

Class Power and Mass Education: A Study of Social....

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CLASS POWER AND MASS EDUCATION:

**A Study of Social Structure and Resource Allocation
in Schooling**

Samuel Bowles

October, 1971

~~Harvard~~ Harvard University

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1. Introduction

In liberal social theory, the educational system-like the state-has been presented as an egalitarian institution, exogenous to the main economic relations of the society. An important defense of the capitalist system has been the purported efficacy of state action and particularly educational policies in ameliorating the inhumane and unequal economic conditions generated by the unregulated operation of markets in land, labor and capital.

This aspect of the liberal viewpoint manifests itself in bourgeois economic theory in two ways. First, the belief that democratically elected governments in capitalist societies would pursue effective income redistribution policies has provided the normative basis for the artificial separation of distributional and allocational aspects of economics.¹ This separation, has, in turn, served to exempt most economists from serious study of income inequality, thus allowing the discipline to concentrate on the relatively successful aspects of the capitalist system-- total production of goods and services-while relegating the skeletons to the closet. The few economists interested in income distribution have largely confined themselves to a consideration of state policies for the distribution of income. Analysis of the determinants of before tax and transfer income has been largely ignored.²

¹ See, for example, Musgrave ().

² There are a few notable exceptions, such as Simon Kuznets, Joseph Schumpeter, Gary Becker, and Jacob Mincer.

Second, the liberal view of education and of the state has diverted economic analysis away from an investigation of the determinants of the factor supplies in a society. Although some headway on this score has recently been made in the study of economic development, the economics of education, and demography, factor supplies are ordinarily called 'endowments' and taken to be exogenously determined. Contemporary economic analysis of international specialization, the distribution of income, and the choice of techniques, to name only a few affected areas, begin by positing a set of factor supplies or exogenously determined changes in these supplies. Where the role of the state as a determinant of factor supplies is recognized, as in some recent planning models, for example, state action itself is taken not as an outgrowth of the economic and social relations of the whole society, but as a normative instrument in the hands of government 'decision makers' acting in the enlightened or at least neutral pursuit of economic growth.¹

This essay is motivated by an alternative view of the state and of education. The state, in this interpretation, serves to stabilize social relations in the interests of the dominant groups of the society. The economic structure is itself influenced by the state, ordinarily in ways which enhance the power and income of the politically powerful groups. The educational system as an important influence on political behavior as well as the distribution of factor supplies, is one of the main instruments of

¹A typical example of this approach is Bowles (1969).

state power in performing these functions.¹

While this Marxist interpretation of the state and education in capitalist societies is hardly subject to empirical test in its present abstract form, comparison with the liberal view of the state does suggest a number of rather specific propositions concerning the role of education in the process of factor accumulation. These hypotheses are testable and will serve to discriminate between the two opposing models.

The educational system is an important determinant of the supply of factors of production in the economy, influencing both the composition of the labor force and the rate of physical capital accumulation. For this reason, we may expect that the pattern of resource allocation in education will exert an influence on the distribution of income, at least in market economies in which factor payments are to some extent responsive to factor supplies. Thus an analysis of educational resource allocation provides an opportunity to distinguish between the liberal and Marxist models. In what follows I will attempt to establish the following two propositions:

First, the observed allocation of resources in the educational sectors of most capitalist countries yields a distribution of factor supplies which is not consistent with an egalitarian or even simply a growth maximizing strategy. Resources are allocated so as to achieve both a more unequal income distribution

¹The role of education in stabilizing class relations in capitalist societies is spelled out in some detail in Bowles (1971).

and a lower rate of growth than would obtain if the state were neutral with respect to distribution and sought simply to maximize the rate of economic growth. Thus, I assert that even the weakest version of the liberal view--that positing the neutrality of the state--is not upheld.

Second, the structure and growth of the educational system, far from being exogenous, is an outgrowth of the economic organization and the class structure of society, and can be quite well predicted using a simple model and crude measurements of class power and economic structure.

In order to establish the veracity of the above two propositions I will construct, by successive approximations, a political-economic model of resource allocation in education. My first approximation--presented in Section 2--outlines the relation between economic transformation and the demands for educated labor. The introduction of political elements--in Section 3--constitutes my second approximation and is based on a simple model of societal choice in the allocation of the surplus to the accumulation of either capital or various types of labor. Using the model, I will spell out the educational policy implications of growth strategies which seek to maximize the income of the dominant class and compare these with the educational policies prescribed by a growth maximizing strategy. In Section 4, the alternative predictions of the two models based on differing maximizing strategies will be confronted with data on returns to schooling.

Analysis of the differing economic interests of various types of elites-traditional, capitalist, and communist-constitutes my third approximation. In Section 5, I will explore empirically the alternative strategies of educational resource allocation pursued by these different elites. Some dynamic aspects and other extensions of the model will be introduced in Section 6. In the concluding section, I will discuss the implications of the analysis for a number of broader issues in economics.

Although I believe my interpretation to be of general applicability, tests of the models are virtually impossible in societies with highly advanced educational systems. The difficulty arises in part because of the ambiguous nature of estimates of the rate of return to primary schooling--a crucial quantity in the testing of my hypotheses--in a society in which virtually nobody fails to complete primary school. For this reason I have confined my empirical work to the poor and middle income countries.

¹A further, though minor, reason for the choice of the sample arises from the fact that the percentage of school age children enrolled in school is an important component of one of the dependent variables used in this study. As the range of this variable is severely restricted among the advanced nations, the inclusion of these nations in the study would have given rise to heteroscedastic disturbances in the equation estimated below.

2. Economic Structure and the Allocation of Resources to Education

The historical record of educational growth provides a starting point for an economic interpretation of educational resource allocation. The extension of education to the majority of the population and the consequent dramatic increase in the average educational level of the labor force is a comparatively recent phenomenon even in the advanced countries, dating back to the late 19th century in most parts of Northern Europe and the United States. In most countries, the growth of public educational institutions particularly at the elementary level followed upon the changes in the mode of production which have been termed the Industrial Revolution.¹

Economists interested in the relation between education and economic growth have ordinarily taken educational growth as the exogenous variable and calculated the economic growth-generating effects of the expansion of enrollments.² Some historians of education, on the other hand, have stressed the changing mode of production as the force behind the growth of schooling.³ While both approaches shed light on the relationship between education and economic growth, it is the latter viewpoint which is more germane to our attempt to explain the historical patterns of factor accumulation. Specific case studies of education in the 19th century

¹See Cippola ().

²See, for example, Denison ().

³See particularly, B. Simon, M. Katz, S. Cohen () and D. Cohen and M. Lazerson ().

U.S. suggest that the historical association between economic transformation and the increasing allocation of resources to education is more than coincidental. In mid-19th century Massachusetts, for example, primary school attendance can be statistically explained by a combination of variables reflecting the distribution of the labor force between manufacturing and agriculture. Particularly important in explaining town to town variations in the extent of primary schooling, was the advent in some towns of large scale factory production.¹

Variations in primary and secondary school attendance across states and over time in the United States for the half century beginning in 1840 are also predictable on the basis of changing economic structures. The early importance and later demise of slavery as a mode of production and the rise of manufacturing employment provide a good statistical explanation of educational growth during this period.² Even abstracting from the main manufacturing centers, the growth of education in the U.S. West in the latter part of the 19th century seems to have been associated with changes in farm structure, particularly with the increase of large scale commercial farming.³

¹Based on the results of research which I am currently undertaking jointly with Alexander Field.

²Based on the results of research which I am jointly pursuing with Janice Weiss.

³See Robert Buchele (). Models using per capita mean or urbanization to explain variation in enrollment and resource use in education have not been particularly successful. See Fishlow () and (). Thus, I doubt that the results cited above arise through a positive correlation between economic structure, per capita income, and urbanization.

