

Dual Labor Markets and the Working Poor: A Comprehensive Study

by David Gleicher and Lonnie Stevans

Abstract

An econometric study—using data from the *2003 March Supplement of the Current Population Survey*--of the main dual labor market hypotheses, through a basic choice-theoretic model. The dependent variable is the likelihood of an individual being a member of the working poor. The explanatory variables are the worker's occupation and firm characteristics. The cost constraint comprises, on the one hand, the worker's family characteristics (notably family income), and on the other, the costs to the worker of signals used by firms in making employment decisions. These include not only the cost of education, but also that of what we call 'discriminatory signals': gender, race, ethnicity and citizenship status. The study offers a comprehensive profile of the working poor. The econometric results confirm the significance of each of the explanatory variables, and each element of the cost constraints, as well. It also provides new insight into a more complex set of relationships between the signaling variables themselves, as well as between signals and occupations and industry and occupation, than has heretofore been observed.

1. Dual Labor Market Hypotheses

Generally speaking, the phenomenon of dual labor markets has been viewed as a divide between high and low wage rate sectors, where the key variable that differentiates 'primary' from 'secondary' markets, is the wage, per unit of labor, paid by firms. This dual price structure is then naturally theorized, in the neoclassical manner, as an equilibrium outcome resulting from optimizing behavior on the part of competing individual workers supplying labor to firms, on the one hand, and firms demanding labor from workers, on the other. (*e.g.*, Bulow and Summers, 1986; Albrecht and Vroman, 1992).

A more classical element is introduced, as well, into the current study (Piore, 1979: 93-5; Gleicher and Stevans, 1992). It draws upon the notion, first fully articulated by David Ricardo, of a long run equilibrium subsistence wage per worker, that is a distribution, rather than strictly a price variable (see Dobb, 1973). The subsistence wage can be seen, then, as the base of a somewhat different dual labor structure. The secondary markets are those significantly more likely to draw in the 'working poor,' contemporary parlance for individuals earning the subsistence wage. And the primary markets are those significantly

more likely to require workers who, for one reason or another, can command earnings net of subsistence.

The central empirical problem posed by dual labor market theory is where the dualities between primary and secondary markets are located. A number of approaches within the prevailing framework of a dual price structure have been taken to this question. Human capital theory (Becker, 1975), and one of its important outgrowths, the wage efficiency hypothesis (Akerlof and Yellen, 1986), for the most part draw dividing lines in an occupational space.

The former points to the skill requirements associated with alternative occupations, and draws out the implications of this to the financing, by the firm and/or individual worker, of the investment in 'human capital' required to attain such a skill. The wage efficiency hypothesis emphasizes the degrees to which 'principal/agent' problems exist in various occupations, and consequently how much the wage rate is used by firms to lower, on the margin, monitoring and search costs. Here, the wages of certain workers include a rent generated from an asymmetry of information between the employee, as agent, and the firm, as principal. From a classical viewpoint, this amounts to saying the subsistence wage is that which yields to the worker a zero net return on human capital, or, equivalently, the wage paid to the 'no rent worker.'

A third approach, the screening hypothesis (Spence, 1973), like wage efficiency, stresses monitoring and search costs. But it locates the price duality, in the first instance, in an individual trait; notably, formal education. Formal education, it is theorized, is used by firms as a 'signal.' While a particular level and type of formal education may be a prerequisite to perform certain kinds of work, but not others, here it is claimed to function, independent of this, as a means of gaining information about certain broad characteristics of the worker that affect his/her productivity, within any given occupation and industry; such factors as the individual's subjective valuation of work, family history, intellectual and social discipline, ability and willingness to learn, cultural affinities and aversions, and so forth.

These can be subsumed under the general term ‘socialization,’ which Piore, defines, citing sociologists, as “the adaptation of the individual to the norms and role patterns of the work group” (1973: 377-8). Independent of having any direct effect on an individual’s productivity, then, education results in a dual wage structure to the degree that the cost of acquiring an education differs significantly between sets of individuals.

