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The American Distribution of Income: A Structural Problem

A Study Prepared for the use of the Joint Economic Committee Congress of the United States

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THE AMERICAN DISTRIBUTION OF INCOME: A STRUCTURAL PROBLEM

A STUDY

PREPARED FOR THE USE OF THE

JOINT ECONOMIC COMMITTEE CONGRESS OF THE UNITED STATES

BY

LESTER C. THUROW

AND

ROBERT E. B. LUCAS

MARCH 17, 1972

Printed for the use of the Joint Economic Committee

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LETTERS OF TRANSMITTAL

MARCH 16, 1972.

To Members of the Joint Economic Committee:

Transmitted herewith is a study of income distribution in the United States entitled "The American Distribution of Income: A Structural Problem" by Professors Lester C. Thurow and Robert E. B. Lucas of the Massachusetts Institute of Technology. This study, which discusses the existing distribution of income and suggests policies which might be effective in altering the distribution of earned income, forms part of the committee's continuing analysis of employment, income, and wealth in the United States.

The views expressed in the paper are exclusively those of the authors and do not necessarily represent the views of the Joint Economic Committee, individual members thereof, or its staff.

WILLIAM PROXMIRE,
Chairman, Joint Economic Committee.

MARCH 15, 1972.

Hon. WILLIAM PROXMIRE,
Chairman, Joint Economic Committee,
U.S. Congress, Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith is a study entitled "The American Distribution of Income: A Structural Problem." This study, which analyzes the distribution of income in the United States and suggests policies for altering the existing distribution of earned income, was prepared by Professors Lester C. Thurow and Robert E. B. Lucas of the Massachusetts Institute of Technology, in association with Data Resources, Inc., of Lexington, Massachusetts. The study represents part of the committee's continuing analysis of employment, income, and wealth.

This study emphasizes the necessity of effecting changes in the demand side of the labor market, that is, in the structure of job opportunities, in order to obtain a more equal distribution of earned income in the United States. This is in contrast to the more traditional view that efforts to improve the distribution of earned income should concentrate on the supply side of the market, that is, on changing the personal characteristics of individuals looking for work. Hence, it is concluded that efforts to change the personal characteristics of individuals, such as, for example, further equalization of educational opportunity, will be fully effective only if accompanied by major efforts to alter the demand for labor.

The views expressed in the paper are those of the authors and do not necessarily represent the views of the Committee, its individual members, or members of the Committee staff.

JOHN R. STARK,
Executive Director, Joint Economic Committee.

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Summary

One of the prime functions of government is continually to redistribute market incomes so that incomes are in accordance with our social or collective judgments as to what constitutes a just distribution of economic resources. (See sec. I.) Governments have two broad sets of techniques by which they can bring the actual distribution of income into accordance with the desired distribution of income. They can attempt to alter market incomes or they can use tax and transfer policies to insert a wedge between market incomes and take-home incomes.

After a review of what has been happening to the American distribution of income (see sec. II), this paper focuses on alternative techniques for altering market incomes. Recent changes in the distribution of income are reviewed to aid in the process of deciding whether the American income distribution is moving in a satisfactory direction at a satisfactory pace. The data indicates that on most dimensions (male-female, majority-minority, rich-poor, etc.) the American income distribution has been approximately constant when changes are measured in relative terms in the post-war period. Everyone's income (male, female, majority, minority, rich, and poor) has been rising at approximately the same rate leaving their ratios unaffected. Groups with incomes twice the national average in 1949 have incomes twice the national average in 1969. As average incomes have risen, however, real income gaps have expanded when measured in constant dollars. Where the real income gap was $10,565 between the average income of the poorest and richest quintile of the population in 1949 it was $19,071 in 1969.

Although this paper focuses on techniques for altering market earnings, tax and transfer policies must be used in conjunction with these techniques if changes are to occur in the distribution of income. Taxes are the only technique for redistributing non-labor earnings (returns to wealth) and transfer payments form the only technique for helping those that are too old or ill to be in the labor market. (See sec. III.)

Historically both governmental policies and economic analysis have concentrated on supply side efforts to alter the distribution of earnings. Programs were designed to educate or train individuals so that they had the skills and personal characteristics necessary to fill higher income jobs. Underlying such programs was a particular view of how labor markets work. According to this theory the supply of low income workers would be reduced in the process of such education and training programs. As a result, the wages for low income workers would rise. Conversely, the supply of high income workers would be enlarged and their wages would be reduced. Thus education and training would have a three-pronged effect on the distribution of income.

NOTE.—Robert Lucas is primarily responsible for sec. V and the appendix while Lester C. Thurow is primarily responsible for the remaining sections.

(1) Some individuals would be raised from low income jobs to high income jobs; (2) wages for low income jobs would rise, and (3) wages for high income jobs would fall. The result, a more equal distribution of market earnings.

While a number of theoretical objections can be raised to such a view of the labor market, it is more instructive to look at the post-war experience with massive education programs. Over this period the distribution of education has become much more equal without bringing about the expected changes in the distribution of earnings. (See sec. IV, pt. A.) As a consequence, it is necessary to rethink the interrelations between the distribution of skills or education and the distribution of earnings. Such a reformulation of how the labor market works to distribute jobs and incomes is presented in section IV, part B. This section views the labor market from the point of view of a "job competition" model rather than a "wage competition" model.

In a job competition model two sets of factors determine an individual's income. One set of factors determines an individual's *relative* position in the labor queue; another set of factors, not mutually exclusive of the first, determines the actual distribution of job opportunities in the economy. Wages are paid based on the characteristics of the job in question and workers are distributed across job opportunities based on their relative position in the labor queue. The most preferred workers get the best (highest real income) jobs. Given the factors that determine an individual's position in the labor queue and given the factors that determine the distribution of lifetime income ladders, it becomes possible to formulate a technique for calculating the impacts of education and training. One of the merits of such an approach is that it recognizes that many, if not most, job skills are acquired in an on-the-job framework. Thus, potential labor training costs become one of the essential ingredients in determining the initial ranking in the labor queue. As a result, job characteristics as opposed to personal characteristics become one of the basic determinants of market earnings. (See sec. V.)

Such analysis indicates that government efforts to alter market incomes cannot be focused solely on supply-side efforts designed to alter personal characteristics. To make such programs work it is necessary to alter the demand for labor or the structure of job opportunities. This can also be seen in the American experience during World War II. (See sec. VI.)

As a result several types of government programs would need to be implemented if the distribution of income were to be altered. First, it would be necessary to run the economy with a continual labor shortage. Such a shortage situation forces changes in the distribution of job opportunities. Second, the government must deliberately use its own wage structure and job opportunities (including a guaranteed job at some wage) to compress the private wage structure. Instead of adjusting public wages to match private wages, public wages are set to force private employers to match them. Third, manpower programs should change from their current focus of paying for training to paying for actual changes in the distribution of income. If employers succeed in raising the earnings of a particular employee, they are eligible for a bonus. Fourth, it is necessary to make some use of quotas to force changes in the distribution of jobs if these changes are to come about in anything but the very long run.

I. The Role of Money Incomes

All of the axioms that are used to praise market economies (capitalistic or socialistic) depend upon a fundamental condition. If a market economy starts with an optimum distribution of income, then a market economy will efficiently and equitably produce and distribute goods and services. Other conditions are necessary to insure that market economies really work, but the whole structure of justifications for market economies depends upon this initial condition. If the condition is not met, the most perfectly functioning market economy will be inefficient and unjust. It is simply starting out with the wrong distribution of economic voting power.

One of the main functions of government is to establish the right distribution of economic voting power. Not only must it establish such a distribution initially, it must continually re-establish such a distribution. Market economies will efficiently and equitably produce and distribute goods and services if they start with the optimum initial distribution of economic voting power, but market economies will not automatically regenerate such a distribution. Using tax and transfer policies, governments must be continually modifying market distributions of income.

But what is the right, optimum, or desired distribution of income? Fundamentally, the answer cannot be found in economic analyses. It is a moral problem that revolves around our collective judgments as to the proper degree of equality or inequality. Some individuals may want a society with complete equality in private purchasing power; others may want a large degree of inequality. In essence the fights over progressive versus regressive tax structures, level of welfare, and social security benefits are all disputes over the optimum distribution of money incomes. Living in one society, however, we must all agree on some common degree of equality.

Economics' only contribution to such a political discussion is a factual analysis of how the division of the economic pie affects the size of the economic pie. Do higher taxes cause individuals to work more or less (they may do either since higher taxes lower take-home wage rates and after-tax standards of living)? What effects do transfer payments have on individuals work habits? Knowing the answers to such questions, it is possible to estimate how the division of America's gross national product affects the size and rate of growth of its gross national product. Knowing the answer to this question does not, however, determine the optimum distribution of income. It is merely one of many factors that the body politic may wish to weigh in making

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its ultimate decisions. It is perfectly rational to opt for a degree of equality that will retard the rate of growth as long as society is aware of what it is doing.

Most of the existing literature on work incentives focuses on the activities of high income managers and self-employed professionals.[1] These are the working individuals who are thought to have the capability of altering their work habits. Such analysis found that high income individuals with the capability of altering their work habits seemed to work harder or longer as a result of higher marginal tax rates. Economic analysis of labor force participation rates confirms this result for the general population.[2] For the labor force as a whole, income effects seem to dominate substitution effects. When taxes are raised and incomes fall, individuals work more not less.

The effect of transfer payments is much less well known. In the past most transfer payments went to individuals who could not work or to individuals who had legal restrictions on their working opportunities (the aged, etc.). Transfer systems also operated with effective tax rates of 100 percent. A dollar earned was one less dollar in the welfare check. Under any theoretical framework, transfer payments coupled with 100 percent tax rates should discourage work effort. Such a conclusion, however, does not prove that transfer payments coupled with something less than 100 percent tax rates discourage work.

At the moment the federal government is in the process of investigating the work impacts of transfer payments in a variety of negative income tax experiments. Early evidence seems to indicate that these transfers do not materially affect the work incentives of low income individuals, but definitive evidence will simply have to wait for these experiments to be completed and analyzed.[3]

Although foreign examples and experiences do not provide conclusive proof as to how the American population would react to different distributions of income, they provide information on the response patterns of other human beings. Interestingly, the pre-tax distributions of income in Sweden, the United Kingdom, and West Germany are not noticeably different from that in the United States. All four countries seem to have approximately an 8 to 1 ratio between the average income of the richest quintile of the population and the poorest quintile of the population.[4] Surprisingly, the country with by far the most rapid rate of growth has the most equal distribution of pre-tax income. In Japan the average income of the richest quintile is less than 5 times as large as that of the poorest quintile.[5] In at least one culture, the world's high-

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[1] For examples see: George Break, "Income Taxes and Incentives to Work," *American Economic Review,* September 1957; Thomas Henry Sanders, *Effects of Taxation on Executives,* Cambridge, Massachusetts, Harvard University Press, 1951.

[2] For a general discussion of the impact of taxes on labor force participation rates see: Lester C. Thurow. *The impact of Taxes on the American Economy*, Praeger Press, New York, 1971, page 23.

[3] These experiments are under the direction of the Institute for Research on Poverty at the University of Wisconsin.

[4] Germany: Federal Office of Statistics, *Statistical Yearbook, 1966,* West Baden, 1966, page 453.

Sweden: *Statistical Abstract of Sweden, 1970,* Kungl. Boktrycheviet P. A. Norstedt & Sonen 700200 Stockholm, 1970, page 330 and 334.

United Kingdom: C. T. Sandford, *Economics of Public Finance,* Pergamon Press, Oxford, 1969, page 177.

U.S.: U.S. Bureau of the Census, *Current Population Reports, Consumers Income, 1969,* Washington, D.C., 1970.

[5] Bureau of Statistics, *Japan Statistical Yearbook, 1966,* Office of the Prime Minister. 1967, page 297.

est rate of economic growth and a relatively equal distribution of market incomes seems compatible.

Analysis should, however, focus on post- rather than pre-tax incomes. Substantial equalization may come about in the process of taxation or in the process of distributing public goods and services. In the U.S. the pre- and post-tax distributions of income are not noticeably different.[6] When all of our taxes (local, state, and federal) are added together, progressive taxes seem to be cancelled by regressive taxes leaving a proportional tax system. As a result, taxes reduce everyone's income by the same percentage and leave relative incomes unchanged. Either pre- or post-tax the richest quintile has approximately 8 times as much income as the poorest quintile. In contrast, in Sweden substantial equalization in living standards comes about through the distribution of public goods and services. Although U.S. public expenditures are also redistributive, they are nowhere near as redistributive as those in Sweden. In the United Kingdom a much more progressive income tax leads to a more equal distribution of post-tax income.

Other than noting the successes or failures of foreign experiences and analyzing the structure of work incentives, there is little that formal economics can contribute toward selecting an optimum (desired) distribution of income for the American economy. *The fundamental problem is one of making social value judgment about the degree of equality or inequality that is morally desirable in the American economy.* In our political system such social value judgments must be made by the President and Congress of the United States.

Depending upon the tastes of the American body politic, the U.S. may have three distinguishable income redistribution goals. First, it may seek to alter the distribution of income—to make it more equal or more unequal. Second, it may wish to alter the distributions of minority and majority incomes so that they are indistinguishable—to make the black income distribution identical with the white income distribution. Third, it may wish to increase economic mobility—to insure that a son's income is not determined by his father's income or to insure that the poorest man this year is not the poorest man next year.

The poverty program is a current program for altering the distribution of income. If it were to succeed, the percentage of total income going to those now in poverty should rise from 2.8 to 4.6 percent in 1970. Equal opportunity programs are designed to bring minority and majority income distributions into conformity. If they were to succeed, a white family's probability of having an income over $25,000 per year would be equal to that of a black family rather than five times as high. Public education is to some extent designed to improve economic mobility. Children from poor families are to be educated to prevent them from also being poor.

Until each of these three possible income redistribution goals have been set, it is not possible to design actual plans and policies for altering the distribution of income. It is possible, however, to analyze the techniques by which the distribution of income might be altered if society were to choose to do so. If the body politic is satisfied with the

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[6] Lester C. Thurow, *The Impact of Taxes on the American Economy*, Praeger Press, New York, 1971, See Chapter 4.

existing distribution of income, such techniques are merely of theoretical interest. If the body politic is not satisfied with the existing distribution of income (the existence of a poverty program and an equal opportunity program indicate some official interest in altering the distribution of income) such techniques are the basic ingredients for constructing plans and programs for altering the distribution of income.

To aid in making the necessary value judgments, section II of this paper outlines the current pattern and recent trends in the distribution of income and wealth. To make value judgments as to how income should be redistributed it is necessary to know how it is currently distributed and what changes are likely to occur in the absence of explicit government programs to alter the distribution of income. If the current distributions are society's desired distributions or if the current distributions are rapidly moving toward society's desired distributions, overt government programs to alter the distribution of income are unnecessary. If current distributions are not satisfactory, governmental programs must be designed to transform the current distributions.

There are two methods for redistributing income and wealth. In the first approach the federal government simply uses its tax rates and transfer system (negative taxes) to transform any market distribution of income into its desired distribution of income. If the market place does not generate enough equality, a progressive tax system is adopted to create equality. If the market place generates too much equality, a regressive tax system is adopted to create inequality. In the second approach the federal government adopts policies to alter the market distribution of income itself. Policies to improve the education of low (or potentially low) income individuals are an example of such approaches. By reducing educational differentials the country seeks to reduce income differentials.

Although there are no technical difficulties in reaching any desired distribution of income from any market distribution of income with tax and transfer policies, large overt redistributions of income from one individual to another may be difficult to achieve politically. This may be especially true if those to be aided are in the minority. Taxpayers may well be willing to help low income individuals earn a larger income but be unwilling to give low income individuals a higher income. From the point of view of self-respect, low income individuals may also wish to be aided indirectly rather than directly. They may wish to "earn" their own living.

With the exception of areas where it is impossible to alter market distributions of income and wealth, this paper concentrates on the ingredients necessary to alter market distributions of income. This is done for two reasons. First, the problems and techniques of redistributing income with tax policies are well known. Second, ingredients of programs to alter market distribution of income must be known to compare the costs and benefits of market redistributions with tax and transfer redistributions.

Although this paper focuses on money incomes, the authors are well aware that money incomes are not the only determinants of welfare or the quality of life. Public services, friends, security, clear air, and a host of other factors influence welfare and the quality of life. At the

same time, however, money incomes remain a principal component of the quality of life. Not surprising, most professions to the contrary seem to come from those with above average incomes.