The historical evidence presented in some detail in the studies cited above suggests that the shifts in the social organization and technology of production were an important impetus to educational expansion.¹ Specifically, the demand for labor with some degree of schooling seems to have arisen in large measure because of two parallel shifts in the distribution of employment. The first shift was out of agriculture. The second and parallel shift was away from self-employment, family production, or cottage industry into large-scale capitalist economic organizations.

The movement of the labor force out of agricultural employment probably increased the demand for labor skills which were not easily acquired through emulation of the parents' role in production. Though it seems highly questionable that very many specific productive skills were taught in schools, it is no doubt true that general skills taught there--the ability to write and calculate, for example--had an increasing economic value as the importance of non-agricultural production increased.

More important as an impetus to the demand for educated labor was the demise of the family as the productive unit and the rise of large-scale capitalist production. Growing up in the home was no preparation for the demands of factory life, for the factory was a vastly different social organization, with a quite distinct set of social relations from those of the family. The factory worker, or for that matter, the office worker, had to learn time

¹The argument is spelled out in S. Bowles (1971).

consciousness, new forms of discipline, new sources of motivation, and respect for authority outside the kinship group. He had to adjust to detailed supervision in highly routine and fragmented tasks. Because the structure and social organization of schools closely approximate that of a large scale economic organization, they were found to be a useful training even for workers whose jobs did not require the rudimentary literacy and ciphering abilities purportedly taught in the classroom.¹

Thus we would expect the economic returns to schooling to be negatively related to both the fraction of the labor force which is employed in family production as well as the fraction of the labor force employed in agriculture. A crude test of this hypothesis is possible, using data of the earnings and quantity of labor with varying levels of schooling in fourteen countries. The relative earnings of more educated as opposed to less educated workers is my measure of economic returns to schooling. The fraction of workers in agriculture (FRAG) is a measure of the sectoral distribution of the labor force. In the absence of a better indicator of the degree of large scale factory and office employment, as opposed to self-employment and family production, I will use the fraction of the labor force employed for salaries and wages (FRAWE). Two equations using these variables appear in Table 1.²

¹See Katz () and Bruck ().

²A similar set of equations based on more limited data is presented in Bowles (1970). The reader interested in amplification concerning ways in which the labor factors were aggregated should consult that source. Basic data for this equation appears in the appendix to this paper.

Table 1
Returns to Schooling and Economic Structure in 14 Countries

<u>Dependent Variables</u>	<u>Coefficients of Independent Variables (t-statistics in Parentheses)</u>			<u>Constant</u>	<u>Degrees of Freedom</u>	<u>R²</u>
	<u>log $\frac{L_1}{L_1}$</u>	<u>FRAG</u>	<u>FRAWE</u>			
1. $\log \frac{w_1}{w_1}$	-.2626 (-4.45)		.0069 (2.06)	.1876 (.81)	11	.67
2. $\log \frac{w_1}{w_1}$	-.3072 (-3.19)	-.0085 (-1.53)		.8719 (5.49)	11	.62

L_1, W_1 = number and earnings respectively of male workers with less than a complete primary school education
 L_1, W_1 = number and earnings respectively of male workers with complete primary school or more education.
 FRAG = fraction of labor force working in agriculture
 FRAWE = fraction of labor force employed for salaries and wages

Sources of data: See Appendix

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The relation between relative earnings and relative labor quantities is negative, as expected. Likewise, the variables measuring the distribution of the labor force have the expected signs.¹

These data are certainly consistent with the interpretation of the relationship between economic structure and the demand for educated labor, and warrant its acceptance as a working hypothesis for the explanation of the allocation of resources to education. Assuming that the level of resource allocation to schools is at least, in part, a response to the perceived demand for educated labor in the economy, we may proceed to explain differences in enrollments among countries on the basis of the same economic structure variables which were hypothesized as the determinants of the returns to schooling. The first approximation to an explanation of educational resource allocation is thus, schematically:

quantity of resources allocated to schooling = f (returns to schooling)

¹When both labor force measures are used in the equation, the statistic of the coefficient of SHAVE falls to 1.24 while that for SHAG falls to 0.28. Because both empirical variables are very crude representations of the phenomenon specified in the abstract model and, moreover, are highly correlated ($r = -.91$), it would be premature to conclude that the distribution of employment between agriculture and non-agriculture is of no importance in the demand for educated labor except as it affects the social relations of production through shifts away from family production into large scale employment.

3. A General Model of Schooling and Factor Accumulation

Though the available data are consistent with the above interpretation of the relation between economic structure and the allocation of resources to education, a number of theoretical considerations suggest an extension of the model. Implicit in this first approximation is a rather limited view of the process by which educational resource allocation decisions are made. We have ample reason to believe that political as well as economic considerations are important in the determination of educational resource use. First, the early proponents of mass education saw schooling as a vehicle for the inculcation of values and attitudes consistent with stability in the new political order which evolved during the process of transformation from a traditional to a capitalist economy. It seems likely that much of the current expansion of mass education in poor countries is motivated by a similar desire to build the basis for stable political evolution within the capitalist system.

Second, actual societies do not contain a single economic interest in education, but varying interests, often in conflict. The observed resource allocation depends on which class or group is dominant. Where traditional agrarian elites are in power, for example, the expansion of schooling may be thwarted, even when the changing structure of production has greatly increased the demand for educated labor by capitalist employers. For example, the dominant interests of the slave holding aristocracy may explain why in the U.S. confederate states prior to the Civil War, the fraction of the school age population attending school was not only low, but bore no relation to the fraction of the population employed in

manufacturing. Such a relationship existed in the non-Confederate states both before and after the Civil War and in the ex-Confederate states following the Civil War.¹ Likewise, substantial underinvestment of resources in primary schooling in Northern Nigeria in the mid-1960's appears to have been a manifestation of the fact that the traditional rulers of that area did not have an interest in the profitability and expansion of the small but growing modern sector of the economy.²

Analogously, the shift in power from a capitalist elite to a popular government in Cuba in 1959 was followed immediately by a major transfer of resources into education, and an especially rapid expansion of primary schooling, which for the four decades prior to the revolution, had educated a progressively smaller fraction of each cohort.³

Though the evidence--both historical and contemporary--is limited, the available data do suggest that improvement upon the first approximation will require explicit consideration of the structure of political power and of the economic interests of the groups exercising predominant influence on educational policy.

The interpretation underlying the first approximation--that resource allocation in education is a simple response to the economic needs of the nation taken as a whole--will serve as the null

¹Based on work in progress jointly with Janice Weiss.

²For evidence of underinvestment in Northern Nigerian primary education, see Bowles (1969).

³See Bowles (1971).

hypothesis in the elaboration of the analysis to include considerations of class and political power. The resulting second approximation-briefly stated-is that educational resource allocation in capitalist countries is a response to the economic needs of the capitalist class. Specifically, the educational policy pursued in capitalist countries generates a distribution of labor factors which, though suboptimal from the standpoint of economic growth, yields an income for the capitalist class which is higher than that which would have been achieved under a growth-maximizing pattern of resource allocation in education. Because the educational policies serving the economic needs of the capitalist class will only, by accident, coincide with economic growth maximizing educational policies, examination of actual resource allocations in education will allow us to distinguish empirically between the two models and to test the null hypothesis.¹

Clarification of the economic interests of the capitalist class in educational resource allocation is thus the main requirement for the development of the second approximation.

