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AUTHOR Vrooman, John
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ABSTRACT

Recurring evidence that workers with similar skills do not necessarily earn the same wages led to the formulation of an alternative to the conventional market theory, namely, the segmented market theory. This theory posits that certain skills are distributed not among prospective employees but among jobs, in relation to the technology of those jobs. These technologically defined skills can be acquired only on the job. If this is indeed the case, then the redistribution of earnings would require policies designed to improve the technology that characterises low-skilled jobs and eliminate hiring discrimination. This study develops a theoretical framework for analysis of technologically induced labor market segmentation on the economic returns to such institutionally acquired forms of human capital as formal schooling and manpower training. This theory refines the dual-market hypothesis by proposing a positive feedback model in which technological innovation is an endogenously determined mechanism. The study poses three specific questions left unanswered by existing market segmentation theories up to now. First, if market segments do exist, how can they be isolated? Second, what specific roles do schooling and technology play in the market segmentation process? Third, how do market segmentation and technologically induced skill specificity affect returns to employment? (CP)

A THEORETICAL MODEL OF SEGMENTED YOUTH LABOR MARKETS AND THE SCHOOL TO WORK TRANSITION

Southwest Educational Development Laboratory
211 East Seventh Street
Austin, Texas

Principal Investigator: John Vrooman

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I. Purpose of Study

Conventional economic theory implies that the distribution of earnings can be altered by policies designed to alter the distribution of skills among the work force. Recurring evidence that workers with similar skills do not necessarily earn the same wages has led to the formulation of an alternative theoretical approach. According to segmented market theory, certain skills are not distributed among prospective employees, but among jobs, in relation to the technology of those jobs. These technologically defined skills can only be acquired on-the-job. If this is the case, then the redistribution of earnings would require policies designed to improve the technology that characterizes low-skilled jobs. This study theoretically analyzes the ways in which the labor market experiences of certain youths and demographic groups are affected by the impact of technology and schooling on this phenomenon of labor market segmentation.

In their most simple statement, market segmentation theories pose a dual labor market dichotomized by technology and skill specificity into primary and secondary markets. The primary jobs are productive, well-paying and characterized by capital intensive technology. In contrast, the secondary jobs are low-paying, unproductive and characterized by low capital intensity. This duality has often invited the use of segmented market theory as a description of the inequality of the distribution of earnings, but the simplicity of this version of the hypothesis has usually precluded meaningful policy prescription. The empirical fact remains that some individuals, as members of certain market groups are

concentrated in low-paying, low skilled jobs characterized by unproductive technologies. Moreover, if labor market segments are actually reflections of different technologies and skills, it can be shown that the manner in which technology is distributed among markets contributes significantly to earnings disparities among those market segments.

The study poses three specific questions left unanswered by existing theories of labor market segmentation. First, if labor market segments do exist, how can they be isolated? Second, what is the specific nature of the role played by schooling and technology in the labor market segmentation process? Third, to what extent and in what manner are the returns to employment affected by technologically-induced skill specificity and labor market segmentation? If the labor market segments can be isolated and associated with technology, then the study would imply the importance of the complementary roles of technology and manpower in policies of earnings redistribution.

II. Antecedents of the Theory

The fundamental hypothesis of the proposed theory is that technological innovation, on-the-job training and the phenomenon of labor market segmentation are joint products of a single process.[1] In order to establish the importance of the hypothesis, it will be necessary to briefly trace the evolution of the concept of labor market segmentation and examine its current potential as a policy tool.

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[1]This has been the underpinning hypothesis of dual market theory from the outset. Ironically, it has never been tested. See Piore's forethoughts (35) and afterthoughts (47).

A. Neoclassical Origins

The concept of noncompeting groups in the labor market rests firmly in the tradition of neoclassical wage theory.[2] In the neoclassical description the market segments are formed exogenously by factors that determine characteristics of the work force. These exogenous factors impede the convergence of wages toward intermarket equity. The underlying negative feedback principle of neoclassical equilibrium theory is straightforward. Intersectoral wage disparity would normally call forth countervailing numbers of job seekers into the sector with the superior wage. This movement of the supply of labor would tend to lower the superior wage, raise the inferior wage and ultimately restore parity of earnings among the segments. If wage differences persist it is because of the existence of exogenous or "noneconomic" barriers within the labor market. The choice of remedial policy is made simple. Earnings equalization policy should seek to institutionally circumvent the noneconomic barriers and enhance the intermarket mobility of labor. In the neoclassical sense labor market segments do exist but the cause of segmentation is exogenous. Therefore, there is no true neoclassical *theory* of segmentation.