II. The American Distribution of Income and Wealth

(A) FAMILY INCOMES

In the 22 years from 1947 to 1969 the median American family income has risen from $4,972 to $9,433 (in 1969 dollars). While summary measures of relative dispersion, such as the GINI coefficient, seem to indicate little change in the distribution of income these measures can be misleading. The income distribution has been basically stable in the post-war period but there have been noticeable changes. Whether they are significant depends upon the view of the beholder. (See table 1.) The average income of the richest 20 percent of all families has fallen from 8.6 to 7.3 times that of the poorest 20 percent of all families. The average income of the richest 5 percent of all families has fallen from 36.6 to 21.6 times that of the poorest 5 percent of all families.

TABLE 1.[1]—PERCENTAGE SHARE OF AGGREGATE BEFORE-TAX INCOME GOING TO FAMILIES

[In percent]

	1947	1950	1956	1960	1965	1969
Lowest 5th	5.0	4.5	5.0	4.9	5.3	5.6
2d 5th	11.8	12.0	12.4	12.0	12.1	12.3
Middle 5th	17.0	17.4	17.8	17.6	17.7	17.6
4th 5th	23.1	23.5	23.7	23.6	23.7	23.4
Highest 5th	43.0	42.6	41.2	42.0	41.3	41.0
Top 5 percent	17.2	17.0	16.3	16.8	15.8	14.7
Bottom 5 percent	0.47	----------	----------	----------	----------	0.68

[1] U.S. Bureau of the Census, "Current Population Reports, Consumer Income, 1969," Washington, D.C., 1970, page 56.

Relative incomes are only one measure of dispersion, however. Constant and even falling relative differences are compatible with increasing absolute differences in a world with rising incomes. In 1947 the average income of the richest 20 percent of all families was $10,565 higher than that of the poorest 20 percent of all families; in 1969 it was $19,071 higher (in 1969 dollars). The real gap between the poorest and richest 5 percent of all families rose from $17,057 to $27,605 (in 1969 dollars) despite the sharply declining difference in relative incomes.

Analysis of the family income distribution indicates that all income classes seem to be sharing in the fruits of economic growth. Incomes seem to be growing at about the same rate in most income classes. Measured in relative terms some equalization of the distribution of income is occurring; measured in absolute terms some further dispersion of income is occurring.

Within the distribution of family earnings, wives are playing an increasingly important role. The probability of having a working wife rises as a husband's earnings rise until his earnings reach the average

level for husbands. As his earnings continue to rise, her probability of working declines. (See table 2.) Measured in relative terms working wives make the distribution of income more equal. The relative differences in female earnings across male earnings classes are simply not as great as those in male earnings. (See table 2.) The maximum average contribution for a wife is only 2.4 times as large as that of the wives in the lowest income class. In addition, husbands with high earnings have wives with lower average earnings than that of the poorest husbands.

TABLE 2.[1]—HUSBAND-WIFE EARNINGS

Husbands earnings	Probability of working wife (percent)	Median earnings of wife [2]
$0 to $1,000	34.9	$879
$1,000 to $2,000	36.0	720
$2,000 to $3,000	46.0	1,087
$3,000 to $4,000	45.7	1,052
$4,000 to $5,000	48.5	1,214
$5,000 to $6,000	46.3	1,321
$6,000 to $7,000	49.2	1,524
$7,000 to $8,000	47.2	1,489
$8,000 to $10,000	44.9	2,075
$10,000 to $15,000	37.6	1,205
$15,000 to $25,000	30.7	903
$25,000 and up	19.2	570

[1] U.S. Bureau of the Census, "Current Population Reports, Consumer Income, 1969," Washington, D.C., 1970, page 56.
[2] Includes husband-wife families with and without working wives.

Working wives make the absolute income gap between poor and middle income families larger, but reduce the income gap between middle and high income families. The largest contribution to family earnings ($2,075 per year) is made by wives of husbands earning $8,000 to $10,000 per year, while wives with husbands at the bottom of the earnings distribution earn $879 and wives with husbands at the top of the earnings distribution earn $570.

Post-war increases in female participation rates have resulted in some relative equalization of the distribution of income. They have reduced the absolute income gaps between middle and upper income families, but they also have increased the absolute income gaps between poor and middle income families. Given the existing distribution of female participation rates by their husbands earning class, the areas with the greatest potential for further increases are at the top and the bottom of the income distribution. If improvements in job opportunities were to entice these wives into the labor force, poor family incomes would rise relative to middle class family incomes but rich family incomes would also rise relative to middle class family incomes.

If income opportunities were opened so that women had the same potential earning capabilities as males, the impact would depend on the extent of selective mating. To the extent that males with high potential earning capabilities marry females with high potential earning capabilities and males with low potential earning capabilities marry females with low potential earning capabilities, equal income opportunities for women would make the family income distribution more disperse. Since actual mating habits are not apt to match males with higher earning capabilities with females with low earning capabilities,

increasing female income opportunities will probably make the actual distribution of family incomes more disperse. This would occur unless high income males choose to select wives who are willing to stay at home.

(B) MINORITY GROUPS

Minority groups are participating in the same general growth in incomes as the white majority. While average white family incomes were growing from $5,194 to $9,794, the average family incomes of Negroes and other races were growing from $2,660 to $6,191 (from 51 percent to 63 percent of white incomes). (See table 3.)

TABLE 3.[1]—RATIO OF NEGRO AND OTHER RACES TO WHITE MEDIAN INCOMES

	Percent		Percen
Year:		Year—Continued	
1947	51	1963	53
1949	51	1965	55
1952	57	1966	60
1954	55	1967	62
1958	51	1968	63
1960	55	1969	63

[1] U.S. Bureau of the Census, "Current Population Reports, Consumer Income, 1969," Washington, D.C., 1970, page 25.

Based on econometric analyses of the relationships between black incomes and the business cycle, black incomes might have been expected to rise to about 57 percent of white incomes in 1969 but not to 63 percent.[7] The difference is an indication of some movement toward more income equality for minority groups. Once again, however, relative improvements are compatible with absolute deteriorations. From 1947 to 1969 the absolute difference between black and white family incomes rose from $2,534 to $3,603 (in 1969 dollars).

In terms of income distributions, the distribution of income among Negroes and other races is slightly more unequal than the distribution of income among whites. (See table 4.) While the richest 20 percent of all black families have 43.1% of all black family income the richest 20 percent of white families have 40.4% of all white family income.

TABLE 4.[1]—PERCENTAGE SHARES OF AGGREGATE INCOMES IN 1969

	White	Negro and other races
Lowest 5th	6.0	4.7
2d 5th	12.6	10.8
Middle 5th	17.6	16.9
4th 5th	23.4	24.4
Highest 5th	40.4	43.1
Top 5 percent	14.8	14.7

[1] Lester C. Thurow, "Poverty and Discrimination," the Brookings Institution, Washington, D.C., 1969, page 26.

The major source of income gains for minority groups has been geographic mobility. Blacks have increasingly moved out of the south

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[7] Lester C. Thurow, *Poverty and Discrimination,* The Brookings Institution, Washington, D.C., 1969, Page 30.

where their relative incomes are low to the north and west where their relative incomes are higher. In 1970 blacks earned 57 percent of white incomes in the south, 71 percent in the northeast, 73 percent in the north central region, and 77 percent in the west. Based on the geographic movements that have actually taken place among blacks between 1950 and 1970, black incomes should have risen by about 12 percentage points relative to white incomes.[8] In fact, they have risen by about 10 percentage points. Thus geographic movement more than accounts for the observed relative increase in black incomes. Up to 1969 anti-discrimination programs seemed to be having little impact on average black incomes. Although geographic movement can be a powerful source of relative income gains, it is inherently limited. If all black families were to move out of the south, black incomes would still only be about 75 percent of white incomes.

Improvements in female incomes and job opportunities will also tend to lead to a widening gap between black and white family incomes. In 1969 53 percent of all black wives were working in the paid labor force while only 38 percent of all white wives were doing so. At high incomes the difference is even more extreme. Seventy-three percent of all black families with incomes over $15,000 had a wife in the paid labor force while only 48 percent of all white families with incomes over $15,000 per year had a wife in the paid labor force. As a consequence, better income opportunities for existing female workers would tend to equalize black and white incomes, but better income and job opportunities that succeeded in attracting more female workers into the labor force would tend to increase the dispersion between black and white incomes. There are simply more white wives remaining to be attracted into the labor force.

In addition to blacks, Spanish speaking Americans and American Indians are the principal groups with below average incomes. The average income for Spanish speaking Americans is $5,641 (in 1969), or $350 less than that of blacks. American Indians make even less (probably around $3,000 per family).[9] Although Americans of recent European descent often consider themselves to be subject to discrimination, all of the major ethnic groups have average incomes above those of white Americans who arrived earlier. (See table 5.) In 1969 the range was from $11,554 for Russian American families to $8,127 for Irish Americans. In contrast other Americans (natives) had average incomes of only $7,671.

TABLE 5.[1]—*Median family incomes*

Origin:	
English	$8,324
German	8,607
Irish	8,127
Italian	8,808
Polish	8,849
Russian	11,554
Spanish	5,641
Other	7,671

[1] U.S. Bureau of Census, *Current Population Reports, Characteristics of the Population by Ethnic Origin, 1965,* Series P–20 #221, Washington, D.C., page 22.

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[8] This calculation estimates what relative black incomes would have been if each state had maintained the 1950 structure of relative incomes and blacks had been redistributed based on their actual 1970 geographic distribution.

[9] Alan L. Sorkin, *American Indians and Federal Aid,* The Brookings Institution, Washington, D.C., 1971, page 8.

(C) FEMALE INCOMES

Almost no changes have occurred in the relative earnings of males and females since 1939. In 1939 year-around full-time female workers earned 58 percent of male earnings; in 1969 they earned 59 percent. Once again constant relative differences imply increasing absolute differences. In 1939 the real income gap was $1,570 (in 1969 dollars) between year-around full-time male and female workers; in 1969 it was $3,526.[10]

The overall consistency masks quite dramatic changes for black females. Between 1939 and 1969 year-around full-time white female earnings fell from 61 to 58 percent of their male couterparts while the earnings of year-around full-time black female earnings rose from 51 percent to 69 percent of their black male counterparts. Since year-around full-time black male earnings were rising from 45 percent to 69 percent of their white male counterparts (most of this increase occurred during World War II), year-around full-time black female workers earnings rose from just 38 percent of their white counterparts to 82 percent.

Family incomes, however, did not equalize at the same rate. White women were moving into the year-around full-time labor force much faster than black women. Rising white female participation rates managed to offset much of the income gains of black workers.

(D) AGE AND INCOME

With an increasing tendency for young people to stay in school (to be part-time rather than full-time workers), the age distribution of income has become more unequal in the post-war period. Individuals less than 24 years of age have significantly lower incomes relative to average incomes. (See table 6.) Other than this general change, however, the male distribution of income has been remarkably stable across age classes. In addition to the general deterioration in the position of young women, women above the age of 45 made particularly sharp gains. Women 45–54 years of age witnessed an increase in their incomes from 121 percent to 167 percent of average female incomes.

TABLE 6.[1]—INCOME BY AGE (RELATIVE TO AVERAGE INCOME)

	Males		Females	
	1949	1969	1949	1969
Age:				
14 to 19	17.5	10.4	45.4	22.3
20 to 24	73.6	58.5	135.3	118.0
25 to 34	117.4	124.0	137.7	140.7
35 to 44	125.8	140.7	133.7	151.8
45 to 54	117.3	134.1	121.4	166.9
55 to 64	100.9	113.2	104.2	130.9
65 and up	43.3	44.0	53.7	65.5

[1] "Consumer Income 1969 and 1949," page 97 and page 30.

(E) WEALTH

Distributions of wealth are available less frequently than those of income, but occasional measurements have been made. In 1962 the

[10] *Consumer Income 1969*, Op. Cit., page 136.

Federal Reserve Board conducted a survey of the ownership of all private assets. At that time, the wealthiest 20 percent of the population owned over 75 percent of all private assets while the poorest 25 percent of all families had no net worth (their debts equaled their assets). (See table 7.) The wealthiest 8 percent of the population owned 60 percent of all private assets; the wealthiest 1 percent owned over 26 percent of all private assets.

TABLE 7.[1]—FAMILY DISTRIBUTION OF NET WORTH IN 1962

	Cumulative distribution of families	Cumulative distribution of total net worth
Net worth class (thousands):		
Negative	8.1	−0.2
0 to $1	25.4	0
$1 to $5	42.7	2.1
$5 to $10	56.9	6.6
$10 to $25	81.3	23.8
$25 to $50	92.5	40.9
$50 to $100	97.6	55.9
$100 to $200	98.6	61.3
$200 to $500	99.5	74.2
$500 and over	100.0	100.0

[1] Federal Reserve Bulletin, "Survey of Financial Characteristics," March 1964, Washington, D.C., page 291.

As these data indicate, the distribution of wealth is much more unequal than the distribution of income. While the richest 20 percent of all families have 41 percent of total income they own 75 percent of all assets. While the poorest quintile has 5.6 percent of total income, they have no net worth. Wealth is also closely associated with income. Those with high net worths have high incomes. (See table 8.)

TABLE 8.[1]—1962 DISTRIBUTION OF INCOME AND WEALTH [2]

Income (thousands)	All families (percent)	Net worth (thousands)										
		Negative	$0 to $1	$1 to $5	$5 to $10	$10 to $25	$25 to $50	$50 to $100	$100 to $200	$200 to $500	$500 to $1,000	$1,000 and up
$0 to $3	100	12	31	16	15	17	7	1				
$3 to $5	100	15	22	22	12	17	8	3				
$5 to $7.5	100	7	14	21	17	28	8	4	1			
$7.5 to $10	100	3	5	19	16	37	14	5	2			
$10 to $15	100	1	3	9	13	34	24	11	4	1		
$15 to $25	100			2	8	18	30	26	7	7	1	
$25 to $50	100				1	2	7	20	31	30	5	3
$50 to $100	100						1	3	13	37	27	20
$100 and up	100								1	4	61	35

[1] Federal Reserve Bulletin, "Survey of Financial Characteristics," March 1964, Washington, D.C., page 291.
[2] Blanks indicate less than ½ of 1 percent.

(F) ECONOMIC MOBILITY

What is the probability of individuals moving from one point on the income distribution to another over the course of a year, a lifetime, or a generation? What is the conditional probability of a son's income given his father's income? With perfect intergenerational mobility, knowing a father's income provides no information as to his son's income. With no intergenerational mobility, knowing a father's income provides all of the information necessary to predict a son's income. Eco-

nomic mobility of this type is important since society's value judgments about the equity or inequity of a particular income distribution may depend upon the degree of economic mobility (annual, lifetime, or intergenerational) within it. A high degree of economic mobility may make us more willing to tolerate inequalities at any point in time. If incomes were given out on a lottery basis, any annual income distribution, no matter how unequal, could be consistent with a completely equal lifetime income. Although it is not extensive, there is some data on economic mobility.

Studies of poverty families indicate that about 70 percent of the families that were in poverty last year are in poverty this year. Of the remaining 30 percent, 11 percent were dissolved from death and other causes and 19 percent escaped from poverty. Of the 19 percent who escaped, 8 percent were still within $1,000 of the poverty line, 4 percent were within $2,000 of the poverty line, and 7 percent were more than $2,000 away from the poverty line.[11] Families who escape from poverty in any one year also have a significant probability of falling back into poverty in succeeding years. As a consequence, poverty data would seem to indicate a low degree of economic mobility among the poverty population. Such evidence, however, does not prove a low degree of economic mobility for other parts of the income distribution.

Data on the use of income averaging provisions of the federal income tax laws indicates that only 0.7 percent of all returns found it profitable to average their incomes over a 5 year period in 1968.[12] To be eligible for income averaging, 1968's income needed to exceed the average of the four previous years by 33⅓ percent and by a minimum amount of $3,000 or more. Such data would indicate that economic mobility in high income ranges is rather low. Few individuals have large fluctuations in their annual incomes. As a result, distributions of income would probably not be noticeably different if they were collected on a lifetime rather than an annual basis.

Intergenerational economic mobility is even less well charted. Sociologists rather than economists have studied intergenerational mobility. They have focused on occupational mobility rather than economic mobility partly because of their interests and partly because of a lack of data of intergenerational economic mobility. Given the wide ranges of incomes within occupations, the lack or presence of occupational mobility indicates little about economic mobility. Intergenerational occupational mobility is not high, but this conclusion does not necessarily lead to the same conclusion for economic mobility.

(G) FUTURE TRENDS

In the absence of governmental policies to the contrary, future trends in the distribution of income are apt to mirror the trends of the post-war period. These trends seem firmly established in the American economy. Without government actions to alter them, they can be expected to continue.