The classical conception of the wage, as a distributional variable, underlies yet another approach to the question of where the boundary between the primary and secondary markets lie. We will call this an ‘institutionalist/Keynesian’ dual labor theory (Piore, 1979: 35-43). The hypothesis here is that large-scale oligopolistic firms (‘natural monopolies’)—arguably the most economically and politically powerful private institution in contemporary capitalist society—are especially sensitive to fluctuations in market demand, because these firms invest in a high ratio of fixed to variable capital (including fixed investments in specific human capital). To protect themselves, then, these firms secure for the oligopoly the most stable sources of demand, which then constitutes the primary market. The ebbs and flows of demand, on the margin, are then left to a secondary market of relatively small competitive firms who sell services to the oligopoly, that are otherwise done in-house, or augment its production.

It is noteworthy that this approach identifies job stability as a key characteristic, along with the wage rate, in identifying the line between primary and secondary markets. This proposed duality—which is along the dimension of the firm—is also addressed by wage efficiency theory and the screening hypotheses, both emphasizing the drive to reduce transactions and monitoring costs in high fixed-cost industries.

The institutionalist/Keynesian hypothesis draws a multi-dimensional dividing line between the secondary and primary markets. As just mentioned, the duality exists, in part, in a space that is neither occupations, nor individual traits, but rather made up of firms; that is, the industry a job is in. At the same time, by this hypothesis the duality also exists in the same occupational space that human capital theory and the wage efficiency hypothesis do.

The less the general human capital required of the worker in an occupation, and/or the less the monitoring and transaction costs, on the margin, associated with the occupation, the more likely the individual is to be working poor.

In the occupation and firm spaces, indeed, wage efficiency and the institutionalist/Keynesian dual labor hypotheses almost appear to merge. Bulow and Summers (1986), for example, put forward a model predicated upon an association of a disproportionate monitoring cost with scale of production. Hence, by wage efficiency, they argue workers in occupations and industries associated with large-scale technologies comprise the primary market (also see, Rebitzer and Robinson, 1991).

In a similar fashion, the institutional/Keynesian approach almost seems to merge with the screening hypothesis in the space of individual traits. When the duality is seen as a division between those who bear the burden of demand fluctuations versus those who do not, then workers in the secondary markets can be understood as those for whom the cost of a signal is an effective constraint on employment in primary markets. Beyond the real cost of education, this also can include a cost imposed on individuals who, for one reason or another, have, or are perceived to have, a low preference, relatively, for long-term employment (Vella, 1993; Swaffield, 2000). This is a point we will return to in due course.

The chief purpose of the present study is not to ‘prove’ (or ‘disprove’) a particular dual labor hypothesis. The different hypotheses are not necessarily exclusive of one another, in any case. Rather, our object is to comprehensively profile workers according to the likelihood of being a member of the working poor; that is, to ascertain empirically the dualities that exist, and consider which of the various approaches seem best to comprehend them.

We do this by testing a basic choice-theoretic model, with effective cost constraints (see Macho-Stadler and Perez-Castrillo, 2000: 189-95; Laffont and Martimort, 2002: 68-9). The constraints comprise, on the one hand, an individual worker’s family characteristics (notably family income), and on the other, different costs facing individual workers of

signals used by firms in making employment decisions. These include not only the cost of education, but also the cost of what we call ‘discriminatory signals.’ Analogous to education, we hypothesize a heterogeneity within certain sets—notably gender, race, ethnic identification and citizenship status—which we hypothesize also entail an opportunity cost. As is observed by Spence (who prefers to call these ‘indices’ rather than signals) the discriminatory variables refer to personal attributes that are “immutably fixed,” in contrast to the education signal, which, for the individual, is “alterable” (1973: 357-8).

2. The Econometric Model

The premise of the model is that the individual’s decision to work in the secondary versus primary labor market, is observed as a binary variable, and is affected by the explanatory variables pertinent to each of the various dual market approaches. The model tests the likelihood of an individual worker being employed in the secondary labor market, or, in other words, of being a member of the working poor. The real returns, or vector of utilities (\mathbf{U}), derived by individuals from working in the primary sector (p) and the secondary sector (s), respectively, are:

$$(1)$$

$$(2)$$

where $\mathbf{U}_p, \mathbf{U}_s$ are latent variables and $\mathbf{X}_p', \mathbf{X}_s'$, are vectors of explanatory variables in the occupational and firms spaces (see **List of Explanatory Variables** below). The latter comprise the human capital and wage efficiency variables (which are occupational), and certain institutional/Keynesian variables in the firms space, such as scale. As observed, these variables can be interpreted, alternatively, as affecting a net return on investment to the worker, or a rent, either on scarce information or social privilege.

