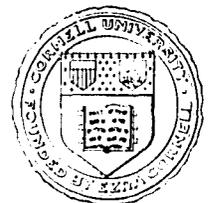


JUNE 1993

WORKING PAPER 43

Labor Force Participation, Sectoral Choice, and Earnings in Conakry, Guinea

Peter Glick
and David E. Sahn



**LABOR FORCE PARTICIPATION, SECTOR OF EMPLOYMENT
AND EARNINGS IN CONAKRY, GUINEA**

**Peter Glick
David E. Sahn**

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CFNPP is funded by several donors including the Agency for International Development, the World Bank, UNICEF, the United States Department of Agriculture, the New York State Department of Health, The Thrasher Research Fund, and individual country governments.

Preparation of this document was financed by The World Bank and also by the U.S. Agency for International Development under USAID Cooperative Agreement AFR 000-A-0-8045-000.

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ISBN 1-56401-143-7

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This document was word processed and formatted by Gaudencio Dizon. The manuscript was edited by Brent Beckley. The cover was produced by Jake Smith.

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I. INTRODUCTION

Labor markets in developing countries are more likely than those of developed countries to be composed of segments, which differ in terms of the factors determining both participation and earnings. Casual observation in urban areas of less developed countries (LDCs) suggests the existence of such heterogeneity, for example, in the distinction between employment in a small family enterprise and wage work in the public sector. Education, experience, and other characteristics are likely to affect not just whether an individual works but also in which sector, as well as influencing earnings in ways that may depend on the sector of participation.

The distinction between self-employment and wage employment is especially relevant in sub-Saharan Africa. Self-employment is of overwhelming importance as a source of income for women in urban areas, particularly for those with little schooling. Own-enterprise activities also figure importantly as a means of livelihood for migrants to Africa's expanding urban centers, many of whom are unlikely to be able to find jobs in the formal wage sector. In view of both of these well-known characteristics of the urban African economy, it is important to determine whether there are rewards to human capital in self-employment comparable to those in wage work.

A second division in the labor market of potential relevance for Africa is that between the private and public sectors. Wage setting procedures, hence the structure of earnings, are likely to be different in the private wage sector and the civil service. For example, there is evidence for a number of African countries of wage compression in the public sector (Lindauer et al. 1988), that is, a narrow distribution of earnings such that the ratio of pay of the most skilled to the least skilled workers is substantially smaller than in the private sector. Although motivated by, among other factors, government attempts to maintain equity in earnings, the compression of public sector pay is widely considered to be a major source of allocative inefficiency in labor markets in Africa and results in reduced public sector productivity through poor motivation and the loss of highly skilled individuals to the private sector (Stevenson 1992).

There is an important gender dimension to the analysis of labor market structure in Africa. Male and female labor force participants are not represented equally in all portions of the labor market; it is typical, for example, to find a substantially higher proportion of women than men engaging in non-wage activities. An important question for research is whether the predominance of women in self-employment reflects institutional barriers to the hiring of women in wage occupations, or merely differences in the backgrounds, particularly schooling, of men and women.

Empirical research on labor markets in LDCs needs to account for potential labor market heterogeneity. Clearly, if labor market behavior is modelled simply as a dichotomous choice of whether or not to work, when in fact there is more than one distinct labor force alternative, parameter estimates in the participation equation will incorporate a specification bias. Similarly, in estimating earnings functions, the failure to address the non-homogeneity of labor markets for women and men can result in biased estimates of the returns to human capital through inappropriate aggregation of sectors with different earnings structures. Although most studies of labor market participation in LDCs have employed the simple dichotomous choice framework, a few have incorporated various labor market alternatives (e.g., Alderman and Kozel 1989; Gindling 1991; Khandker 1987, 1992; Magnac 1992). For sub-Saharan Africa specifically, there are now several studies that model labor market choices and earnings in a polychotomous framework. These do not, however, capture the full range of labor market alternatives characterizing urban areas in the region. Appleton et al. (1990) estimate models of sector allocation in Côte d'Ivoire, but since their focus is on wage employment, their specifications do not distinguish between self-employment and non-participation. Van der Gaag et al. (1989) and Mills and Sahn (1993) consider the distinction between private and public sectors but not the decision to participate at all or the choice of self-employment vs. wage employment.

In this study we use data from Conakry, Guinea, a rapidly expanding city in West Africa with a population of approximately 1 million people, to expand upon the few previous studies of labor market participation and wage formation in Africa (Appleton et al. 1990; van der Gaag et al. 1989; Lindauer and Sabot 1983). Our first concern is with the criteria for selection into different sectors of the labor market. We identify four alternatives: self-employment (primarily in very small-scale enterprises), wage and salaried employment in the private sector, wage employment in the public sector, and non-participation. We assess the relative importance of human capital and other factors in determining how participants are sorted into different sectors. Since an important concern for policy is the presence of constraints to women's income-earning opportunities, we focus on differences in male and female participation and sector of employment determination.

Second, we analyze wage formation in a labor market that is not homogeneous. Most previous work on wage determinants in Africa that has distinguished between different sectors of the labor market has been weakened by a failure to correct for the possible non-randomness of selection of workers into one or another sector, leading to potentially biased estimates. A second limitation of these studies is that they ignore earnings in self-employment, thereby leaving out of the analysis a major sector of activity in the African economy.¹ In this study we make use of detailed survey information on enterprise revenues and input use to analyze earnings of self-employed men and women as well as examining earnings of private and public sector wage employees. Thus we extend work on the role of

¹ Vijverberg (1990) provides an econometric analysis of self-employment earnings in Côte d'Ivoire, but not in the context of modelling sector participation decisions.

human capital in agricultural productivity (summarized in Schultz 1988) to examine how schooling affects the profits in non-agricultural enterprises.

The remainder of this paper is organized as follows. In Section 2 we discuss the model of participation and wage determination used in the analysis. This is followed in Section 3 by a discussion of the survey of 1,725 households from Conakry used in this analysis. We also present descriptive statistics on the urban labor force in this section. In Section 4, a multinomial logit model of participation and sector choice is estimated. Section 5 estimates earning functions for the three sectors, correcting for potential biases caused by the self-selection of individuals into different sectors. In Section 6, the results are briefly summarized, with emphasis on policy implications.

2. MODEL SPECIFICATION

In the first part of this study we estimate a model of labor market participation and sector of employment determination. Our initial examination of the data, as well as the general considerations discussed above, suggests that a plausible view of the labor market in Conakry would allow for three distinct sectors: self-employment, wage employment in the private sector, and wage employment in the public sector. In view of the number of discrete choices involved, the multinomial logit model provides the most suitable econometric approach to estimating the probabilities an individual will be found in each sector. These models can be derived from the assumption of utility maximization through the theory of probabilistic choice as developed by McFadden (1973). Briefly outlined, utility conditional on the choice of each labor market alternative j (including non-participation) is specified in linear form:

$$V_{ij} = B_j X_i + u_{ij} \quad (1)$$

V_{ij} is the indirect utility function of individual i in labor market sector j and is a linear function of individual characteristics X_i , such as education, age, and income. The stochastic component of utility u_{ij} captures unmeasured determinants of choice. The parameters B_j are allowed to vary across alternatives, as they must to estimate the model since the X_i 's do not vary (Maddala 1983). The individual is assumed to choose the sector k ($k=1,2,3,4$) for which V_{ij} is highest. Thus the probability that sector j is chosen by individual i , using equation (1), is:

Assuming the u_{ij} 's are distributed independently and identically Gumbel, their differences ($u_{ik} - u_{ij}$) have a logistic distribution and the probabilities take the multinomial logit form:

$$P_{ij} = \frac{\exp(B_j X_i)}{\sum_k \exp(B_k X_i)} \quad (3)$$

The formulation of the choice problem in (2) implies that only differences in utilities from being in different sectors, rather than absolute levels, matter for the determination of choice probabilities. Some method of normalization is therefore necessary. It is standard to normalize by setting the parameter vector associated with one alternative equal to zero. For our problem we choose non-participation to be the base, and the estimated coefficients will be interpreted as the effect of the variable on the utility derived from an employment alternative relative to the utility of not participating.²

Next we will estimate and compare earnings functions by sector of employment and gender using the standard human capital model associated with Mincer (1974) and others. The natural log of wages or earnings of individual i in sector j is expressed as a function of a vector of human capital variables:

$$\ln W_{ij} = \gamma_j Z_i + \eta_{ij} \quad (4)$$

where Z_i contains such variables as years or level of education, technical or professional training, age, and experience, and the disturbances η_{ij} are assumed normal. OLS estimation of (4) on the subsample of workers in sector j , however, presents a problem because individuals are likely to select themselves (or be selected into) the different sectors rather than be randomly sorted among them. The problem arises through the correlation of the disturbances in the equations determining participation and the wage, which will be non-zero if unmeasured characteristics that influence the wage also affect the sector selection process. With non-random sorting, values for η_{ij} in a certain range are systematically excluded from the distribution of the errors observed for workers in sector j ; η_{ij} , in other words, has a truncated distribution. The expected value of the disturbance term conditional on choice of sector j is therefore non-zero and conventional OLS estimates of the parameters γ_j will, in general, be biased (Heckman 1979, Lee 1983). Taking the expectation of (4) conditional on j yields

² The multinomial logit formulation in (3) has the limitation that the ratio of the probabilities of choosing two alternatives i and j is independent of the number of alternatives (the Independence from Irrelevant Alternatives property). The nested multinomial logit model, in contrast, does not make this assumption, which derives from the assumption of the independence of the disturbances in (1). We therefore also estimated a number of alternative specifications of nested models. In each case, however, the term approximating the correlation of errors fell outside the unit interval, indicating misspecification (Maddala 1983). We therefore only report the estimates from the non-nested logit models in Section 4.

$$E(\ln W_{i,j} | j) = \gamma_j Z_i + E(\eta_{i,j} | j) \quad (5)$$

Selectivity implies $E(\eta_{i,j} | j) \neq 0$.

Two-step approaches to eliminating selectivity bias are based on a reinterpretation of the problem of truncation of the disturbances as one of omitted variable bias. Heckman (1979) pointed out that including a term for $E(\eta_{i,j} | j)$ to account for the truncation of the error term will lead to the appropriate conditional regression equation for this subsample with a new disturbance with zero mean. Calculating the conditional mean of $\eta_{i,j}$ involves the specification of the joint distribution of $\eta_{i,j}$ and the error(s) in the participation equation(s). In the present example, selection is determined in a multinomial framework where the (differences in the) disturbances follow a logistic distribution while the errors in the wage equations are assumed normally distributed. Lee's (1983) approach involves the transformation to normality from non-normal distributions of the participation equations, permitting the two-stage method to be used in the present context. Using Lee's method, the estimated earnings functions are

$$W_{i,j} = \gamma_j Z_i + (\sigma_j \rho) \lambda_{i,j} + \epsilon_i \quad (6)$$

where

$$\lambda_{i,j} = \frac{\phi(\Phi^{-1}(P_{i,j}))}{P_{i,j}} \quad (7)$$

$\sigma_j \rho = E(\eta_{i,j} | j)$ and the expected value of the disturbances $\epsilon_{i,j}$ for this equation is zero. ϕ is the standard normal density function; $P_{i,j}$ is the predicted probability of observing individual i in sector j , given by the multinomial logit model; $\Phi^{-1}(P_{i,j})$ is a standard normal variable and represents the transformation to the normal from the logistic distribution; σ_j and ρ are the standard deviation of the disturbance $\eta_{i,j}$ from (4) and the correlation of η and $\Phi^{-1}(P_{i,j})$, respectively. OLS estimation of (6) will yield consistent parameter estimates of γ_j as well as of $(\sigma_j \rho)$.

3. DATA AND DESCRIPTIVE STATISTICS

The Conakry household welfare survey is a self-weighted random sample survey of 1,725 households that was conducted over a 12-month period. For the present analysis, a total of 3,566 men and 3,306 women over the ages of 15 are included in our definition of the potential labor force. The survey contains detailed information on respondents' labor market participation, job search activities, and earnings. For the self-employed, data on costs and revenues were collected. A wide range of other data on the structure of the household, education, and other social and economic characteristics was also collected.

In Table 1 we see that overall, 56.17 percent of men and 70.66 percent of women in the potential labor force are currently not working. The participation rates are highly dependent upon age and tend to be very low for those under 30 years of age. For example, only 4.08 percent of the men between 15 and 20 years of age are working, in contrast to 80.85 percent in the 31-to 50-year-old age group. Females 15 to 20 years old are more likely to be working than males, but their participation rate is still below 10 percent. For both men and women 21 to 30 the participation rate is only slightly more than 25 percent. However, for women between 31 and 65 years old, the probability of working is slightly less than half that of men in this age group.