As a result, the distribution of family income will probably remain reasonably constant when measured in relative terms, but continue to

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[11] *Report of Council of Economic Advisors, 1965,* Washington. D.C., page 164.
[12] Internal Revenue Service, *Statistics of Income for 1968,* Washington, D.C., page 93.

disperse when measured in absolute dollars. The largest unknown factor in such a prediction revolves around the impact of women's liberation. If the current movement toward women's liberation were to open up new job opportunities for women and succeed in attracting more women into the labor force, the distribution of family income might become more dispersed on either measure. More working wives would raise family incomes at all levels but the family incomes of the rich would grow more rapidly than those of the less well off. Wives of high income males have the greatest potential for entering the labor force since they currently have the lowest labor force participation rates.

The rise in minority incomes relative to the majority will depend heavily on geographic movements from the south to the north and west. To the extent that this trend continues, black incomes will rise relative to white incomes. To the extent that it slows down, black incomes will cease rising relative to whites. In this area the major unknown factor is the future impact of equal opportunity programs and anti-discrimination laws. As yet these programs do not seem to be having a noticeable impact on relative incomes, but they may start to do so in the future. Although the changes are not visible in national averages, small groups, like young northern black male college graduates, may be advancing as a result of these programs.

Given the long-run consistency in male-female wage differentials there is no reason to believe that these differentials will change as the result of economic forces. If they are to change, it will be the result of political or sociological forces. As yet no changes are visible.

Given post-war changes in the distribution of income and the likelihood that the same types of changes will occur in the immediate future, the body politic must explicitly decide whether it wants changes in the distribution of income. Without such decisions and programs to bring the desired changes about, the distribution of income will not be noticeably different than it now is. Every group seems to be participating in economic progress to the same degree. Average incomes are rising, but the distribution of income around this average is not changing.

III. A Necessary Role for Taxation

Market redistributions of income are inherently limited in terms of what they can accomplish. They cannot affect the earnings of those who are outside of the labor forces and they can only slowly affect the existing distribution of wealth. As a consequence, any systematic effort to raise the incomes of low income individuals or to alter the distribution of wealth must rely on the tax transfer system.

To raise low incomes some variant of the negative income tax (sometimes known as the family assistance plan or the guaranteed annual income) *is essential.* The aged, the ill, the handicapped, and the mentally retarded are only a few of the groups that cannot possibly earn a satisfactory income in the market place. Although negative income taxes will not be analyzed in this paper (they are well analyzed elsewhere [13]), they are a necessary ingredient in any comprehensive set of income redistribution policies.

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[13] For example see: Christopher Green, *Negative Taxes and the Poverty Problem,* The Brookings Institution, Washington, D.C., 1967.

Efforts to alter market incomes are also ineffectual if there is a desire to alter the distribution of wealth. Savings from earned income contribute to wealth, but they are just one source, and a small one, of the present accumulations of net worth. Much of savings comes from unearned income and most accumulations of wealth are passed from generation to generation. As a result, programs to alter market earnings will only slowly affect the distribution of wealth. Practically speaking, any redistribution of wealth must come about through the imposition of a system of effective wealth taxes. Although wealth taxes will not be analyzed in this paper (they are analyzed elsewhere [14]), they are a necessary ingredient in any comprehensive set of policies to redistribute income and wealth.

IV. Altering the Structure of Market Incomes

(A) THE IMPACT OF CURRENT PROGRAMS

Historically both governmental policies and economic analysis have concentrated on supply side efforts to alter the distribution of earnings. Programs were designed to educate or train individuals so that they had the skills and personal characteristics necessary to fill higher income jobs. Underlying such programs was a particular view of how labor markets work. According to this theory the supply of low income workers would be reduced in the process of such education and training programs. As a result, the wages for low income workers would rise. Conversely, the supply of high income workers would be enlarged and their wages would be reduced. Thus education and training would have a three pronged effect on the distribution of income. (1) Some individuals would be raised from low income jobs to high income jobs; (2) wages for low income jobs would rise, and (3) wages for high income jobs would fall. The result, a more equal distribution of market earnings.

While a number of theoretical objections can be raised to this view of the labor market, it is perhaps more instructive to look at post-war experience to see if existing education and training programs have had the impacts that would have been predicted for them. Manpower training programs are of such recent vintage and so small in relationship to the size of the economy that it is impossible to analyze their impact on the American economy, but it is possible to look at the impact of the post-war growth in education to see if it has had the hypothesized impact on the distribution of income. To eliminate the impacts of discrimination and part-time workers, it makes sense to concentrate on the impact of education on the incomes of adult white males. Have the post-war changes in their education led to the income changes that might have been expected?

From 1950 to 1970 the distribution of education among adult white males has become noticeably more equal. (See table 9.) In 1950 the bottom quintile of the population had 8.6 percent of the total number of years of education while the top quintile had 31.1 percent of the total number of years of education. By 1970 the share of the bottom

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[14] For a more extensive discussion of wealth taxes see: *The Impact of Taxes on the American Economy,* Op. Cit. Chapters 4 and 7.

quintile has risen to 10.7 percent and that of the top quintile had dropped to 29.3 percent. At the same time the distribution of income among white males has become more unequal. (See table 10.) From 1949 to 1969 the share of total income going to the lowest quintile has dropped from 3.2 percent to 2.6 percent and the share going to the highest quintile rose from 44.8 percent to 46.3 percent. Education has been becoming more equally distributed yet income has been becoming more unequally distributed.

TABLE 9.[1]—DISTRIBUTION OF EDUCATION AMONG ADULT WHITE MALES

[In percent]

	Percentage share of years of education attainment	
	1950	1970
Lowest 5th	8.6	10.7
2d 5th	16.4	16.4
Middle 5th	19.0	21.3
4th 5th	24.9	22.3
Highest 5th	31.1	29.3

[1] Bureau of the Census, "Current Population Reports, Population Characteristics," series P–20, No. 207, page 12, and "U.S. Census of Population: 1950," PE–No. 5B U.S. Government Printing Office, Washington, D.C., 1953, page 5, B–108.

TABLE 10.[1]—DISTRIBUTION OF INCOME AMONG ADULT WHITE MALES

[In percent]

	Percentage shares of total money income	
	1949	1969
Lowest 5th	3.2	2.6
2d 5th	10.9	9.4
Middle 5th	17.5	16.7
4th 5th	23.7	25.0
Highest 5th	44.8	45.3

[1] U.S. Bureau of the Census, "Current Population Reports," series P–60, No. 75, Dec. 14, 1970, "Income in 1969 in Families and Persons in the U.S.," U.S. Government Printing Office, Washington, D.C., 1970, page 101.

The usual explanation is to argue that earned incomes are composed of two types of income—income earned by pure human labor and income earned by human capital. Equalizing the distribution of education should equalize the earnings from human capital, but it does not necessarily lead to a more equal distribution of total earnings. As long as the variance (dispersion) in the returns to human capital are larger than the variance in the returns to pure labor income, increasing the quantity of human capital (education) may increase the variance in total income. For example, if pure labor incomes are absolutely equally distributed, additions to human capital incomes increase the dispersion of income even if human capital incomes are becoming more equally distributed. Pure labor income (the equally distributed portion of total income) become a smaller and smaller fraction of total income. Total income becomes more unequally distributed even though pure labor income is equally distributed and human capital income is becoming more equally distributed. Eventually, however, as human

capital income becomes a larger and larger fraction of total income, total incomes will start to equalize. As a result, the United States simply needs an even more equal distribution of education to begin seeing the impact on the distribution of income.

While logically plausible such an argument is not in accordance with the empirical evidence. First, if the earnings of laborers with zero years of education are used as the measure of pure labor earnings over three-fourths of the earnings of college graduates are a return to their human capital rather than a return to their pure labor. As a consequence the United States has already reached a point where education should have entered into the equalizing phase of its impact. Second, the variance in returns to pure labor are, if anything, greater than the variance in the returns to human capital. In 1950 the coefficient of determination (variance/mean) of earnings for those with zero years of education was 1.26 while the coefficient of variation for those with some college education was 0.86. As a consequence a more equal distribution of education should have led to a more equal distribution of income (as measured by the coefficient of determination). Using the actual income coefficient of determination for different educational classes in 1949, the actual post-war changes in the distribution of education should have led to a 10.6 percent reduction in the coefficient of determination for white males by 1969. In fact, the coefficient of determination rose by 1.1 percent. Empirically education has not been having the equalizing impact that rate of return calculations would have led one to believe.

Black-white income gaps reveal the same problem. From 1952 to 1968 the mean education of black male workers rose from 67 percent to 87 percent of white male workers, yet median wage and salary incomes only rose from 58 percent to 66 percent.[15] Most of this increase can also be traced to mobility from the south (with its low relative incomes for blacks) to the north and west (with its higher relative incomes for blacks). As a result, education does not seem to be equalizing black and white incomes in the manner that rate of return calculations would hypothesize.

Similarly a more rapid rate of growth of education should have led to a more rapid growth of the economy. More education should lead to more productive workers. Measured in embodied or human capital terms more labor was being added to the economy. In the early 1950's the college educated labor force was growing by 3 percent. In the late 1960's it was growing by 6 percent. Yet there does not seem to be any evidence that the rate of growth is accelerating. If anything, the opposite is happening. Productivity seems to be below its trend rate of growth of 2.9 percent per year even after cyclical factors are taken into account. There are explanations for this (we may be on an increasing cost portion of the production function where more education is needed to generate the old rate of growth), just as there are explanations for why education has not been equalizing incomes as one would expect, but the observed impact of education does not seem to be in accordance with its hypothesized impact. Education may be having the hypothesized impact on productivity and the distribution of in-

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[15] U.S. Bureau of the Census, *U.S. Census of Population: 1950,* PE–No. 5B U.S. Government Printing Office, Washington, D.C., 1953, page 5B–108.

come, but this belief is a matter of faith rather than evidence. If anything, the evidence seems contrary.

Implicit in the standard view of the labor market is the belief that wage competition is the most important short-run method for equilibrating the supplies and demands for different types of labor and the incentive for long-run changes in supplies and demands. Wage competition equalizes within-group wages and establishes appropriate differentials among groups. While no one expects wage competition to be as instantaneous as it would be in a perfect market and while no one would argue that American labor markets are without wage competition, there is a real question as to whether the actual degree of wage competition is high enough to support simple rate of return calculations. Do relative wages indicate short-run returns and do they provide appropriate long-run signals as to relative scarcities?

Although calculations of the rate of return on investment in higher educations merely assume a statistically significant difference between the average wages of high school and college laborers, public policies tend to be formulated as if there were a high school wage and a college wage. This is partly due to the fact that economic theory leads one to expect equal wages for equally productive workers. In reality there is not a college wage and a high school wage, but a distribution of college wages and a distribution of high school wages. The ranges of these distributions are wide with considerable overlap, but the college distribution has a higher mean and median than the high school distribution. In 1969 the median adult white male with some college education had a money income of $11,117 while the median adult white male with some high school education had a money income of $8,171. (See table 11.) Approximately 30 percent of those with college educations had incomes below the median high school income while approximately 26 percent of those with high school educations had incomes above the median college income. If the normal adjustments for differences in ability, family background, and wealth are made, the overlapping nature of the distributions would be even more pronounced than that in the raw data. All of these adjustments lower the distribution of college incomes toward that of high school incomes and increase the overlap.

TABLE 11[1].—MONEY INCOME OF WHITE ADULT MALES IN 1969 (25 AND OVER)

Income	High school education (percent)	College education (percent)
$0 to $1,000	1.6	1.3
$1,000 to $2,000	3.5	2.3
$2,000 to $3,000	4.0	2.8
$3,000 to $4,000	4.3	3.1
$4,000 to $5,000	5.5	2.8
$5,000 to $6,000	7.7	3.9
$6,000 to $7,000	9.9	5.1
$7,000 to $8,000	11.7	7.0
$8,000 to $10,000	20.6	15.1
$10,000 to $15,000	24.1	30.2
$15,000 to $25,000	5.9	19.3
$25,000 and over	1.1	7.3
Median	$8,171	$11,117
Mean	$8,534	$12,720

[1] U.S. Bureau of the Census, "Current Population Reports, Consumer Income, 1969," Washington, D.C., 1970, page 124.

If the data is broken down by IQ, occupation, industry, region, hours of work, or by even finer methods of classification, the same wide differences seem to exist.[16] Why doesn't competition among college workers and among high school workers reduce the intra-group range of wages? In the standard (neo-classical) theory, intra-group competition should quickly narrow the dispersion in earnings.

Defenders of the neo-classical faith would argue that wage differentials indicate other factors that have not been taken into account (like willingness to accept risks, etc.) or by factors that cannot be taken into account (personal motivation, etc.). As long as any wage differential remains unexplained, some factor producing wage differentials has been ignored.

The absence of wage competition is mirrored in employers lack of interest in relative wage differentials when designing new plants. In the several cases extensively investigated by Piore and Doeringer, plant designers typically did not use (or even know) the relative prices of different types of labor when designing a new plant.[17] They could not economize on expensive skills since they did not know which skills were expensive and which skills were cheap. They simply used an average wage rate in making their calculations. While it is not absolutely essential to the validity of micro-economic theory that the actual actors in the economic game describe their motivations as micro-economic theory would describe them or that they have the types of data that economic theory says they should have, such discrepancies raise some questions about the original theory.[18] Deeper analysis may eventually reveal that wage competition is the key to the labor market, but existing evidence points in other directions.

As a result, our experience with large investments in higher education should at least raise questions about the impact of supply oriented programs to alter the distribution of market incomes. Such investments may be capable of altering the distribution of income, but post-war experience is not encouraging. Large investments have been made. What little has happened to the post-war distribution of adult white males incomes has been contrary to expectations.

Before further investments are made on such expenditures, it is necessary to determine why past investments have not had the right impacts and what complimentary programs are necessary to insure that they do have the right impacts in the future. To do this it is necessary to re-examine our views of how the labor market works.

(B) A "JOB COMPETITION" VIEW OF THE LABOR MARKET

Government education and training policies have to a great extent been based on a "wage competition" view of the labor market. They have not had the predicted impact since they have ignored the "job competition" elements in the labor market. Instead of competing

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[16] U.S. Bureau of the Census, *Current Population Reports,* Series P–60, No. 69, April 6, 1970, *Income Growth Rates in 1939 to 1968 for Persons by Occupation and Industry Groups for the U.S.* U.S. Government Printing Office, Washington, D.C., 1970, page 86, Table A–7.

[17] For an extensive discussion of this phenomenon see : Peter B. Doeringer and Michael J. Piori, *Internal Labor Markets and Manpower Aanalysis.* D. C. Heath, Lexington, Massachusetts, 1971, Chapter 6, page 119.

[18] Profit maximization theories have confronted this problem and thus far have managed to argue that other theories are in fact merely different names for profit maximization or require profit maximization as an intermediate goal.

against each other based on wages, individuals compete for jobs based on background characteristics. As a result, this section outlines the role of job competition in the American economy and its implications for programs designed to alter the distribution of income.

To make the presentation as clear as possible and to highlight the differences between a wage competition economy and a job competition economy, the argument will be advanced *as if* job competition existed without wage competition. In reality there is a continuum between wage competition and job competition. The real American economy lies somewhere on the continuum between these two extremes. Both types of competition exist. The "as if" assumption is made to clarify the role of job competition by isolating its impacts from those of wage competition.

In a job competition model two sets of factors determine an individual's income. One set of factors determines an individual's *relative* position in the labor queue; another set of factors, not mutually exclusive of the first, determines the actual distribution of job opportunities in the economy. Wages are paid based on the characteristics of the job in question and workers are distributed across job opportunities based on their relative position in the labor queue. The most preferred workers get the best (highest real income) jobs. (In this context a job is best thought of as a lifetime sequence of jobs rather than a specific job with a specific employer.)

Given the factors that determine an individual's position in the labor queue and given the factors that determine the distribution of lifetime income ladders, it becomes possible to formulate a technique for calculating the impacts of education and training.

1. The labor queue

In neo-classical theory the labor market exists to match a vector of labor demands with a vector of labor supplies. In the matching process, or in the mismatching process, various signals are given. Businesses are told to raise wages or redesign jobs in skill shortage sectors. In surplus sectors they are told to lower wages. Individuals are told to acquire skills in high wage shortage areas and discouraged from acquiring jobs and skills in low wage, surplus areas. In the process each skill market is cleared with increases or reductions in wages in the short-run and by a combination of wage changes, skill changes, and production process changes in the long-run.

In a job competition model labor skills do not exist in the labor market. New workers come into the labor market with a variety of background skills and characteristics. These background characteristics (education, age, sex, etc.) affect the cost of training a worker to fill any given job, but they do not in general constitute a set of skills that would allow the worker to enter directly into the production process. Most cognitive job skills, general and specific, are acquired either formally or informally through on-the-job training after a worker finds an entry job and the resultant promotional ladder.