For the sake of simplicity and ease of geometric presentation, I start with a simple, two factor, two class model. Capitalists own capital, K , and do not work. Workers may be educated (primary school only) or not. Together the combined labor services of workers with no schooling (L_0) and workers with primary schooling (L_1) are represented by L^* , where L^* is a positive

¹In a later section, the second approximation will itself be modified to take account of the interests of the governing groups in traditional and Communist societies.

function of the level of schooling in the labor force. The direct costs of schooling are assessed to be publicly financed. I assume a constant number of workers and a constant supply of investable resources as defined by total output minus consumption. In order to provide more schooling to the labor force, resources must be withdrawn from investment in physical capital. Thus, the society has a variety of feasible combinations of factor supplies, each corresponding to a different level of resource devoted to the education of workers. Assuming that the relative social costs of capital and schooling (the marginal rate of transformation of capital into schooling) is constant, we may represent these factor supply possibilities by the line xy in figure 1.¹ Oxy represents the set of feasible factor supplies. Natural resource endowments, international exchange possibilities, conditions of domestic demand for the output of each sector, as well as the production technologies available throughout the economy, are summarized in isoquants, $I_1 \dots I_n$, derived from the function

$$Q=f(L^*,K)$$

where Q is a measure of total output of goods and services.²

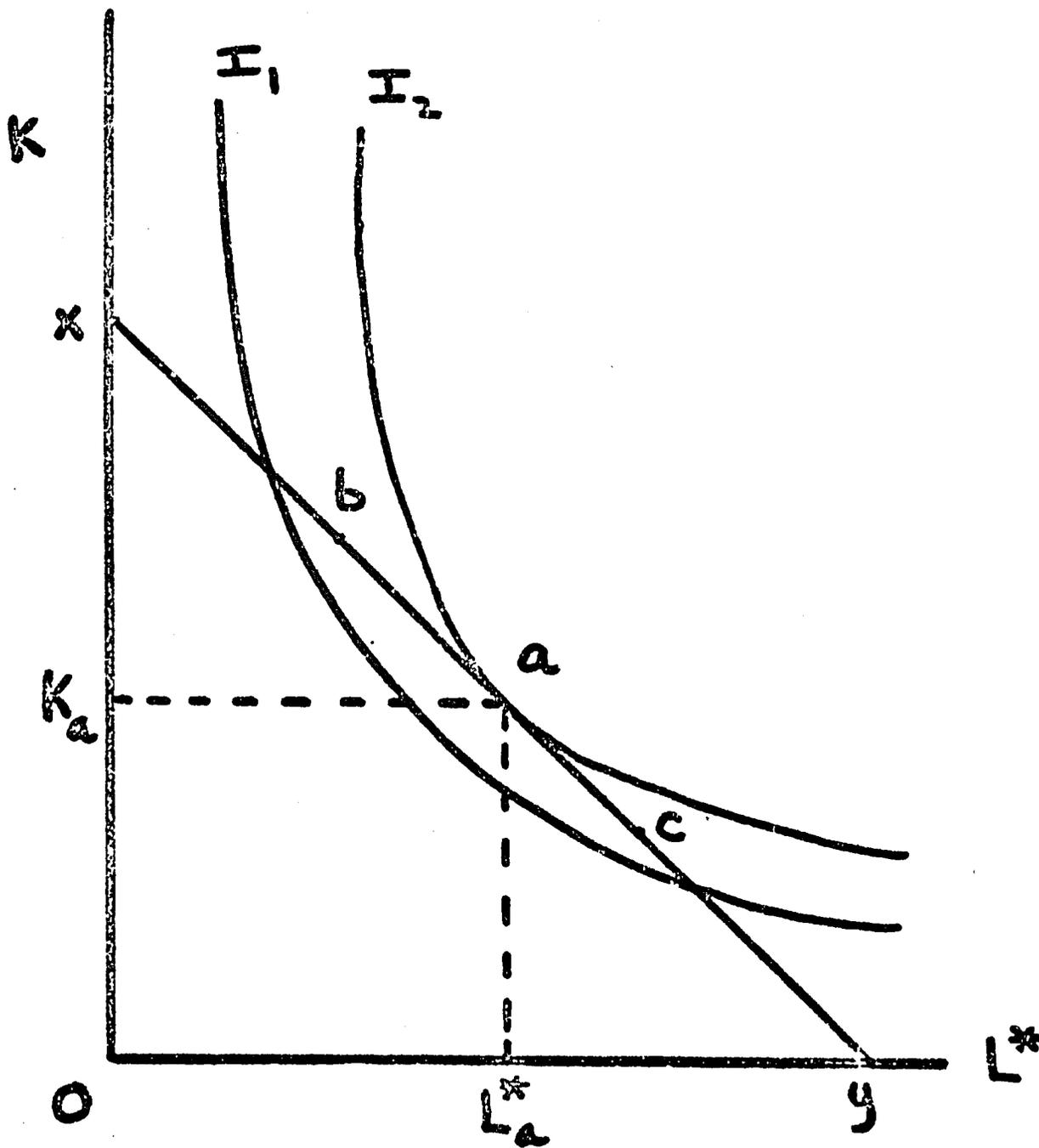
We can identify a point-- a --as that which maximizes total output subject to the constraint defined by the factor supply opportunity set. This 'output-optimal' point, a , represents a capital stock of K_a and an amount of schooling in the labor force adequate to bring the total labor services up to L_a .

Now consider the pattern of factor supplies which maximizes

¹The linearity of the transformation locus is immaterial to the argument.

²I am abstracting from problems in the measurement of the variable, K , in the function, f . In the empirical analysis, the variable will be dropped.

figure 1. The Factor Accumulation Decision Problem



the income of the capitalist class. A number of cases is possible. First, if all workers are paid a fixed, say, subsistence, wage, regardless of their educational level, then the capitalists' income is simply total output minus a fixed wage bill; the capitalist income maximizing solution is again point a.¹ This solution might arise in a slave society, or in one with no competition among employers in factor markets. Yet the evidence on relative wages of workers with different levels of schooling--as summarized in the estimated internal rates of return to schooling in figure 2--lend no support to the notion of a fixed wage.

If labor markets are competitive, the capitalists' income maximizing solution will, in general, differ from point a, the output-optimal solution. This is because the first order conditions for the maximization of the capitalist income differ from the first order conditions for the maximization of total output. The pattern of factor endowments which satisfies one set of conditions will not satisfy the other.²

Whether the capitalist income maximizing solution will yield less education, as at point b, or more, as at point c,

¹The capitalists' maximand is $f(L^*,K) - \bar{w}N$, where N is the number of workers, and \bar{w} is the fixed wage, measured in output units.

²Specifically, the output optimal factor endowments is the solution to this problem:

$$\begin{aligned} &\text{maximize } f(L^*,K) \\ &\text{subject to } T(L^*,K) = 0 \end{aligned}$$

while the capitalist income maximizing factor supplies are found by maximizing:

$$\begin{aligned} &f(L^*,K) - wN \\ &\text{subject to } T(L^*,K) = 0 \end{aligned}$$

where w is the average wage of labor, which may be expressed as a function of the average educational level of workers, L^*/N , the total amount of labor services in the economy, L^* , and the capital stock, K . For purposes of simplicity, I assume the usual competitive conditions.

cannot be immediately determined. On the one hand, because increased productivity of primary school educated workers results in higher wages, which appear as a cost when the capitalists' income is being maximized, we would expect to find biases against this type of resource use. However, if the production function is characterized by severe diminishing returns to primary school educated labor and strong complementarity between primary school labor and capital, widespread primary schooling would have the effect of depressing the wages of labor and raising the returns to capital.