Note that participation has been defined thus far as being employed. In principle, persons not currently working but who are searching for work should also be included in the labor force. In Conakry, however, most individuals not currently employed do not appear to be looking for work. Virtually all males and females between 15 and 20 years old who are not working are also not searching for work. Perhaps surprisingly, even among non-working men 21 to 30 years old, who comprise fully 72 percent of this age and sex category, only 15 percent report that they are looking for work. It is only for non-working men between 31 and 50 years of age that the searchers are greater in number than the non-searchers. For women, the share of non-participants not searching remains above 90 percent for all of the age cohorts for women.

Participation rates, even including the unemployed who are looking for work, are therefore quite low. The most frequent explanation given for not searching for employment by non-participants (those less than 30 years of age) is that they are still in school or are engaged as apprentices (Table 2). The failure to find employment at a young age is probably also rooted to some extent in social norms, whereby most men do not get married until relatively late in life. Less than 5 percent of men under 25 years old are married, and less than 15 percent of men between 25 and 30 years of age are married. For the most part, these young men remain in the homes of their parents, which presumably raises their reservation wage, and do not enter the labor force until after marriage. Note also, however, that both continued schooling or training and delay in marriage may be responses to an overall depressed job situation in Conakry.

Table 1 — Participation Rates and Job Search Behavior, by Age and Gender

Gender/ Age Group	Participants	Non- participants	All	Nonparticipants		
				Searching	Not Searching	All
Percent						
Men						
15 to 20	4.08	95.92	100	2.51	97.49	100
21 to 30	27.29	72.71	100	14.66	85.34	100
31 to 50	80.85	19.15	100	73.58	26.42	100
51 to 65	64.80	35.20	100	35.42	64.58	100
Over 65	30.30	69.70	100	3.08	96.92	100
All	43.83	56.17	100	15.15	84.85	100
Women						
15 to 20	9.45	90.55	100	1.19	98.81	100
21 to 30	28.08	71.92	100	8.31	91.69	100
31 to 50	47.04	52.96	100	7.27	92.73	100
51 to 65	31.84	68.16	100	0.70	99.30	100
Over 65	10.39	89.61	100	0.00	100.00	100
All	29.34	70.66	100	4.90	95.10	100

Table 2 --Non-participants Not Searching for Work: Reasons, by Age and Gender

Gender/Sex	Reason not Searching							All
	Apprentice	Student	Too Old	Too Young	Retired	Homemaker	Other	
	Percent							
Men								
15 to 20	28.96	55.34	0.00	1.80	0.00	0.77	13.00	100
21 to 30	43.50	40.25	0.00	0.00	0.00	1.55	14.71	100
31 to 50	26.19	14.29	0.00	0.00	7.14	0.00	52.38	100
51 to 65	0.00	1.61	12.90	0.00	59.68	0.00	25.81	100
Over 65	0.00	1.59	61.90	0.00	34.92	0.00	1.59	100
All	32.52	43.90	3.02	0.88	3.90	1.01	14.78	100
Women								
15 to 20	9.37	30.12	0.13	1.20	0.00	33.47	25.70	100
21 to 30	10.55	13.52	0.45	0.89	0.00	64.04	10.55	100
31 to 50	0.82	0.41	0.62	0.41	0.62	88.25	8.87	100
51 to 65	0.00	0.00	28.17	0.00	4.23	54.23	13.38	100
Over 65	0.00	0.00	88.24	0.00	0.00	2.94	8.82	100
All	6.83	15.04	5.06	0.80	0.43	56.17	15.65	100

Among the older cohorts, the primary reason given for not working differs by gender. For women between 31 and 50 years of age, 88.25 percent explained their non-participation by saying they were homemakers, a response never given by men in this age group. For persons 51 to 65 years old, the response given most often by men for not working is that they were too old or retired, while for women, being a homemaker remained the main reason.

Turning to the sector of participation for those working, Table 3 shows that men in the labor force are dispersed relatively equally across the three sectors of private wage, public wage, and self-employment. In contrast, women are predominantly engaged in self-employment activities. In fact, only 7.22 percent of the women in the labor market are in the private wage sector, and only 14.54 percent are in the public wage sector. The remaining 78.25 percent of participating women are self-employed. More than half of all self-employed workers in Conakry are women, while women comprise only 11.40 and 23.0 percent of men and women working in the private and public wage sectors, respectively.

Age also has a strong association with the sector of participation. For men between 31 and 50 years of age, 38.56 percent are engaged in the public wage sector, a higher percentage than in either private wage employment or self-employment (Table 4). This pattern does not hold for any other age group. For instance, only 12.33 percent of the men between 21 and 30 years old are engaged in the public sector. For women, a similar pattern is observed. Relative to other age cohorts, women between 31 and 50 years of age are more likely to be found in the public wage sector.

Demographic factors, such as the presence or number of young children in the household, can be expected to influence participation and sector allocation, particularly for women. Table 5 presents the labor force participation rates of all women and of women with and without young children. Although for both groups the overall participation rate is quite low, the participation rate of 41.5 percent for mothers of young children is markedly higher than for women without young children (26.3 percent) and for all women aged 15 to 65 (31.6 percent). A woman whose youngest child is under 2 years old, moreover, is as likely to be in the labor force as a woman whose youngest child is between 2 and 5 years old. Compared with findings in developed countries, where female participation is almost always inversely associated with fertility, the pattern observed in Conakry might appear anomalous. Studies in other developing countries, however, as often as not fail to replicate the inverse association shown in industrial societies. The difference is usually attributed to the greater availability of adult or adolescent potential childcare substitutes within the typical developing country household, as well as to the greater compatibility of childcare with many forms of market work in developing economies. Both factors may underlie the higher participation rates of women with children in Conakry, where households are large (averaging 7 persons) and self-employment predominates among females in the labor force.

Table 5 also shows that women with two children under 5 years old are more likely to be employed than those with just one child, and that women with more than two children are the least likely to be working. This pattern may reflect

Table 3 — Labor Market Participants: Sector of Employment, by Gender

Sector	Men	Women	All
Private wage			
Number	544	70	614
Row percent	88.8	11.40	100.00
Column percent	34.80	7.22	24.24
Public wage			
Number	472	141	613
Row percent	77.00	23.0	100.00
Column percent	30.20	14.54	24.20
Self-employment			
Number	547	759	1,306
Row percent	41.88	58.12	100.00
Column percent	35.00	78.25	51.56
All			
Number	1,563	970	2,533
Row percent	61.71	38.29	100.00
Column percent	100.00	100.00	100.00

Table 4 —Labor Market Participants: Sector of Employment, by Age and Gender

Age	Men				Women				Total			
	Public Wage	Private Wage	Self-Employment	All	Public Wage	Private Wage	Self-Employment	All	Public Wage	Private Wage	Self-Employment	All
Percent												
15 to 20	0.00	44.12	55.88	100	1.25	6.25	92.50	100	0.88	17.54	81.58	100
21 to 30	12.33	44.86	42.81	100	8.25	10.89	80.86	100	10.25	27.56	62.18	100
31 to 50	38.56	30.46	30.97	100	21.85	5.71	72.44	100	32.84	21.96	45.18	100
51 to 65	25.43	37.93	36.64	100	5.63	2.12	91.55	100	20.79	29.70	49.50	100
Over 65	3.33	43.33	53.33	100	0.00	12.50	97.50	100	2.63	36.84	60.53	100

Table 5 —Labor Force Participation and Sector of Employment of Women 15 to 65 Years Old, by Age and Number of Children under 5 Years Old

Group	N	Not Partici- pating	Self- Employment	Wage Employment	All	Overall Partici- pation Rate
All women	3,243	68.5	24.8	6.8	100.0	31.6
Non-mothers	2,130	73.7	20.1	6.2	100.0	26.3
Mothers of children <5	1,113	58.5	33.8	7.7	100.0	41.5
Of which:						
Youngest child <2	635	59.69	32.91	7.40	100.0	40.3
Youngest child 2-5	478	56.90	34.94	8.16	100.0	43.1
1 child <5	735	61.09	31.56	7.35	100.0	38.9
2 children <5	348	52.59	39.37	8.05	100.0	47.4
3 or more children <5	30	63.33	23.33	13.33	100.0	36.7

the fact that more children require more resources, so women with two young children who are able to find substitute childcare providers or who can combine work and childcare will have a greater inducement to enter the labor force than women with only one child. Alternatively, however, the pattern may reflect associations between fertility on one hand and age, schooling, or household income on the other, since all of these factors will also likely influence labor market participation. To assess these influences requires a multivariate approach, which we take in the next section.

A particular concern for policy is the source of income of poor households. When we examine the distribution of persons in the labor market by sector according to the expenditure quintile of the household in which they reside, two findings emerge that are particularly noteworthy (Table 6). Women who are engaged as public sector wage workers tend to reside in households that are heavily concentrated in the upper end of the income distribution. For example, 58.86 percent of the women in the public wage sector live in households that are in the upper 40 percent of the income distribution. This contrasts sharply with those women engaged in self-employment: 59.29 percent of these workers are from households in the bottom 40 percent of the income distribution. Among men, in contrast, there are no strong associations between the sector in which they are engaged and the income of the household.

Finally, in Table 7, we examine the relationship between the number of income earners per households, their sector of employment, and household incomes. A few important patterns emerge. First, over half (57 percent) of households have only one income earner, and only 13 percent have three or more income earners. Households with more workers are disproportionately represented in the bottom end of the income distribution. For example, 55 percent of households with at least three workers are in the bottom 40 percent of the income distribution. Among households with two earners, those with both earners in the wage labor market tend to be considerably better off than the population in general. The opposite holds when both income earners are self-employed. Among households with only one worker, there is a relation between sector and income distribution. Fifty-three percent of single earner households in which the earner works in the public wage sector are in the upper 40 percent of the income distribution for households.

The descriptive statistics just discussed suggest some strong differences in welfare among persons engaged in various segments of the labor market. In the next section, multivariate analysis is used to determine how sorting among labor market sectors occurs, and how human capital affects earnings in different portions of the labor market.

Table 6 — Sector of Employment, by Gender and Household Per Capita Expenditure Quintile

Sector/Gender	Per Capita Expenditure Quintile					All
	1	2	3	4	5	
Percent						
Private wage						
Men	20.59	22.24	20.77	18.01	18.38	100
Women	18.57	11.43	20.00	22.86	27.14	100
All	20.36	21.01	20.68	18.57	19.38	100
Public wage						
Men	17.16	19.07	17.80	24.15	21.82	100
Women	7.09	18.44	15.60	26.24	32.62	100
All	14.85	18.92	17.29	24.63	24.31	100
Self-employment						
Men	22.85	18.83	21.02	20.11	17.18	100
Women	32.54	26.75	21.34	12.52	6.85	100
All	28.48	23.43	21.21	15.70	11.18	100

Table 7 — Sector of Employment for Single and Multiple Earner Households, by Per Capita Expenditure Quintile

Household Type and Sector	Quintile					All	N
	1	2	3	4	5		
	Percent						
One earner							
Private wage	14.18	18.91	19.27	22.55	25.09	100.00	275
Public wage	14.72	15.58	16.88	21.65	31.17	100.00	231
Self-employment	21.60	21.07	18.67	19.73	18.93	100.00	375
All	17.48	18.96	18.39	21.11	24.06	100.00	881
Two earners							
Both wage	10.66	19.67	14.75	22.95	31.97	100.00	122
Wage/self	17.99	24.87	26.46	19.05	11.64	100.00	189
Both self	26.49	28.48	19.87	13.91	11.26	100.00	151
All	18.83	24.68	21.21	18.40	16.88	100.00	462
More than two earners							
All	34.33	20.40	22.39	15.42	7.46	100.00	201

4. PARTICIPATION AND SECTOR OF EMPLOYMENT

Parameter estimates and asymptotic t-statistics from the multinomial logit model for men and women are presented in Tables 9 and 10. As noted, the parameters are normalized using non-participation as a base, so the reported coefficients represent the effect of an exogenous variable on the difference in utilities of being in a given sector relative to the non-participation alternative. The parameters themselves do not represent the effect of a change in an independent variable on the probability of entering a sector. These effects are arguably of more interest than the direct parameter estimates and can be calculated from the latter. To determine marginal effects for variables that are continuous, we calculate the partial derivative of the probability of being in a sector with respect to the variable.³ Our models also contain many categorical variables, for which such derivatives are not meaningful. For these variables, we calculate the probabilities of belonging to each sector when the variable takes a value of 1 and when it is zero and report the difference in the probabilities. The estimated effects of changes in continuous and discrete variables on entry probabilities are reported beneath the t-statistics.⁴ In addition, we present separately the probabilities of belonging to each sector by level of education, a variable of particular interest, in Table 11. We also report results from dichotomous logit models of the decision to participate in any income-earning activity. We do so to facilitate comparison with most previous work, which has employed a binary approach, and also to illustrate the advantages of the polychotomous choice framework.