Such a training process is evident in the American economy. A survey of how American workers acquired their cognitive job skills found that only 40 percent were using skills that they had acquired in formal training programs or in specialized education. In addition, most of these reported that some of the skills that they were currently using

had been acquired in informal casual on-the-job training. The remaining 60 percent acquired *all* of their job skills through informal casual on-the-job training. Even among college graduates over ⅔ reported that they had acquired cognitive job skills through informal casual processes on the job. When asked to list the form of training that had been the most helpful in acquiring their current job skills, only 12 percent listed formal training and specialized education.[19]

Thus the labor market is not primarily a market for matching the demands and supplies of different job skills, but a market for matching trainable individuals with training ladders. Except for background characteristics, the demand for job skills creates the supply of job skills since the demands for labor determine which job skills are taught. In marginal productivity terms, marginal products are associated with jobs and not with individuals. The operative problem is to pick and train workers so that they can generate the desired marginal product of the job in question with the least investment in training costs. For new workers and entry level jobs, background characteristics form the basis of selection. Those workers with the background characteristics that yield the lowest training costs will be selected. For workers with job experience, existing job skills (including skills like reliability and punctuality) are relevant to the selection process to the extent that they lead to lower training costs. Training ladders or job progressions emerge when job skills are complimentary.

Workers are ranked in a labor queue based on their training costs regardless of whether the job skill in question is general or specific.[20] Even if the job skills in question are basically general and workers pay for their own general training, employers are still interested in training costs. Several factors determine this interest. First, every job has some specific skills for which employers must pay training costs. The most universal are where and when to report, locations of tools, and the experience of working with a specific set of individuals as a production team.

Second, non-marginal increases in the quantity of any one factor will raise the marginal productivity of other factors. The marginal product of capital depends on the quantity and quality of labor with which it is working. Consequently, employers will want to generate more job skills, general or specific, than individuals will be willing to buy. Individuals simply are not able to appropriate all of the indirect benefits of the additional skills.[21]

If employees pay training costs by accepting wages below their marginal productivity and if all workers in a given job are paid the same wage, the difference between wages and marginal productivities will be adjusted to reflect average training costs. To the extent that employers can hire workers with less than average training costs, they will be able to earn extra returns. The difference between wages and marginal productivities simply exceeds actual training costs.

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[19] U.S. Department of Labor, *Formal Occupational Training of Adult Workers,* Manpower Automation Research Monograph #2, 1964, pages 3, 18, 20, and 43.

[20] General skills are skills that are useful to more than one firm (i.e., they can be sold in the market), while specific skills that are useful to one and only one firm (i.e., they cannot be sold in the market).

[21] The equilibrium wage rate for trainable labor can easily exceed that for untrained labor, yet workers may still be paying for training since the equilibrium wage rate is below the marginal productivity of the jobs that they hold.

In addition many firms will find that they must pay for all or part of the general training costs that might be absorbed by the employee. Assume for the sake of simplicity that there are two types of labor—trainable and untrainable. The wage rate for trainable labor may be such that it exceeds marginal productivity minus training costs for many general job skills. Due to the complementarity between skilled labor and other factors of production it still pays firms to undertake such training, but it also pays them to minimize training costs. By the same token the wage rate for trainable labor needs not be less than that for untrained labor even during training. As a result, workers do not necessarily pay for their training by accepting wages less than their opportunity costs of working as untrained laborers.

Based on the background characteristics and skills acquired in previous jobs, potential employees are ranked by employers on a continuum from the best worker to the worst worker. Although it is possible to place groups with the same background characteristics and skills at some specific point in the queue, this is not to say that each individual in that group falls into the same specific position on the labor queue. Each group could be characterized by some distribution around its own mean.

Such distributions arise for a number of reasons:

(a) Since there are many relevant background characteristics, classifications based on any one characteristic, such as education, will lead to a distribution of workers around the group's mean.

(b) If job search procedures resemble Markov chains, there is no guarantee that employers and jobs will be perfectly matched. Employers may fill with less than the best available employee since time and other search costs are necessary to find the best available employee. Similarly laborers may take less than the best available job. The result in non-equal incomes for identical individuals.

(c) A host of other market imperfections (transition costs, etc.) may generate distributions of income for individuals with identical characteristics.

(d) Some characteristics that are unmeasurable or difficult to measure (willingness to take risks, personal motivation) will generate observed distributions of income around group means since it is never really possible to distinguish homogeneous groups based on generally available background characteristics. The net result is income distributions where some individuals with preferred background characteristics will make less than some individuals with less desirable background characteristics.

(e) Different employers order their labor market queues differently. A background characteristic of relevance to one employer may not be of relevance to another. Thus a group's national position is merely a weighted average of its position with each individual employer.

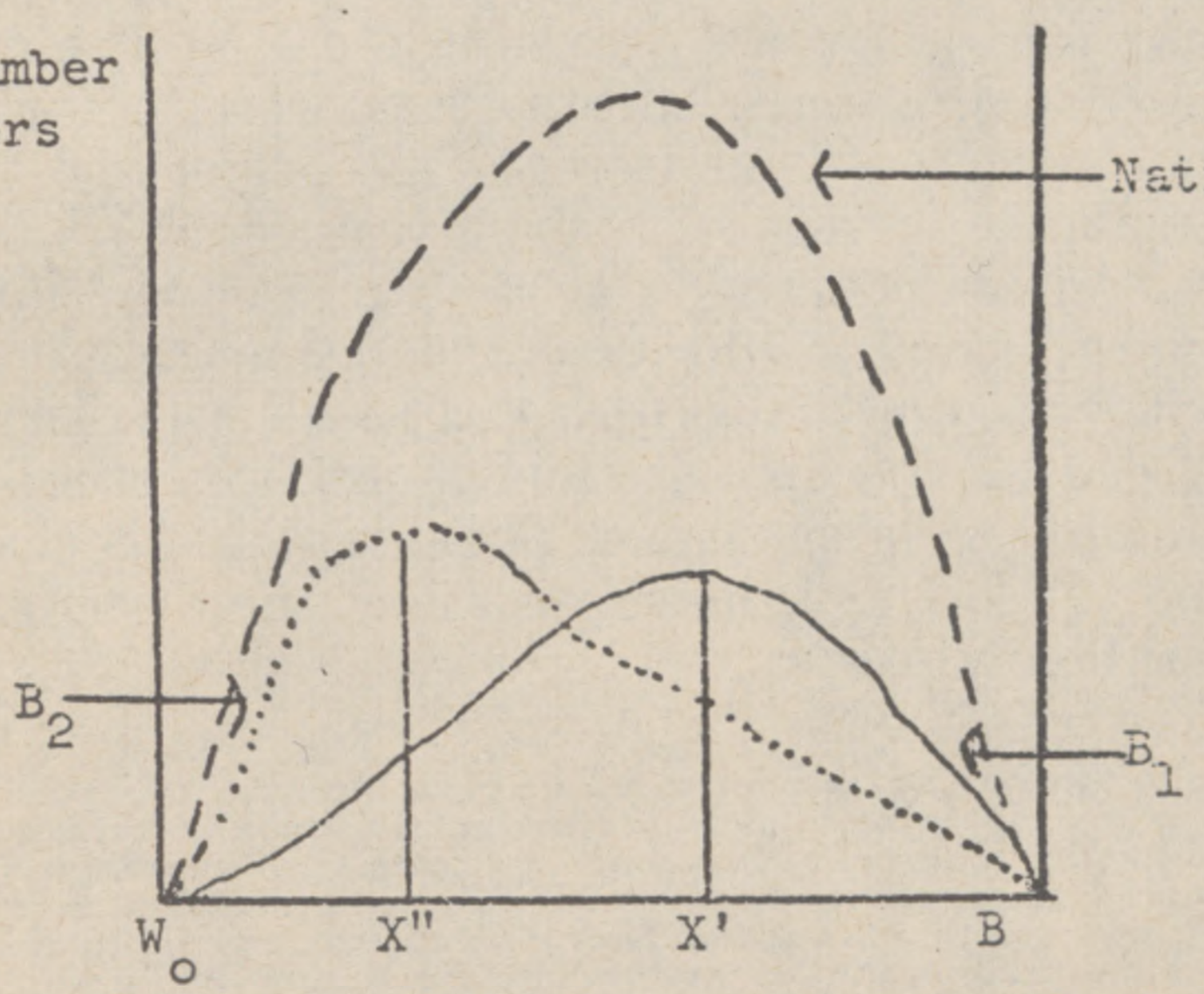
Training costs are the basic determinants of the rank order in the labor queue, but lacking direct evidence on specific training costs for specific workers, laborers are ranked according to their background characteristics—age, sex, educational attainment, previous skills, psychological tests, etc. Each is used as indirect measures of the costs necessary to produce some standard of work performance. (Training costs, as the term is used here, include the costs of inculcating norms of

industrial discipline and good work habits and the uncertainty costs associated with hiring workers whose training costs are more variable or unknown.)

Subjective elements may also enter the labor queue. If employers discriminate against blacks, blacks will find themselves lower in the labor market queue than their training costs would warrant. To some extent the smaller the objective differences in training costs the more subjective preferences can determine the final ordering. If every individual had identical training costs, blacks could be placed at the bottom of the labor queue with no loss in efficiency.

The national labor queue depends upon the distribution of background characteristics and employers ranking of different background characteristics, but it also depends upon the distributions within each background class. (See chart I.) An individual may belong to a class with a set of characteristics preferred to the characteristics of another individual, but still end up with a lower position in the national labor queue. While no two workers may be exactly alike, the costs of discovering small differences are so large that individuals are ranked based on a finite number of background characteristics. This means that there are a finite number of rankings in the labor queue and that many individuals have identical rankings.

CHART I.—THE LABOR QUEUE.



Ranking number of workers from least preferred to most preferred.

B_1 and B_2 are sets of background characteristics where B_1 is generally preferred to B_2.

The National Labor Queue is derived by vertical addition of the underlying distribution for each background class.

Based on such a labor queue, jobs and their corresponding training ladders are distributed in the labor market with employers working down from those at the top of the queue to those at the bottom of the queue. The best jobs will go to the best workers and the worst jobs will go to the worst workers. Given a need for untrained (raw) labor, some workers at the bottom of the labor queue will receive little or no training. In periods of labor scarcity, however, training will extend farther and farther down the labor queue as employers are forced to train more costly workers to fill job vacancies. If there are an inadequate

number of jobs, those at the bottom of the labor queue will be left unemployed.[22]

Differences between these expected values will depend upon the size of the random fluctuations around the group's expected value. As a result, groups have expected positions in the labor queue, but individuals do not. They are subject to random fluctuations around their group's expected position.

To the extent that education and formal training are an important background characteristic used for screening individuals into different job opportunities, alterations in the distribution of education can have an important impact on the shape of the labor queue. Less dispersion in education leads to less dispersion in the labor queue. The relevant empirical question is the weight that is attached to educaton in screening relative to the weight attached to other factors. This obviously differs from job to job, but educational screening tests are ubiquitous if not universal.

Even given a labor queue, however, there is still the problem of determining the actual distribution of job or income opportunities. Since the labor queue is used to distribute indivduals across job opportunities, the labor queue determines a group's relative position in the distribution of job opportunities but it does not determine the shape of the job distribution. Individuals compete for job opportunities based on their relative positions in the labor queue. The best jobs (highest real income) go to the best workers, etc., but the shape of the job opportunities distribution need not be similar to that of the labor queue. An equal group of laborers (with respect to training costs) might be distributed across a relatively unequal distribution of job opportunities. After receiving the resultant on-the-job training, the initially equal workers would have unequal marginal productivities since they now have unequal skills. As a result, the distribution of income is determined by the distribution of job opportunities and not by the distribution of the labor queue. The same factors that affect the shape of the labor queue may, however, affect the distribution of job opportunities (see below).

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[22] To understand the labor queue it is helpful to view the market for labor from a probability perspective. Positions in the labor queue are distributed in a lottery, but it is a lottery with conditional probabilities. For each group of background characteristics there is some associated probability distribution that determines the position into which each individual falls. (See equation 1.) If the sets of background characteristics were ranked from the most preferred to the least preferred, the expected value of each group's position will fall in the same rank order as that of the background characteristics. (See equations 2 and 3.)

$$(1) \qquad \sum_{i=1}^{n} P_j(X_i/B_j)=1 \qquad j=1, 2, \ldots m$$

where X_i=the ith rank order where there are n possible ranks
B_j=the jth set of background characteristics where there are m sets of background characteristics.

$$(2) \qquad \sum_{i=1}^{n}[P_j(X_i/B_j)]X_i=E(X_{B_j})$$

and

$$(3) \qquad \sum_{i=1}^{n}[[P_1(X_i/B_1)]X_i]>\sum_{i=1}^{n}[[P_2(X_i/B_2)]X_i]>\ldots>\sum_{i=1}^{n}[[P_m(X_i/B_m)]X_i]$$

or

$$E(R_1)>E(B_2)>\ldots>E(B_m)$$

where $E(X_{B_j})$=expected value of position of individuals with the B_jth background characteristics.

Consequently, the income or job distribution for each set of background characteristics is related to the income or job distribution for every other set of background characteristics. All of the underlying component distributions of income must, by definition, sum to a given national distribution of income. As a result, increases in the numbers of individuals in more preferred background groups can lead to a deterioration in the mean and/or distribution of income for less preferred groups. Every additional college worker may mean a deterioration in the position of the remaining high school workers.

2. Facilitating training

In a world where laborers acquire many of their cognitive job skills, general and specific, through informal training from other workers or their immediate supervisors, the labor market needs to be structured in such a way as to maximize the transmittal of knowledge and to minimize the resistence to new knowledge (technical progress). To some extent removing direct wage competition and limiting job competition to entry jobs is a necessary ingredient in the training system.

If workers feel that they are training a potential wage or job competitor every time they show another worker how to do their job, they have every incentive to stop giving such informal training. Each man would try to build his own little monopoly by hoarding skills, general or specific, and information. Job insecurity would also mean that every man had a vested interest in resisting any technical improvements that reduce the number of job opportunities in his occupation. Conversely, in a training system where no one is trained unless a job is available (this is what on-the-job training means), where strong seniority provisions exist, and where there is no danger of some competitor bidding down your wages, employees can more freely transmit information to new workers and can more readily accept new techniques. If anyone is made redundant by such techniques, it will be a clearly defined minority—new workers.

As a result, the types of wage and job competition that are the essence of efficiency in simple neo-classical models may not be the essence of efficiency in an economy where the primary function of the labor market is to allocate individuals to on-the-job training ladders and where most learning occurs in work related contexts. Here wage and job competition (above the entry level) becomes counterproductive. Wage and job competition might allow the economy to approach its efficiency frontier more closely, but movements toward the efficiency frontier might also lower its rate of growth. Since the potential long-run gains from movements in the efficiency frontier completely dominate the potential short-run gains from moving closer to the efficiency frontier, the labor market needs to be structured to maximize long-run movements of the frontier rather than short-run approaches to it.[23]

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[23] Although direct wage and job competition may not be pervasive, strong indirect wage and job competition can occur in the external labor markets if final demands are marked by high price elasticities. If an industry or firm gets its average wages out of line, consumers force them back into line by shifting to alternative goods and services. The only comprehensive study of price elasticities by Houthakker and Taylor found that out of 82 exhaustive consumption categories 54 had price elasticities that were not significantly different from zero, 9 had price elasticities between zero and 1, 8 had price elasticities between 1 and 2, and 11 had price elasticities in excess of 2. Thus there is some scope for indirect wage and job competition in the external labor market, but it is limited. In many areas it does not seem to exist. H. S. Houthakker and Lester D. Taylor, *Consumer Demand in the United States*. Harvard University Press, Cambridge, Massachusetts, 1970.

What is the impact of limited wage competition for government policies to alter the structure of income? What is the implication of limited wage competition for education and formal training policies? To the extent that educated labor is distributed across non-competitive lifetime income ladders (job sequences), equalization of the distribution of education will have a correspondingly lesser impact on the equality of the income distribution. The dispersion in the labor queue will be lessened, but a narrower labor queue will still be distributed across a wide distribution of jobs or incomes. Education may equalize incomes through its direct impact on the distribution of job opportunities, but it will not equalize incomes by increasing the supplies and lowering the wages of high skill workers while lowering the supplies and increasing the wages of low skill workers. More potential plumbers will not lower the wages for plumbers since the market is structured in such a manner that individuals cannot learn plumbing skills unless there is a job opening available. Such a job will not exist unless it can generate enough marginal product to pay the current wage.

3. The distribution of job or income opportunities

The shape of the income or job distribution across which individual laborers will be distributed is governed by three sets of factors—the character of technical progress, the sociology of wage determination, and the distribution of training costs. Each could be the focus of an extended discussion, but most of the attention in this paper will be devoted to the distribution of training costs since the other two factors have been extensively investigated elsewhere.