If we assume competitive factor and product markets, the outcome of the capitalists' maximizing process depends on the characteristics of the economy as summarized in the aggregate production function, f . An interesting limiting case is the production function linear in the logarithms of the variables:

$$4. \quad Q = f(L^*, K) = \alpha L^* + \beta K$$

This function implies a relationship between the relative quantitative and remuneration of L^* and K , such that the share of a factors payments in total output is independent of relative factor supplies.¹ In this case the capitalist income is simply βQ , regard-

¹This is the necessary and sufficient condition for the first order conditions of the two maximization problems to be identical.

less of the levels of factor supplies, and the maximization of capitalists' income will require simply the maximization of total income, resulting in the level of factor supplies at point a. If the elasticity of substitution exceeds unity, the solution must lie to the left of a, representing less education. This can be seen at once by recalling that point a itself will not be chosen unless the elasticity of substitution is unity¹, and noting that any labor-to-capital ratio larger than $\frac{L^*_a}{K_a}$ will reduce both total output and the capital share. Thus, some point along xa representing less schooling, say b, must be optimal. The converse argument holds for an elasticity of substitution less than 1.

While the resource allocation implications of capitalist domination of the process of factor accumulation seem reasonably clear on a conceptual level, the available data do not allow empirical analysis of the capital vs. aggregate education choice. In the first place, we have no estimates of the relationship between the relative supplies and relative remuneration of L^* and K . The desired estimate is not the technically defined elasticity of

¹Let $\frac{T_k}{T_{L^*}}$ = the marginal rate of transformation of capital into labor

$$f_k = \frac{\partial Q}{\partial K}$$

$$f_{L^*} = w = \frac{\partial Q}{\partial L^*}$$

and σ = the elasticity of substitution between L^* and K .

Then, if f is homogeneous of degree 1, the first order conditions for the output-optimal solution are:

$$\frac{f_k}{f_{L^*}} = \frac{T_k}{T_{L^*}}$$

while those for the capitalist income maximizing solution are:

$$\frac{f_k}{f_{L^*}} + (\sigma - 1) \frac{f}{f_{L^*K}} = \frac{T_k}{T_{L^*}}$$

substitution in production, but rather a measure of the responsiveness of factor payments to factor supplies taking account of indirect factor substitution through economy wide adjustments in the pattern of final demand as well as direct factor substitution in production. Most elasticity of substitution estimates are for single sectors of the economy. Those few which are estimated at the level of the national economy define labor services by the number of workers, rather than by the education adjusted labor services.¹ Both the failure to adjust for the educational level of the work force and the estimation at the sectoral level reduce the estimated elasticities below the estimate appropriate for our concept.

Secondly, identification of the output-optimal factor accumulation patterns for the economy as a whole is exceedingly difficult. We are thus, unavoidably forced to concentrate attention of the distribution of resources within the education sector.

The problem of total resource allocation to schooling can be separated from the problem of resource allocation within the education sector by assuming that the elasticity of substitution between capital and quality adjusted labor services is unity. In this case, the total level of L^* and K is the same in the output-optimal solution and in the capitalist income maximizing solution. Thus the distribution of resources between education and physical

¹See Nerlove () for a summary of estimates.

capital formation is independent of the choice of a maximand. We can now consider the allocation of resources among the various levels of schooling.

In what ways, if any, will the output optimal solution differ from that based on the maximization of capitalist income? An answer to this question requires a revised version of the aggregate production function and the factor supply opportunity set as well as some extensions of the crude capitalist-worker class structure posited for the two factor model.

The production function for the single sector may be written for four factors of production: capital, including land (K), uneducated labor (L_0), primary school educated labor (L_1), and higher educated labor (L_2). For the purposes of illustration, it is not necessary to include secondary education or other types of schooling. Let the aggregate production function defined for total output, Q , then be

5. $Q = f(K, L_0, L_1, L_2) = f(K, L^*)$ where

6. $L^* = g(L_0, L_1, L_2)$.

Assume as above that from any initial level of supplies of each of the above factors of production, the possible transformations to a different level of capital stock and different levels of educated and uneducated labor is described by a 4-dimensional transformation function similar to xy in figure 1.

We must finally elaborate the class structure to take account of the presence of university educated labor. In most countries under consideration, the sons and daughters of large property owners are drastically over-represented among university students.

Moreover, highly educated workers are disproportionately likely to own capital. Thus, it ordinarily makes sense to define the graduates of the university as members of the capitalist class.

In some situation, it might be more appropriate to define two powerful classes--the capitalists and the highly educated--and explain educational resource allocation as the outcome of a bargaining process among these two elements of the ruling group.¹ In either case, we can assume that the members of the politically dominant group act to maximize the income accruing to capital, plus the income paid to university graduates.²

Extending the argument given in the case of two factors, it can be seen that the function g is characterized by a unitary elasticity of substitution among the labor inputs, the resulting "optimal" resource supplies will not depend on the form of this maximand. In this case, the plan which maximizes capitalists' income will be identical to that which maximizes total income.

¹This framework would well apply to many of the West African nations and to other societies with a small or a weak capitalist class.

²Their maximand is now $F(L_0, L_1, L_2, K) - W_0 L_0 - W_1 L_1$ subject to $T(L_0, L_1, L_2, K) = 0$. Classes and class consciousness are assumed to have an inter-generational dimension. Implicit in the maximand is the assumption that parents seek to further the economic interests of their children.

In societies characterized by competition between a capitalist and an educational elite, this maximand corresponds to the joint profits maximization solution in oligopoly theory. Having maximized the total income of the two elite groups, transfers among the elite may be required to maintain the cohesion of the ruling coalition.

If, on the other hand, the function, q , is characterized by a high elasticity of substitution among the labor inputs, a bias against primary schooling in the capitalists' educational plan appears. In this case, it will be optimal for the capitalists to augment the supply of labor services primarily through the production of higher educated labor, thus providing a complement to the capitalists' physical assets while embodying skills and earnings capacity in their children. While increased supply of highly educated labor would depress the earnings of this group somewhat, high substitutability among labor inputs implies only a slightly less great downward tendency would be felt for all labor categories, thus augmenting returns to capital, and offsetting any losses felt by the capitalist class through a reduction in their earnings from their educational credentials. In the extreme case of infinite elasticity of substitution among labor inputs, the optimal capitalists' plan would be to enroll only enough students in primary schools to assure an adequate supply of inputs into higher education; primary schools would not be terminal courses at all; rather they would be seen simply as feeder schools for higher education. If highly educated labor is relatively more complementary to capital than primary school educated labor, these tendencies are obviously exacerbated.¹

Evidence on the elasticity of substitution among labor in-

¹Evidence on the degree of complementarity between capital and highly educated labor is scanty. Griliches() suggests that the two factors are highly complementary.

puts is based primarily on cross-country or cross-state analysis of the relationship between the relative earnings and quantities of labor with varying levels of schooling. Equation 1 presented earlier, is typical of the approach used, and I will discuss it here by way of illustration before referring to other estimates. The estimate of the elasticity of substitution between highly educated and less educated labor implied by this equation is 3.8¹. Because the variable FRAWE, measuring the fraction of the total labor force employed for salaries and wages, appears in the equation, we may interpret this estimate as follows: a 3.8 percent change in the ratio of L' to L₁ would be associated with a 1 percent change in the ratio of the earnings of the two types of labor, given no change in the structure of the economy as measured by the fraction of the labor force employed for wages and salaries.² Because we may expect the expansion of higher levels of schooling to be associated with exactly those structural changes which

¹The elasticity of substitution between L' and L₁ is:

$$d \log \frac{L'}{L_1} / d \log \frac{W_1}{W'}$$

which is the negative inverse of the coefficient of:

$$\log \frac{L'}{L_1}$$

²in equation 1.