To assess whether the polychotomous approach is preferable to a simple binary participation framework, likelihood ratio tests were performed on the null hypothesis that the parameter vectors associated with each work choice are equal,

³ For a continuous variable x in the multinomial logit model, the partial derivative of the probability of being in sector j is:

$$\partial P_j / \partial x = P_j (B_j - \sum_{i=0}^3 P_i B_i),$$

where B_i is the coefficient on the variable in the indirect utility function for the i^{th} sector. Note that these marginal effects are not elasticities representing the percent changes in probabilities, but rather the absolute change in the probabilities (which are themselves percentages).

⁴ The estimated impacts of changes in the independent variables are calculated as the average of the effects for all observations; the alternative of using the means of the data will not produce consistent estimates of average effects because the model is nonlinear in the explanatory variables (see Train 1986).

Table 8 —Means and Standard Deviations of Variables Used in the Analysis

Variables	Men		Women	
	Mean	Standard Deviation	Mean	Standard Deviation
Age (percent)				
21 to 30	—	—	0.326	0.469
31 to 40	0.214	0.410	0.221	0.415
41 to 50	0.124	0.330	0.106	0.308
51 to 65	0.100	0.301	0.067	0.251
Over 65	0.028	0.164	0.023	0.151
Education (percent)				
Primary school	0.348	0.477	0.243	0.429
Secondary school	0.141	0.348	0.073	0.261
University	0.076	0.263	0.021	0.142
Married (percent)	0.442	0.497	0.644	0.479
Children < 2	0.521	0.715	0.587	0.736
Children 2 to 5	1.061	1.134	1.237	1.207
Children 6 to 14	2.123	1.916	2.402	2.000
Males and females				
15 to 20	1.676	1.659	1.666	1.606
Men 21 to 64	2.339	1.687	1.965	1.536
Women 21 to 64	1.826	1.391	2.242	1.518
Men > 64	0.123	0.343	0.112	0.325
Women > 64	0.086	0.305	0.114	0.350
Unearned income (GF)	0.194xe**	0.546xe**	0.182xe**	0.547xe**
Migrated since 1985 (percent)	0.183	0.387	0.194	0.395
Ethnic group (percent)				
Fulani	0.264	0.441	0.246	0.431
Malinke	0.204	0.403	0.202	0.402
Other	0.070	0.255	0.059	0.236
Household receives electricity (percent)	0.881	0.324	0.882	0.322
Resides near city center (percent)	0.124	0.329	0.136	0.343
April-September (percent)	0.426	0.495	0.444	0.497
Business capital/10,000 GF*	1.368	7.004	0.113	0.783
No. of observations	3,566		3,306	

* Self-employed only.

Table 9 —Men: Maximum Likelihood Estimates of Binary Logit Participation and Multinomial Logit Sectoral Choice Models

Variables	Binary Logit Participation Model (1)	Multinomial Logit Model*		
		Self- Employment (2)	Private Wage (3)	Public Wage (4)
Intercept	-1.156 (6.14)	-1.944 (8.11)	-1.613 (7.01)	-4.45 (13.26)
Education (relative to no education)				
Primary school	-0.361 (3.18) [-0.0482]	-0.799 (5.52) [-0.0989]	-0.260 (1.87) [-0.0115]	0.507 (2.86) [0.0634]
Secondary school	-0.097 (0.65) [-0.0130]	-1.223 (5.18) [-0.1582]	-0.220 (1.17) [-0.0404]	1.550 (7.47) [0.1867]
University	-0.150 (0.78) [-0.0202]	-2.344 (-5.81) [-0.1976]	-0.715 (2.78) [-0.0823]	1.667 (7.06) [0.2399]
Age (relative to < 21)				
31 to 40	1.626 (11.57) [0.2851]	1.196 (6.21) [0.0444]	1.457 (8.33) [0.0933]	2.525 (10.74) [0.1418]
41 to 50	1.827 (9.68) [0.3200]	1.274 (5.48) [0.0345]	1.408 (6.13) [0.0542]	3.176 (11.44) [0.2350]
51 to 65	0.608 (3.42) [0.1025]	0.090 (0.39) [-0.0285]	0.567 (2.54) [0.0356]	1.762 (6.04) [0.1078]
Over 65	-0.866 (2.85) [-0.1260]	-0.723 (1.77) [-0.0406]	-1.062 (2.67) [-0.0645]	-1.459 (1.36) [-0.0273]
Married	1.954 (14.79) [0.3614]	2.162 (11.80) [0.1647]	1.803 (10.74) [0.1155]	1.935 (9.55) [0.0823]
Children <2	0.094 (1.32) [0.0123]	0.067 (0.74) [0.0010]	0.105 (1.17) [0.0068]	0.106 (1.01) [0.0041]
Children 2 to 5	-0.0322 (0.67) [-0.0046]	0.050 (0.82) [0.0104]	-0.138 (2.18) [-0.0176]	-0.010 (0.14) [0.0017]
Children 6 to 14	-0.115 (3.62) [-0.0150]	-0.071 (1.72) [0.0005]	-0.192 (4.54) [-0.0182]	-0.051 (1.08) [0.0027]
Males and females 15 to 20	-0.077 (2.23) [-0.0102]	-0.029 (0.63) [0.0040]	-0.170 (3.55) [-0.0175]	-0.041 (0.78) [0.0019]

Table 9 (continued)

Variables	Multinomial Logit Model ^a			
	Binary Logit Participation Model (1)	Self-Employment (2)	Private Wage (3)	Public Wage (4)
Men 21 to 64	-0.062 (1.87) [-0.0093]	-0.094 (1.94) [-0.0075]	-0.9556xe ⁻⁴ (0.00) [0.0063]	-0.112 (2.14) [-0.0069]
Women 21 to 64	-0.114 (2.49) [-0.0146]	-0.126 (2.01) [-0.0077]	-0.077 (1.29) [-0.0008]	-0.128 (1.87) [-0.0052]
Men >64	0.055 (0.35) [0.0042]	-0.217 (0.91) [-0.0344]	0.343 (1.76) [0.0491]	-0.098 (0.34) [-0.0129]
Women >64	0.126 (0.80) [0.0172]	-0.064 (0.27) [-0.0179]	0.302 (1.55) [0.0367]	0.021 (0.08) [-0.0048]
Unearned income	-0.138xe ⁻⁴ (1.45) [-0.018xe ⁻⁴]	-0.27xe ⁻⁴ (1.55) [-0.021xe ⁻⁴]	-0.224xe ⁻⁴ (1.48) [-0.015xe ⁻⁴]	-0.153xe ⁻⁷ (0.12) [-0.109xe ⁻⁷]
Migrated since 1985	0.153 (1.22) [0.0199]	0.263 (1.69) [0.0273]	0.270 (1.79) [0.0337]	-0.458 (2.19) [-0.0453]
Ethnic group (relative to Soussou)				
Fulani	0.327 (2.76) [0.0432]	0.660 (4.54) [0.0657]	0.079 (0.65) [-0.0187]	0.133 (0.77) [-0.0061]
Malinke	0.291 (2.29) [0.0384]	0.461 (2.72) [0.0360]	0.091 (0.57) [-0.0155]	0.364 (2.07) [0.0172]
Other	0.296 (1.57) [0.0393]	0.511 (2.17) [0.0418]	0.064 (0.28) [-0.0213]	0.400 (1.48) [0.0197]
Household receives electricity	0.041 (0.28) [0.0052]	-0.354 (0.21) [-0.0108]	-0.049 (0.29) [-0.0155]	0.426 (1.85) [0.0336]
April - September	-0.024 (0.26) [-0.0029]	-0.643 (0.54) [-0.0078]	0.043 (0.37) [0.0079]	-0.020 (0.15) [-0.0013]
Resides near city center	-0.170 (1.17) [-0.0222]	-0.013 (0.07) [0.0157]	-0.514 (2.59) [-0.0521]	-0.011 (0.06) [0.0117]
Ln likelihood	-1,503		-2,924	
χ^2	1,883		2,468	
No. of observations	3,566	547	544	472

Notes: Absolute value of asymptotic t-statistics in parenthesis. Changes in probabilities are in brackets.

^a Excluded category is non-participation.

Table 10 —Women: Maximum Likelihood Estimates of Binary Logit Participation and Multinomial Logit Sectoral Choice Models

Variables	Binary Logit Participation Model (1)	Multinomial Logit Model*		
		Self- Employment (2)	Private Wage (3)	Public Wage (4)
Intercept	-2.652 (12.79)	-2.659 (12.04)	-6.00 (7.77)	-8.976 (7.62)
Education (relative to no education)				
Primary school	-0.063 (0.57, [-0.0109]	-0.565 (-4.35) [-0.1141]	1.760 (4.94) [0.0316]	2.775 (8.21) [0.0749]
Secondary school	0.432 (2.67) [0.0799]	-0.817 (-3.37) [-0.1674]	2.380 (5.85) [0.0526]	3.918 (10.62) [0.1758]
University	1.778 (6.08) [0.3494]	-1.284 (1.70) [-0.2319]	3.700 (7.13) [0.1194]	5.53 (11.86) [0.3624]
Age (relative to < 21)				
21 to 30	1.041 (6.64) [0.1521]	0.960 (5.75) [0.1191]	1.588 (2.97) [0.0183]	2.713 (2.58) [0.0195]
31 to 40	1.608 (9.71) [0.2692]	1.337 (7.55) [0.1707]	2.081 (3.60) [0.0229]	4.544 (4.34) [0.0801]
41 to 50	1.846 (9.87) [0.3230]	1.615 (8.14) [0.2136]	2.636 (4.09) [0.0366]	4.930 (4.57) [0.0956]
51 to 65	1.314 (6.34) [0.2050]	1.154 (5.29) [0.1444]	1.464 (1.65) [0.0119]	4.047 (3.47) [0.0593]
Over 65	-0.009 (0.02) [-0.0013]	-0.165 (0.37) [-0.0163]	1.337 (1.12) [0.0174]	-11.51 (0.01) [-0.0020]
Married	0.747 (6.07) [0.1280]	0.847 (6.05) [0.1188]	-0.236 (0.73) [-0.0098]	0.594 (1.92) [0.0128]
Children <2	0.111 (1.85) [0.0195]	0.124 (1.93) [0.0191]	0.114 (0.57) [0.0022]	-0.121 (0.70) [-0.0045]
Children 2 to 5	0.042 (1.06) [0.0072]	0.077 (1.79) [0.0122]	-0.065 (0.50) [-0.0012]	-0.096 (0.86) [-0.0029]
Children 6 to 14	0.044 (1.70) [0.0077]	0.054 (1.91) [0.0075]	-0.049 (0.59) [-0.0015]	0.132 (1.98) [0.0035]

Table 10 (continued)

Variables	Multinomial Logit Model ^a			
	Binary Logit Participation Model (1)	Self-Employment (2)	Private Wage (3)	Public Wage (4)
Males and females 15 to 20	-0.025 (0.76) [-0.0044]	-0.061 (1.67) [-0.0102]	-0.013 (0.4) [-0.0005]	0.144 (1.93) [0.0044]
Men 21 to 64	0.002 (0.05) [0.0001]	0.0508 (1.46) [0.0093]	-0.128 (1.28) [-0.0020]	-0.224 (2.37) [-0.0062]
Women 21 to 64	-0.158 (3.91) [-0.0274]	-0.186 (4.09) [-0.0266]	.002 (0.02) [0.0013]	-0.203 (2.02) [-0.0045]
Men >64	-0.077 (0.54) [-0.0156]	0.044 (0.29) [0.0107]	-0.069 (0.17) [0.0014]	-0.966 (1.95) [-0.0270]
Women >64	0.136 (0.98) [0.0246]	0.101 (0.66) [0.0130]	0.403 (1.11) [0.0068]	0.256 (0.73) [0.0053]
Unearned income	-0.146xe ⁻⁶ (-1.54) [-0.026xe ⁻⁶]	-0.388xe ⁻⁶ (2.52) [-0.059xe ⁻⁶]	0.300xe ⁻⁷ (0.19) [0.02xe ⁻⁷]	-0.580xe ⁻⁷ (0.41) [-0.007xe ⁻⁷]
Migrated since 1985	-0.277 (2.34) [-0.0476]	-0.259 (2.03) [-0.0338]	-0.339 (0.88) [-0.0036]	-0.754 (2.15) [-0.0164]
Ethnic group (relative to Soussou)				
Fulani	-0.322 (2.97) [-0.0566]	-0.345 (2.95) [-0.056]	-0.208 (0.61) [-0.024]	-0.192 (0.65) [-0.0026]
Malinke	-0.416 (3.55) [-0.0720]	-0.423 (3.27) [-0.607]	-0.31 (0.30) [-0.0017]	-0.33 (1.16) [-0.0058]
Other	-0.135 (0.75) [-0.024]	-0.185 (0.93) [-0.0293]	-0.434 (0.69) [-0.0077]	0.271 (0.68) [0.0110]
Household receives electricity	0.277 (2.06) [0.0469]	0.252 (1.80) [0.0324]	0.351 (0.65) [0.0039]	0.681 (1.24) [0.0145]
April - September	0.405 (4.80) [0.0719]	0.459 (5.03) [0.0693]	0.220 (0.85) [0.0026]	0.084 (0.38) [-0.0012]
Resides near city center	0.311 (2.48) [0.0563]	0.362 (2.64) [0.0567]	0.003 (0.009) [-0.0016]	0.125 (0.42) [0.0011]
Ln likelihood	-1,731		-2,093	
χ ²	539.5		1,101	
No. of observations	3,306	759	70	141

Notes: Absolute value of asymptotic t-statistics in parenthesis. Changes in probabilities are in brackets.