(a) The character of technical progress

The distribution of income opportunities reflects the generating function that produces technical progress since technical progress governs not only the growth in average incomes, but the distribution of income opportunities around this average. Different products, machines, and techniques of production generate jobs with different marginal productivities. At each moment in time there is an efficient distribution of products, machines and techniques given by the state of technology. The question, however, is to what extent technical progress will "adjust" to alterations in relative factor proportions. Will the existence of more college laborers automatically induce technical progress to produce more jobs for college graduates? Will the generating function behind technical progress change?

Although the "induced" character of technical progress has not been examined for different types of labor, it has been examined for substitutions between capital and labor.[24] In general the same conclusions hold. There is no reason to assume that the generating function behind technical progress will automatically change to absorb more college laborers as their supply increases.

No one denies that research and development *could* be focused on increasing the use of college graduates, but everyone also agrees that there is no rational economic reason for giving such directives. The

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[24] Paul A. Samuelson, "A Theory of Induced Innovation Along Kennedy-Weisacker Lines," *The Review of Economics and Statistics*, November 1965, page 343.

purpose of research and development is to develop new products or to lower production costs for old products. Profit maximization, however, does not call for the selection of new products based on whether they do or do not use particular factors of production. It calls for selections based on their potential profitability. The use or avoidance of expensive factors of production has nothing to do with a product's potential profitability.

Since a dollars savings from using less of a cheap factor of production is just as valuable as a dollars savings from using less of an expensive factor of production, there is no reason to assume that the research and development costs of saving a dollar's worth of usage of expensive factors of production will be less than the research and development costs of saving a dollar's worth of usage of cheap factors of production. In fact, the common distinction between cheap and expensive factors of production has almost no economic meaning. Cheap and expensive have meaning only if they are used to describe the difference between a factor's marginal productivity in some use and its marginal cost. A factor is cheap when its marginal productivity is greater than its marginal market price and a factor is expensive when its marginal productivity is less than its marginal cost. In a perfectly functioning competitive economy in equilibrium factors of production are always paid their marginal products. No factor is cheap or expensive in general. No economic incentives exist to direct research and development toward or away from the use of any factor of production.

As a result, there is no economic reason for believing that research and development should be biased toward generating jobs for college laborers. There is no tendency for technical progress to search for alternative methods of providing the labor services of high school and grade school laborers. Technical progress is not biased toward income equalization. If it is a profit maximizing substitution, a low wage worker may be substituted for a high wage worker, but the reverse is just as likely to happen. High wage labor may be substituted for low wage labor.

In a world with wage competition and where all college laborers were paid a common wage, increases in the supplies of college laborers and reductions in the wages of college laborers would lead to higher profits for goods using college laborers. The resulting expansion in the production of these goods would lead to an increased demand for college laborers offsetting some of the reduction in college wages that would otherwise have occurred. (The degree to which this would happen depends upon the price elasticity of demand for those goods produced by college laborers. In general U.S. price elasticities of demand seem to be low.) Lower wages of college laborers would also lead employers to substitute college laborers for non-college laborers. Such substitution would support college wages but lower wages for non-college laborers. (The degree to which this would happen depends upon the elasticity of substitution between college and non-college labor (see above)). Such expansions of demand, however, have nothing to do with induced technical progress. They are merely substitutions within the existing framework of technical knowledge and limited by it.

In a world without wage competition and without a common wage for college laborers (a world where each worker is paid the marginal

product of the job he holds), there are no similar incentives to alter the relative demands for college laborers. More college laborers do not lead to lower wages in jobs held by existing college laborers. Instead more college laborers are simply available to compete with non-college laborers for jobs (and wages) that formerly had been held by non-college workers.

In either a wage competition world or a job competition world, the distribution of income opportunities reflects the characteristics of the generating function that produces technical progress. The connection is simply more rigid in a job competition world. In neither is there any reason for increasing factor supplies to induce technical progress that uses that factor of production.

Thus technical progress may simply be occurring in such a fashion to generate a fixed distribution of incomes around a rising average (the post-war U.S. result). There is no logical reason why technical progress has been generating such a distribution. It simply did. If such is the case, the only remaining problem is distributing individuals across this fixed distribution of marginal productivities.

Although it is quite clear that there is no economic reason for private research and development expenditures to concentrate on using educated labor, government research expenditures might be directed to such an objective (just as they are directed toward reaching the moon). A conscious effort to alter the generating function for technical progress might be successful. On the other hand a policy of educating labor and then directing technical progress to find uses for such labor must be compared with simply directing technical progress to generate a more equal distribution of marginal productivities.

(*b*) *The sociology of wage determination*

Sociology must play an important role in wage determination. Even theoretically neo-classical economic principles cannot determine wages in three cases. If production occurs in conditions of less than or more than constant returns to scale, factors of production cannot be paid their marginal products and still just exhaust the total product that is to be distributed. With diseconomies of scale (less than constant returns to scale), total output exceeds the summation of each factor's marginal product. Who is to get the surplus? How is it to be divided among workers and capitalists? There is no set of efficient economic rules. Some other decision rule must be invoked. In practice the distribution of economic power and senses of justice among workers and employers must govern the disbursements. Similarly when there are economies of scale (greater than constant returns to scale), the summation of each factor's marginal product exceeds total output. Who is to get less than his marginal product? How is this reduction to be divided among workers and capitalists? Once again there are no economic rules. Although aggregate production functions do not indicate significant economies or diseconomies of scale, many individual industries, firms, or production processes are subject to economies or diseconomies of scale. In each of these firms or industries wage determination must be based on something other than marginal productivities.

Finally, some goods and services are produced in a group production process where each factor of production is absolutely essential to production. Output drops to zero when any one factor is removed. In this situation there is no theoretical or practical method for determining individual marginal productivities. Average wages can be set by the group's average productivity, but individual wages must be based on negotiations among workers and between workers and capitalists. The importance of this case is magnified by the fact that many goods and services are produced in circumstances where it is theoretically possible to determine marginal productivities, but where such a determination is simply too expensive. As a result, marginal products are often never actually determined. In their absence some other principle must be applied.

Even within group production processes where individual marginal productivities could be easily estimated, marginal products may not be used to set wages. If workers preference systems are highly interdependent rather than independent (as they are in the simple neo-classical world), group and individual performance may heavily depend upon having a set of relative wage rates that the group itself regards as fair and equitable. Workers may be anxious to bargain about relative wage rates as they are about absolute wage rates. In a neo-classical world higher wages for my co-worker do not lower my utility; in the real world higher wages for co-workers may very well lower my utility and my performance.

If utility functions are interdependent and conditioned by experience and history, changes in relative wages will be very difficult to bring about since historical wage differentials have the sanction of time. They are assumed to be just until proven unjust. Even more importantly, the longer they exist, the more they condition workers beliefs about what constitutes justice and injustice. Thus a fixed distribution of observed incomes may simply indicate that social value judgments on relative earnings have not changed in the period under consideration. To understand changes in relative wages, an understanding of what causes changes in a group's sense of justice and injustice may be central. Changing the distribution of marginal productivities may have little impact on the observed distribution of earnings. As a result, the constant post-war distribution of earnings may reflect sociology and interdependent preferences as much as it does a technologically fixed distribution of marginal productivities.

Such interdependent utility functions would also lead to the elimination of direct wage competition. Direct wage competition becomes counter-productive in a production environment since a wage increase for any worker shows up a real wage (utility) reduction for every other worker. Given a need for production teamwork, wage negotiations are conducted on a team rather than an individual basis.

To say that relative earnings are conditioned by sociology is not to say that relative earnings are immutable. Relative wage preferences may change in the future even if they have not changed in the recent past. Public policies could also be adopted to change such preferences. These policies may in fact lie at the heart of any attempt to alter the distribution of earned income.

(c) *The distribution of training costs*

In a job competition model where many cognitive skills are learned on-the-job, training costs play a key role in determining the distribution of earnings. When an individual changes his background characteristics, he changes his training costs and the jobs for which he is eligible to compete. Alterations in the distribution of potential training costs may also induce alterations in the distribution of job (income) opportunities. But to what extent will changes in the distribution of background characteristics induce changes in the distribution of earnings? Will a more equal distribution of education, for example, lead to a more equal distribution of income (everything else remaining the same)? If background characteristics, like education, have their primary impact on the costs of training individuals for various positions, how will reductions in training costs or a change in the distribution of training costs influence the distribution of income?

The answer to these questions depends upon four factors:

(*a*) Who bears training costs—the employee or the employer?

(*b*) What set of background characteristics did the individual have prior to improving his education and what set of background characteristics does the individual possess after improvements in his education?

(*c*) What is the elasticity of training costs with respect to increases in education across the lifetime income ladders?

(*d*) What is the relationship between training costs and lifetime income ladders? Do training costs go up relative to earnings as earnings increase?

Although improvements in the distribution of training costs brought about by an expansion of higher education may influence the distribution of job opportunities, such an improvement will not increase the range of potential job opportunities. What was the highest marginal productivity job before expansion will continue to be the highest marginal productivity job after expansion?[25] Research (increasing knowledge) generates higher income opportunities but education (expanding existing knowledge across more people) does not. Lower training costs might, however, move the center of gravity of the distribution in such a way as to raise average incomes or in such a way as to increase the density of the distribution at any point over the existing range of possibilities.

If employees bear training costs and if employees pay for training costs by accepting wages less than their marginal productivities, reductions in training costs will have no impact on the distribution of gross incomes (gross marginal productivities), but will raise at least observed incomes (net incomes or net marginal productivities). Each employee will be forced to devote less of his gross income to training expenses. Increases in the supplies of college laborers will thus lead to observed wage increases in the jobs that they actually obtain. The extra college laborers will receive jobs that had been high school jobs, but the observed wages in these jobs will rise above the level paid for

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[25] This might not be true in the limited case where the highest productivity jobs were complimentary with the quantity of educated labor. Thus a supervisor's productivity might go up if he had more college workers and fewer non-college workers to supervise.

non-college employees even though the gross marginal product of the jobs are unaffected.[26]

For that portion of training costs paid by employers, reductions in training costs would have no direct impacts on observed income. Observed wages remain constant, but the returns to capitalists increase since their production costs fall. Depending upon the distribution of capitalists across the income distribution, the distribution of income would become more or less equal. In a competitive market, however, there would be further indirect effects. With lower training costs, production costs would fall, leading to price decreases and increases in the demand for labor. In addition, lower training costs would lead to some substitution of trained for untrained labor.

The precise results will depend upon the exact distribution of price elasticities of demand and the exact elasticities of substitution between different jobs. If price elasticities are high for products that use highly trained labor, highly trained job opportunities will expand. If substitution elasticities are high, many jobs with little training will be replaced with jobs that require training. The impact on the distribution of earnings, however, will depend upon exactly what jobs are expanded and exactly what jobs are replaced. For example, if the expanding job opportunities are farther above the median income than the contracting job opportunities are below the median income, income equality will decrease. If they are closer to the median income, income equality will increase. Similarly both the jobs to be replaced and their replacements may come from many locations on the income distribution. Such substitutions may or may not lead to a more equal distribution of income.

The precise shift in the distribution of background characteristics is important since an individual's job opportunities are affected by his

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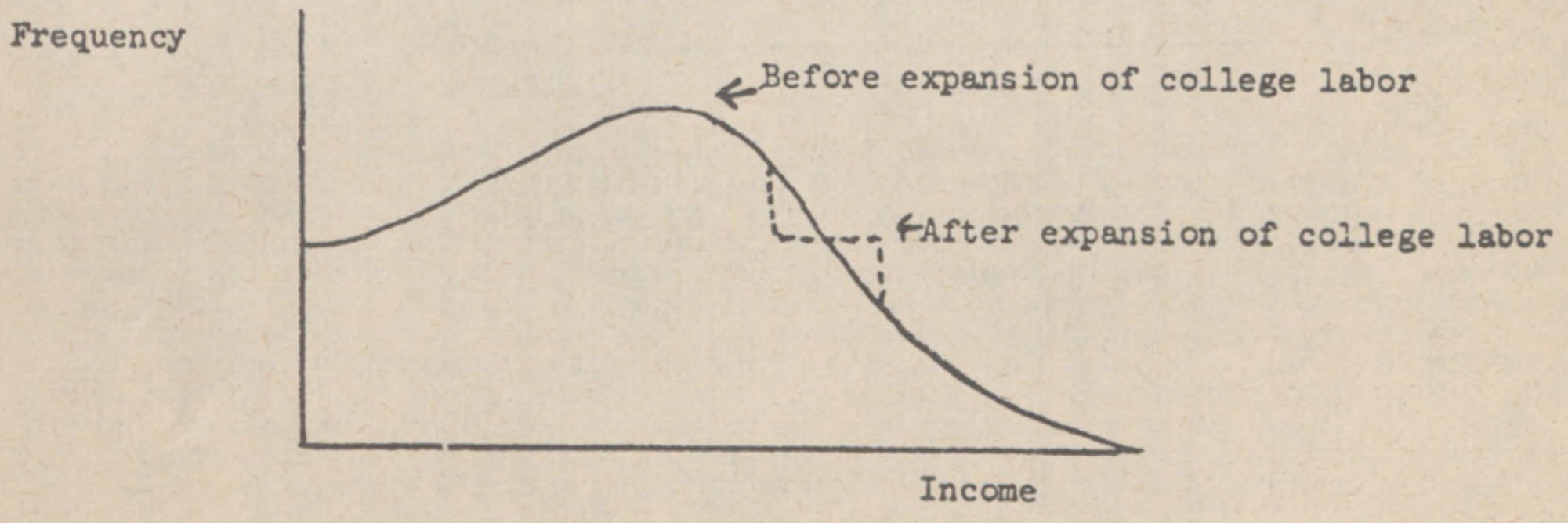
[26] Wages would not, however, rise to the level paid in jobs already held by college laborers. College laborers would take the jobs in which they held the greatest comparative advantage first and gradually move down into jobs where they hold less and less of a comparative advantage.

Observed incomes would rise in those jobs that were taken over by college laborers. Employers would substitute college laborers for noncollege laborers and with lower training expenses would raise observed wages. Such a substitution would shift the observed distribution of income to the right. (See chart below.) Employers would only make such substitutions if they had an interest in the educational composition of their labor force. In the limiting case where all training costs were paid by labor, employers would have no such interest. But as was pointed out earlier, this limiting case is probably non-existent in practice. If all college laborers were preferred to all non-college laborers, an increase in the supply of college laborers might shift the income distribution from that given by the solid line to that given by the dotted line in the chart below. College workers would take what had been the highest income non-college jobs, but observed incomes in these jobs would rise as a result of lower training costs.