Following in the neoclassical tradition, early versions of human capital theory attributed earnings disparity to unequal distributions of institutionally-acquired skills among the work force.

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[2]See, for example, Cairnes (6) pp. 65-73, Hicks (23), ch. IV, and Reynolds (38).

Becker (3) hypothesized that institutionally-acquired forms of human capital, such as schooling, were segmenting the work force into sets of differential skills. If rational employers were paying workers in accordance with their relative skills, an inferior wage for a set of workers reflected the inferiority of the embodied skills of that set. If earnings equality was the desired goal, it would best be accomplished by altering the institutional distribution of the skills implicitly associated with schooling. The labor force would then have the necessary human capital mobility to achieve intermarket parity of earnings.

The human investment hypothesis was clear and its policy implications were logically deduced. However, subsequent empiricism revealed that a significant residual element of income disparity remained after controls were made for the segmentation effects of schooling.[3] The nature of the responses to this evidence of schooling model failure distinguishes two major schools of labor market segmentation: (1) human capital residualism, and (2) the dual market hypothesis.

B. Human Capital Residualism as Evidence of Segmentation

When the schooling models began to generate residuals, human capital theorists began to generate explanations as to the source of those residuals. Becker (3) and Chiswick (7) argued that the residuals were the result of unmeasured or unmeasurable forms of

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[3]See, for example, Berg (4), Hanoch (21) and Harrison (22).

human capital, such as quality of schooling and intelligence.[4] Arrow (2) hypothesized that the unexplained element of earnings disparity that remained after contolling for "supply" factors was evidence of overt discrimination against certain social subsets by employers.[5] Mincer (31) (32) suggested that non-institutional forms of human capital, such as job experience, acquired *post* school were relevant components usually omitted from empirical specifications of the human capital mode. With other minor corrections, the control for post school human capital seemed to explain the residual element of earnings disparity. However, there was still no theory formulated about the origin of the post school segmentation mechanism. Explanation of this source of earnings disparity associated with job-related skills was the *raison d'etre* of segmented market theory.

C. The Dual Market Hypothesis as Segmentation Theory

Drawing from an institutional tradition of dual market arguments[6] Doeringer and Piore (10) posed a labor market dichotomized into a secondary market, characterized by structureless low-paying jobs which encourage rapid turnover, and a primary market characterized

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[4]Residual earnings disparity remained even after controlling for cognitive abilities. See, for example, Griliches and Mason (17), Gintis (15), Vrooman and Greenfield (42).

[5]If this were the case, the human capital argument was tautological. See Marshall (30) and (25), pp. 268-79. The important implication for the theory advanced in this proposal is that recognition was given to the potential segmentation effects of the demand for workers.

[6]See Dunlop (11) and Kerr (26).

by high pay and job stability. "Internal labor markets[7] appear to be generated by a series of factors not envisioned in conventional economic theory: (1) skill specificity, (2) on-the-job training, and (3) customary law" (8), p. 13. The source of the dichotomy seemed to be the same as that suggested by the findings of Mincer. Because of the costs associated with training specific skills and the importance of on-the-job training, employers sought to minimize employee turnover through various screening techniques, such as the use of educational credentials, as predictors of employment stability.

In many respects the dual market hypothesis and the human capital residualism were similar. Both envisioned a labor market segmented by schooling and skills acquired after schooling, on-the-job, but the dual market perspective takes the hypothesis a step further toward the segmented market theory advanced in this proposal. In the dual market description, skill specificity is seen as the result of the technological specificity of the job. It is the jobs that are characterized by different technologies and skills, not the prospective employees.

As an alternative to the neoclassical wage competition model Thurow (39) posed a job competition model in which the distribution of earnings is determined by two sets of factors. "One set of

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[7]In the early statements the dual market terminology was often confusing. For clarification the following conversions may be helpful: primary = internal = core and secondary = external = periphery. Each label has since acquired its own denotation.