^a Excluded category is non-participation.

Table 11 — Predicted Sector Entry Probabilities of Men and Women, by Level of Education

Gender/Level of Education Completed	Not Working	Self-Employment	Private Wage	Public Wage
Average probabilities ^a				
Men				
None	0.544	0.220	0.172	0.065
Primary	0.591	0.121	0.160	0.128
Secondary	0.555	0.062	0.131	0.251
University	0.584	0.023	0.089	0.305
Women				
None	0.719	0.269	0.007	0.006
Primary	0.727	0.155	0.038	0.080
Secondary	0.658	0.101	0.059	0.181
University	0.469	0.037	0.126	0.368
Probabilities evaluated at data means for total sample ^b				
Men				
None	0.532	0.250	0.180	0.039
Primary	0.628	0.133	0.164	0.076
Secondary	0.571	0.079	0.155	0.196
University	0.626	0.028	0.104	0.242
Women				
None	0.772	0.221	0.006	0.014
Primary	0.809	0.132	0.036	0.024
Secondary	0.767	0.097	0.063	0.071
University	0.541	0.043	0.166	0.251

^a To calculate average probabilities, predicted probabilities are calculated for each male observation using multinomial logit parameter estimates in Table 8 and for each female observation using estimates in Table 9. Averages for men and women are then calculated.

^b Calculated using data means for total (male and female) sample and multinomial logit parameter estimates in Table 8 for men and Table 9 for women.

that is, that the polychotomous model reduces to the simple binary participation model. For both men and women, the restriction was rejected at the 1 percent significance level, indicating the superiority of the polychotomous framework. The equality of different pairs of parameter vectors (e.g., for self-employment and private wage employment) was also tested, and was also rejected at the 1 percent level in every case. These tests confirm the notion that labor markets in a developing country such as Guinea are heterogenous in the sense that the determinants of entry into different segments of the labor market are not the same.

With regard to the effects of specific factors, our results are consistent with those of previous studies in developing countries that indicate the importance of education in sorting individuals among sectors of the labor market (Alderman and Kozel 1989; Magnac 1992; Behrman and Wolfe 1984). Before discussing the multinomial results, however, we present estimates from the binary logit models of the decision to participate in any income-earning activity. In many societies adult male labor force participation is almost universal, making an analysis of the participation decision, in contrast to sectoral choice, of little interest. Because participation rates for some groups in Conakry are very low, however, an analysis of the male participation decision is warranted. The binary logit results for men are given in the first column of Table 9. The schooling coefficients indicate that level of education has a negative impact on men's participation, although only the coefficient on primary education is significant. This is not altogether surprising since, as discussed in the previous section, a large number of men under 30 years old are not working and indicate that they are still in school.

When we examine male labor market decisions by sector using the multinomial logit model, we find that educational attainment has a strong negative impact on the likelihood of being self-employed, and this effect increases with education level (Table 9). As seen in the top half of Table 11, the average predicted probability of being self-employed falls from 22 percent for a man with no education or less than a primary education to 12 percent for completed primary and only 2 percent for a university graduate, holding other characteristics constant. More education also reduces, somewhat less strongly, the likelihood of being in the private wage sector. On the other hand, higher levels of schooling are clearly associated with public sector employment for men, and this effect is stronger for higher levels of education. The probability of being in the public sector rises from 7 and 13 percent for men with no education and primary schooling, respectively, to 25 and 30 percent for secondary and university graduates. Education is obviously the key to civil service employment for men, while lack of schooling is not a barrier to finding wage work in the private sector.

Table 10 gives the binary and multinomial results for women. The first column presents the results for the binary logit model for women's participation in any income-earning work. A number of previous studies in developing countries have found a non-linear or even non-monotonic impact of schooling on participation, with higher educational attainment more strongly associated with entry into the labor force than lower educational attainment (Sahn and Alderman 1988, Kozel

and Alderman 1991). Our findings reveal a similar pattern: although women with completed primary schooling are no more likely to be in the labor market than those with less than a primary education, participation is strongly correlated with having a secondary education and even more so with being university educated.

Examining the multisectoral results for women in Tables 10 and 11, it can be seen that, as with men, educational attainment is negatively related to women's participation in self-employment, and positively related to being in the public wage sector. Unlike men, however, more schooling increases (rather than reduces) the probability of a woman entering private wage employment, and the parameter estimates are strongly significant. Clearly, the types of occupations open to, or chosen by, women in this sector are in general quite different than for men, for whom education is inversely related to entry. It appears that poorly educated women are not admitted to unskilled wage jobs, or are discouraged by preference or custom from seeking them. For these women, therefore, own-enterprise activities are virtually the only source of labor income.

The impacts of age, represented by dummy variables for different age categories, are similar for men and women. The binary choice participation models show that participation of men and women follows an inverted U-shaped profile with age, in keeping with a life-cycle interpretation. For both sexes and all sectors, individuals in age categories over 30 are more likely to be employed in any activity than those 30 and under. For men, the fact that most non-participants 21 to 30 years old report that they are unpaid apprentices or still in school (Table 2) is relevant here, suggesting a rather lengthy delay in obtaining paid employment. It can also be seen from the polychotomous choice models the positive effect of age on the likelihood of being in public sector employment is greater than for the other sectors. The younger cohort of recent entrants into the labor force may have difficulty obtaining public sector jobs, reflecting the impact of measures to reduce the civil service.

Demographic characteristics can be expected to influence labor force participation and sector allocation, particularly for women who must balance domestic responsibilities with the need to augment family income. In industrial countries, female participation is almost always negatively associated with the presence of young children (Browning 1992, Frank and Wong 1990). Conceptually, however, children exert contradictory effects on female participation, as has long been recognized in the literature (Bowen and Finnegan 1969). Children need care and supervision, which raises the reservation wage. At the same time, they increase the need for family resources, which depresses the reservation wage and encourages participation.

Underlying the theoretical framework is the assumption that childcare and market work are mutually exclusive activities, whereas for many kinds of work in LDCs this need not be the case. This difference is important when considering our estimates of the impact of young children. In the simple binary participation model in Table 10, confirming the pattern seen earlier in the descriptive analysis, a greater number of children under 2 and 2 to 5 years old in the household increases the likelihood a woman will enter the labor market, although

only the coefficient on the former is statistically significant. The binary model estimates, however, hide some noteworthy differences among the sectors. As the multinomial results show, an additional young child under 5 years of age raises the probability of participation only for self-employment. As noted, the nature of own-account activity and the flexibility of hours should make it easier for self-employed mothers to care for their children while earning income. For wage work, the parameter estimates and marginal probabilities are for the most part negative, but the coefficients are not significant.

A number of other household composition variables have significant effects on female participation and sector of employment. Children aged 6 to 14 encourage participation, perhaps by acting as substitutes for prime age women in domestic work. The number of women 21 to 64 years old, on the other hand, has a negative and significant impact on participation in the univariate logit model and on participation in self-employment and public employment in the multinomial logit model. Although the presence of other adult women may encourage labor force participation by increasing the possibilities for substitution in work in the home, there is also a confounding wealth effect associated with a greater number of potentially economically active adults in the household. Thus an increase in the number of women may either reduce or increase the reservation wage, and consequently has a theoretically ambiguous effect on the decision to participate.

The number of adult men in the household has disparate and difficult to interpret effects on female participation in the polychotomous model, in contrast to the dichotomous model, where no effect is evident. Compared to women, there are few significant household composition effects on male participation and sector decisions. One noteworthy result is that the presence of other adult men and women is negatively associated with men's labor force activity in general and in the individual segments of the labor market. A reverse causality may be in effect here whereby unemployed or job-searching men join households with a number of working adults.

Also among demographic variables, marriage is strongly and positively related to overall participation for both sexes. For men, this may reflect either the greater responsibility associated with being married, or that men do not get married until they have secured a livelihood. The strong positive impact of marital status on women's labor market participation shown in Table 10 is noteworthy because in a number of studies it has been found that married women are less likely to participate in certain sectors or not at all (Sahn and Alderman 1988, Behrman and Wolfe 1984). The rationale for a negative association is that a woman's marital status raises her reservation wage because it is associated with greater income or wealth other than from her own earnings. This reasoning, which is based on an assumption that income is pooled within the household, may be less applicable to Guinean context. It is interesting to note

that our results conform to those of Appleton et al. for Côte d'Ivoire, who find that being married increases a woman's chances of being in wage employment.⁵

In accord with expectations from theory, increased non-labor or exogenous income, which is expected to raise the reservation wage, reduces participation for men and for women in the simple participation models. Having migrated to Conakry since 1985 (five years before the survey was conducted) is positively associated with overall male participation but negatively associated with female participation. The former suggests that men come to the city from rural areas to work. The men's polychotomous estimates in Table 9, however, are noteworthy in that for the public sector, the coefficient on having migrated since 1985 is negative and significant. A recent migrant to Conakry is approximately one-third less likely to enter the public sector than a native or long-term resident with otherwise similar characteristics.⁶ Such a pattern is not surprising in light of the retrenchment of the civil service as part of the structural adjustment program of this period. The positive effects of migrant status on self-employment and private wage employment in Table 9, on the other hand, suggest that newcomers suffer no disadvantage compared to natives in finding work in the private sector. Note, however, that migrants also may have a lower reservation wage — as might be expected if they move to the city primarily to find work — hence may be apt to search harder or accept offers of employment more readily than residents.

The model results also shed light on a number of factors that have a particular influence on women's participation in self-employment (Table 10, column 2). Residing in a district located near the commercial center of the city encourages self-employment activity, reflecting the lower time and monetary costs of transportation to markets where such activity is conducted. At the same time, receiving electricity in the household also encourages women's own-account activity, presumably by making production in the home or working during the evenings easier. Given women's household responsibilities, it is not surprising that their participation in market activities is sensitive to changes in travel time to work and in factors affecting the feasibility of conducting these activities in the home. An implication of our results is that infrastructural development — in the urban transportation system and the provision of services such as electricity — will raise female participation, at least in self-employment, in the future.

The dummy variable April-September captures the months of the rainy season in Conakry. The positive and significant coefficient on this variable for

⁵ An alternative, though not incompatible, explanation for the effect of marriage is that married women are able to secure capital through their husbands to start up small enterprises or can use their husbands' connections to obtain wage employment.

⁶ This figure is derived from the change in the probability of public sector work from being a migrant (-.045) and the overall probability of public sector employment of approximately 13 percent.

women's participation in self-employment is somewhat unexpected, as this period corresponds to a time when commercial activity would be expected to be diminished rather than increased. It is tempting to hypothesize that women take over the operation of household enterprises during this period to substitute for the labor of males returning to their villages for the harvest.

Finally, the models include dummy variables for ethnicity. The most interesting effects are for self-employment. For women, being Malinke or Fulani decreases the probability of being self-employed. This result conforms with casual evidence of the predominance of Soussou women (the excluded group in the estimation) in informal market activity in Conakry. It is difficult to say whether this pattern is due to the influence of custom, barriers to employment in other sectors based on ethnicity, or other factors. Interactions of the ethnicity variables with exogenous income and education in general did not yield significant results. For men, surprisingly, an opposite pattern prevails: members of ethnic groups other than Soussou are more likely than Soussou to be self-employed (as well as in government employment).

Before turning to the estimates of the earnings equations, the main results of the polychotomous logit participation model can be summed up. The most basic question to be asked is whether the polychotomous approach, in which labor markets are not assumed to be homogenous, is superior to a simple binary participation framework. Our results confirm the notion that labor markets in a developing country such as Guinea are heterogenous in the sense that the determinants of entry into different segments of the labor market appear to be quite different. As seen, educational attainment is an important mechanism allocating individuals among sectors. In addition, for women, the differences across sectors in the coefficients on household composition variables — especially the presence of young children — suggest that different types of work are not perceived to be the same with respect to the ways in which they permit domestic and market activities to be balanced.