Using 8 education classifications and state data for the U.S., Doherty () estimated elasticities ranging from 5.2 to 9.0, depending on the way in which labor categories were grouped. Elasticities between adjacent pairs of categories of labor were much higher. My own estimates (Dowles 1970) using a sample of 12 countries, range from to . Psacharopoulos and Hinchcliffe, extending my cross-country estimates to a sample of 18 countries, found elasticities ranging from 2.2 to 50.0. All of the estimates reported are significantly greater than unity at the 1 per cent level of significance. Welch () estimates that within U.S. agriculture, the elasticity of substitution between

increase the demand for educated labor—namely, an extension of the fraction of the labor force employed in capitalist production—the estimated coefficient based on equation 1 is a downward biased estimate of the real capacity of an economy to absorb educated labor.¹ In the framework of this general model of factor accumulation, these estimates of a high elasticity of substitution among labor inputs imply that in capitalist countries, resource allocation to primary education will be less than that which would be output-optimal.²

4. "Under Investment" in Mass Education

In order to test the hypothesis that capitalist societies tend to devote fewer resources to primary schooling than would be optimal from the standpoint of economic growth, we turn to evidence on rates of return to various types of schooling in a sample of countries. Where the objective of the government is to maximize some measure of economic growth, such as gross national product per capita, the "optimal" educational plan may be defined as that which equalizes the internal rate of return to schooling at all levels (primary, secondary, higher, and other)

¹Without FRAVE in the equation, the estimated elasticity is 5.7. Estimates of the elasticity of substitution within a given sector tend to be lower, as they abstract from the possibilities of indirect substitution through factor supply induced shifts in the composition of final demand. See Syrquin ().

²A possible objective to the analysis must be considered. One might grant the inegalitarian consequences of a resource allocation pattern with "too little" investment in primary education, and yet justify it in terms of a growth objective on the grounds that in a capitalist society substantial income inequality is necessary to achieve the high level of aggregate savings necessary to finance a rapid rate of capital accumulation. According to this argument, the static efficiency losses due to less-than-output-optimal resource allocation might be offset by dynamic gains operating via a positive relationship between income inequality and the savings ratio. Empirically, this objective lacks force. Cromwell, () using a sample of countries, as well as time series and state cross-section in the U.S. has decisively rejected the hypothesis that the aggregate savings ratio and income inequality are positively related.

within the educational system, as well as between schooling and alternative investments in other sectors of the economy.¹ Where other, non-growth, objectives are being pursued, we would expect to find violations of these first order conditions for output maximization. Specifically, if government is attempting to maximize the income of the capitalist and highly educated class, we would expect to find a pattern of rates of return indicating less than growth-maximizing levels of resource allocation to primary schooling. In this section, I will show that we find precisely this evidence of "under investment" in primary schooling in the overwhelming majority of countries on which rates of actual studies are available.

The shortcomings of estimates of the rate of return to schooling are well known.² The estimates are normally based on the earnings of a cross-section of workers. The age profiles of earnings for each educational level are not normally adjusted for the likely effects of future productivity growth. Many studies fail to adjust the earnings streams for the probability of labor force participation and employment following schooling. Many studies are

¹I am abstracting from the general difficulties with the rate of return concept, such as non-uniqueness.

²For a review of the weakness of the internal rate of return as a guide to resource allocation in education, see Bowles (1969), Chapters 3 and 6.

based on a sample of urban workers, and thus abstract from the return to schooling which takes the form of a greater access to the high paying urban labor market. With few exceptions, the entire difference in earnings between individuals with different levels of schooling is attributed to the effects of schooling, no attempt being made to isolate the effects of other variables exercising a direct effect on earnings, such as parental wealth or ethnic origin, which are ordinarily correlated with the number of years of schooling.

Equally serious, the earnings of workers classified by schooling are taken to be a good approximation to their social marginal productivity. While it seems likely that in economies with any significant market sector there will be some relationship between earnings and labor productivity, there are undoubtedly significant deviations from this neoclassical ideal in all economies. In societies with surplus labor in the agricultural sector, the earnings of the unschooled may grossly overstate the social marginal productivity of these workers, and thus lead to an underestimate of the returns to primary schooling.¹ Likewise, in ex-colonial nations where the professional salary schedules were originally set to attract technicians and bureaucrats and where the bulk of the high level labor is still employed by the government, the earnings of the university educated may greatly exceed their

¹The lifetime earnings stream of unschooled workers appears in the calculations as an opportunity cost of primary schooling.

social marginal productivity. The same type of argument applies to all levels of workers who, through membership in unions or employment in the government bureaucracy, gain admission to the 'protected sector' of the economy.

Where rates of return are very high relative to the social opportunity cost and capital, they may be a misleading guide to output optimal resource allocation, even in the absence of any discrepancy between earnings and marginal productivities. The correct objective for the output maximizing planner is the present value of net returns per unit of constrained resource.¹

The discrepancy between output-optimal resource allocations and those indicated by the internal rate of return, appear whenever there are differences in the time profile of the net returns profile for each level of schooling and will be greater the more the internal rate of return deviates from the social opportunity cost of capital.

¹Using this measure in northern Nigeria in the mid-1960's, the benefit cost ratios for primary schooling and higher education, calculated at a 5 per cent discount rate, were respectively 16.9 and indicating the overwhelming superiority of resource allocation to primary schooling.

The constrained resource here is government expenditures. The benefit cost ratios were calculated at the present value of the expected earnings stream of primary school graduates minus the present value of the lifetime earnings stream for those with no education or an incomplete primary school education, divided by the present value of the direct costs of primary schooling. The primary school earnings stream was corrected for the probability of dropping out, labor force participation, and unemployment. The ratio for higher education (two years of form six and three years of university) were calculated analogously. The discount rate was based on an estimate of the social opportunity costs of capital. See S. Bowles (1965). Rates of return for the two investments are respectively 24 and 21 per cent, giving the erroneous impression that the two are roughly equivalent from the output maximizing standpoint.

While the objections to the use of the internal rate of return as a guide to output-optimal resource allocation are serious, I can see no reason why the biases would, on balance, operate in favor of the hypothesis in question.¹