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" (39), p. 76. Wages are based on the characteristics of the job, because most skills are acquired through on-the-job training *after* a worker is employed. Because the distribution of earnings is a function of both the characteristics which determine order of access to jobs and the distribtuion of jobs, changes in the characteristics of the labor queue will not necessarily affect earnings. "To alter the distribtuion of earnings, it is necessary to significantly alter the distribtuion of on-the-job training" (39), p. 191. The mechanism which gives certain jobs relevant on-the-job skills is the capital intensity and rate of technological innovations of those jobs. This implies that the distribution of earnings can only be affected by altering the distribution of jobs or, more fundamentally, by improving the distribution of technology among job segments.

D. Toward a Segmented Market Model

Although the dual market hypothesis has provided valuable insight into the structure of labor markets, its simplicity has frustrated formal evaluation of the hypothesis. Two subsequent refinements have advanced the dual market hypothesis to a point where it and the potential efficacy of its policy derivatives can be empirically examined.

Initially the dual market arguments were used by manpower

practitioners for organizing the behavior of low-income labor markets. Following Bluestone (5), Harrison (32) envisioned a broader labor market duality of a high-income core and a low-income periphery. Within the periphery, the legitimate activities of the secondary labor market were supplemented by the illicit economic phenomenon of "hustling" and existing manpower and welfare assistance programs. See Figure 1. None of the activities alone were yielding a sufficient wage, and the labor market experience of the periphery was characterized by unstable circulation among the subsectors. Viewed from a dual market perspective, the manpower and welfare programs were not valued for their training effects but only for their supplemental stipends. In this sense, the CETA and AFDC sectors were seen as symptomatic treatment of the low wages characteristic of the periphery. If this is indeed the case, then the relevant policy question becomes: How can the structure of these programs be altered to confront the nature and causes of labor market segmentaiton among youths? The answer required an indepth study of worker behavior *within* the periphery and *within* the core of the labor markets available to American youths.

Realizing that the simplicity of the original dual market dichotomy between primary and secondary jobs was frustrating attempts for "rigorous empirical examination," Piore (37) subsequently developed a more comprehensive hypothesis concerning segmentation within the primary market. The primary economy can be dichotomized into an upper and lower tier of jobs. The early descriptions of

skill specificity and job stability for internal markets (8) applied only to the lower tier, subordinate primary jobs. In contrast, the upper tier, independent primary jobs are not characterized by a complex set of work rules, and formal education is an essential requisite for employment. The independent primary jobs seem to offer greater variety and room for individual creativity and initiative.[8] See Figure 1.

The significant difference between upper and lower tier jobs derives from the nature of their respective skills and the learning processes whereby those skills are acquired. Upper tier behavior requires deductive reasoning from a variety of circumstances. These behavior patterns were termed general traits. Alternatively, the subordinate primary jobs require specific traits, which are acquired on-the-job, and incidental to the production process. Therefore, each tier of the primary labor market requires a different function of the institutional or schooling process. The independent primary tier requires cognitive skills and the ability to deductively respond to varied situations. These cognitive characteristics are then reinforced and enhanced through experience in upper tier segments. The specific traits of the lower tier are learned by repeated exposure to familiar environments. To the extent that they are not complementary with specific trait acquisition,

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[8]In this case Piore's typology of primary market segmentation approximates Marshall's professional, mainstream, marginal and submarginal labor markets. See (30), pp. 130-136.