Our multinomial logit model results raise the issue of differential access to employment in various sectors of the labor market. Are jobs in what may be described as the formal economy (public and private wage sectors) subject to rationing as suggested in the segmented or dual labor market literature? There is an important gender dimension to this issue: does the predominance of women in self-employment reflect disadvantaged female access to potentially better-paying or higher-status opportunities in the wage sectors? It must be stressed that the existence of labor market segmentation, defined as the presence of barriers to entry into one or more sectors of the labor market, cannot be assessed unambiguously from our multinomial logit model results. This is a problem even with formal tests of the hypothesis of segmentation (which we do not attempt here).⁷ A common source of ambiguity in interpretation for both male and female behavior arises from the difficulty of distinguishing the presence of actual institutional barriers to entry from the effects of unobserved preferences

⁷ See Dickens and Lang (1985); Heckman and Hotz (1986); Magnac (1992); and Gindling (1991).

for one type of employment over another. With regard to gender-based differentials in sector of employment, differences in backgrounds of men and women, in particular their unequal levels of schooling, explain in part the low representation of women in the public sector compared to men (though it does not explain the small number of women in the private wage sector). Jobs in the public sector obviously have relatively high education requirements, unlike in self-employment, where the majority of women in the labor force are found. Differences in educational attainment, however, do not completely explain the low presence of women in the public sector workforce. To see this, it is necessary to compare predicted entry probabilities for each sector for men and women controlling for gender differences in schooling and other characteristics. This is done in the bottom half of Table 10, where the probabilities are evaluated at the means of the data for the entire adult sample.⁸ As seen, the chances that a woman with a completed primary, secondary, and university education enters the civil service are 2.4 percent, 7.1 percent, and 25.1 percent, respectively, compared to 7.6 percent, 19.6 percent, and 24.2 percent for a man with identical characteristics. Except for university graduates, therefore, men are still far more likely than women to be in the civil service. Participation in the labor force in general is lower for women for all levels of schooling other than university, so it is not surprising that it is also lower in the public sector. Even among employed men and women, however, women are less likely to be in the public sector, and more likely to be self-employed, than men of similar backgrounds.

Whether these disparities reflect gender-based discrimination in public sector hiring or differences in preferences of men and women is impossible to say given the nature of the data. Women, even those who are educated, may be culturally conditioned to have lower career aspirations, reducing their desire to seek work in any sector of the labor market, and may tend to prefer self-employment if they do participate. As Appleton et al. point out in their study of Côte d'Ivoire, however, in either case the policy implications are the same: increasing girls' enrollments — in secondary school and university in the case of Guinea — will lead to greater female participation in the public sector, even if it will not be sufficient to eliminate the gender gap entirely.

Although the public sector remains of great significance to the Guinean economy, ongoing reforms are aimed at reducing the role of government (including civil service retrenchment) and expanding the private sector. For this adjustment to be both complete and equitable, there must not be barriers to women's employment opportunities in the private sector. Unfortunately, there is evidence of possible gender discrimination in hiring in the private wage sector, at least for women with low skills. The negative schooling coefficients for men (as well as descriptive data: see Glick, del Ninno, and Sahn 1992) suggest that

⁸ Note that the entry probabilities in the top part of Table 11 are averages for all men and all women. Although these calculations control for differences in schooling between men and women, they do not control for differences in other characteristics that affect sector allocation. To do both, it is necessary to apply the model parameters for men and women to identical values for all explanatory variables, as done in the second part of the table.

many if not most of the positions held by men in this sector are characterized by low education or skill requirements. For women, in contrast, the strong positive impact of schooling indicates that it is primarily educated women who have access to employment in the private wage sector. Evaluated at the sample means for the data (bottom of Table 11), men with less than completed primary and completed primary schooling have 18.0 percent and 16 percent probabilities of being in the private wage work force, compared to just 1 percent and 3.6 percent for women.

Women evidently face constraints that prevent them from obtaining low or unskilled jobs in the private wage sector. We caution that this may reflect cultural attitudes that discourage poorly educated women from even considering private sector work as an alternative (perhaps due to the reluctance of male household heads to allow women to work for others), as much as it may be due to outright discrimination by employers.⁹ In any event, there are lessons for policy. In the long run, raising girl's school enrollments will lead to greater representation of women in private wage employment, just as it will raise female participation in the public sector. In the short or medium term, however, the benefits to less-educated women of reforms that encourage private sector expansion are likely to be limited mostly to changes in opportunities or incentives in small scale self-employment activities, where most participating women with low schooling are currently found. For men of all educational backgrounds, in contrast, private sector expansion can be expected to create employment opportunities in the wage sector as well as changing incentives for microenterprise development.

Regarding the other question — whether there is general rationing of jobs in some segments of the labor market — some inferences can be made. As seen, recent migration is associated with a reduced probability of being in the public sector and an increased probability (for men) of self-employment or private wage employment. This variable may serve as a proxy for a lack of connections or access to information about jobs relative to long-term residents of the city. As there is no *a priori* reason to expect male migrants to prefer work in the private sector over the public sector, our results offer indirect evidence of rationing of civil service employment. Such a conclusion, as noted above, is in line with Guinea's recent retrenchment of the public sector workforce.

Sectoral differences aside, our results also raise the question of whether employment opportunities in general (i.e., in any sector of the labor market) are limited in Conakry. The age level coefficients as well as the descriptive

⁹ Less educated women may also be discouraged from seeking private wage employment if combining childcare and income-generating activities in this sector is difficult or impossible and they lack the resources for childcare services that more educated women can afford. Although the presence of children has little impact on the absolute probability of women's private wage employment (seen above), these factors may play a role in the choice for women who are in the labor force between becoming self-employed and entering the private wage sector.

statistics discussed previously point to a prolonged period before men and women enter the labor force. Possible cultural or social explanations for this phenomenon were discussed earlier. Also as noted above, the large numbers of non-working men 21 to 30 years old reporting that they are still in school or "in training" raises the possibility that they are not in the labor market and are engaging in these activities because actual income-earning opportunities are lacking.

Finally, the effect of migrant status on employment deserves to be stressed in its own right in light of the rapid expansion of Conakry's population caused by the influx of migrants from other areas of the country. The ability of labor markets to absorb the inflow of migrants seeking work is a major policy concern in Conakry as elsewhere in urban sub-Saharan Africa. We have found that although recent migrants to the city may be rationed out of the public wage sector, there is indirect evidence that they do not suffer a disadvantage relative to the native population in gaining access to work in the private sector, either in self-employment or as wage workers. Note, however, that this refers to the relative employment probabilities of migrants and residents. Overall employment opportunities may still be lacking for both groups. In addition, an important question is whether, controlling for differences in human capital, migrants (and others) in self-employment or private wage employment are at a disadvantage compared to public sector employees with respect to earnings. We address this question in the following section.

5. THE DETERMINANTS OF EARNINGS

Estimates from earnings equations for public wage, private wage, and self-employment are presented in Tables 12 and 13 for men and women, respectively. In the case of self-employment, the dependent variable is the log of weekly enterprise revenues minus costs divided by hours worked in the last week.¹⁰ For the wage sectors, it is the log sum of monetary and non-monetary compensation received in the last week divided by hours worked. These equations have been corrected for potential selectivity bias employing the method described above, making use of the results of the sectoral choice model. With the exception of the private wage sector for women, discussed below, the coefficients on the selectivity correction terms are insignificant, indicating an absence of sample selectivity.

Our first step was to test whether the overall wage structures in different portions of the labor market are the same, that is, to see if disaggregation of earnings functions by sector is justified.¹¹ For men, the equality of wage determinants is rejected at either the 1 percent or 5 percent level for each pair of sectors. For women, we test only whether the determinants are the same for self-employment and public sector earnings (see footnote 11). We cannot reject this equality at conventional levels of significance, in spite of what appear to be large differences in a number of the parameter estimates, especially for schooling. It is likely, however, that this result largely reflects the small cell sizes, particularly for women in public sector employment (only 137 observations), resulting in a test with low power. For this reason, we maintain the sectoral distinctions for women as well as men in the analysis.

Turning to the individual parameter estimates, our main interest is the effects of human capital, particularly education. We represent schooling by

¹⁰ Approximately 10 percent of self-employed individuals were working in enterprises with more than one family worker. These individuals posed a problem for the estimation of earnings functions since ascertaining their marginal contribution to firm profits would entail using a production or profit function approach that is beyond the scope of this paper. We chose to exclude individuals in multi-person enterprises from the earnings estimation while recognizing the potential for biases through sample censoring. The underlying participation models were rerun on this truncated sample in order to generate the correct selectivity correction factors for the earnings regressions.

¹¹ The absence of selectivity allows us to drop the insignificant lambda terms and pool samples of earners in different sectors to construct the appropriate F-tests. The only sector for which selectivity was indicated — women in private sector employment — was not included in the tests, because, as explained below, the estimates from the selectivity corrected earnings equation appear unreliable.

Table 12 —Men: Selectivity Corrected Log Hourly Earnings Equations

Variable	Public Wage	Private Wage	Self-employment	
			Including Business Capital	
Education (relative to no education)				
Primary school	0.3001 (3.49)	0.2573 (3.19)	0.273 (1.40)	0.2175 (1.21)
Secondary school	0.3622 (3.01)	0.5824 (5.35)	0.999 (2.77)	0.6544 (2.19)
University	0.6581 (4.80)	0.9205 (6.223)	1.426 (2.82)	1.284 (2.76)
Age (relative to < 31)				
31 to 40	0.0750 (0.46)	0.0736 (0.71)	0.2321 (1.24)	0.2127 (1.23)
41 to 50	0.2463 (1.28)	0.2470 (2.24)	0.7302 (3.50)	0.5681 (2.95)
51 to 65	0.0932 (0.55)	0.1334 (1.09)	0.5500 (2.327)	0.3326 (1.52)
Over 65	0.4688 (1.166)	-0.0776 (0.34)	0.8932 (2.01)	0.7725 (1.89)
Business capital/10,000 GF	—	—	—	0.0712 (8.88)
Duration	0.0038 (1.166)	0.0145 (3.72)	0.0456 (2.08)	0.0453 (3.108)
(Duration) ²	—	—	-0.0008 (2.22)	-0.0008 (2.39)
April-June	0.0596 (0.85)	0.0620 (0.67)	-0.1497 (0.91)	-0.1401 (0.92)
July-September	0.0821 (1.190)	0.1290 (1.507)	-0.5133 (3.11)	-0.4637 (3.06)
October-December	0.1660 (2.47)	-0.1732 (1.954)	-0.8894 (5.43)	-0.8989 (5.98)
Ethnic group (relative to Soussou)				
Fulani	0.0865 (1.32)	-0.0271 (0.36)	-0.1541 (0.90)	-0.1505 (0.95)
Malinke	-0.0389 (0.62)	0.0213 (0.24)	0.3299 (1.77)	0.2439 (1.42)
Other	-0.0083 (0.08)	0.1765 (1.34)	0.4839 (1.81)	0.4355 (1.78)
Lambda	-0.06979 (0.59)	0.2710 (0.23)	0.0054 (0.03)	-0.0544 (0.27)
Intercept	5.33 (15.4)	5.2474 (24.0)	5.788 (13.97)	5.880 (15.44)
Adjusted R ²	0.185	0.138	0.192	0.319
F	8.12	6.73	7.50	13.01
No. of observations	470	540	438	438