The individual, then, maximizes utility subject to the cost constraints. The latter are:

(3)

where \mathbf{I} is a latent index of the costs to individuals, and the vector \mathbf{Z}' contains explanatory variables in the individual traits space. These are both screening and institutional/Keynesian variables.

The necessary conditions for a signal to be used by the employer (the principal) is that there be less than a 50% conditional probability of, respectively: 1. the signal predicting that an individual, who has the desired traits, does not have them, *i.e.*, a false negative; and 2. the signal predicting that an individual, who does not have the desired traits, does have them, *i.e.*, a false positive (Riordan and Sappington, 1988; Cremer and McLean, 1988).

Note that education is purely a signaling variable here, to the extent that we are controlling for occupation and industry. As we have already observed, human capital theory and wage efficiency, by contrast, serve as a explanations of inter-occupational and inter-industrial wage differences. In both cases rents are paid to agents, and wage differentials ensue. As a consequence, the model allows us potentially to evaluate, at least in terms of significance, the effect of education as a work requirement, versus that of a pure signal.

A worker, then, will choose employment at subsistence wages, subject to the cost constraints, if $U_s - U_p - \mathbf{I} > 0$.¹ More formally, the net benefit (\mathbf{Y}^*) of employment in the secondary markets is:

(4)

Y^* is a latent binary variable. What we observe is the decision itself; *i.e.*, $Y = 1$ if $Y^* > 0$ and $Y = 0$ if $Y^* < 0$. Y is the criterion variable, denoting whether or not the individual is classified as working poor.

There is considerable controversy over how to define both 'working' and 'poor' (Kim, 1998). We have selected a relatively broad measure of each. We use the definition of employment found in the *2003 March Supplement of the Current Population Survey*, the source of our data, which refers to all currently employed individuals. We classify an individual as 'poor' if he/she has earnings below 150% of the official US poverty threshold for a single person. Note that this calculation is in terms of individual income, not family income. An individual's family income is contained in the model as an element of the cost constraint vector Z' . This reflects the fact that we are interested here in the determination not of a welfare measure of poverty, but of the subsistence wage per individual.

The vector W' of explanatory variables in equation (4) encompasses the various approaches to dual labor market theory we've discussed, and can be organized into the three spaces in which the worker is profiled: occupation, firm and individual traits. The elements of these are shown in the *List of Explanatory Variables* below.

3. The Main Effects

Below is a list of explanatory variables observed in our study and the direction in each case, of its main (significant) effect. A positive sign (+) signifies a greater likelihood of being a member of the working poor and (-) a lesser likelihood. It is important to keep in mind that, as we will delve into in some detail in due course, there are significant interactions between certain key explanatory variables. We will report odds ratios in due course in the context of those interactions. The main effects reported here, then, must be viewed with this important qualification in mind.

Main Effects²

X'	<p>Occupation Space</p> <p><u>Occupation (/Professional and Managerial)</u></p> <p>Administrative +</p> <p>Construction +</p> <p>Farming & Fishing & Forestry +</p> <p>Maintenance +^m</p> <p>Production +^m</p> <p>Sales +^m</p> <p>Service +</p> <p>Transportation +</p> <p>Firms Space</p> <p><u>Industry (/Professional Business Services)</u></p> <p>Agriculture, Forest, Fishing & Hunting +</p> <p>Construction ins.</p> <p>Education & Health Services +</p> <p>Finance ins.</p> <p>Information Services ins.</p> <p>Leisure & Hospitality +</p> <p>Manufacturing +</p> <p>Mining ins. .</p> <p>Other Services +</p> <p>Pub Administration +</p> <p>Transportation & Utilities ins.</p> <p>Wholesale & Retail Trade +</p> <p><u>Location</u></p> <p>Metropolitan/Non-Metropolitan +</p> <p><u>Scale</u></p> <p>Small/Large -</p>
Z'	<p>Individual Traits Space</p> <p><u>Age</u> - [cv]</p> <p><u>Disability</u></p> <p>Disabled/Non-disabled +</p> <p><u>Education (/No High School)</u></p> <p>High School Degree -</p> <p>Some College -</p> <p>College Degree -</p> <p><u>Ethnic Identification</u></p> <p>Hispanic/Non-Hispanic +</p>