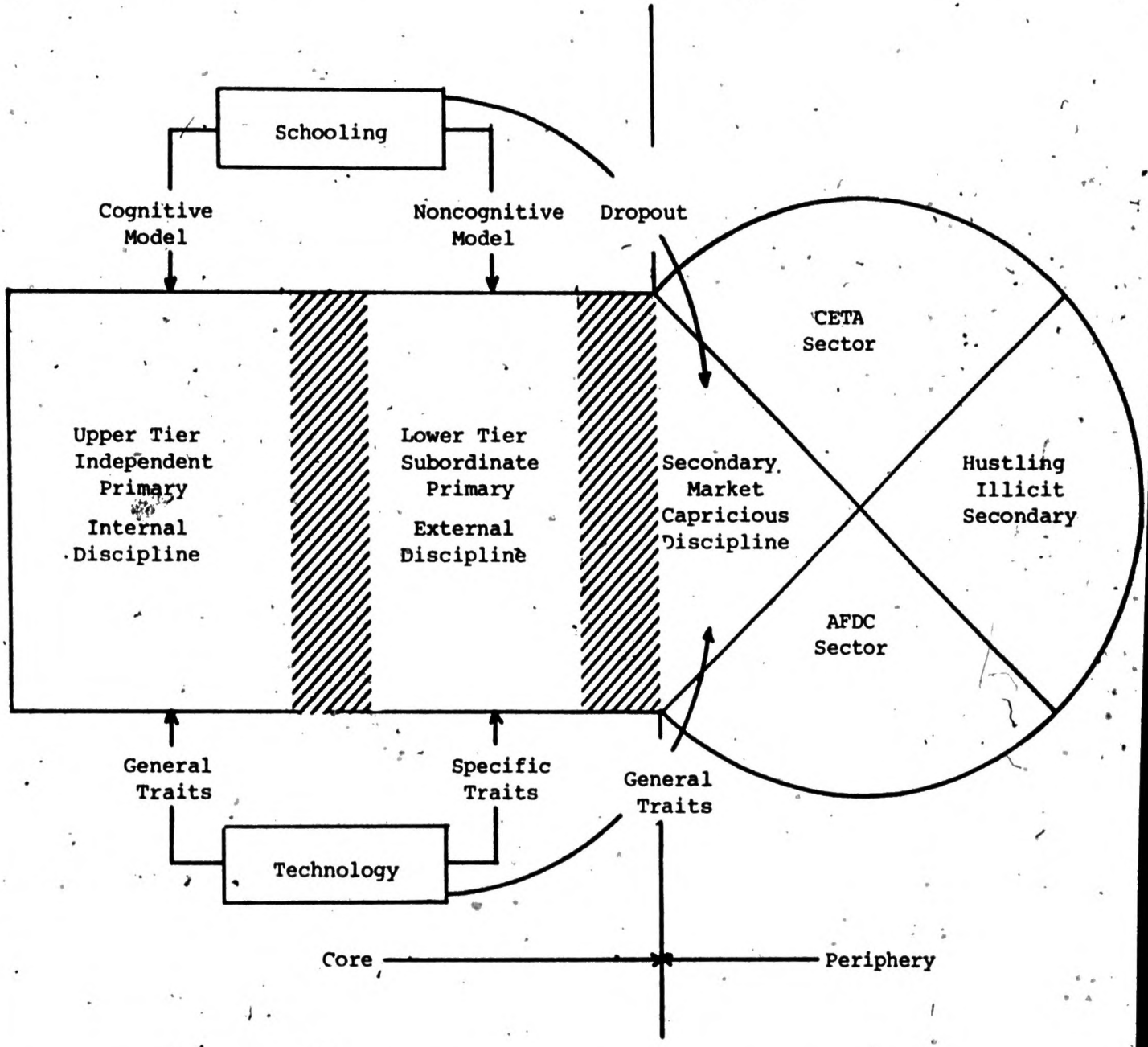

FIGURE 1. A Segmented Market with Interrelated Technological and Schooling Functions

cognitive skills are not as important in the subordinate tier and a premium is placed on job stability. Schooling is important to the acquisition of specific traits only to the extent that it imparts stability.

The important point concerns the cause of the primary market dichotomy. According to Piore it is the structure of technology:

> The basic hypothesis is essentially that the underlying determinant of the division into different types of mobility chains is the structure of technology. This dictates a core of jobs that lend themselves to the building of lower tier mobility chains. . .. Around this core is a second technology, associated with the uncertainty and instability of demand, which generates a job structure that does not lend itself to lower-tier mobility chains, but instead to secondary jobs and upper-tier mobility chains (35), p. 147.

The specific technology which jointly segments the lower tier primary market and increases the importance of on-the-job training is characterized by capital intensive production processes for stable or predictable product markets. Output fluctuations in these markets can be met by inventory changes while labor and capital remain fully employed. Alternatively, the upper-tier primary and secondary jobs are characterized by a less capital intensive technology and greater variability in the production process. Only upper-tier, independent job structures, requiring general traits and embodied human investment, or secondary jobs, requiring no skills at all, can exist in a climate of variable product markets and low capital intensity.