Table 13 —Women: Selectivity Corrected Log Hourly Earnings Equations

Variable	Public Wage	Private Wage		Self-employment	
			Without Lambda		Including Business Capital
Education (relative to no education)					
Primary school	0.612 (2.22)	-0.6514 (3.12)	0.1190 (0.46)	0.3081 (2.27)	0.2968 (2.21)
Secondary school	0.8416 (2.43)	-0.6926 (1.62)	0.3326 (1.13)	0.3951 (1.58)	0.2610 (1.04)
University	1.3115 (3.07)	-0.7220 (1.24)	0.7671 (2.14)	1.9249 (1.83)	1.838 (1.77)
Age (relative to < 31)					
31 to 40	0.1058 (0.56)	-0.1842 (0.84)	-0.1940 (0.82)	0.3671 (3.23)	0.3448 (3.06)
41 to 50	0.2329 (0.92)	-0.1506 (0.84)	0.0715 (0.21)	0.3905 (2.50)	0.3359 (2.42)
51 to 65	0.2771 (0.77)	-0.0153 (0.03)	-0.148 (0.23)	0.1723 (1.08)	0.1542 (0.97)
Business capital/10,000 GF	—	—	—	—	0.1971 (3.64)
Duration	0.019 (2.15)	0.0072 (0.32)	0.0156 (0.65)	0.0625 (3.41)	0.0593 (3.26)
(Duration) ²	—	—	—	-0.0018 (2.57)	-0.0017 (2.49)
April-June	0.0169 (0.14)	-0.0643 (0.25)	-0.0212 (0.08)	-0.0031 (0.03)	0.0153 (0.14)
July-September	0.1292 (1.06)	0.0694 (0.27)	0.2310 (0.851)	-0.2670 (2.26)	-0.2660 (2.27)
October-December	-0.0142 (0.11)	0.1325 (0.45)	0.1588 (0.56)	-0.2907 (2.29)	-0.3016 (2.40)
Ethnic group (relative to Soussou)					
Fulani	-0.0254 (0.21)	0.1930 (0.78)	0.1509 (0.56)	0.0309 (0.29)	0.03259 (0.31)
Malinke	-0.2155 (1.87)	0.1145 (0.50)	0.0432 (0.18)	0.2548 (2.06)	0.2639 (2.15)
Other	0.1225 (0.77)	0.8610 (1.94)	0.6904 (1.45)	0.0189 (0.10)	-0.0341 (0.18)
Lambda	0.1918 (1.03)	-1.223 (3.12)	—	0.1564 (1.12)	0.1435 (0.87)
Intercept	4.354 (6.73)	8.741 (7.76)	5.3128 (19.34)	4.8168 (18.70)	4.885 (19.11)
Adjusted R ²	0.128	0.156	0.022	0.090	0.108
F	2.42	1.90	1.12	4.99	5.61
No. of observations	137	69	69	608	608

dummy variables for completed primary, secondary, and university education. To capture the returns to experience, we include a series of dummy variables for age level to reflect general work force experience, as well years of employment at the present activity and its square to represent job-specific experience.

For men, schooling has a strongly significant impact on earnings in every sector of the labor market. All the education coefficients are significantly different from zero at the 1 percent level, with the exception of primary education in self-employment. Interestingly, the returns to schooling appear to be highest in self-employment. The coefficients on secondary school and university are 0.90 and 1.43 in this sector, implying that male secondary school completers and university graduates earn 146 percent and 316 percent more, respectively, than those who have not completed primary school.¹² The benefits to secondary and university education are 79 and 150 percent in the private wage sector and only 45 and 93 percent in the public wage sector. The markedly lower returns to post-primary schooling in the public sector point to an artificial compression of the civil service pay structure. As noted in the introduction, public sector wage compression is common in African countries and may represent a significant source of inefficiency in the labor market. We stress, however, that reported earnings do not include non-wage benefits, which were not recorded in the survey. These benefits would be expected to be greatest in the public sector, and if they rise disproportionately with reported salaries (hence with schooling), the true range of earnings in the public sector would be less narrow than our estimates suggest.

In Table 13 we present estimates from earnings functions for women. Here selectivity appears to be an issue, at least for the private wage sector, where the coefficient on the selection term is significant. Note as well that the variation in earnings explained by the regressions for women is generally quite low and is less than that for men, especially in self-employment.

For women engaged in self-employment and in the public sector, the returns to education are positive and for the most part significant at the 5 percent level. The expected returns to education for women in the public sector are substantially higher than for men for all levels of schooling. Based on the parameter estimates, completed primary, secondary, and university education increase civil service earnings by 84 percent, 132 percent, and 271 percent, respectively, over the base case of no schooling. These effects on earnings are more than twice those for men in the public sector, indicating that the compression of the salary structure observed for men in government employment does not apply to women; this may reflect differences in the kinds of positions men and women hold in the civil service. Note, however, that the higher incremental education effects on earnings for women do not imply that expected

¹² In the semilogarithmic specification, the percentage change in earnings due to the presence of the characteristic represented by a dummy variable is $100 \cdot \{\exp(c) - 1\}$, where c is the coefficient on the variable. If the sign on the coefficient is positive, therefore, the actual percentage effect will be greater than the parameter estimate (Halvorsen and Palmquist 1980).

pay levels for women in the public sector, even those with substantial schooling, are higher than men with similar educational attainment. In fact, as discussed below, the opposite is found.

For self-employed women, completed primary schooling raises hourly enterprise profits by around 36 percent relative to not having completed primary school. Going on to complete secondary school yields only a modest increment to earnings, raising them 48 percent above the no schooling case. The coefficient on secondary schooling is only marginally significant, reflecting in part the small number of women in this subgroup. Although university education appears to have a very strong impact on enterprise earnings (larger than for men), the estimate should not be considered reliable because there is only a single observation with university education in self-employment. The effect of primary schooling on women's self-employment incomes shows that the kind of work in which the vast majority of self-employed women engage (small-scale retailing) does reward basic skills. Other studies of self-employment earnings, in contrast, have often failed to find any impact of formal schooling for women or in general, especially at low levels of schooling (Khandker 1992, Vijverberg 1990). At the same time, the small apparent improvement in hourly profits from completing secondary school, which contrasts with the large increase for men noted above, suggests that self-employed women are engaged in activities in which the benefits to schooling beyond the primary level are limited.

The estimates for the selectivity corrected earnings regression for women in the private wage sector do not seem plausible, particularly for schooling. The education coefficients are negative, although only significant at the 10 percent level for women with primary education. Almost none of the other variables are close to significant, which can be attributed in part to the small sample size (68 persons). The negative signs on the schooling coefficients, on the other hand, reflect the presence of the selectivity correction term, as demonstrated by comparison with the results from a simple OLS regression excluding this term (also shown in Table 13) in which these coefficients have the expected positive signs. The selectivity variable, which is highly correlated with education, is apparently picking up non-linear education effects and this leads us to doubt whether the equation is properly identified.¹³ In the OLS

¹³ As Maddala (1983) and others have noted for two-stage procedures using a binary discrete choice model, if there are no variables entering significantly in the participation decision that can be excluded from the second stage regression, the correction term is simply a non-linear transformation of the variables appearing in this equation. In this case, identification is achieved through a functional form assumption, namely, that the variables do not enter in such a non-linear manner in the true regression model. Our multinomial logit specification does include a number of variables, such as those relating to household composition and exogenous income, that do not enter the wage equations. It is noteworthy that none of these yield significant estimates for the vector of parameters relating to the choice of private wage employment in particular, although many of them do have significant coefficients for the other sectors. (continued...)

model, all the education parameter estimates became positive, although only significant at the university level. The returns to schooling appear to be relatively low for women in the private wage sector, but the absence of selectivity correction in the regression and the small sample size preclude drawing firm conclusions.

Age, which we use as a proxy for general experience, has no independent effect on either public or private sector earnings for women. For men also, age has no effect on earnings in the public sector, although for those engaged in the private wage sector there is an increase of about 28 percent for men 41 to 50 years old relative to the 15-30 cohort. Among self-employed men, there are large positive and significant coefficients on age beginning with the 41-50 cohort: self-employed men 41 to 50 years old earn about twice as much as men under 30, controlling for other factors, and the benefits to age do not fall as age increases. For women in self-employment, there are also significant, but substantially smaller, effects on earnings, and the benefits diminish after 50.

These effects reflect general experience since the regressions control for actual experience in one's current position. Years in the present position (the duration variable) has a positive and highly significant effect on earnings in the private sector for men but not for women, while the opposite is true in the public sector. The linear specification of job duration was superior to a quadratic one for private and public wage employment (the quadratic for the latter resulted in insignificant coefficients). In contrast, in self-employment for both men and women, duration has a non-linear effect on earnings: there are positive and decreasing returns to job-specific experience, as indicated by the negative and significant coefficient on the squared duration variable.

In addition to the human capital variables, dummy variables for ethnicity and season were included to capture possible discrimination and seasonality. For both men and women, Malinkes in self-employment appear to enjoy an advantage relative to the excluded Soussou group. This pattern is not replicated in either wage sector. In fact, being Malinke is associated with lower earnings in the public sector, although the effect is not significant for men. Season appears to affect earnings for the self-employed but not for wage employees: enterprise profits are lower in the periods July to September and October to December. The seasonal variability of self-employment earnings is not surprising because many small enterprises are involved in marketing agricultural products.

¹³(...continued)

Since all the estimated parameters enter into the calculation of each lambda term (equations 6-7) the private sector wage equation is still, in principle at least, identified by exclusion restrictions rather than simply functional form assumptions. This identification, however, may be weak and our results lead us to suspect that the lambda term is indeed capturing non-linear schooling effects.

ENTERPRISE CAPITAL AND VOCATIONAL EDUCATION

The estimation of earnings functions for the self-employed presents a special problem because incomes in own-account activities will depend not only on human capital but also on the stock of physical capital as well as other inputs used by the enterprise. Most importantly, the exclusion of the enterprise's capital stock from the self-employment regressions discussed so far will bias the estimates of returns to human capital if these variables are correlated with the amount of physical capital used by the business.

In order to address this problem, we include a variable representing the capital stock of the enterprise in separate earnings functions in Tables 12 and 13. Although a reliable measure of the actual capital stock of each enterprise was not available from the survey, self-employed workers reported the value of capital purchases made over the past year. To use this variable to represent actual capital stock, it is necessary to assume, rather restrictively, that purchases of capital goods are made to exactly replace the depreciated value of existing capital, and that the rate of depreciation was the same across all firms. Although as a proxy for enterprise capital this variable is not ideal, including it in the earnings functions should provide an idea of potential biases in our estimates of the returns to human capital. The mean expenditures on capital inputs in the past year (divided by 10,000 Guinean Francs) for men and women in own-account activities are given in Table 8. It is clear that, on average, businesses run by men employ far greater amounts of capital than those run by women, reflecting differences in the scale and types of operations run by men and women and perhaps constraints to women's access to credit as well.

As shown, this measure of capital stock has a positive and significant effect on enterprise earnings for both men and women. Moreover, for men, inclusion of this variable adds substantially to the explanatory power of the regression. The magnitude of the coefficient for women is more than twice that for men; this may be a reflection of the relative scarcity of capital in women's enterprises. With regard to the impact on the other parameter estimates, the coefficients on education and age fall for both men and women, implying a slight upward bias in the estimated effects of these variables in regressions excluding enterprise capital. The directions of the biases are not surprising, as one would expect more educated, and older, people to have more assets. The results suggest that, to a degree, inequality in earnings across education groups in self-employment reflects inequality in the ownership of productive assets. This disparity, in turn, may be due to a combination of a lack of savings among those who are poorer and less well-educated and constraints in credit markets. The less educated may also have less knowledge about the uses of capital and other non-labor inputs.¹⁴

¹⁴ It could be argued that other enterprise inputs, such as materials, should be included in the earnings regressions to avoid specification bias. Unlike capital purchases, however, which are reported for the past year, purchases of other inputs are recorded for the past seven days. They clearly represent short-
(continued...)

The human capital variables used in the regressions in Tables 13 and 14 do not include either apprenticeship training or professional and technical schooling, the effects of which on earnings are of significant policy interest. The efficacy of technical (i.e., vocational) schooling, in particular, has been widely challenged on cost-effectiveness grounds, reflecting in part evidence of small or non-existent earnings advantages to those who have had such schooling (see Psacharopoulos 1987, Zymelman 1976). In Tables 15 and 16, we report estimates of earnings functions for men and women including dummy variables for having had apprenticeship training (in self-employment) or professional/technical training (in wage employment).¹⁵ For wage employees, the benefits to vocational schooling appear to be limited. Only for men in the private wage sector is the effect significant, where its inclusion also reduces the magnitude of the primary and secondary education coefficients.¹⁶ Among the self-employed, having been an apprentice has an independent and positive effect on earnings of females, but not for males.

PREDICTED EARNINGS OF MEN AND WOMEN

Lastly, we examine differences in representative or predicted wages of men and women across sectors and educational groups. Table 16 presents predicted earnings for men and women using our selectivity-corrected parameter estimates and evaluated at the means for the independent variables for all participating men and all participating women, respectively.¹⁷ For men, in line with the discussion of the parameter estimates above, the education-wage profile is steeper in the private wage sector than in the public sector. Although expected hourly wages are slightly higher in public employment for men with less than

¹⁴(...continued)

term decisions and cannot be justified as predetermined. Thus their inclusion might involve even more serious biases because of simultaneity problems.

¹⁵ Note that these variables are more likely than regular schooling to be statistically endogenous to earnings or wages. If individuals choosing such training would tend to benefit more from it in terms of increased productivity and earnings than those who do not choose it, the parameter estimates representing the effects of this training will be biased upwards.