<u>Family</u>	
No child care/Child care	+ ^m
Family Income Per Capita [cv]	- [cv]
No spouse/Spouse	+
<u>Gender</u>	
Female/Male	+
<u>Citizenship</u>	
Non-citizen/US	+
<u>Labor Supply (/Full-time)</u>	
Economically necessary part-time--usually full-time	+
Economically necessary part-time—usually part time	+
Not economically necessary part-time--usually part time	ins.
<u>Racial Identification (White)</u>	
Asian	+ ^m
Black	+
Mixture	+
Other	+

These general results lend credence to our analysis as a whole by their intuitive plausibility. We see that all the binary variables, and both of the continuous variables as well, are significant, and, with one exception (which we will discuss in due course), the signs of the coefficients are what one would expect. Similarly, considering the signaling variables, as one would expect, we find the likelihood of being working poor significantly declines with each higher level of formal education, whites are significantly less likely to be working poor than any other race (although Asian is a marginally significant variable), and Hispanics are significantly more likely to be working poor than non-Hispanics.

When we look at the occupational and firm spaces, respectively, the dual nature of the labor markets seems to be brought more clearly into relief. With regard to the former, managerial & professional workers are found to be significantly less likely to be working poor than workers in any of the other occupations (maintenance and production are marginally significant). In the firm space, those industries significantly less likely to employ the working poor are either in a technical business service sector--in particular, finance, information services and professional business services--or high fixed-cost

industries: construction, mining and transportation & utilities. An exception, in the latter case, is manufacturing, in which a worker is found to be more likely to be working poor. Less technical service industries—wholesale and retail trade, education & health services, and leisure & hospitality—are significantly more likely to employ members of the working poor.

Keeping in mind the caveat mentioned above, that there are significant interactions between many of these variables, we can make two preliminary assertions based on these main effects, in general. First, the fact that citizenship, ethnicity, gender and race are each a significant variable lends support to our model of differences in cost constraints when it comes not only to education, but within the discriminatory signaling sets as well. Second, none of the approaches to dual labor market theory is gainsaid by these main effects, in and of themselves.

Finally, there is one main effect that bears some further comment, before we turn to the interactions. It is the finding that a worker in a small scale firm is *less* likely to be a member of the working poor than one employed in a large scale one. We found no significant interaction of this scale variable by industry or by occupation, indicating that this effect does not significantly vary by industrial organization or job requirements.

Since we are controlling both for industry and occupation, the result does not tell us anything about the effect of industrial organization on likelihood of being working poor. Rather, we speculate that the negative sign here is picking up a firm characteristic not explicitly captured by our observations, but that is connected to the scale variable: the long-term stability of the job. In effect, scale serves as a signal about the firm to the worker. Within any industry, and any occupation, a job in a small business is an index of less secure long term employment, and hence workers capture a rent in their wages relative to comparable employees of a large business.

4. Interactions of Signals

When we get inside the main effects on the likelihood of being working poor, to the interactions between the variables in our study, what we find, instead of a collection of dualities, is a more complex dual market structure than any one of the approaches, standing alone, comprehends.

A notable finding is that there are significant interactions of two of the discriminatory signaling variables, gender and citizenship, by education. But there are no significant interactions of either race or ethnicity (Hispanic versus non-Hispanic) by education, or by each other. The interactions in question are shown in the table below.

Table 1
Interaction Odds Ratios:
Education by Gender; Education by Citizenship

Education	Gender	Citizenship
	<i>Female/Male</i>	<i>Immigrant/US</i>
No High School	1.25	1.9
High School Deg.	1.5	1.59
Some College	1.36	2.22
College Degree	1.83	3.38

We see that, with two minor exceptions,³ the likelihood of being working poor increases both for females relative to males, and non-citizens relative to US citizens, as the level of education increases. These parallel interactions suggest that the education signal is influenced by the perception of employers that females, relative to males, on the one hand, and non-citizens relative to US citizens on the other, have a lower preference for long-term employment. Such a perception would reflect the central role traditionally played by women in the household—notably, child-rearing—and, with respect to citizenship, the pulls and pushes toward ones native country.