POSSIBLE DISTRIBUTION OF INCOME BEFORE AND AFTER EXPANSION OF COLLEGE LABOR FORCE



relative position in the labor queue. For example, the position of high school laborers differs depending upon whether an increase in the supply of college laborers arises from transforming existing high school laborers into college laborers or whether it arises from transforming existing grade school laborers into college laborers. In the first case the remaining high school laborers find that they must compete with a larger group of college laborers, but they also find that there are fewer high school laborers to compete against. In the second case, they do not find fewer competing high school workers. If all college laborers were preferred to all high school laborers and if all high school laborers were preferred to all grade school laborers, an increase in the supply of college laborers brought about by a reduction in the number of grade school laborers might alter the distribution of income at two points on the income distribution.[27] The new college laborers would replace existing high school laborers in what had previously been the best job opportunities for high school laborers. To the extent that the laborers paid for training costs, observed wages would rise. High school laborers would filter down the distribution of job opportunities and replace grade school laborers in what had previously been the best job opportunities for grade school laborers. As a result, average incomes would fall for college laborers, high school laborers, and grade school laborers. Depending upon the changes at the two margins, however, the entire distribution of income might become more or less equal.[28]

What should be noticed, however, is that regardless of whether employees or employers pay for training, the gains from more education and lower training costs cannot be estimated from the income gaps between college laborers and high school laborers. Increasing the supply of college laborers leads to lower average incomes for both college laborers and high school laborers. *Neither marginal or average income gaps between high school and college laborers serve to estimate the gains from more education either to the individual or to society.* When

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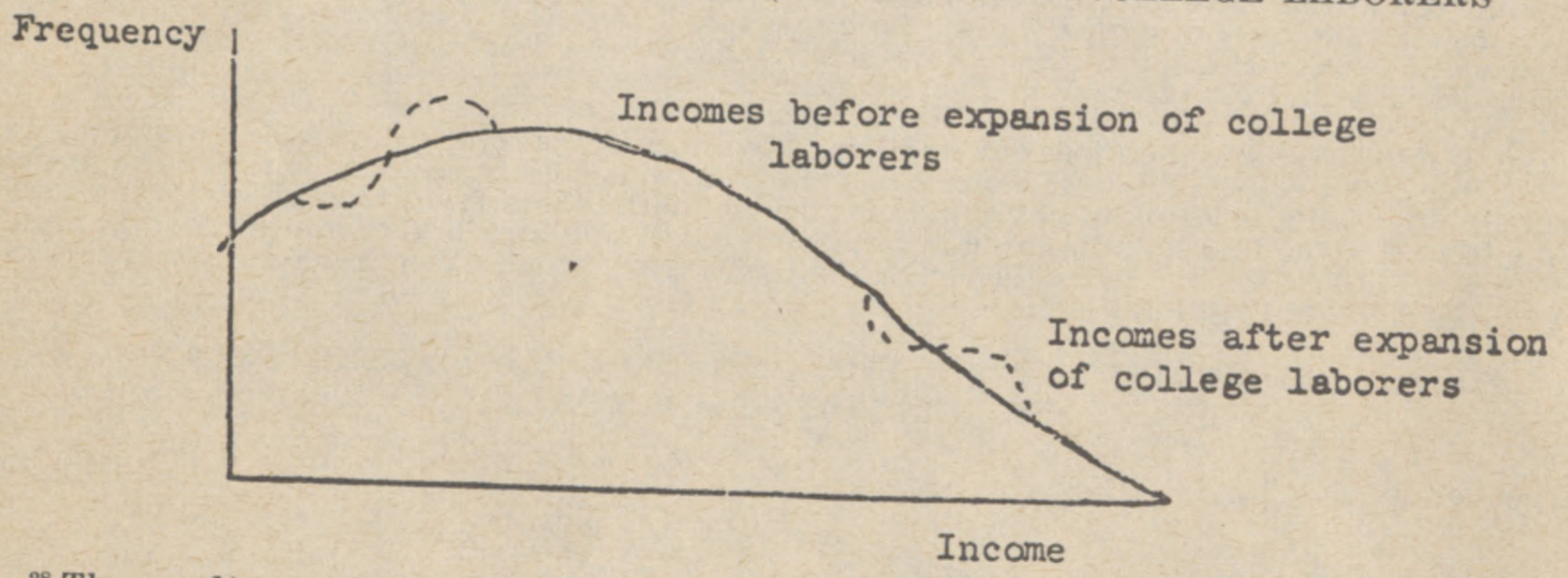
[27] POSSIBLE CHANGES IN THE DISTRIBUTION OF INCOME BROUGHT ABOUT BY TRANSFORMING GRADE SCHOOL LABORERS INTO COLLEGE LABORERS



[28] The results can be seen in terms of simple supply and demand if it is assumed that there is an economy with a high wage sector and a low wage sector. Given the wage rate in the high wage sector and the demand curve for high wage labor, the number of high wage jobs is determined. Workers are then allocated to this sector with college laborers receiving preference. If there are an inadequate number of college laborers, some high school laborers receive high wage jobs. As the number of college laborers expands, however, high school workers are crowded out of the high wage sector. As the number of college laborers expands still further, college laborers find that they must enter the low wage sector. As a result, the average wage for college and high school laborers will fall as the number of college laborers increases. Given such a structure the observed wage differential need not indicate anything about the relative productivity of college and high school laborers. Instead it may reflect the amounts of training given to high wage employees and low wage employees.

labor pays for training, the economic benefits from education would be measured by observing the resultant increases in wages in those jobs that college laborers take from high school laborers. When employers pay for training, the economic benefits from education would be measured by the resultant price reductions and by the wage differentials between those jobs that were replaced and those jobs that were created.

The elasticity of training costs with respect to education and the size of training costs are important since they determine the reduction in training costs that will result from an increase in educated labor. If either training costs or elasticities are small, additional education can have little impact on the distribution of income.

Both factors may also vary across the distribution of observed incomes. If elasticities are highest at the upper end of the income spectrum, increases in college laborers would make the distribution of income more unequal. There would be a big jump in the observed incomes of those jobs previously held by high school laborers and now held by college laborers. If the elasticities were highest at the lower end of the income spectrum, increases in the supply of college laborers and the resulting jobs bumping (potentially leading to a better man in every job if the worst grade school worker were made into the best college laborer) might lead to large observed wage increases in relatively low wage jobs. Once again, however, relative income differentials between educational classes do not reflect the distribution of either elasticities or training costs. Yet these elasticities and training costs are what is needed to determine the economic benefits from education.

Thus in a world characterized by job competition rather than wage competition, rate of return calculations based on normalized income differentials provide no information as to whether education does or does not have an economic payoff. Instead of focusing on income differentials, analysts need to concentrate their empirical investigations on who bears training costs, observed changes in wages when jobs shift from high school to college incumbents, the distribution of training costs across the distribution of jobs, and the elasticity of training costs with respect to education.

4. Job competition in the American economy [29]

It is beyond the scope of this paper to determine exactly where the American economy falls on the continuum between a wage competition economy and a job competition economy. Seniority provisions, the stability of wages when excess supplies of labor develop, the extent of on-the-job training, the existence of highly structured internal labor markets, the intensity of relative wage bargaining, and a host of other factors would go into such a determination. Readers can judge for themselves exactly where they would place the American economy on such a continuum and whether they think a job competition model can aid in answering the relevant questions and puzzles. In any case there does seem to be a substantial element of job rather than wage competition in the American economy. To the extent that it exists it must be considered in any set of programs to alter the structure of American incomes.

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[29] All of the data in this section including that used as a source for the tables comes from the U.S. Bureau of the Census, *Current Population Reports: Consumer Income: Income in 1969,* Page 101 and U.S. Bureau of Census, *U.S. Census of Population: 1950,* PE–No. 5B, GPO, Washington, 1953, Page 5B–108.

If at the beginning of the post-war period, an observer had been told that the composition of the adult white male labor force was going to change from 47 percent with a grade school education, 38 percent with a high school education, and 15 percent with a college education, to 20 percent with a grade school education, 51 percent with a high school education, and 28 percent with a college education (the actual 1949 to 1969 changes), expectations about the distribution of income would have been very different depending upon whether the observer subscribed to a job competition model or a wage competition model. Assuming for the moment that there were no offsetting changes on the demand side of the market, the observer subscribing to a wage competition model of the world would have predicted a substantial equalization of earnings as the extra supplies of more educated workers drove down their relative wage rate. But what would the observer subscribing to a job competition view of the world have predicted?

According to a job competition model the most preferred group (college laborers) would have experienced an equalization of income within their group, a rise in incomes relative to other groups, but a fall in incomes relative to the national average. As the most preferred group expanded, it would filter down the job distribution into lower paying jobs. This would lead to a fall in wages relative to the national average. As it moved into a denser portion of the national job (income) distribution, it would however, experience within group equalization of income. By taking what had previously been the best high school jobs college incomes would rise relative to high school incomes.

Such a prediction would have been correct. The proportion of college incomes going to the poorest 25 percent of white male college laborers rose from 6.3 percent to 9.0 percent from 1949 to 1969 while the proportion going to the richest 25 percent fell from 53.9 percent to 46.0 percent. While the median income of college laborers was rising from 198 percent to 254 percent of the incomes of grade school laborers and from 124 percent to 137 percent of high school laborers, it was falling from 148 percent to 144 percent of the national average.

As the least preferred group (grade school laborers) contracted in size, a job competition observer would have expected it to be moving out of the denser regions of the income distribution and to become more and more concentrated in the lower tail of the income distribution. Given the shape of the lower tail of the American income distribution, such a movement would have led to falling relative incomes and increasing income equality.

In fact the incomes of grade school laborers have fallen from 50 percent to 39 percent of college incomes and from 63 percent to 54 percent of high school incomes. The income going to the poorest 25 percent of all grade school laborers has risen from 2.9 percent to 6.6 percent of the group's total and the income going to the richest 25 percent has fallen from 53.5 percent to 49.4 percent.

Predictions of the position of the middle group (high school laborers) would have depended upon an analysis of the relative densities of the income distribution at the margin with college laborers and

grade school laborers. Since the American income distribution is denser on the margin with grade school laborers than on the margin with college laborers, an expansion in the size of the middle group, should have lead to more within group equality, an income rise relative to grade school laborers and an income fall relative to high school laborers.

In fact the proportion of income going to the poorest 25 percent of all high school laborers has risen from 8.2 percent to 10.2 percent while the proportion going to the highest 25 percent has fallen from 46.0 percent to 41.6 percent. High school incomes have risen relative to grade school incomes (from 160 percent to 185 percent) and fallen relative to college (from 81 percent to 73 percent).

Changes in the job distributions for grade school, high school, and college laborers have been quite dramatic in the post-war period. Table 12 shows the actual probability distributions for grade school, high school, and college white adult male laborers in 1949 and 1969. In 1949 a grade school laborer had a 4.3 percent chance of obtaining a job that would place him in the top decile of jobs and a 14.4 percent chance of getting a job that would place him in the lowest decile of jobs. By 1970 these probabilities had dropped to 1.7 percent and risen to 23.0 percent. Conversely, the probability of college laborers holding a job in the bottom decile of jobs has fallen from 5.1 percent to 3.8 percent. (The probability of holding a job in the highest decile also fell due to the vast expansion of college laborers.) High school graduates have become similarly disadvantaged. Their probability of holding high income jobs has fallen and their probability of holding low income jobs has risen.

TABLE 12.—DISTRIBUTION OF JOBS OVER EACH EDUCATION CLASS (ADULT WHITE MALES)

[In percent]

	Elementary (0 to 8 years)		High school		College	
	1950	1970	1950	1970	1950	1970
10 percent best jobs	4.3	1.7	10.5	6.5	28.9	25.6
2d best 10 percent	6.0	3.5	13.2	11.3	16.3	14.7
3d 10 percent	7.6	3.5	13.4	11.3	10.0	14.7
4th 10 percent	7.7	6.2	13.4	12.5	9.9	9.6
5th 10 percent	9.4	6.9	12.1	12.5	6.9	8.8
6th 10 percent	10.7	8.7	10.6	12.4	6.1	7.1
7th 10 percent	11.8	11.3	9.0	11.5	6.0	5.9
8th 10 percent	13.1	15.6	7.0	9.3	6.2	5.0
9th 10 percent	14.8	19.6	5.2	7.1	4.6	4.7
10 percent worst jobs	14.4	23.0	5.6	5.5	5.1	3.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

An alternative method for looking at the same changes is to look at the fraction of jobs held by each educational group in each decile of jobs. (See table 13.) While college laborers held 41 percent of the best jobs in 1950, they held 65 percent of the best jobs in 1970. Conversely, grade school workers saw their percentage of the best jobs drop from 22 percent to 5 percent.

TABLE 13.—JOB PROBABILITIES (ADULT WHITE MALES)

[Figures for: 1950—Money income in 1949, population in 1950; 1970—Money income in 1969, population in 1970]

Quality of jobs (determined by income of total males with income 25 years and older)	Percent of total people in each job class, in 1950 and 1970, with the following education—					
	Elementary		High school		College	
	1950	1970	1950	1970	1950	1970
10 percent best jobs provide incomes of—1950, $5,239.3 and up; 1970, $15,000 and up	21.9	4.8	37.0	30.2	41.0	65.0
2d best 10 percent provide incomes of—1950, $4,028.84 to $5,239.2; 1970, $12,506.26 to $14,999	30.6	9.9	46.4	52.7	23.0	37.3
3d 10 percent—1950, $3,519.7 to $4,028.83; 1970, $10,012.9 to $12,506.25	38.8	9.9	47.0	52.7	14.2	37.3
4th 10 percent—1950, $3,025.2 to $3,519.6; 1970, $8,752 to $10,012.8	39.0	17.4	47.0	58.2	14.0	24.4
5th 10 percent—1950, $2,553.6 to $3,025.1; 1970, $7,573.9 to $8,751	47.8	19.4	42.4	58.3	9.8	22.4
6th 10 percent—1950, $2,101 to $2,553.5; 1970, $6,449.6 to $7,573.8	54.2	24.4	37.1	57.7	8.6	17.9
7th 10 percent—1950, $1,530 to $2,100; 1970, $5,148.3 to $6,449.5	59.9	31.6	31.6	53.5	8.5	14.9
8th 10 percent—1950, $706 to $1,529; 1970, $3,576.6 to $5,148.2	66.7	43.8	24.6	43.5	8.8	12.7
9th 10 percent—1950, $270.6 to $705; 1970, $2,008.2 to $3,576.5	75.3	54.9	18.3	33.2	6.5	11.9
10 percent worst jobs—1950, $0 to $270.5; 1970, $0 to $2,008.1	73.2	64.5	19.6	25.8	7.2	9.7

The increasing economic segregation based on education can be seen even more clearly in table 14 where each cell has been adjusted for changes in the proportions of college, high school, and grade school laborers. (The table is constructed so that each cell would have the number 1 if incomes were randomly drawn with respect to education.) In 1949, a college graduate was 6 times as likely to hold a job in the top decile as a grade school graduate (2.715/0.436), but by 1969 he was 15 times (2.549/0.1714) as likely to hold a job in the top decile. Conversely, the probability of a grade school graduate holding a job

TABLE 14.—NORMALIZED PROBABILITIES (ADULT WHITE MALES)

[Figures for: 1970—Money income in 1949, population in 1950; 1970—Money income in 1969, population in 1970]

Quality of jobs (determined by income of total males with income, 25 years and older)	Percent of total males in each job class, in 1950 and 1970, with the following educational attainment (divided by percent of total males with that education attainment that year)—					
	Elementary		High school		College	
	1950	1970	1950	1970	1950	1970
10 percent best jobs provide incomes of—1950, $5,239.3 and up; 1970, $15,000 and up	0.436	0.1714	1.066	0.648	2.715	2.549
2d best 10 percent provide incomes of—1950, $4,028.84 to $5,239.2; 1970, $12,506.26 to $14,999	.599	.3535	1.337	1.130	1.523	1.468
3d 10 percent—1950, $3,519.7 to $4,028,83; 1970, $10,012.9 to $12,506.25	.772	.3535	1.354	1.130	.940	1.468
4th 10 percent—1950, $3,025.2 to $3,519.6; 1970, $8,752 to $10,012.8	.776	.621	1.354	1.248	.927	.960
5th 10 percent—1950, $2,553.6 to $3,025.1; 1970, $7,573.9 to $8,751	.952	.692	1.221	1.251	.649	.881
6th 10 percent—1950, $2,101 to $2,553.5; 1970, $6,449.6 to $7,573.8	1.079	.871	1.069	1.238	.5695	.704
7th 10 percent—1950, $1,530 to $2,100; 1970, $5,148.3 to $6,449.5	1.193	1.128	.910	1.148	.5629	.586
8th 10 percent—1950, $706 to $1,529; 1970, $3,576.6 to $5,148.2	1.328	1.564	.708	.933	.5827	.500
9th 10 parcent—1950, $270.6 to $705; 1970, $2.008.2 to $3,576.5	1.500	1.960	.527	.712	.4304	.468
10 percent worst jobs—1950, $0 to $270.5; 1970, $0 to $2,008.1	1.458	2.303	.564	.552	.4768	.3818

in the lowest decile has risen from 3 to 6 times that of college graduates. Similarly college probabilities of holding the best job have risen relative to high school graduates (from 2½ to 4 times those of high school) while high school probabilities of holding the worst jobs have risen (from 1.2 to 1.5 times those of college). Extrapolation of these trends for another 20 years would lead to a world where income was almost perfectly segregated based on education.

Although the job competition model seems to post-cast accurately what would have happened to the American distribution of income in the post-war period, post-casting is not completely convincing and there are other explanations for what happened in the post-war period. One explanation would argue that increasing technical progress has simply made education more necessary to acquiring income producing skills. Training costs differentials have risen and this explains the increasing economic segregation based on education. Another explanation would argue that higher education has become more meritocratic in the post-war period (i.e., it is becoming more perfectly correlated with other income producing factors). Thus there is an appearance of more economic segregation based on education. Still another explanation would argue that the American economy has become more of a credential society where education is used as a cheap (or defensible) screening device. It is not very closely related to training costs but it is used as a pervasive hiring criteria.

Although it is not possible to disprove the hypothesis that technical progress is changing in a manner as to offset precisely the impacts of rising and more equal educational distribution, the consistency in the distribution of income, the lack of acceleration in productivity increases, and the filtering of college laborers farther and farther down the income ladder all raise questions about offsetting changes on the demand side of the labor market.

To distinguish among rival explanations it would be necessary to look at training costs to see if training cost differentials have risen over time and to see if training costs are now more highly correlated with education. If they have not risen over time and are not more highly correlated with education, the economy must be becoming more credentially orientated. Alternatively, the wage competition model may be inappropriate. (Analysis of correlations between job performances and education would not provide the necessary evidence since training programs are used to equalize job performances in similar jobs. Training costs differ; but not job performances.) A question then arises as to why artificial credentials should have become more important.