¹⁶ Since we do not have data on costs, we are unable to compare general and vocational education using cost-benefit criteria. It should be noted that some researchers have recently challenged the anti-vocational school "orthodoxy," arguing that such schooling can compare favorably to general schooling in terms of cost effectiveness in those cases where the recipient actually enters a related occupation (Arriagada and Ziderman 1992). In future work with the Guinea data, we intend to examine this question.

¹⁷ Earnings for the university-educated appear to be an exception. Recall, however, that there is a single observation in this cell for self-employment, making the figure somewhat less than reliable.

Table 14 —Men: Selectivity Corrected Log Hourly Earnings Equations, Including Apprenticeship and Professional/Technical Training

Variable	Public Wage	Private Wage	Self-employment	
			(including business capital)	
Education (relative to no education)				
Primary school	0.2598 (2.78)	0.1983 (2.35)	0.2756 (1.41)	0.2197 (1.23)
Secondary school	0.3087 (2.39)	0.4579 (3.77)	0.8431 (2.58)	0.6044 (2.00)
University	0.6525 (4.76)	0.9329 (6.33)	1.3616 (2.67)	1.2257 (2.63)
Age (relative to < 31)				
31 to 40	0.0639 (0.39)	0.0418 (0.40)	0.2471 (1.31)	0.2263 (1.31)
41 to 50	0.2325 (1.21)	0.1932 (1.72)	0.7286 (3.49)	0.5670 (2.94)
51 to 65	0.0870 (0.51)	0.0902 (0.73)	0.5534 (2.34)	0.3361 (1.54)
Over 65	0.4652 (0.84)	-0.1248 (0.55)	0.8969 (2.02)	0.7762 (1.90)
Apprenticeship				
Professional school	0.0780 (1.13)	0.2529 (2.28)	—	—
Business capital/10,000 GF	—	—	—	0.0711 (8.87)
Duration				
Duration	0.0036 (1.09)	0.0154 (3.94)	0.0474 (2.86)	0.0454 (3.12)
(Duration) ²	—	—	0.0008 (2.23)	-0.0781 (-2.40)
April-June	0.0599 (0.86)	0.0668 (0.73)	-0.1378 (0.83)	-0.1293 (0.85)
July-September	0.08498 (1.23)	0.1315 (1.54)	-0.5289 (3.20)	-0.4779 (3.15)
October-December	0.1690 (2.51)	-0.1636 (1.85)	-0.8948 (5.47)	-0.9037 (6.01)
Ethnic group (relative to Soussou)				
Fulani	0.0900 (1.37)	-0.0254 (0.34)	-0.1802 (1.04)	-0.1741 (1.09)
Malinke	-0.0405 (0.65)	0.0167 (0.19)	0.3084 (1.65)	0.2247 (1.30)
Other	-0.0124 (0.12)	0.1796 (1.37)	0.4811 (1.80)	0.4331 (1.77)
Lambda	-0.0700 (0.60)	-0.0009 (0.01)	0.01381 (0.063)	-0.0468 (0.23)
Intercept	5.345	5.2979 (24.21)	5.8644 (14.02)	5.950 (15.46)
Adjusted R ²	0.186	0.144	0.193	0.319
No. of observations				
	470	540	438	438

Table 15 — Women: Selectivity Corrected Log Hourly Earnings Equations, Including Apprenticeship and Professional/Technical Training

Variable	Public Wage	Private Wage		Self-employment	
			Without Lambda		Including Business Capital
Education (relative to no education)					
Primary school	0.5666 (2.02)	-0.7739 (2.20)	-0.0308 (0.11)	0.2910 (2.16)	0.2837 (2.12)
Secondary school	0.8041 (2.31)	-0.9027 (2.02)	0.0818 (0.24)	0.3362 (1.35)	0.2256 (0.90)
University	1.3877 (3.19)	-0.6638 (1.15)	0.7991 (2.25)	1.988 (1.91)	1.8995 (1.84)
Age (relative to < 31)					
31 to 40	0.1390 (0.72)	-0.2207 (1.01)	-0.2336 (0.99)	0.3645 (3.23)	0.3449 (3.08)
41 to 50	0.2740 (1.06)	-0.3095 (0.90)	-0.1065 (0.29)	0.3780 (2.73)	0.3311 (2.39)
51 to 65	0.3294 (0.91)	0.0362 (0.06)	-0.0891 (0.14)	0.1296 (0.81)	0.1195 (0.75)
Apprenticeship	—	—	—	0.6652 (2.98)	0.5561 (2.48)
Professional school	0.1243 (0.92)	0.3363 (1.45)	0.3666 (1.47)	—	—
Business capital/10,000 GF	—	—	—	—	0.1768 (3.24)
Duration	0.0191 (2.14)	0.010 (0.45)	0.0184 (0.78)	0.0639 (3.50)	0.0607 (3.35)
(Duration) ²	—	—	—	-0.0019 (2.79)	-0.0018 (2.68)
April-June	0.0295 (0.25)	-0.1019 (0.40)	-0.6313 (0.23)	0.0069 (0.06)	0.0218 (0.19)
July-September	0.1398 (1.14)	-0.0178 (0.07)	0.1326 (0.48)	-0.2565 (2.18)	-0.257 (2.20)
October-December	-0.0076 (0.06)	0.0279 (0.10)	0.0441 (0.150)	-0.2833 (2.25)	-0.294 (2.35)
Ethnic group (relative to Soussou)					
Fulani	-0.0234 (0.20)	0.1099 (0.43)	0.0611 (0.23)	0.0330 (0.31)	0.03417 (0.32)
Malinke	-0.2176 (1.89)	0.1152 (0.50)	0.0456 (0.19)	0.2508 (2.04)	0.2596 (2.13)
Other	0.1158 (0.72)	0.8181 (1.84)	0.6399 (1.35)	-0.0485 (0.25)	-0.0039 (0.02)
Lambda	0.2149 (1.14)	-1.2061 (3.09)	—	0.1340 (0.80)	0.1041 (0.62)
Intercept	4.230 (6.40)	8.7438 (7.84)	5.3885 (19.47)	4.863 (18.97)	4.916 (19.29)
Adjusted R ²	0.127	0.173	0.042	0.102	0.116
F	2.316	1.950	1.214	5.301	5.69
No. of observations	137	69	69	608	608

Table 16 - Predicted Hourly Earnings, by Sector, Gender, and Level of Education

	Public Wage (GF)	Private Wage (GF)	Self-employment (GF)
Gender/education level completed			
Men ^a			
None	264	250	485
Primary school	356	323	602
Secondary school	379	448	932
University	509	627	1,749
All	318	316	639
Women ^b			
None	98	249	194
Primary school	181	280	261
Secondary school	228	347	252
University	365	536	—
All	126	272	22 ^a

^a Based on sample means for male labor force participants and using estimates in Table 11.

^b Based on sample means for female labor force participants and using estimates in Table 12. Predicted wages for women in the private wage sector are based on OLS estimates.

completed primary and completed primary schooling, private wage earners who have completed secondary school or university appear to enjoy a substantial wage premium over public sector workers with the same backgrounds.

Even more striking are the much higher hourly earnings for men in self-employment compared with either wage sector at all levels of schooling as well as the more pronounced increase in earnings with education level in self-employment. For example, the predicted hourly net revenue in self-employment for a man with a completed high school education is 932 GF, more than twice as high as the predicted sector wage (448 GF) and about 2.5 times the wage in the public sector (379 GF).

For women, in contrast to men, predicted self-employment earnings are in general lower than private wage sector earnings. As with men, wage employment in the public sector appears to be the least remunerative. Mean expected wages in the private wage sector, which for reasons discussed above are calculated using the OLS estimates without correction for selectivity, appear to be quite a bit higher than in the public wage sector.

As noted, there are substantial differences between men's expected self-employment earnings and their predicted wages in the private and public sectors. The existence of a premium to self-employment is consistent with equilibrium in labor markets because of the greater risks and variability in incomes associated with enterprise activities. However, the difference is too large to be a credible representation of differences in actual remuneration between the sectors. Several factors may explain the gap. On the wage side, we have indicated that earnings do not include non-wage benefits accruing to formal sector employees in the private and public wage sectors. We also considered the possibility that predicted earnings of the self-employed reflect the influence of a small number of very large or profitable enterprises. Estimating the earnings function after dropping observations with very high actual as compared to predicted revenues (those with studentized residuals more than two standard deviations above the mean) did result in a fall in the magnitude of the education coefficients and in predicted hourly earnings. These predicted earnings, however, were still well above those in either wage sector. Another possibility is that there is a bias due to sample truncation because enterprises incurring negative net revenues are excluded from the sample. It is in fact necessary to drop firms incurring zero or negative profits, or else assign them an arbitrary low value (e.g., 0.01), if the standard semilog earnings specification is to be used. In our case, truncation was not imposed in the estimation because there were very few enterprises, male or female, for which calculated profits were not positive. Bias is still a possibility, however. The absence of loss-incurring enterprises may be indicative of a tendency to underestimate costs, or else may reflect another kind of sample truncation whereby individuals in failing enterprises cease operations, and thus are selected out of the sample. Expected net revenues will be overestimated in either case; in the case of truncation,

this will be because account is not taken of the probability of business failure (or success).¹⁸

To make accurate comparisons of the earnings of men and women, it is necessary to control for differences not only in schooling but in other characteristics as well of men and women in the workforce. Table 17 presents wage predictions for men and women based on the same set of characteristics, the averages for all (male and female) labor force participants. It is clear that in most cases men can expect to earn a good deal more than women with similar amounts of human capital. The largest gap is in self-employment, where male earnings are more than double female earnings at the no education through secondary levels.

This can be explained in part by the fact that enterprises run by men tend to be much larger than those run by women; hourly profits are highly correlated with the scale of the enterprise. It is likely that self-employed women, the great majority of whom are engaged in very small-scale retailing activities, are shut out of more lucrative or larger ventures either by custom or through lack of access to credit from formal institutions or informal sources.¹⁹

The gender gap in earnings is also large in the public sector but, given the relatively flat schooling-wage profile observed for men, closes substantially as education level rises. Only in private wage employment are representative wages fairly close for men and women for given levels of education, although the use of potentially biased OLS parameter estimates and the small size of the subsample for women suggests caution be used in inferring a similarity of returns in this sector. Overall, the comparisons in the table point to a substantial gap in earnings between men and women controlling for differences in human capital. Such a large gender earnings differential is of major policy concern and is clearly an area for more research.

¹⁸ Note that one way in which costs can be underestimated is by undercounting the labor of other family members in the enterprise, which will inflate calculated hourly profits. Although our sample is restricted to enterprises that are described by respondents as having a single family member working in them, unreported labor inputs of others is still a possibility.

¹⁹ Note that part of the difference in predicted self-employment earnings of men and women may be due to a greater upward bias in estimated self-employment profits for men. This might be the case if extent of the bias is related to the average scale of the enterprises in a sample.

Table 17 — Male-Female Comparisons of Predicted Hourly Earnings, by Sector and Level of Education^a

	Public Wage (GF)		Private Wage (GF)		Self-employment (GF)	
	Men	Women	Men	Women ^b	Men	Women
Education level completed						
None	258	104	244	259	461	203
Primary school	349	192	315	292	573	273
Secondary school	371	242	436	361	887	263
University	499	387	612	558	1,665	1,273
All	303	146	298	295	581	260

^a Calculations for both men and women are based on means for all (male and female) labor force participants using estimates on Tables 12 and 14.

^b Uses OLS parameter estimates.

6. SUMMARY AND CONCLUSIONS

This study represents one of the few efforts to date to analyze the determinants of labor force participation, sector of employment, and earnings in a sub-Saharan African economy. In this section, the results presented above are summarized and policy implications of the study are discussed.

Estimates from the multinomial logit model of sectoral allocation reported in Section 4 support the hypothesis that urban labor markets in Conakry are heterogeneous in the sense that the determinants of entry into the sectors are quite different. Education was seen to be an important means by which labor force participants are sorted into different sectors of the labor market. For both men and women, higher educational attainment is associated with a reduced probability of entry into self-employment and a higher likelihood of working in the public sector. The low representation of women in public sector employment can therefore be explained, in part, by their lower average educational attainment. However, even women with completed primary and secondary schooling (though not university graduates) are markedly less likely than men with similar characteristics to be in the civil service. The data do not allow us to determine whether this disparity reflects lower career aspirations or gender inequalities in hiring.

Although educational attainment is clearly associated with public sector employment for both men and women, schooling is positively associated with entry into private wage employment for women but not for men. This difference suggests the presence of constraints to female entry into low-skilled private wage jobs. These may involve discrimination in hiring on the part of employers, cultural factors that prevent women from seeking this work, or childcare constraints faced by poor women that make self-employment more attractive than wage work. For one or a combination of these factors, women with little or no formal education who are in the labor force are found almost exclusively in self-employment.