Our finding supports the hypothesis that this perception can render the educational cost constraint ineffective. The latter, it will be remembered, signals a set of broad individual traits, which together constitute the ‘socialization’ of the individual. The importance of this

to the employer, largely (but not exclusively), is because it bears upon the individual's potential to be a dependable, responsible and loyal long-term employee.

To the extent, then, that employers can ascertain with a significantly greater certainty through gender and citizenship signals than through education, that an individual has a relatively weak preference for long-term employment--that is, if both the conditional probability of a false negative and of a false positive are reduced--then, for women and non-citizens, the education signal is significantly lessened, if not rendered ineffective. Concerning gender, in particular, there are several studies indicating significant wage rates differences between men and women, related to women leaving the work-force for periods in favor of child rearing (Zalokar, 1988; Vella, 1993;. Blau and Kahn, 2000; Swaffield, 2000; Erosa, Fuster, and Restuccia, 2002). This points to the basis, then, of the conditional probabilities that underlie 'successful' use of gender as a signal.

That education is *not*, by contrast, interacted by race or ethnicity, can be explained by the fact that, unlike gender and citizenship, there is little to link individuals of a particular race or ethnicity to a perceived preference *vis < vis* long-term employment, analogous, that is, to that of women or non-citizens. Implicitly, there is no significant difference in the conditional probabilities of either false positives or false negatives, between race or ethnicity, as signals on the one hand, and education, on the other. Given the main effects, then--focusing here on the key racial division between Whites and Blacks--it follows that a more educated Black strengthens his/her signal, relative to a less-educated one, to a degree that is not significantly different from what a more educated White achieves relative to a less-educated White.

It is of interest, in this context, to report that we found significant interactions of race by gender, but, as already stated, no interactions of race by ethnicity (or, of course, ethnicity by race). The fact that race, like education, is interacted by gender, but is not interacted by ethnicity, further indicates that education, race and ethnicity, as signals, are

distinct from gender and citizenship. The interactions of race by gender are shown in the table below, focusing again, on the division between Whites and Blacks.

Table 2
Interaction Odds Ratios
Race by Gender

Race\Gender	<i>Male</i>	<i>Female</i>
<i>Black/White</i>	1.71	2.24

We see that the (negative) signal of being Black, here, is somewhat more telling with respect to women than for men. This indicates, perhaps, that a subtle aspect of racial signaling is the unequal likelihood, as perceived by employers, of a Black versus White woman eventually opting for child rearing; *i.e.*, having a low preference for long-term employment.

5. Interactions of Signals by Occupation

We do not find that the effect of education on the likelihood of being working poor is interacted either by occupation or by industry. This confirms that we have successfully isolated a signaling effect of education, separating it from ‘productivity effects’; *i.e.*, those based on particular knowledge and skills requirements, as well as wage efficiency cost requirements, of one kind of work, relative to another.

That education, controlling for both occupation and industry, significantly reduces the likelihood of being working poor, confirms the general findings, albeit some more mixed than others, of numerous other studies (for an early survey, see Riley, 1979) that there is, indeed, a significant signaling effect, independent of a return to human capital. We arrive at this result, here, however, not by constructing an indirect measure of the impact of the signal itself, comparing, for instance, workers employed by firms as compared to the self-employed (Wolpin, 1977), or alternatively, introducing such variables as the

individual's rank in the distribution of educational attainment (Kroch and Sjoblom, 1994), or the 'over-education' required by firms (Chatterji, *et. al.*, 2003).

Rather, we find that, within a comprehensive model, education has a significant effect that is not interacted by productivity effects. We then infer that the effect of education, as a work requirement--including here, again, wage efficiency cost requirements--is expressed by the significant differences in likelihood of being working poor by occupation and/or industry.

As for the discriminatory signals, however, we do find that occupation is interacted, once more both by gender and citizenship, but not, again, either by race or ethnicity. The interactions are shown in the table below.