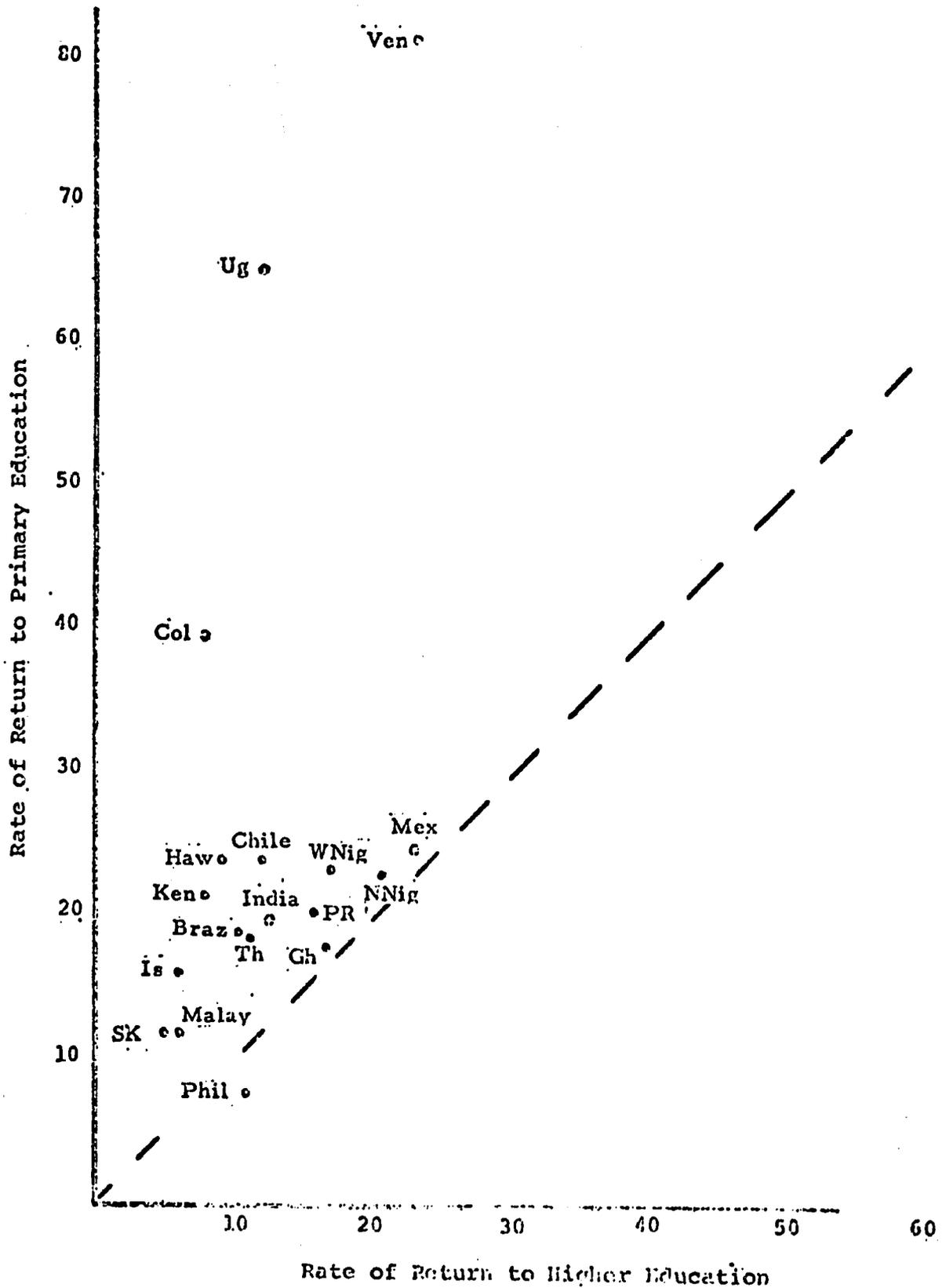
The estimated rates of return from 18 poor and middle income countries appear in figure 2.² With the exception of the Philippines the internal rate of return to primary schooling exceeds 10 per cent. Again excepting the Philippines the rate of return to higher education falls short of that to primary schooling. The average rates of return for the 18 countries are 27 for primary education and 12 for higher education.³ While further studies, and more rigorous adjustments of the data will undoubtedly modify the results presented in figure 1, it seems unlikely that the impression of 'under investment' in primary

¹ Indeed, the above discussion suggests that strong biases may be operating against the appearance of high returns to primary schooling.

² As was indicated at the outset, the advanced countries have been eliminated because of the difficulty in interpreting estimates of the internal rate of return to primary education in a society with virtually universal primary education. To my knowledge, the only advanced country on which rate of return estimates for primary schooling are available is the U.S. These estimates indicate that both the social and private rates of return to primary education exceed the rates of return to secondary and higher education. See Hines, Tweeten, and Pedfern () and Hanoch ().

³ The average rate of return for secondary schooling is substantially less than that for primary schooling. I have not considered the case of secondary schooling here, as its role in the class structure is somewhat ambiguous. For the purposes of this analysis, in some countries, secondary education should be grouped with higher education, in others with primary education. The changing class composition of various levels of schooling during the process of economic growth is discussed in Carnoy ().

figure 2. Social Rates of Return to Primary and Higher Education



Source: See Appendix

education will be reversed.¹

Of course, some deviation from the output-optimal pattern of rates of return would be expected even if the governments were pursuing growth as their sole objective. Lack of information, rigidities in the planning and allocation process, and other barriers to perfect optimization undoubtedly explain some of the inequality in the rates of return. However, resource allocation in education is not a highly complicated, one shot investment project; it is a process repeated year after year with ample opportunity to audit the costs and observe the returns. Thus, in this area I assume that those making the allocation decisions know what they are doing. The actual pattern of resource allocation thus permits inferences concerning the real objectives of the gov-

¹Becker has argued that the demand function for human capital facing an individual or family is (eventually) downward sloping. Becker (1967). Yet, even if we accept Becker's model of individual investment decision making, the pattern of rates of return exhibited in Figure 2 is not necessitated by this downward sloping individual demand curve for human capital. The rate of return estimates refer to investments in different groups of people, not to a single individual as he or she continues a pattern of human capital accumulation. Accepting Becker's model for the moment, the evidence presented here strongly suggests that the (financial or other) conditions of educational supply differ from person to person. (Becker identifies this as the pattern of educational policy.) We must look behind the analytical concepts in Becker's model to ask: What is it about the conditions of educational supply which restrict the supply of primary school educated labor so as to yield such a high social rate of return to this form of schooling? From the social standpoint, the expansion of resource use by the two types of schooling analysed here--primary and higher--must be viewed as two separate investments. As long as the social rate of return to one investment exceeds the other, we have evidence that resource allocation in schooling is not output-optimal.

ernment as a reflection of the relative power of various classes in society. In any case, while sub-optimal resource allocation in education may be explained by mistakes, imperfect information and the like, these considerations provide no basis for expecting to find virtually all the deviations from the national income-maximizing resource allocation operating in the same direction--in favor of one class and against another.

5. Class Structure and Educational Policy

The rate of return evidence strongly supports the interpretation of educational resource allocation outlined in Sections 2 and 3. The pattern of resource allocation to education in capitalist countries appears to respond to the structure of the economy as outlined in Section 2 and is modified by the class income maximizing strategies of the capitalist and highly educated class as described in the model of factor accumulation.

Yet this interpretation is still too simple. Classes or ruling groups rarely govern unchallenged. Traditional elites and communist ruling groups have interests in education different from those of the capitalist elite. Educational policy often reflects the struggle of groups contending for power, or the attempts of a dominant group to maintain its position. Thus, the second approximation must be extended to take account of the interests of non-capitalist ruling groups, and to allow educational resource allocation decisions to reflect modifications of simple class income maximizing strategies to take account of the political requirements of stability of the power structure.

I will begin by distinguishing between traditional and capitalist elites. The traditional elite may be understood as the ruling group of a pre-capitalist society. Its economic base is ordinarily in non-capitalist agriculture, and its political legitimacy customarily depends its ascribed status, sometimes inherited, sometimes not. Examples of these countries in the early 1960's are Nepal, Morocco, and Afghanistan.

For a number of reasons, traditional elites have little economic interest in the expansion of mass education. The main assets held by these groups is land devoted to family farming, often at a near subsistence level. Neither the social relations of production in peasant agriculture, nor the actual production methods require the type of socialization and training ordinarily undertaken in primary schools. On the contrary, primary schooling often is the vehicle whereby children escape from the traditional sector of the economy. The expansion or preservation of the traditional sector is of paramount importance to the traditional elite. Policies which facilitate the growth of the modern capitalist sector, and threaten to draw labor out of the traditional sector are ordinarily opposed. Thus, for example, in the U.S. slave South, the traditional elites effectively limited the growth of both education and manufacturing, so as to protect their assets in law and slaves.¹ The other assets held by the traditional elites--their hierarchical position--are also

¹See Genovese ().

not enhanced by the spread of mass education. I conclude that schooling is not complementary to the assets which define the traditional elite and provide their income and prestige.