Our results also show that for both men and women and for all sectors of the labor market, participation is strongly affected by an individual's age. Most importantly, participation among persons between 15 and 30 years old is quite low. This prolonged period before men and women enter the labor force may reflect cultural norms, as well as the desire to continue with schooling, but it also raises the possibility that employment opportunities, particularly in the formal sector, are limited. Capital constraints may also discourage young people from starting their own enterprises, but this hypothesis cannot be tested using our data. Being a recent male migrant to Conakry is associated with a greater probability of self-employment and private wage employment but a reduced likelihood of joining the civil service, a result that is indicative of rationing of jobs in the public sector.

For women in particular, a number of factors relating to the demographic composition of the household have significant impacts on labor market choices. As the polychotomous framework demonstrates, these effects often vary by sector. Most notably, the presence of young children encourages entry into self-employment activities while having the opposite effect for wage employment. This result presumably reflects the relative compatibility of self-employment and child care, due to the flexibility of hours or the feasibility of performing market and household activities simultaneously.

Earnings determinants were investigated in Section 5. A number of interesting points emerge from our analysis. Most generally, we have shown in the context of a very low-income country that earnings respond to increases in human capital as embodied in schooling and job-specific experience, thus confirming the benefits to education of boys and girls. The structure of earnings determinants, however, varies between sectors and between men and women. In accord with findings in a number of other African countries, there is evidence of wage compression in the public sector for men, pointing to inefficiencies deriving from civil service wage-setting policies. In the private sectors of the economy, where pay scales are likely to be fixed to a lesser degree if at all, earnings rise more sharply with schooling. Thus, while men with little or no schooling can expect to receive approximately the same wage in the private and public sectors, men in the private wage sector with a secondary or university education enjoy a premium over their counterparts in the private sector.

One of the important contributions of this study is the analysis of self-employment earnings, which have not been the subject of much previous econometric work in developing countries. The earnings of the self-employed in our sample respond to improvements in human capital in the form of schooling, experience working in the enterprise, and (for women) apprenticeship training, as well as to inputs of physical capital. Previous work on self-employment earnings has not always found significant schooling effects. Our results are encouraging and suggest that investments in schooling can contribute to future productivity growth in small informal enterprises as well as in the formal or wage sectors. Moreover, comparisons of expected earnings across sectors indicate that the self-employed do not earn less than workers in formal wage employment when differences in credentials are taken into account. For men, self-employment even appears to be substantially more remunerative than wage work, although for reasons noted above, there is likely to be an upward bias in the estimated advantage to being self-employed.

Finally, although women's labor market earnings, like those of men, respond positively to increases in schooling, comparisons of predicted earnings of men and women in each sector indicate that in general men are likely to earn more than women with similar characteristics. In wage employment, this gap may reflect discrimination in pay setting procedures, or in access to high paying occupations within the private and public sectors.

For self-employment, it may be due to women's inability (or unwillingness) to secure credit to expand their enterprises to increase revenues and profits, or to traditional barriers to women's entry into certain kinds of enterprise

activities. Low potential earnings are a disincentive to engaging in income-earning activities and thus clearly work against efforts to encourage women's entry into the labor force.

The results of this study have a number of implications for policy and for future research. First, to encourage female participation in formal (wage) employment in both the private and public sectors, the clear policy prescription that emerges from this analysis is to increase girl's schooling, particularly at post-primary levels. In the long run, this will result in a shift in the relative importance of female formal or wage sector employment and self-employment in favor of the former. As noted earlier, entry of women into wage employment will rise with level of education whether their current low participation is due to relatively low career aspirations or to the presence of institutional barriers to the hiring of women, or both.

Remedying gender inequalities in educational attainment, however, will not have an impact on the labor market for some time. Of substantial concern in the short or medium term are the constraints on female employment in low-skilled private wage activities. These constraints represent an important restriction on women's mobility in the labor market, particularly in light of the implementation of adjustment measures to encourage private sector growth. Our findings imply that an expansion of the private sector (more specifically, of enterprises that hire labor) is unlikely to draw many women who are not well-educated into the wage labor force. From both an efficiency and an equity standpoint, therefore, policy reform needs to take into account the existence of impediments to female employment in the private wage sector. The appropriate measures will depend on the nature of the constraints. If women, particularly those who are poor, are reluctant to engage in wage work because of childcare constraints, policies to provide affordable childcare alternatives are indicated, as observers have stressed in many contexts (e.g., Joekees 1987). Gender discrimination in hiring by private employers, on the other hand, can be countered through effective implementation of anti-discrimination laws. The Government of Guinea's *Code de Travail* explicitly prohibits discrimination on the basis of sex. The effectiveness in practice of these codes is unclear, however. More information is clearly needed on the reasons why women, especially poor women, do not engage in formal private employment. Note, however, that even without measures to address this problem, privatization of the economy can still benefit this group of women if attention is given to enhancing opportunities in small-scale enterprise activities.²⁰

²⁰ Changes in incentives to women and to firms that result from reform measures — higher potential wages for the former and higher marginal profits from adding workers for the latter — can be expected to partially overcome barriers to female private wage employment. This will occur whether the barriers derive from women's reluctance to join the private sector workforce or from employer's unwillingness to hire them. Either of these factors, however, will still hinder responses to such incentives.

Improving the earnings of self-employed women is of particular importance because so many participating women are found in this sector. Our findings indicate that increasing women's education will raise the profits of female enterprises. However, the benefits to additional schooling in these enterprises appear to decline sharply after the primary level. This probably reflects the nature of informal activities open to women and is likely one reason why few women with secondary schooling and beyond are found in self-employment. In any event, investment in schooling is, as noted, a long-term strategy: to help women currently (or potentially) involved in own-account activities, most of whom have little or no schooling, other measures must be found. These might include targeted credit programs to make it easier for women to make purchases of capital and other inputs, or the provision of job-specific training, since both of these factors appear to raise earnings.

Finally, the compression of civil service salaries seen for men has potentially serious implications for productivity in the public sector. These include poor employee motivation for those at higher levels; civil servants engaging in unrelated income-earning activities while on the job; and difficulty in attracting and retaining skilled employees (Nunberg and Nellis 1990). Our results point to the need to reform the pay structure for government employees, both to maintain public sector productivity and to ensure the appropriate allocation of labor of different skill types among the private and public sectors.

REFERENCES

- Alderman, H., and V. Kozel. 1989. *Formal and Informal Sector Wage Determination in Urban Low-Income Neighborhoods in Pakistan*. Living Standards Measurement Study Working Paper No. 65. Washington, DC: World Bank.
- Appleton, S., P. Collier, and P. Horsnell. 1990. *Gender, Education, and Employment in Côte d'Ivoire*. Social Dimensions of Adjustment Working Paper No. 8. Washington, DC: World Bank.
- Arriagada, A., and A. Ziderman. 1992. "Vocational Secondary Schooling, Occupational Choice, and Earnings in Brazil." PRE Working Paper WPS 1037. Washington, DC: World Bank.
- Arulpragasam, J., and D. Sahn. 1991. "Economic Reform in Guinea: Adjusting for the Past." Washington, DC: CFNPP.
- Behrman, J., and B. Wolfe. 1984. "Labor Force Participation and Earnings Determinants for Women in the Special Conditions of Developing Countries." *Journal of Development Economics* 15: 259-288.
- Bowen, W. G., and T. A. Finnegan. 1969. *The Economics of Labor Force Participation*. Princeton: Princeton University Press.
- Browning, M. 1992. "Children and Economic Behavior." *Journal of Economic Literature* 30: 1434-1475.
- Dickens, W., and K. Lang. 1985. "A Test of Dual Labor Market Theory." *American Economic Review* 75(4): 792-805.
- Frank, R., and R. Wong. 1990. "Empirical Considerations for Models of Fertility and Female Labor Supply in Developed Countries." *Research in Human Capital and Development* 6: 3-16.
- Glick, P., C. del Ninno, and D. Sahn. 1992. "Labor Markets and Time Allocation in Conakry". Washington, DC: CFNPP.
- Gindling, T. H. 1991. "Labor Market Segmentation and the Determination of Wages in the Public, Private-Formal, and Informal Sectors in San Jose, Costa Rica." *Economic Development and Cultural Change*: 585-605.
- Halvorsen, R., and R. Palmquist. 1980. "The Interpretation of Dummy Variables in Semilogarithmic Equations." *American Economic Review*. 70(3): 474-475.

- Heckman, J. 1974. "Shadow Prices, Market Wages, and Labor Supply." *Econometrica* 42: 679-94.
- _____. 1979. "Sample Selection Bias as Specification Error." *Econometrica* 47: 153-61.
- Heckman, J., and Hotz. 1986. "An Investigation of Labor Market Earnings of Panamanian Males: Evaluating the Sources of Inequality." *Journal of Human Resources* 21: 507-541.
- Hill, M. A. 1983. "Female Labor Force Participation in Developed and Developing Countries: Consideration of the Informal Sector." *Review of Economics and Statistics* 5(3): 459-468.
- Joekes, S. 1987. "Women's Work and Social Support for Childcare in the Third World." Washington, DC: International Center for Research on Women.
- Khandker, S. 1987. "Labor Market Participation of Married Women in Bangladesh." *Review of Economics and Statistics* 69(33): 536-541.
- _____. 1992. "Earnings, Occupational Choice, and Mobility in Segmented Labor Markets of India." World Bank Discussion Paper 154. Washington, DC: World Bank.
- King, E. 1990. *Does Education Pay in the Labor Market: The Labor Force Participation, Occupation, and Earnings of Peruvian Women.* Living Standards Measurement Study Working Paper No. 67. Washington, DC: World Bank.
- Kozel, V., and H. Alderman. 1991. "Factors Determining Work Participation and Labor Supply Decisions in Pakistan's Urban Areas." *Pakistan Development Review* 29(1): 1-18.
- Lee, L. F. 1983. "Generalized Econometric Models with Selectivity." *Econometrica* (51): 507-512.
- Lindauer, D. L., O. A. Meesok, and P. Suebsaeng. 1988. "Government Wage Policy in Africa: Some Findings and Policy Issues." *World Bank Research Observer* 3: 1-25.
- Lindauer, D. L., and R. H. Sabot. 1983. "The Public-Private Wage Differential in a Poor Urban Economy." *Journal of Development Economics* 12: 137-152.
- McFadden, D. 1973. "Conditional Logit Analysis of Qualitative Choice Behavior." In *Frontiers of Econometrics*. Edited by P. Zarembka. New York: Academic Press.
- _____. 1983. "Econometric Analysis of Qualitative Response Models." In *Handbook of Econometrics*. Edited by Z. Griliches and M. Intrilligator. New York: Elsevier.

- Magnac, T. H. 1992. "Segmented or Competitive Labor Markets?" *Econometrica* 59(1): 165-188.
- Malathy, R. 1989. *Labor Supply of Married Women in Urban India*. Discussion Paper No. 585. Yale University Economic Growth Center.
- Mincer, J. 1974. *Schooling, Experience, and Earnings*. New York: Columbia University Press.
- Mills, B., and D. Sahn. 1993. "Labor Market Segmentation and the Implications for Public Sector Redeployment Programs." Washington, DC: CFNPP.
- Mohan, R. 1986. *Work, Wages, and Welfare in a Developing Metropolis: Consequences of Growth in Bogota, Columbia*. New York: Oxford University Press.
- Nunberg and Nellis. 1990. "Civil Service Reform and the World Bank." PRE Working Paper WPS 113. Washington, DC: World Bank.
- Psacharapoulos, G. 1987. "To Vocationalize or not to Vocationalize: That is the Curriculum Question." *International Review of Education* 25 (2).
- Sahn, D., and H. Alderman. 1988. "The Effects of Human Capital on Wages and the Determinants of Labor Supply in a Developing Country." *Journal of Development Economics* 29: 157-183.
- Schultz, P. 1988. "Educational Investment and Returns." In *Handbook of Development Economics*. Edited by H. Chenery and T. R. Srinivasan. New York: Elsevier.
- Stevenson, G. 1992. "How Public Sector Pay and Employment Affect Labor Markets: Research Issues." PRE Working Paper WPS 944. Washington, DC: World Bank.
- van der Gaag, J., M. Stelcner, and W. Vijverberg. 1989. "Public-Private Wage Differentials and Moonlighting in Côte d'Ivoire and Peru." *World Bank Economic Review* 3(1).
- Vijverberg, W. 1990. *Profits from Self-employment: A Case Study of Côte d'Ivoire*. LSMS Working Paper No. 43. Washington, DC: World Bank.
- Zymelman, M. 1976. *The Economic Evaluation of Vocational Training Programs*. Baltimore: The Johns Hopkins University Press.

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