. Turning to education, we see that the higher the education, the greater the access to managerial jobs. Surprisingly, however, education has no significant effect on being in an internal labor market. This goes strongly against what should be expected from the theoretical literature on internal labor markets. I think that the most probable explanation for this is the way in which the internal labor market has been operationalized. Instead of

reflecting such institutional arrangements accurately, it may reflect only unionization and collective action among workers. Hence, instead of contradicting the theory that higher education leads to higher position within labor markets, I think the results point toward the need for finding better operationalization of the theoretical concept of internal labor markets.

One of the aims of causal analysis is to decompose total effects into direct and indirect effects. In our case, it would have been interesting to find out how much of the combined effect of education, stability, and experience works directly, and how much is transmitted through the screening mechanisms discussed above. Because of nonlinearity and nonadditivity in some of the relationships, that procedure is very complex, although solutions to the problem are available (Stoltzenberg, 1980). I shall not follow the procedure here. The only thing we are able to conclude in this respect is that recruitment mechanisms play an important role in the determination of earnings, and that the indirect effects go in the same direction as the direct ones.

E. Relative importance of individual and structural variables. In this paper I have made a distinction between individual and structural determinants of earnings. An interesting question that can be asked is what the relative importance of these two sets of factors is in accounting for the variance in earnings. If one looks at Table 2, one could be tempted to say that individual factors explain 29.5% of the variance in earnings (Model 5), and that the structural variables are less important since they account for only 6.5%, which is the increment in R^2 that follows from adding these variables (Model 6).[5] That reasoning is, however, invalid. The individual and structural variables

may have a lot of variation in common, and the importance of this common variation in explaining the variance in the dependent variable will be credited to the variables that are entered in the first step of the regression procedure. The importance for the models used here becomes evident from Table 7.

Table 7. Explained Variance (R^2) in Earnings for Different Models

Model	R^2
Full additive	.360
Additive; only structural variables	.249
Additive; only individual variables	.295

From this table we see that if we had started out with the structural variables alone, they would have explained 24.9% of the variance, and would have led us to the conclusion that the structural variables are more important than the individual ones for explaining variance in earnings. We therefore reach different conclusions according to the order in which the variables are entered. Thus, if one is to make conclusions about the relative importance of different variables from the increment in R^2, one must have a strong causal theory about the order in which the variables are entered, and about how to "distribute" the explained variance due to common variation among the variables.

SOME ALTERNATIVE CONCEPTUALIZATIONS OF STRUCTURAL DETERMINANTS OF EARNINGS

In the literature, several other ways of conceptualizing structural determinants of earnings than those used in this paper have been applied. Examples of this are occupational status (e.g., Sewell and Hauser, 1975; Featherman and Hauser, 1978); census-based occupational classifications (e.g., Stoltzenberg, 1975); and census-based industry classifications (e.g., Wachtel and Betsey, 1972). The problem with the use of such classifications is that the theoretical justification for why they should influence earnings is often too little developed. For example, the use of occupational status as a predictor variable for income is justified by pointing out that earnings can be looked upon as rewards for performing occupational roles (Sewell Hauser, 1975). This does not say much about what kind of earnings-relevant processes occupational status is supposed to represent, in order to justify its use theoretically as predictor for income. In the same way, industrial and occupational classifications are often used because they are supposed to represent "structural forces", without being justified theoretically as such (Wachtel and Betsey, 1972; Rodseth, 1977). Accordingly, it is possible to argue that the reason that occupational status and occupational and industrial categories may account for some variance in earnings is that they reflect variation along the dimensions discussed earlier in this paper. If this is the case, we will expect that the variance accounted for by these three variables disappears, or is at least substantially reduced, when the structural variables used earlier in this paper are controlled for.

Table 8 shows results that may throw light on this issue. For occupational status, census-classified occupations, and census-classified

industries (both at the 1-digit level), I first present the increment in explained variation in earnings that results from adding these variables to the individual background characteristics. Next, I show the increment in R^2 that follows from adding these variables after the structural forces discussed earlier in this paper have been accounted for. By comparing these R^2s, we can see if the occupational and industrial measures add anything to explaining variance in earnings, apart from reflecting the processes identified earlier. Occupational status is measured through the same socioeconomic status scale used for social background earlier, while occupational and industrial census codes are represented through a set of dummy variables (see Appendix 2).