Table 3
Interaction Odds Ratios:
Occupation by Gender; Occupation by Citizenship

Selected Occupations	Gender	Citizenship
	<i>Female/Male</i>	<i>Immigrant/US</i>
Administration	.86	1.81
Managerial, Professional	1.25	1.9
Production	1.77	2.15
Services	1.17	2.28

We speculate that the interactions reflect, respectively, gender-specific and citizenship-specific productivity differences, based on the work involved. In production occupations, which disproportionately involve the operation of machinery, it is not surprising that woman would be disproportionately in low-productivity jobs, and, therefore, be more likely to be working poor relative to a man than in any of the other occupations. On the other hand, in administrative occupations, most akin to running a household, a woman is least likely to be; and, indeed, we find in this one case, the sign is the reverse of the main effect. Similarly, regarding citizenship status, it is not farfetched that it is services, where the work involves direct worker to customer activities—the higher productivity jobs

requiring a US native's knowledge of language, local culture, etc.—that the non-citizens is most likely to be working poor relative to the citizen.

An inference we draw is that, since occupation is not interacted either by race or ethnicity, there are no significant productivity differences according to occupation, specifically along either of these lines. Put another way, occupation, in the model, picks up significant gender-specific and citizenship-specific productivity effects, respectively, but neither race-specific nor ethnicity-specific effects. This is somewhat analogous to education, which we found also picked up certain signaling effects specific to gender and citizenship, respectively, not specific to either race or ethnicity.

Another aspect of the results in **Table 3** is worthy of some attention, since it bears directly on a number of the dual labor market approaches. We see a parallel interaction of the production occupations by gender and citizenship. As compared to other occupations, a woman in production, as already observed, and, as well, a non-citizen, are significantly more likely to be working poor than, respectively, a man and a US citizen (the only slight exception being the aforementioned services occupation with respect to citizenship).

The 'production' occupations are described by Piore at one point as being in "the lower tier of the primary sector" (1973: 383). Its more productive (higher paying) work is characterized by a combination of the need for large investments in specific training, and little need for any general training *i.e.*, formal education. The financing, and hence the return from this kind of investment, based on human capital theory, largely accrues to the firm, any sharing of it with the worker being a means of it (the firm) lowering its cost of turnover, on the margin, relative to the loss in share (Becker, 1975:).

The production occupations, then, disproportionately 'pay' workers in the currency of stable employment, which, as discussed, is a defining aspect of the institutional/Keynesian understanding of the primary labor markets. Piore argues that these occupations, in turn, attract individuals that have a relatively strong preference for long-term employment and highly repetitive, routine work. He writes:

The employees tend to be what sociologists term *working class adults*. They are attached to a lifestyle or subculture which places a premium upon stability and routine and is centered in the extended family unit the support of which is the primary function of the work (1973: 383).

Our finding that a woman and non-citizen, respectively, are each more likely to be working poor in production occupations, as compared to other occupations, points, in turn, to the objective factor that makes gender and citizenship effective signals: an increased likelihood of a relatively *low* preference on the part of a woman and non-citizen, respectively, for stable.

6. Interactions of Industry and Occupation

The last result of ours, of interest, is the finding of significant interactions of occupation by industry. These are shown in the table below:

Table 4⁴
Interaction Odds Ratios
Industry by Occupation

Sel. Industry\Occ.	<i>Mgr., Prof</i>	<i>Admin.</i>	<i>Prod.</i>	<i>Services</i>
<i>Professional Business Services</i>	1	2.52	1.33	2.32
<i>Construction</i>	1.11	2.69	4.03	7.15
<i>Education & Health Services</i>	1.58	1.53	1.53	1.85
<i>Leisure & Hospitality</i>	1	3.22	1	2.83
<i>Manufacturing</i>	1	2.38	1.43	4.34
<i>Other Services</i>	4.54	3.66	1	3.35
<i>Transportation &, Utilities</i>	1.46	2.14	1.82	4.84
<i>Wholesale & Retail</i>	1.33	3.22	2	2.77

The first thing to note about these results is that the main effects of occupation on the likelihood of being working poor is transparent, being virtually uniform across industries. With only a few minor exceptions,⁵ within any given industry workers in managerial & professional and production occupations, respectively, are significantly less likely to be working poor than workers in either administrative or service occupations. Thus in the context of our model, controlling for signaling effects, the productivity effects--including wage efficiency requirements on the firm--seem to transcend industrial organization. This suggests that the underlying duality within the labor markets is in the occupation space, not that of the firm.