The capitalist class, in contradistinction, has good reasons for supporting expansion of primary education, stemming from the strong complementarity between primary school educated labor and the capitalist assets embodied in factories, offices, and other large economic organizations. Thus, while the income maximizing strategy of the capitalist class leads to less than the output-optimal level of resources in primary schooling, it also gives rise to more primary schooling than would be optimal from the standpoint of the traditional elite.

The political interests of the capitalist and the traditional elites are equally divergent. While the political position of the traditional elite depends on the maintenance of traditional values and often upon mutual supporting relationships with religious institutions, the capitalist class seeks to weaken and circumscribe many of these values and institutions. Indeed, historically, capitalist support of the expansion of primary schooling in the currently advanced countries was at least in part, due to its purported efficacy in breaking down old ideas, in implanting new rational patterns of thought more consistent with the market, and in inculcating a set of values which would serve as a substitute for obedience to traditional rulers, namely respect for modern bureaucratic authority, as manifested in the organization of the firm.¹

¹The role of education in the conflict between the old and the new in 19th century France was noted by Marx. (): "

I conclude that for both economic and political reasons, the traditional elite will have less of an interest in mass education than the capitalist elite. The capitalist elite will still pursue a less than growth maximizing allocation of resources to primary schooling. On the other hand, consider the economic interests of the ruling groups of communist countries. Their income is not determined in a factor market directly tied to any factor ownership, though it is related to bureaucratic position. This is a fact of great importance, for it suggests that income or status maximizing strategies of these elites can be pursued independently of the pattern of factor accumulation. Given the dominant ideology in these countries, the political legitimacy of the regimes depends importantly on the achievement of a rapid rate of growth and movement towards a more equal society. On the basis of these considerations we might expect to see output-optimal allocations of resources to primary education, or perhaps even more-egalitarian-than-output-optimal allocations. On the other hand, the sons and daughters of the decision making elites in communist countries, tend to be over-represented in higher and secondary education, a fact which might lead to the modification of the investment policy towards education. While the outcome of these conflicting tendencies is impossible to determine, it seems likely that communist elites will pursue a more nearly output-optimal policy of educational resource allocation than with either the capitalist or the traditional elite.

I have attempted to test these hypotheses using the sample of 55 countries analysed in Section 2, augmented by six communist

countries. Thirteen of the original 55 countries were classified as dominated by a traditional elite. While there are numerous borderline cases, and none which fits the ideal type exactly, it is hoped that this classification will capture some of the gross differences in the distribution of power and the interests of dominant groups in the countries of my sample. The non-traditional, non-communist countries are all classified as capitalist.¹

I have first to predict the level of resource allocation to primary education for the entire sample of 61 countries, using only the economic structure variables representing the distribution of the labor force to agriculture and wage and salary employment. The results appear in Table 2 . To identify the importance of the political power of my three distinct ruling classes, I have re-estimated the same equation using a dummy variable to distinguish the traditional and communist countries (Equation 5 in Table 2). The addition of the class power variables greatly increases the explanatory power of the equation, suggesting that the class in power is an independent influence upon the educational resource allocation, above and beyond the influence exerted by the economic structure of the society. The signs of the class power dummies are as expected, and the coefficients are quantitatively both large, and significantly different from zero.² The positive effect of being a communist country is 91 per cent of the mean of the dependent variable for the entire sample. Likewise the negative effect of dominance by a traditional elite is 21 per cent (in absolute value) of the mean for the entire sample.

¹The methods of classification of the countries and sources of data are discussed in the appendix.

²The coefficient of TRAD is significant at the 10 per cent level.

Table 2. Prediction of Resource Allocation in Education

<u>Dependent variable</u>	<u>Coefficients of independent variables</u> <u>(t-statistics in parentheses)</u>						<u>R²</u>
	LFRAG	LFRawe	COM	TRAD	\hat{PTPCH}	LPOP	
4) PTPCH	-.0058 (-2.7)	.0035 (2.7)					.38
5) PTPCH	-.0069 (-4.0)	.0020 (2.0)	.0157 (6.2)	-.0035 (-1.9)			.67

Notes for Table 2

PTPCH = primary school teachers per child of school age in the population
 \hat{PTPCH} = PTPCH predicted from equation 2
LFRAG = log of the fraction of the labor force working in agriculture
LFRawe = log of the fraction of the labor force working for wages and salaries
COM = dummy variable set equal to 1 for communist countries, 0 otherwise
TRAD = dummy variable set equal to 1 for countries dominated by traditional elites, 0 otherwise

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variables underestimate the real impact of class power in the case of the traditional elites, in view of the fact that the preservation of a large agricultural sector and the limitation of the modern wage earning sector is presumably part of the economic strategy of these elites. Thus, the economic structure variables are not exogenous. If the share of the labor force employed for wages and salaries or in agriculture were completely determined by the relative power of various classes or elites, then we could let these political variables represent the exogenous elements in a recursive system in which the economic and educational characteristics of the society would be determined. To do this, of course, would be to ignore the existence of other influences on the economic structure of the society, such as the natural resource base, geography, and the peculiarities of the historical development of the country concerned. Using the single equation approach, however, obscures some of the influence of class power, which operates indirectly on educational resource allocation via the determination of the economic structure as well as directly upon the educational allocation decisions within a given economic structure.

6. Extension of the Model

The evidence from this sample of 61 countries supports the model of resource allocation in education as thus far elaborated. Yet, important influences on educational resource allocation have been excluded from the picture. In particular, the adoption of a static model, the use of cross-section data, and the assumption

that at any one time a single class or group is dominant, have directed attention away from the dynamic development of the educational system in its political context.

The demarcation of class boundaries can never be exact, even in a static analysis; in the real world, class composition is constantly changing. Groups on the margins of power and wealth seek access to higher positions. Poor and excluded groups seek a larger share of income and political influence. A model based simply on the income maximizing strategy of a particular class misses these aspects of educational policy which are the outgrowth of the unresolved conflict between classes; further, it omits the important dimensions of educational policy designed to co-opt recalcitrant groups and buy their acquiescence to the hegemony of the class in power. Thus, for example, the apparent overinvestment in higher education in capitalist countries relative to primary schooling may be the result not of a conscious plan of income maximizing on the part of the dominant group. Rather it may result from the fact that the families of children which stand to benefit from the expansion of university facilities are often the most politically vocal and powerful groups which have thus far been excluded from the elite.¹ In these cases, university expansion may well be a concession to this politically important and affluent group. Similar pressures occur at all levels of the school system, though as one proceeds downward to primary schooling, the political influence of the families thus far excluded from access to education is rather minimal.

¹This will be true particularly in societies when most of the children of the elite already attend college.

The use of the educational system to buy off excluded groups may have unintended consequences if the expansion of a particular level of schooling proceeds without reference to the demands for educated labor being generated in the economy. In India, for example, the rapid expansion of higher education and the continual failure to meet even the minimal plan targets for primary education appear to be a reflection of the government's attempts to buy the loyalty of an important segment of the upper middle class.¹ Yet the low private returns to higher education in India, and the substantial unemployment of university graduates suggests that the cooptation mechanism may merely postpone political discontent and cause it to reappear later in a perhaps exacerbated form.²

A more detailed model might consider the special role of particular interest groups in the educational planning process. The role of foreign experts and aid givers may be of considerable importance in modifying the influences emanating from the domestic political situation. The particular economic and political interests of the foreign participants in the educational policy process of capitalist poor countries are somewhat difficult to identify. At times, the interests of those represented by the international agencies would seem to require the strengthening or enlargement of the domestic elite through expanded higher education; in other circumstances, the needs of foreign investors for a disciplined semi-skilled and unskilled labor force would seem to dictate more

¹See Blaug, Layard, et. al. ().