5. Implications of job competition view of the economy

If there is a substantial element of job competition rather than wage competition in the economy (as the author believes there is), education's impact on the distribution of income (both its level and shape) cannot be simply determined with rate of return calculations based in normalized income differentials between different levels of education. Although the exact impact of an alteration in the distribution of education can have different impacts on the distribution of income depending upon the factors outlined above, large observed income differentials could persist after the net social productivity of education was reduced to or below zero. An increasing supply of college laborers

might lead to college laborers accepting jobs farther down the job opportunities distribution. In the process they would lower average college incomes, but they would also lower average high school incomes. This would preserve the observed wage differential between college and high school labor, but it would not have its neo-classical meaning. A differential would not mean that output was increasing as a result of more education; a differential would not reflect the productivity differential between the marginal college man and the marginal high school man.

As a result there is a need to be much more agnostic about the economic returns to education than current economic analysis would indicate. Education may or may not have the payoffs that are currently predicted. To determine whether it does or does not, a job competition model would lead to the analysis of who bears training costs, the exact movements in the distribution of education, the distribution of training costs across job opportunities, the elasticities of training costs with respect to education, and the other factors outlined above.

If true, the job competition model indicates that most of the current programs to improve the data base for estimating the economic returns to education are misdirected. They are focusing on calculating accurate normalized income differentials when they should be focusing on calculating the impact of education on training costs. Unfortunately, the types of samples and surveys for generating accurate incomes differentials are completely inappropriate for generating accurate data on the impact of education on on-the-job training costs. At the moment data on training costs by education class is almost completely non-existent. Such data should be a key goal in the design of future expenditures to improve our knowledge of the market for educated labor.

If true, the job competition model indicates that education may become a defensive necessity to private individuals even if there are no net social returns to education. As the supply of educated labor increases, individuals find that they must improve their education simply to defend their current income position. If they don't, others will and they will not find their current job open to them. Education becomes a good investment, not because it would raise an individual's income above what it would have been if no one had increased their education, but because it raises their income above what it will be if others acquire an education and they do not. In effect education becomes a defensive expenditure necessary to protect your "market share." The larger the class of education labor and the more rapidly it grows, the more such defensive expenditures become imperative. Interestingly many students currently object to the defensive aspects of acquiring a college education.

Education may, however, have a payoff in terms of economic mobility even if it does not have a payoff in terms of increasing incomes or equalizing the distribution of income. If incomes are randomly assigned once an individual enters an educational class (acquires a particular background characteristic), increasing college laborers (particularly miniority group college laborers) may be a powerful device for increasing economic mobility or equalizing the distributions of white and black incomes.

Both the post-war experience with impacts of education on incomes and the extent of job competition in the American economy lead to substantial doubts about the feasibility of altering the structure of American incomes with government programs that are exclusively focused on the supply side of the labor market. Background characteristics can be altered without altering the structure of incomes. Given the on-the-job nature of most skill acquisitions it is very difficult to design government training programs for altering the skills actually used. Even if skills can be taught in formal training programs, workers find that labor markets are not able to absorb them since normal entry jobs are not skilled jobs. Supply side programs may be necessary in any general program for altering the structure of American incomes, but they must be combined with programs to alter the structure of labor demands.

V. The Market for Job Characteristics

To design a strategy for altering the structure of incomes it is necessary to start isolating those job characteristics that produce earnings. Before programs can be designed to alter earnings, the factors that produce earnings must be known. Sometimes these characteristics are also personal characteristics, but often they are not characteristics that reside in the individual. They reside in the job itself.

This section is an attempt to begin the process of analyzing the market for job characteristics. As an initial attempt, it obviously does not represent a definitive account of the value of different job characteristics. (Given the preliminary nature of the results, most of the results are set in the appendix.) In essence it is an attempt to deduce values that are explicitly determined in socialistic economies. There a simple system of weights is often applied to wages to compensate for job characteristics (skills or irksomeness). The capitalistic counterpart to this overt set of wage premiums is the market for job characteristics. Here the interacting forces of supply and demand determine the quantity and price of various job characteristics.[30] These prices for job characteristics are in turn a major component of the observed wage rates for different jobs and occupations.

The aim of this section is not to explain why a particular characteristic has a particular price, but to deduce what the price actually is. To do this the observed wages and job characteristics were matched for four racial and sexual groups for a large number of individuals. (See the appendix.) Econometric techniques are used to explain observed wages in terms of job characteristics. In the process a price is assigned to each of the characteristics. For some reason, perhaps their volatile participation patterns, the wages of white females bore little relationship to the job characteristics that were collected in the data used in this analysis.

Aptitudes (intelligence, abilities, dexterity, and coordination) required by jobs play an important part in determining wages, but there

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[30] The price of a job characteristic is the difference in wage rates between a job that requires a particular characteristic and a job that does not. See: Z. Grilliches use of Hedonic Prices in "Hedonic Price Indexes for Automobiles: An Econometric Analysis of Quality Changes," *Government Price Statistics, Hearings,* U.S. Congress, Joint Economic Committee, January 1961.

is no simple rule which says that the higher level of aptitude required the higher the wages paid. For instance, jobs requiring higher levels of intelligence on average pay lower wages, given the other characteristics of the job. For white males high intelligence required lowered average wages by $1.47 per hour. (See table 15.) One plausible explanation might be that high intelligence jobs are more attractive, thus giving a relatively large supply at a given price.

TABLE 15.—*Job characteristic prices for white males*

	Cents per hour
General education development demanded by the job is:	
(*a*) equivalent to 12 years of schooling	85.5
(*b*) equivalent to 16 years of schooling	173.3
(*c*) equivalent to 18 years of schooling	221.2
Working outside	68.7
Working in:	
(*a*) heat	70.2
(*b*) hazardous conditions	—78.0
(*c*) fumes	28 1
Job requires high level of:	
(*a*) intelligence	—147.3
(*b*) numerical ability	118.3
(*c*) manual dexterity	117.8

NOTE.—This table is an extract from some early results presented in full in the appendix.

Wages of males increase with general level of educational development demanded by the job, but this is not true for females. Non-white males are also paid a lower price for the same educational ability required by a job than are white males, except at very high levels (graduate school equivalent) of educational development. This remains true even if the effect of the actual education of the person is already taken into account. (See table 17 in appendix.) For males, the effect on wages of overeducation and undereducation is almost symmetrical, although stronger for whites. For non-white females the increment in wages for a year of overeducation is double the loss for a year of undereducation.

The prices of working conditions are also not always those that might be expected. For instance, the presence of danger in a job tends to reduce wages. The presence of fumes, odors, and toxic conditions produces a more predictable increase in wages. Working in heat raises the wages of white males significantly, but not those of non-whites.

The level of strength required by the job proved to have an insignificant effect on wage-rates, both for males and females. But strength is probably correlated with manual dexterity and other job characteristics which have significant effects.

All of the results in table 15 and in the appendix are, of course, preliminary, but they indicate the kind of work that must be done in the future to determine the price of different job characteristics. Only in such an approach will it be possible to determine the relative value of different personal characteristics and different job characteristics. To the extent that job characteristics are important, government programs to alter the distribution of income must shift from their current exclusive focus on personal characteristics to a concurrent focus on job characteristics.

VI. Programs To Alter Labor Demands

As the previous analysis indicated, government programs to alter the structure of incomes cannot be focused entirely on the supply side of the labor market. No one denies the importance of programs to alter personal characteristics, but differences in personal characteristics do not explain all or even most of the observed differences in wages and salaries. Only 30 percent of the observed income differences between black and white males can be attributed to differences in personal characteristics. The remaining 70 percent is explained in terms of demand side phenomena (wage and job discrimination, full employment, etc.).[31] Between women and men demand side elements are even more important. After standardizing for all of the personal characteristics that are demanded in the labor market, women earn only 50 percent of what men earn. The remaining 50 percentage points are explained by differences in the demand for women and men.[32] As a consequence, no program for altering personal characteristics can hope to equalize incomes of blacks and whites or male and females. Efforts must be directly focused on relative wages and job characteristics.

If historical experience is to be used as any guide to the factors that are necessary to cause an increase in the equality of the income distribution, it is necessary to go back to the Great Depression and World War II. In both instances, the distribution of income seems to have become noticeably more equal. From 1929 to 1941 the share of total income going to the bottom 40 percent of the population rose from 12.5 percent to 13.6 percent while the share of income going to the top 5 percent fell from 30.0 percent to 24.0 percent and the share of income going to the top 20 percent fell from 54.4 percent to 48.8 percent. From 1941 to 1947 the share going to the bottom 40 percent rose to 16.0 percent while the share going to the top 5 percent fell to 20.9 percent and the share going to the top 20 percent fell to 46.0 percent.[33] In both cases alterations in the demand side, rather than the supply side, of the market seem to have provided the mechanism for equalizing incomes.

In the Great Depression an economic collapse was the mechanism for changes. Individual fortunes were lost, firms collapsed, and a wage structure emerged that was noticeably more equal than that before the collapse. While interesting, the deliberate collapsing of an economy in order to equalize the distribution of income is not a policy that commends itself. World War II is more interesting from this vantage point.

As a result of an overwhelming social and political consensus that the economic burdens of the war should be relatively equally shared, the federal government undertook two major actions. First, it instituted a very progressive income tax (more progressive than the current federal income tax) that converted a regressive tax system into a

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[31] Lester C. Thurow, *Poverty and Discrimination,* The Brookings Institution, Washington, D.C., 1969, Chapter 3.

[32] Ronald L. Oaxaca, "Male-Female Wage Differentials in Urban Labor Markets," Princeton University memo.

[33] Herman P. Miller, *Income Distribution in the United States,* Bureau of the Census, Washington, D.C., 1966, page 21.

mildly progressive tax system. Second, it used a combination of wage controls and labor controls to equalize market wages. This was accompanied by a conscious policy of restructuring jobs to reduce skill requirements and to make use of the existing skills of the labor force. To some extent old skill differences were simply cloaked with a new set of relative wages and to some extent skill differentials were actually collapsed. When put together the two factors lead to an equalization of market incomes that was not dissipated after the war ended.

To some extent the wage policies of World War II were a deliberate attempt to change the sociology of what constitutes "fair" wage differentials. To some extent the sociology judgments changed as a result of the war (war burdens were to be equally shared) and this was reflected in wage patterns. As a consequence of the widespread consensus that wage differentials should be reduced, it was possible to make a deliberate attempt to reduce wage differentials. While it may be difficult to alter sociological judgments concerning the definition of "fairness", such changes are an important ingredient in any attempt to alter the structure of wages. Since wage negotiators always look at relative wages as well as absolute wages, it is very difficult to change relative wages unless the participants believe that relative wages should as a matter of "fairness" be changed.

Efforts to restructure skill differentials in the production process are also an essential ingredient of any plan to alter the structure of incomes. Earlier this was referred to as directing research and development expenditures toward altering the mix of labor skills required. At the moment almost all of our research and development expenditures are devoted toward discovering new products. Some of these expenditures might be directed toward discovering new (and perhaps cheaper) techniques of producing old products. Skill differentials could be deliberately collapsed as a matter of public policy.

Perhaps it is impossible to generate a consensus on the desired degree of equality without a major war, but there are certainly actions that can be taken to reduce barriers to shifts in the relative distribution of income. The first is to minimize fears of job competition by insuring a full or overly full employment economy that *never* suffers from business cycles and recession. If existing employees fear that every new employee is a potential competitor for their jobs, they will simply refuse to provide the informal on-the-job learning that is necessary for an effective transfer of skills. Second, in a world of labor *shortages* every employer has an incentive to go beyond his existing labor force—to recruit and upgrade workers that he would not otherwise recruit or upgrade. Without shortages every employer will stick to his traditional labor force. Labor shortages will not automatically generate the desired distribution of income, but labor shortages are a necessary ingredient in any policy to do so. Even in wartime, labor shortages, as much as desired to equalize wartime burdens, explain the observed restructuring of the labor force.

In addition to an economy with substantial and persistent labor shortages, it is necessary to think of how the government can directly compress wage differentials without resort to the elaborate wartime structure of wage and labor controls. The answer must be found in

public employment opportunities. Instead of adjusting its wage scales to the private economy, the public sets its wages at the desired level and places pressure on the private economy to adjust to the public wage structure. Since the public sector must be able to compete for high income employees, the adjustments must come by raising the wages of the lower paid workers rather than by lowering the pay of upper income workers. At the lower end of the wage structure, the federal government would abandon the minimum wage law and replace it with a guaranteed job at some minimum wage. Thus the government might guarantee to employ everyone who wants work at $2 per hour. This would force the private economy to pay a minimum wage of $2 per hour but it would also eliminate the adverse unemployment effects that spring from higher minimum wages. To compress the private wage structure, the federal government would set its wage scales in the appropriate manner and subsidize state and local governments to set their wage scales in the appropriate manner.

To encourage changes in the relative wage structure of the private economy, manpower expenditures should also shift from their present focus on personal background characteristics to a focus on the real objective—a restructuring of incomes. If the objective is to alter the distribution of wages and salaries, expenditures should be directed toward this purpose. The easiest method for doing this is to establish a system of payments that rewards employers for altering their relative distribution of wages and salaries.[34]

For example, a system of bonuses could be constructed where employers would be paid depending on the degree to which they raised the wages of their low income workers relative to the national average. If there were a desire not to have any worker earning less than 50 percent of the national average and the average wage of $4 per hour was rising at 6 percent per year, employers would receive bonuses for raising the wages of employees earning less than $2 per hour faster than 6 percent per year. Since the bonus would not be large enough to cover the full cost of raising wages, employers would be left with the problem of the precise method of increasing the productivity of low wage workers. For some workers this might involve more training, for some workers this might involve a restructuring of jobs within a firm, and for some workers new employers might find it easiest to make use of their talents. In any case, the government would let the private economy determine the best technique for altering relative wages. It would merely stand ready to pay a bonus for any alterations that actually occurred.

Such a system has the advantage that the government only pays for the output that it wants. If relative incomes change, it pays. If relative incomes do not change, it does not pay. It is not involved with paying for different inputs, such as training, that may or may not cause the desired results. The program is either successful or it has a zero cost. If it has a zero cost or a low cost (indicating little change) the initial bonus level is too small and must be increased to bring about

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[34] For a more detailed description of one such program see: Lester C. Thurow, *Poverty and Discrimination,* The Brookings Institution, Washington, D.C., 1969, Appendix I, page 191.

the desired results. (This may very well happen since only experimentation with different bonuses could determine the right bonus level.)

Any rapid improvement will also require some kind of quota system to place pressure on major organizations to bring their wage and salary structures into line with the desired national structure of incomes. To be effective any quota should focus on the ultimate objective—a change in the distribution of income. Firms could be allowed to set their own time path of compliance as long as there was a final time deadline on complete compliance, but they would be fined for any deviation from their own path. For example, firms might be required to bring their wage and salary distribution into conformity with national objectives over a 10-year period, but allowed to set their own path subject to some minimum rate of progress (say 5 percent per year) toward the ultimate goal. The goal would be expressed in terms of the firm's income distribution. Thus if the aim were to aid minorities, the firm would be required to pay an appropriate fraction of the income in each quintile of its income distribution to minorities. If minorities constituted 10 percent of the area in which the firms were located, 10 percent of the wage and salary payments in each quintile of the firm's income distribution would have to go to minorities by the end of 10 years.[35]

An adequate package of government programs to alter the structure of incomes would include the following: (1) Research and development expenditures directed toward finding techniques of production that used new skill mixes, (2) efforts to alter sociological judgments about "fair" wage differentials, (3) fiscal and monetary policies designed to create labor shortages, (4) public wage scales deliberately set to force the private sector of the economy to adjust to them, (5) a system of direct bribes to encourage compression of the private wage structure and to help pay for it, and (6) a set of flexible quotas. With such a package of public policies, the relative structure of earnings could undoubtedly *be compressed.*

While these programs would compress the wage structure, they would also have some adverse side effects. A program to compress the structure of incomes would probably make the inflation problem worse. Some of the new production techniques might be more expensive than the old, groups would fight to preserve historic wage differentials, labor shortages would lead to wage increases as firms bid against each other for labor, and a compression of the wage structure would probably come about by raising low wages rather than lowering high wages. Viewed in the context of income compression, inflation is not necessarily a negative factor. While inflation certainly creates horizontal inequities (two individuals with equal incomes before inflation may have unequal incomes after inflation), these do not seem to differ noticeably across different income classes.