E. Positive Feedback and the Endogeneity of Technology

Both the human capital and dual market descriptions are weak in that they present no theory about the origin of the segmentation mechanism. Both agree that the differential returns to on-the-job experience are a major source of interoccupation, interindustry earnings disparities, and both vaguely blame technology as the source of differing degrees of skill specificity. Neither approach explains how or why technology affects jobs, skills, experience, earnings, job-turnover or job satisfaction. Ultimately, one is led to suspect technology as the cause of the segments, the skill specificity and the returns to employment, but both descriptions treat technology as an autonomous force. A true segmented market *theory* should isolate the complete function of technology in the segmentation process.

Paralleling Doeringer and Piore, Vietorisz and Harrison (40) developed a dual market thesis with productive afterthoughts, one of which was the conception of a positive feedback model to *explain* the duality (41). In the positive feedback model, changes within labor markets are not met with countervailing, equilibrating forces, but instead are reinforced by circular and cumulative causation. The effect is the divergence of market segments, rather than the convergence that follows from the neoclassical principle of negative feedback. The positive feedback model leads directly to the theory advanced in this paper.

The human capital and dual market approaches hypothesize a

causal sequence in which the distribution of technology influences both the productivity of labor and the skill specificity of jobs. The differential growth in productivity results in earnings disparity among job markets, while the development of job specific skills effectively segments those markets. The distribution of technology then generates both earnings disparity and the factors which act to perpetuate that disparity. But in order to fully understand the segmentation process it is not sufficient to merely observe the manner in which the patterns of technological innovation forge segments. To generate meaningful implications for policy it is necessary for a theory to isolate those phenomena which originally generate the innovation patterns, themselves. This theory hypothesizes a positive feedback model in which technological innovation is an endogenously determined mechanism of labor market segmentation. See Figure 2.

Circular causation would reusIt from the hypothesis that technologically advanced firms are characterized by high profitability and that innovation for these firms is financed internally from retained earnings. If the profitability can be viewed as a function of productive employment and ultimately technological innovation, a positive feedback circle can be closed around the segmentation process. Interindustry distributions of technology generate variations in productivity, which create the internal fund situation necessary for further innovation. The distribution of technology among industries not only generates a segmented labor market, but