²A similar problem may develop in the U.S., particularly with reference to the products of the junior colleges. See Bowles (1971).

emphasis on primary schooling.

While it is difficult to specify the net impact of these considerations in a general theoretical model empirical analysis of the distribution of loans and grants of the major aid giving agencies indicates that the impact of foreign aid is to exacerbate the biases against the allocation of resources to primary schooling emanating from the domestic class structure.

In fiscal 1969, the U.S. Agency for International Development committed only 7 per cent of its education resources to primary schooling.¹ Similarly, over the period ending in June, 1970, the World Bank (IBRD) spent a paltry 1.1 per cent of its education loans on primary schooling.²

The distorted pattern of international aid and loans from the capitalist countries is reflected in corresponding biases in the educational planning models ordinarily used by the foreign educational planning experts whose employment in the poor countries is often financed by the World Bank, AID, and other aid giving agencies.

The most widely used educational planning technique-the manpower requirements approach-consistently yields prescriptions for a more rapid expansion of higher and middle level education than would appear warranted from the rate of return evidence presented

¹ Agency for International Development, U.S. Department of State, AID Projects - FY 1969, By Country and Field of Activity, (Washington, D.C., 1970), p.v.

² Information provided in a communication from the Education Projects Department of the IBRD, dated August 17, 1970.

above.¹ The well known Tinbergen-Correa planning model goes so far as to omit labor educated up to the primary school level as a scarce factor of production.² Finally, the human resource development index devised by Frederick Harbison—one of the most influential U.S. educational planners working in the poor countries—does not consider the level of primary schooling as a measure of a nation's human resources.³ Thus, the intellectual orientation of educational planning experts from the capitalist advanced countries appear to complement the predilections of the aid giving agencies.

The influence of other interest groups would also have to be accounted for in a more detailed model. The participants in the educational process itself—teachers, administrators, and students—often play an independent political role which serves to modify the basic resource allocations arising from the income maximizing strategies outlined in the previous three sections. Religious, military, and other groups often acting independently of the capitalist or traditional elites also exert influence on the outcomes of educational policy decisions.

7. Conclusion

I have attempted, in a simple model, to outline the influences emanating from the structure of the economy which influence educa-

¹For a discussion of the point, and of the income distributional biases in various approaches to educational planning, see Bowles (1969), Chapter 6.

²See Correa and Tinbergen () and Bowles (1969).

³Harbison and Meyers ().

tional resource allocation. Further, I have attempted to elucidate the ways in which these basic economic influences are modified by the structure of power among classes. The model as it stands, is a stark oversimplification of actual planning processes. Moreover, the data at hand do not correspond at all closely to the conceptual categories of my analysis. Nonetheless, the results of the empirical analysis lend support to the working hypotheses of this study. In particular, I believe that I have shown that the pattern of resource allocation in education is responsive both to the basic economic structure of the society and to the economic interests of the dominant classes. Secondly, I have shown that in capitalist societies, the outcome of this interaction between the economic structure and the interests of the dominant class is to divert income away from the poor and in so doing, to retard the rate of national economic growth.

These results raise a number of questions concerning the current state of economic theory. In this concluding section, I will touch briefly on the implications in four fields: models of human capital, the theory of international specialization, the choice of techniques, and the theory of the state.

Underlying the empirical propositions tested here is a societal model of decision making in education. Central to this model is the interaction among social classes and other groups seeking to affect state action. The rate and direction of the augmentation of labor supplies is seen as the outcome of class conflict. Individual decision processes are not analysed directly; rather attention is focused on those forces which determine the parameters

facing individuals in making educational decisions. Of course, many of the considerations raised here could be formally integrated into an individual maximizing model. Societal resource allocation could then be inferred by aggregating the results of the individual decision processes. Yet to make the individual or family the primary decision unit-as in the models of Becker and Mincer-is to obscure precisely the influences operating at the societal level which apparently exercise a decisive influence on educational resource allocation. That these societal forces often are implemented by affecting the marginal return or costs to schooling for various groups is, of course, true. Yet, understanding the evolution of factor supplies in a society requires that we look behind the marginal returns and cost schedules facing individuals to identify the underlying determinants of the aggregate resource allocation in education.

Because they are content with letting these underlying determinants of educational policy be exogenous, individual decision making models of human capital investment are not particularly helpful in the analysis of long run changes in patterns of labor supplies.¹

Turning to the theory of international specialization, the model of factor accumulation outlined here suggests a number of revisions. The assumption common to most international trade theory

¹In an analogous paper, Steven Marqlin has questioned the usefulness of Fisherian individual savings and consumption models in the analysis of capital accumulation. See Marqlin ().

that factor supplies are exogenously determined, must be rejected.¹ To the extent that factor supplies influence a nation's competitive position, the pattern of a country's comparative advantage at a given time is the outcome of the factor accumulation process reflecting the interests of the dominant groups in society. The strength of the case for a dynamic theory of comparative advantage is thus considerably enhanced.² In view of the endogenous nature of factor supplies, the static theory of comparative advantage must be seen politically, as well as economically, conservative, as it prescribes a pattern of international specialization which purportedly yields the highest possible returns to a set of factor supplies which was, in an important degree, a reflection of the power of the dominant classes in society to determine the nation's path of factor accumulation.

The assumption of exogenously determined factor supplies which underlies the theory of technical choice must also be rejected. Even if technical choice reflected the profit maximizing decision of price taking firms operating in markets in which factor prices measured real social opportunity costs, the resulting pattern of technical development would not be output-optimal. Even under these most "favorable" conditions, if the factor supplies are not output-optimal, the resulting technical choices will simply reflect and reinforce the biased pattern of factor

¹See Heckscher () and Ohlin (). International factor mobility has long been recognized as a part of the process of international exchange. For capital movements, see the effect of trade policies on international labor migration is discussed in . Yet these considerations have always been peripheral to the conventional analysis of trade and specialization.

²The case for a dynamic theory of comparative advantage has thus far rested primarily on the presence of learning by doing in young industries. See

accumulation resulting from the structure of class power.

Critics of economic development policy have often asserted that technologies chosen in the poor countries are "too capital intensive" or "too" intensive in the use of high level labor. But in order for this to be the case, there must be some way for the capitalist or highly educated class as a whole to impose the interest of the class on the individual firms, for under competitive market conditions, profit maximizing decisions would lead to technical choices which would be output-optimal, but would fail to maximize the income of the dominant class. In order to reconcile sub-optimal technical choices with the profit objectives of firms, some writers have pointed to mechanisms operating outside of competitive markets such as the over-pricing of labor, direct collusion among employers, and the near monopoly of technical information by firms and other organizations based in the advanced capitalist countries.¹ Yet if the interpretation offered in this paper is correct, technical choice in the capitalist poor countries would reflect a distorted pattern of factor supplies and would thus be too intensive in the use of high level labor and perhaps capital as well, even in the absence of these non-market mechanisms.

Lastly, the important (though ordinarily implicit) role of the liberal theory of the state in modern normative economics must be questioned. The notion that the state--operating in

¹See Weisskopf ().

large measure through its control over the educational system--would provide an antidote to the inequalities of a property-owning market economy finds no support in these data.¹ Even the weakest statement of the liberal view--asserting state neutrality on distributional issues--must be rejected.

The available evidence on resource allocation between levels of schooling strongly suggests that in capitalist societies, the role of education in the process of factor accumulation serves inegalitarian objectives.

¹ To object (correctly) that my evidence does not demonstrate the incapacity of the state to use the school system for egalitarian ends is to miss the point, for the separation of distributional issues from the main body of economic thought in modern bourgeois economics rests not simply on the purported ability of the state to redistribute income but on an implicit faith that the state would, in fact, accomplish significant redistribution.