Horizontal inequities seem to be just as great among the rich as among the poor. Vertically, the combination of full employment and inflation is an equalizing agent. The poor catch up with the rich and the middle class.[36] During periods of full employment and inflation

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[35] For a more detailed description of such a proposal see : John Kenneth Galbraith, Edwin Kuh, and Lester C. Thurow, "The Galbraith Plan to Promote the Minorities," New York Times Magazine, August 22. 1971, page 9.

[36] See : Charles E. Metcalf, "The Size Distribution of Personal Income during the Business Cycle," *American Economic Review,* September 1969. or Lester C. Thurow, "Analyzing the American Income Distribution," *American Economic Review,* May 1970.

expanding job opportunities benefit the poor relatively more than the rich and wage differentials tend to be compressed. While there are certainly poor people who are hurt by inflation, the poor, as a group, are helped by inflation.

Viewed from the context of income equalization alone the correct response is not to suppress inflation, but to find methods for eliminating its harmful effects on horizontal equity. Such methods would include programs to add cost of living escalators to all wage and salary contracts and to all social insurance programs. In addition the government would sell bonds dominated in real rather than money terms to insure protection for the small saver and to insure that private pensions could be dominated in real as opposed to money terms. With a few simple devices of this type it would be possible to eliminate most, if not all, horizontal inequities. Such devices make inflation more difficult to stop, but there is no evidence that such devices make the inflation problem worse than it already is.

Most of the current government instruments for reducing inflation, such as creating recessions, limiting interest rates for small savers, and resisting cost of living escalators only serve to make the poor worse off. At the moment, the poor are asked to pay the price necessary to stop inflation for the rest of society. At the moment there is no doubt that there is a direct head to head confrontation between income equalization and inflation suppression. Most policies to cause income equalization would create more inflation and the current set of policies for suppressing inflation create more income inequality.

The second income distribution goal is to alter the shape of minority income distributions so that they resemble that of the majority. To the extent that a poverty program is successful, the distributions will be equalized at the bottom (no one will be below the minimum allowable income) but they will not be equalized at the top. While training programs have a role to play, the basic problem is once again on the demand side of the market.

There are millions of blacks, Spanish speaking Americans, other minorities, and women who have all of the necessary qualifications to be promoted into better jobs than those they now hold. Yet they are not promoted. The problem is not solely one of increasing the supply of potentially qualified people, but also of increasing the demand for minority laborers.

The third income distribution goal is to increase economic mobility. Effective inheritance taxes are the only method for insuring economic mobility across the unearned income component of personal income and across the distribution of wealth. Programatically, economic mobility among earned incomes is much harder to achieve. Programs to provide high quality educations, skills, and equal opportunities all have some role, but among a preferred group like white males, the problem is not so much equal opportunity as equal motivations and equal environments. If sons of professional people become professional people because they see the example of their fathers while the sons of blue collar workers become blue collar workers because they do not have the example and environment of a professional father, the country faces a problem that cannot be met in the traditional economic fashion. Since the answers to such a problem are sociological rather than economic, the authors of this paper are in no position to provide suggestions as to how they may be solved.

VII. Conclusions

If a restructuring of incomes is desired, it can be brought about. Substantial efforts, however, must be directed toward altering the demand for labor as opposed to altering personal characteristics of individuals looking for work. Without such efforts on the demand side of the market most programs for altering personal characteristics will have little payoff. Such has been the case in the past and will be the case in the future.

It must be realized, however, that the current structure of market incomes is deeply embedded in the American economy. There are no easy solutions. Any set of programs that actually altered the structure of incomes would require enormous political pressure on its behalf. From the point of view of economics, tax-transfer policies are by far the easiest to implement yet these are probably the most difficult to implement from a political viewpoint. Unfortunately, there simply are no governmental policies that will just slightly affect the economy yet cause large changes in the market distribution of earnings.

APPENDIX

Notes on Job Characteristic Prices

1. Data Sources

(*a*) Survey of Economic Opportunity 1967. This survey includes two samples:
(i) A national sample of 18,000 households drawn in the same way as the Current Population survey sample.
(ii) 12,000 additional households drawn from areas with large non-white populations.

From these samples all adults were used for whom the average hourly earnings and occupations were reported. (Adults known to have left their job since reporting their occupation, but prior to reporting their wage-rate, were omitted from our sample.)

(*b*) Dictionary of Occupational Titles, Ed. Three. As a supplement to the Dictionary, data has been collected describing the job characteristics of 13,778 jobs.

(*c*) A matrix cross-classifying members of the 35,000 households included in the Current Population Survey conducted in October 1966, according to Census and Dictionary of Occupation Titles occupational classifications.

2. Preparation of Job Characteristics Data

Each observation in the regressions is an individual adult. The S.E.O. gives the Census Occupation and Census Industry of each adult we used. Some of the job characteristics were already in the form of 1/0 dummies, others had ordinal step values. The latter were converted to series of dummies. The values in the cross-classification matrix were then used as probability weights to sum the dummy values. Thus, given census occupation, the probability of having a job with a particular characteristic was known.

In the case of certain Census occupations (especially "Laborers not elsewhere classified," and "Operatives and kindred workers not elsewhere classified") we decided that the occupations were too heterogeneous to forego further classification. Therefore, the industry associated with each D.O.T. job was matched with one or more Census Industries thus enabling a subdivision of these occupations by industry. Thus, for each adult we calculated the probability of them having a job with a particular characteristic, given their Census Occupation, and in some cases their Census Industry.

3. Regressions

Eight sets of regressions were run, subdividing the sample by race (white/non-white) and sex, and using two additive functions, including and excluding personal characteristics. Our dependent variable was average, gross, money, hourly earnings. Ordinary Least Squares was used.

4. Results

The results are set out in tables 16 and 17. The units of the earnings variable is the cent. All variables except the personal characteristics in table 17 are probabilities ranging from zero to one. The coefficients are given in each with their standard error in parentheses directly beneath. Thus, the number in the first column of Table 16, opposite Outside, means that, given all other job characteristics, white males hourly earnings are 68.7 cents higher if they work outside than if they do not work outside.

5. Variables

Job characteristics variables are classified into sets, as indicated in the left hand columns of tables 16 and 17. Some of these sets are closed, and in these cases the coefficients indicated are normalized upon the omitted variables. Thus the variables under relationship to things, data, and people are normalized on all other relationships to things, data, and people respectively; General Educational Development is normalized on levels 1 through 3 (or less than 12 years of education). Specific vocational preparation is normalized on levels 5 through 9 (or more than one year). Variables in all other sets are normalized in relation

only to their own non-presence in the job, except the effects of working outside, which is in relation to work inside and both inside and outside. The aptitude variables are the probabilities of the job requiring that level of the ability possessed by the top 20 percent of the population.

TABLE 16.—PRICES OF DIFFERENT JOB CHARACTERISTICS [1]

	White males	Nonwhite males	Nonwhite females	White females
Constant	346.4	195.6	140.8	164.8
	(28.3)	(21.6)	(22.4)	(56.5)
Relationship to things:				
Feeding/offbearing	−97.4	−51.1	−53.2	0.2
	(20.0)	(12.7)	(31.3)	(75.9)
Precision work	69.7	165.3	85.2	82.0
	(17.8)	(16.7)	(11.3)	(28.2)
Relationship to data:				
Comparing data	−24.4	−25.0	94.7	33.7
	(21.7)	(15.9)	(28.1)	(67.1)
Synthesizing data	107.2	5.7	−56.4	−83.7
	(22.1)	(25.2)	(15.1)	(35.4)
Relationship to people:				
Taking instructions/helping	−51.3	18.2	31.7	−13.3
	(18.3)	(14.9)	(16.2)	(39.2)
Supervising people	−117.0	−53.6	−124.4	42.4
	(24.9)	(17.9)	(24.1)	(77.1)
Instructing people	143.8	37.2	160.3	97.3
	(30.7)	(22.8)	(33.8)	(69.8)
Temperaments:				
Frequent change of task	−32.9	59.7	20.6	19.7
	(13.7)	(13.0)	(10.2)	(26.8)
Repetitive short cycle	72.4	113.4	31.0	26.1
	(27.5)	(20.7)	(27.0)	(55.7)
Under specific instructions	8.1	30.1	−90.6	−62.3
	(20.0)	(13.9)	(25.4)	(54.5)
Dealing with people	−40.9	−17.9	−75.8	−83.1
	(17.8)	(15.8)	(12.4)	(33.1)
Influencing people	6.6	98.5	121.7	70.5
	(20.0)	(14.4)	(11.9)	(41.3)
Performing under stress	−181.6	−212.1	94.7	67.6
	(66.0)	(68.2)	(63.3)	(127.0)
General educational development:				
Level 4 (=12 years)	85.5	33.4	106.7	95.7
	(31.0)	(24.2)	(27.8)	(60.8)
Level 5 (=16 years)	173.3	118.7	69.5	41.8
	(35.3)	(30.0)	(30.8)	(71.6)
Level 6 (=18 years)	221.2	275.3	107.5	143.8
	(40.0)	(38.0)	(32.6)	(78.8)
Location:				
Outside	68.7	52.2	173.7	28.5
	(22.3)	(16.3)	(37.4)	(79.7)
Working condi'ions:				
Cold	−679.9	−393.1	−192.5	−49.2
	(223.1)	(141.8)	(87.8)	(202.5)
Heat	70.2	25.9	8.0	29.9
	(26.0)	(20.2)	(20.0)	(55.0)
Hazards	−78.0	−20.8	−77.7	−105.6
	(19.6)	(14.1)	(23.4)	(55.2)
Fumes, odors, and toxic conditions	28.1	40.3	36.0	29.4
	(17.7)	(12.5)	(22.7)	(50.9)
Aptitudes:				
Intelligence	−147.3	−124.7	−74.8	56.9
	(25.8)	(22.3)	(24.3)	(59.3)
Numerical ability	118.3	36.4	49.5	−13.0
	(16.9)	(13.8)	(9.8)	(30.8)
Spatial ability	−107.9	−22.8	76.5	−64.8
	(15.9)	(12.5)	(10.8)	(34.8)
Clerical ability	−73.0	−57.4	−89.4	−.8
	(23.1)	(13.5)	(10.6)	(35.7)
Motor coordination	125.3	250.2	77.8	−54.6
	(40.7)	(41.7)	(35.1)	(75.7)
Finger dexterity	−157.8	−87.4	−81.8	−10.2
	(41.6)	(38.2)	(23.6)	(57.9)
Manual dexterity	117.8	−224.9	28.0	92.7
	(49.7)	(45.6)	(40.9)	(94.2)
Eye/hand/foot coordination	−604.3	−187.1	−214.2	−250.3
	(95.7)	(91.2)	(72.3)	(151.6)
Specific vocational preparation:				
Less than 1 year	−33.6	−63.7	−38.6	33.4
	(30.1)	(24.2)	(35.7)	(85.3)
Sum of squared residuals	0.5522 E09	0.6231 E08	0.2437 E08	0.5879 E09
Standard err r	0.2524 E03	0.1255 E03	0.8561 E02	0.3368 E03
Number of observations	8,696	3,985	3,356	5,215

[1] Excluding personal characteristics in the regressions.

TABLE 17.—PRICE OF DIFFERENT JOB CHARACTERISTICS [1]

	White males	Nonwhite males	Nonwhite females	White females
Constant	240.7	152.4	108.1	132.1
	(28.5)	(21.1)	(22.1)	(57.6)
Relationship to things:				
Feeding/offbearing	−58.3	−49.8	−45.1	−26.1
	(19.5)	(11.9)	(30.0)	(76.1)
Precision work	20.6	101.7	49.7	67.3
	(17.5)	(16.0)	(11.1)	(28.9)
Relationship to data:				
Comparing data	−85.8	−48.1	34.4	5.7
	(21.1)	(15.0)	(27.4)	(67.3)
Synthesizing data	74.3	8.6	−29.2	−67.8
	(21.3)	(23.6)	(14.8)	(35.6)
Relationship to people:				
Taking instructions/helping	−94.3	−5.0	18.5	−12.6
	(17.7)	(13.9)	(15.6)	(39.3)
Supervising people	−63.0	−45.6	−70.1	38.3
	(24.1)	(16.8)	(23.3)	(77.2)
Instructing people	49.0	−5.0	115.4	79.3
	(29.9)	(21.5)	(32.6)	(71.2)
Temperaments:				
Frequent change of task	−41.3	31.0	24.3	24.9
	(13.2)	(12.2)	(9.9)	(26.9)
Repetitive short cycle	77.3	90.0	29.8	11.5
	(26.4)	(19.4)	(25.9)	(56.1)
Under specific instructions	−11.8	4.0	−89.9	−52.4
	(19.2)	(13.1)	(24.5)	(54.8)
Dealing with people	−46.2	−21.1	−66.5	−75.5
	(17.2)	(14.7)	(11:9)	(33.2)
Influencing people	7.3	81.1	113.6	63.2
	(19.2)	(13.6)	(11.5)	(41.6)
Performing under stress	−221.0	−230.0	9.2	65.4
	(63.5)	(63.8)	(61.0)	(127.3)
General educational development:				
Level 4 (=12 years)	54.2	38.5	82.1	95.9
	(29.9)	(22.7)	(26.8)	(60.8)
Level 5 (=16 years)	191.4	138.6	92.5	69.8
	(33.9)	(28.2)	(29.7)	(72.3)
Level 6 (=18 years)	254.1	290.3	127.7	169.8
	(38.7)	(35.6)	(31.3)	(79.4)
Location:				
Outside	49.6	37.4	144.2	15.0
	(21.5)	(15.3)	(35.9)	(79.8)
Working conditions:				
Cold	−765.0	−434.0	−101.6	−1.5
	(214.3)	(132.7)	(84.2)	(202.7)
Heat	22.8	2.9	3.0	31.0
	(25.1)	(18.9)	(19.2)	(55.1)
Hazards	−29.5	−14.3	−72.9	−116.1
	(19.0)	(13.2)	(22.4)	(55.2)
Fumes, odors, and toxic conditions	4.6	28.1	22.5	46.2
	(17.1)	(11.7)	(21.9)	(51.1)
Aptitudes:				
Intelligence	−76.4	−78.8	−42.5	58.7
	(25.0)	(21.0)	(23.5)	(59.7)
Numberical ability	90.2	29.2	31.0	−20.2
	(16.3)	(12.9)	(9.5)	(31.1)
Spatial ability	−89.9	−0.9	67.7	−65.1
	(15.3)	(11.8)	(10.4)	(34.9)
Clerical ability	−17.3	−43.0	−62.0	14.3
	(22.4)	(12.8)	(10.3)	(36.2)
Motor coordination	47.7	162.6	65.1	−64.4
	(39.3)	(39.2)	(33.7)	(76.5)
Finger dexterity	−148.1	−76.4	−86.2	−15.7
	(40.0)	(35.8)	(22.8)	(57.9)
Manual dexterity	176.3	−146.3	50.3	112.9
	(47.8)	(42.8)	(39.7)	(95.1)
Eye/hand/foot coordination	−435.0	−165.6	−137.9	−205.9
	(92.1)	(85.2)	(69.4)	(152.5)
Specific vocatiohal preparation:				
Less than 1 year	−36.7	−44.7	−48.4	39.5
	(28.9)	(22.6)	(34.2)	(85.5)
Personal characteristics:				
Years undereducated	−18.5	−10.4	−7.0	−4.6
	(1.7)	(1.0)	(.7)	(3.0)
Years overeducated	18.8	9.7	14.4	8.7
	(1.4)	(1.0)	(1.3)	(3.5)
Age difference	7.5	3.3	1.3	1.4
	(.7)	(.5)	(.3)	(1.0)
Age difference squared	−.10	−.04	−.02	−.037
	(.012)	(.008)	(.006)	(.021)
Part-time worker	−68.9	−33.1	−7.9	23.1
	(11.8)	(7.2)	(3.6)	(12.2)
Union member	42.7	59.5	24.8	29.2
	(6.5)	(4.4)	(5.1)	(15.6)
Sum of squared residuals	0.5082 E09	0.5430 E08	0.2230 E08	0.5855 E09
Standard error	0.2423 E03	0.1173 E03	0.8197 E02	0.3363 E03
Number of observations	8,696	3,985	3,356	5,215

[1] Including personal characteristics in the regressions.

The regressions presented in table 17 include an extra set of variables, the personal characteristics. These are defined as follows:

(i) Undereducation. The mean level of General Educational Development converted into years, minus the actual number of grades completed by the adult.

(ii) Overeducation. It is simply the converse case. Undereducation is set equal to zero if the person is overeducated, and vice versa.

(iii) Age Difference. The actual age of the adult minus 5, minus the actual number of grades completed, minus the mean value of specific vocational preparation for the occupation of this adult. This is intended as a measure of time elapsed since the adult could have been expected to finish preparation for the job.

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