This conclusion is supported by the fact that there is no equivalent transparency of the main effects of industry on likelihood of being working poor. Within a given occupation, the effects of industry do not bear any obvious relation to those within the others. Thus, for example, if we look at the main effects, a worker in the construction industry is significantly less likely to be working poor than a manufacturing worker. However, by occupation, production workers in the construction industry are the most likely to be working poor relative to workers in all the different industries, while manufacturing workers are among the least likely.

We do see however, an interesting interaction of one occupation by industry. In particular, a worker in a service occupation is significantly more likely to be working poor if he/she is employed in one of the industries with high fixed-capital costs--construction, manufacturing or transportation & utilities—than if employed in any of the other industries, which, for the most part, are providers of services. This finding is suggestive with regard to those strands of the wage efficiency and institutional/ Keynesian approaches that draw a line between the primary and secondary labor markets squarely in the realm of industrial organization.

Bulow and Summers succinctly articulate the former approach:

[Wage efficiency] also provides a basis for a theory of the firm-size effect. Large firms enjoy economies of scale and are able to get reduced prices from suppliers but, because of their size have less favorable [monitoring cost] functions. They therefore substitute high wages for supervision (1986: 388).

Equating ‘large firms’ with high fixed-cost industries,⁶ our finding of an interaction of the service occupation by industry, does not seem understandable through wage efficiency theory; nor does **Table 4**, altogether, lend much support for this kind of explanation. We find no evidence that a production worker’s likelihood of being poor is less in a high-fixed cost industry than in others, and the same can be said for professional & managerial, and administrative occupations, as well. Indeed, production workers both in construction and transportation & utilities are seen to be *more* likely to be working poor than those in *any other* industry, and even a production worker in manufacturing is more likely to be working poor than one in either leisure & hospitality, professional business services, or ‘other services’.

The institutionalist/Keynesian approach, rather than pointing to diseconomies of scale with respect to monitoring costs, places much importance on the relation between use of fixed-cost technologies and industrial organization, as such. As already mentioned, the claim is that in the high fixed-cost industries, intra-industry dualities can readily develop between, on the one hand, an oligopoly of firms that supplies to a stable, core market

demand, and hence which can support high fixed-capital costs--realizing considerable economies of scale as a consequence—and, on the other hand, a competitive set of relatively small, labor-intensive firms. Some of the latter sell low-skilled services to the oligopoly and thereby augment the oligopoly's internal production of these, while other small firms augment the oligopoly's production of final output.

Piore describes the basis of this phenomenon, as follows, blending, one should note, institutionalist and Keynesian precepts:

The organization of capitalist economies creates a basic distinction between capital and labor... Capital is the fixed factor of production. It can be idled by fluctuations in demand, but it cannot be laid off... In the sense that workers can be said to own their own labor power, the owners of labor are like the owners of capital. They each bear the cost of unemployment for the factor that they own. But there is a basic difference between the owners of capital and those of labor in that in a capitalist system it is the former who organize and control the productive process. The effect of this difference is that labor is forced to bear a disproportionate share of the cost of economic flux and uncertainty. Whenever possible, the capitalist will try to seek out the more stable and certain portion of demand and reserve it for the employment of his own equipment...When demand can be divided into stable and variable portions...the capital intensive technique will be used to meet basic demand and the labor intensive method will be used for the [variable] portion (1979: 36-7).

The observed interaction of the service occupation by industry, in these terms, then, reflects the significantly different susceptibilities of industries to the duality posited by Piore. For industries with high fixed-capital costs—including in this investments in specific training, as well as structures and equipment—the 'outsourcing' of services is a significant means of assuring full-employment of fixed-capital resources, even in the face of uncertain demand, effectively pushing a large portion of low-skilled service workers, in particular, into a secondary sector, marked by instability. For industries that chiefly produce services, and have relatively low fixed-capital costs, an intra-industry division of this sort is not likely to emerge as fully, though this is not to say it is necessarily absent altogether from these industries either.

The question remains as to why a service worker in a high fixed-cost industry should earn significantly lower wages than one in another industry. Indeed--along the same line of reasoning we attached to our finding that, *ceteris parabis*, a worker in a small scale firm is less likely to be working poor than one in a large scale firm--we might expect that, to the contrary, given the instability of these jobs, relative to service employment in other industries the likelihood of being poor would be *less* for a service worker in a high fixed-cost industry.