Table 8. Explained Variance in Earnings for Some Alternative Conceptualizations of Structural Determinants of Earnings

Predictor variable	Increment in R^2 after only background characteristics have been accounted for	Increment in R^2 after structural forces in equation (3) have been accounted for in addition to individual characteristics
Socioeconomic status	.017	.002
Occupational categories	.046	.030
Industrial classification	.017	.014

Table 8 shows that occupational (i.e., socioeconomic) status adds little to the explanation of variance in earnings after individual characteristics have been controlled for: R^2 is increased by 1.7%. We also see from the next column that the reason why occupational status

has this influence on earnings is almost entirely due to the fact that it reflects variation in earnings along the dimensions identified as structural forces earlier in this paper. After these variables have been controlled for, occupational status increases R^2 by only 0.2%. When occupational categories from the census classification are used, however, the specific contribution to explained variance in earnings--that is, after all other variables have been controlled for--is larger, at 3%. For the industrial categorization it is 1.4%. Hence, there seems to be something about what tasks people perform (occupation) and what they make (industry) that contributes to the explanation of earnings over and above reflecting variation in the factors that have been incorporated in this paper. To find out exactly what mechanisms are at work here is an important task for future research.

SUMMARY AND CONCLUSIONS

The analysis indicates that higher social background, measured in the form of occupational status of head of family, tends to increase a person's income. This relationship is, however, not very deterministic, and is almost exclusively transmitted through education. The results also show that education and stability influenced earnings in the expected direction, both directly and indirectly; through internal labor markets and social class for stability, and through social class for education. Experience has a curvilinear effect on earnings, and this is also partially transmitted through internal labor market and social class. Hence, these three individual characteristics influence earnings both because they affect a person's productivity (direct effect), and

because they give access to positions that have different earnings tied to them (indirect effect). Health did not have any significant effect on earnings, but there was a weak positive effect from number of hours worked per week.

These individual variables explained 29.5% of the variance in earnings. By adding the structural variables, R^2 increased to 36%. Of the variables supposed to tap compensatory mechanisms, only stress worked as expected. Inconvenient work hours and bad physical working conditions did not seem to be compensated for by higher earnings. Hence, the principle of equalizing differences as it was laid out by Adam Smith does not seem to work effectively in a labor market like the Norwegian one. However, the relationship between supply and demand in occupational segments affects earnings in the expected direction. Hence, market forces are to some extent important for monetary rewards.

Finally, internal labor markets and social class both affected income in the expected direction: Even after controlling for individual differences, being able to restrict competition for one's job, or being a manager (supervisor), increased the earnings one obtained. Several interaction effects were tested for, but only class and education came out as important. This means that managers/supervisors received higher payoff to their education than workers. The analysis showed that the empirical construct used to tap internal labor market should be looked upon with skepticism: the results concerning this variable can only be considered tentative.

As far as the relative influence of individualistic and structural variables in the determination of earnings is concerned, it is not possible to decide this question from the results obtained here. The

answer depends on the theoretical interpretation regarding the explained variance that is due to common variation among the two sets of variables.

Several of the assumptions made in the analysis about functional form of the earnings distribution, linearity in most of the relationships, etc., were tested for. Without reporting all the results here, it can be said that this did not lead to any reinterpretation of the empirical results.

Several conclusions can be drawn. First, it seems to be possible and fruitful to integrate insights into the earning determination process that come from several sources--sociological status attainment research, neoclassical economics, institutional models, and Marxist class analysis. As far as individual earnings attainment is concerned, it is not necessarily a good strategy to draw a sharp distinction between "individualistic perspectives" (status attainment and human capital) and "structural approaches" (institutional models and Marxist class analysis), as some have suggested (e.g., Tolbert et al., 1980). Second, one should not rely solely on the more ad hoc conceptualizations of structural determinants of earnings that have been used in the literature, such as occupational status and occupational and industrial census classifications. Both theoretically and empirically, it seems more rewarding to start out with a theory of what kind of mechanisms are supposed to influence earnings, and then try to represent them as directly as possible through a set of variables. Finally, the approach taken here can be seen as an alternative to the sectoral approaches that try to represent the structural forces in a scheme consisting of categorical economic sectors--e.g., core and periphery. Without strongly opposing the use of such schemes, the approach taken in this paper has the advan-

tage of avoiding the criticism that has been raised against many of the sectoral classifications, which is that they do not adequately reflect the real variation in structural determinants of earnings.

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FOOTNOTES

[1]In status attainment research, occupational status has been regarded as an important intervening variable between social background and earnings (e.g., Sewell and Hauser, 1975). For reasons that will become evident later, this possibility will not be considered in this paper.

[2]This procedure gives the same result as the one outlined by Alwin and Hauser (1975), and was used when calculating the indirect effect of social background through education. I prefer the procedure used here when there are several intervening variables which have no causal ordering among themselves. As I shall discuss later, the procedure gets more complex if some of the relationships in the model are nonlinear or nonadditive.

[3]This strategy implies that the correlation matrix, on which the regression parameters are calculated, consists of correlations which are based on units having information on the two variables involved, even if they lack information on other variables in the matrix.

[4]It should be noted that in Table 2, Model 4, experience was measured as departure from its mean, that is, as (experience - 25.601)--e.g., for 30 years of experience, the value for X_3 to put into equation (1) is $30 - 25.601 = 4.399$.

[5]I will not take the interaction term Education × Class into account in this discussion.