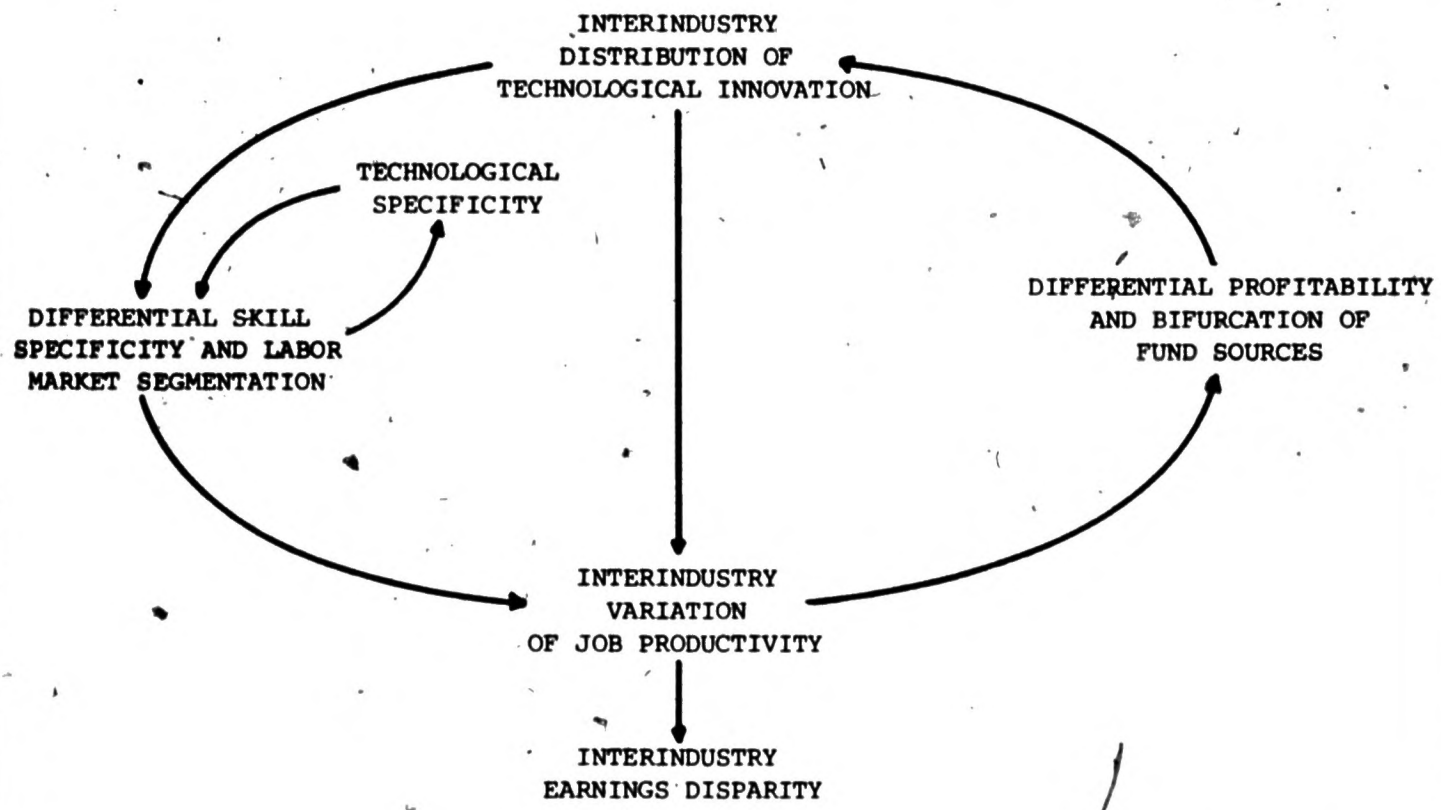

FIGURE 2: Technological Interface of Segmented Labor and Capital Markets

a dual capital market as well.[9] The two segmentation processes can be juxtaposed to form a segmentation *theory* that treats technology as both cause *and effect*. See Figure 2.

F. The Role of Schooling in the Segmentation Process

Alternative theories of schooling can be usefully integrated into this theory of labor market segmentation. As conceived, each market segment is characterized by a technology that requires or accepts a particular kind of student. The general traits of the independent core require cognitive skills, the specific traits of the subordinate core require "stable" students with or without non-cognitive skills, and the periphery accepts the dropouts with or without cognitive skills.

Customarily the schooling process is implicity assumed to equip students with cognitive skills which are sought and rewarded by prospective employers. This may not always be the case. As an alternative explanation, Gintis (15) has developed an "affective" model in which he hypothesizes that schooling's function is not to impart cognitive skills but to repress the "unstable" personality characteristics of certain youths. A comprehensive theory should develop the linkages between the alternative roles of schooling and the technological mechanisms of labor market segmentation.

The independent core jobs would require schooling to produce a

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[9]The Capital market duality envisioned here draws heavily on a cross-sectional bifurcation hypothesis. See, for example, Duesenberry (10) and Meyer and Kuh (27).

set of students with cognitive abilities. For the independent jobs turnover is expected, and the skills that are rewarded are often the cognitive skills that are gained in professional schools. In this case the cognitive model would seem an appropriate allocative mechanism. In contrast, the subordinate core jobs rely heavily on specific skill training on-the-job. Therefore, labor turnover is undesirable. These jobs would require schooling to produce job candidates with a demonstrated stability and the capacity to learn through on-the-job experience. Subordinate core employers are looking for stability rather than cognitive skills in their prospective job candidates. In this case a noncognitive model would seem appropriate. In marked contrast, the periphery market activities do not require stability--indeed, they often encourage instability. Peripheral worker behavior would be judged a failure of any of the hypothesized schooling models, and the periphery simply assumes the high-school dropouts (see Figure 1).

III. Policy Implications

To understand the policy implications of the proposed theory it is important to examine the existing policy measures that are inconsistent with the conclusions of technological segmentation theory. For example, many of the MDTA programs of the 1960's and CETA programs of the 1970's were derived from the early conclusions of the human capital model. The market segments which entrap the disadvantaged were thought to be discriminating with respect to institutionally acquired forms of human capital. In this case the policy solution was to institutionally reallocate

the distribution of human investment and a smoothing of the distribution of earnings should follow. The argument did not hold and the policies were often unsuccessful. Workers concentrated in low-paying jobs with no skills became workers concentrated in low-paying jobs with institutionally acquired skills of little use. Technology was rapidly turning over the relevant specific skills of second-tier primary market jobs, and these skills could only be learned by osmosis in those job capacities. The institutional forms of capital were often obsolete before they were acquired.