A tentative answer to this question is that, just as the production occupation is said (by Piore) to attract individuals with strong preferences for long-term employment, the high fixed-cost industries, in particular, attract into their secondary sectors individuals who have weak preferences for long-term employment. Piore identifies a broad class of 'marginal' workers who "view their attachments to the job and often to the labor market, as temporary and define themselves in terms of some other activity from which they derive their personal and social identity" (1979: 87). In addition to having high opportunity costs of working, such individuals have low productivity, due, in large part, to the high monitoring and transactions costs associated with them. Hence, we speculate that these marginal workers are more likely to be employed in service jobs in the high fixed-capital cost industries than in other industries, and that this is a reason the service occupation is found to be interacted by industry in the manner we observe.

Concluding Summary

We have distinguished between four approaches to dual labor market; three neoclassical views: human capital theory, wage efficiency and the screening hypothesis; and a fourth--more classical approach--which we term 'institutionalist/Keynesian.' We have considered these in light of a conventional choice-theoretic econometric model. The likelihood of an individual being working poor has been comprehensively tested with

respect to the individual, occupation and firm characteristics of the worker. Our main findings have been the following.

1. There are significant signaling effects on the likelihood of being working poor; not only effects of education, but, as well, of discriminatory signals: citizenship, ethnicity, gender and race. In the cases of ethnicity and race the effects do not interact with education, occupation or industry. On the other hand, the effects of education, occupation and industry are each significantly interacted by citizenship and gender. We infer the existence both of citizenship-specific and gender-specific differences in the relative opportunity costs of individuals between the various levels of formal education, on the one hand, and in the productivity of workers between the various occupations, on the other. Such differences do not seem to exist along either ethnic or racial lines. In this sense, there is a ‘pure’ signaling effect of each of the latter variables, as opposed to the former.

2. We find an absence of interactions of occupation by (formal) education. This result indicates that the effect of schooling, *qua* signal, is separable from the productivity requirements of one occupation relative to another. The fact that, controlling for occupation and industry, education has a significant effect on the likelihood of being working poor, is strong confirmation, then, of the screening hypothesis; *i.e.*, it reveals an effect of education on wages independent of any knowledge needed to do a job, that such education might provide. On the other side of the coin, when we look at the main effects of occupation, within our model, it seems plausible⁷ that, to a significantly greater degree than other occupations, the managerial & professional occupations require formal education, in its own right; that is, to meet job requirements. In other occupations, education serves much more as a signal of certain general characteristics of an individual.

3. In the basic structural spaces of occupation and firm, we find that there are significant interactions of occupations and industries. In the case of occupation, however, the main effect on likelihood of being poor, is clearly visible across industries (**Table 4**). A fundamental labor market duality exists between workers in the professional & managerial

occupations and the remainder of the work-force, with only, perhaps, production workers, to be found in its own realm. On the other hand, there is little left of the main effects of industry on likelihood of being poor once the interactions with occupation are made explicit. We do observe that a worker in the service occupations is significantly more likely to be working poor in the high fixed-capital industries than others. And this seems to us explainable from an institutionalist/Keynesian viewpoint, but not that of wage efficiency. But our larger conclusion, here, is that the underlying labor market duality exists in the occupation space, not that of the firm.

¹ We are assuming that utility and the index are in the same units of measure. Of course, if they were not, they can be easily standardized.

² [cv] = continuous variable; ^m = marginally significant; ins. = insignificant

³ One sees, with respect to gender—but not citizenship—a variant of the well-known ‘sheepskin effect.’ The likelihood of a women being working poor relative to a man is greater for individuals with just a high school diploma than those with some college, but no college degree.

⁴ Industries and occupations in which in one or more categories there were insufficient observations to generate statistically meaningful results, are not included here. In addition, the natural resource industries and occupations were not included.

⁵ Production workers in construction industries, administrative workers in education and health services, and managerial and professional workers in other services.

⁶ The passage quoted refers to large scale industries. It is in a section entitled, ‘Interindustry Wage Differentials.’

⁷ One also has to take into account, however, wage efficiency effects that would also be manifest in this result.