The theory does not, by any means, dismiss the effectiveness of institutional programs. Certainly a certain minimum level of competence is necessary for the acquisition of on-the-job skills and required to maintain one's relative position in the labor queue. What the theory does propose would be to concentrate earnings equalization policy on the allocation of jobs and technological processes which define the skills of those jobs. The logic of the model suggests a comprehensive set of earnings equity policy goals: (1) Institutional programs should insure a minimum level of functional competence and the development of traits actually sought by the technologies of labor markets; (2) Diffusion of capital intensive technology should be assisted within certain industries that are cyclically vulnerable; and (3) A socially optimum mechanism for the allocation of jobs of varying degrees of technological specificity among members of the labor queue should be developed and implemented.

IV. Implications of the Theory

The proposition which makes this theoretical framework unique concerns the juxtaposition of the phenomena of technology, technological

change, schooling, on-the-job training and labor market segmentation. The specific corollary hypotheses of relevance for the formulation of effective manpower policy can be stated as follows:

a. Lower-tier primary jobs are characterized by an importance of on-the-job training (OJT) and specific traits.

b. The importance of OJT for lower-tier primary jobs increases with capital intensity and the rate of technological change.

c. Lower-tier primary capacities reward the noncognitive aspects of institutional training.

d. Inter-firm mobility is not rewarded in lower-tier primary jobs.

e. Upper-tier primary jobs are characterized by an importance of institutionally acquired forms of human capital, especially formal education.

f. Upper-tier job capacities reward general skills, and therefore, schooling should serve a cognitive function.

g. Upper-tier jobs should exhibit some returns to experience but it need not be firm-specific experience, and it would not be expected to increase with capital intensity and increased technical change.

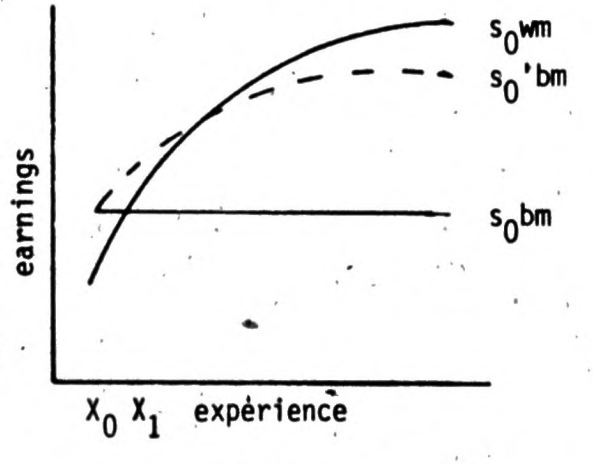
h. Upper-tier jobs should reward inter-firm mobility.

i. Secondary labor market jobs would be expected to exhibit no significant returns to institutional or on-the-job training.

k. Secondary market earnings would be expected to be sensitive to tightness of local labor markets and employment stability.

As conceived, this theoretical approach fills several gaps in the analyses of segmented market arguments. For example, Freeman (13), Welch (45), and Chiswick (8) have observed that young black males were receiving a rate of return to schooling equal to if not greater than that received by young white males, whereas the converse situation existed for older males. Their conclusions, based on these cross-sectional

analyses, have been that recent vintages of black males are better schooled than their older counterparts, and that the market is rewarding their vintage. This may be the case, but it also seems reasonable to argue that the young blacks are situated at the inception of a flat experience-earnings profile, while the white males are experiencing initial earnings depressions characteristic of the acquisition of specific skills (X_0, see figure). If this is the case, then the vintage effect is an ephemeral phenomenon soon to disappear when the white males begin to recoup returns to job specific experience (X_1, see figure). In contrast, the vintage effect implies an upward shift in the profile from s_0bm to $s_0'bm$ in the figure. This would indicate a significant improvement in the earnings outlook for young American blacks, whereas the technological segmentation argument would indicate that the "improvement" was only temporary.[10] The policy implications of each are clearly different. A fundamental hypothesis of this technological segmentation theory is that returns to on-the-job experience are evidence of labor market segmentation and the effects of technology and technological change, and that the absence of returns to experience for a subset is indicative of discriminatory applications of primary labor market (upper- and lower-tier) job opportunities.



[10]For an early exposition of the segmentation interpretation of the experience-earnings profile phenomenon, see Hall (20), pp. 393-96.

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