Beyond Dualism: Multi-Segmented Labor Markets in Ghana

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BEYOND DUALISM: MULTI-SEGMENTED LABOR MARKETS IN GHANA

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Abstract

Using estimates of earnings functions in Ghana, this paper examines patterns of labor market segmentation with regard to formal and informal employment. Persistent earnings differentials are used as indicators of limited mobility across segments of the employed labor force. We find evidence of labor market segmentation between formal and informal employment and between different categories of informal employment which cannot be fully explained by human capital, physical asset, or credit market variables. We argue that dualist labor market models may not be appropriate for understanding employment dynamics in all circumstances and an approach that recognizes the multi-segmented character of labor markets may be preferable.

1 Introduction

It has long been recognized that labor markets and employment dynamics in developing countries differ from those in advanced industrialized economies. Specifically, theories of employment dynamics in developing countries frequently posit a dual labor market composed of two distinct sectors - a formal (or modern) sector and an informal (or traditional) sector. These divisions characterize Ghana's labor market, in which a small number of people work in formal employment and the vast majority work in agricultural or non-farm informal activities. Using empirical analysis of employment in Ghana, this paper argues that traditional dualist models of the labor market may not be appropriate for understanding employment dynamics. Instead, an approach that recognizes the multi-segmented character of labor markets is preferred.

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The precise formulation of dual labor markets varies from application to application, but the essence of dual labor market models remains fairly consistent. Labor markets in the formal sector are characterized by some form of wage rigidity - either due to explicit government interventions (e.g. social protections such as minimum wage legislation), the bargaining power of workers' organizations, or other imperfections in the formal wage labor market - in which wages remain above the market clearing level[1]. Wage inflexibility creates a situation in which formal employment opportunities are rationed. Individuals who are denied access to employment in the formal sector work in remunerative activities in the informal sector, in which regulatory or distributive distortions are absent. Dual labor market theories have a rich history and have been used to shed light on a range of issues, including migration, open unemployment, economic growth, industrialization, employment subsidies, and distributive outcomes (Lewis [15]; Fei and Ranis [8]; Todaro [25] ; Harris and Todaro [11]; Stiglitz [22][23]; Bourguignon [3]).

In these approaches to the dual nature of labor markets, the "informal" or "traditional" sector is characterized as a homogenous residual, with no barriers to entry, no constraints on mobility, and no rationing of opportunities. However, other studies have suggested that informal labor markets are segmented, worker mobility is constrained and that opportunities in the informal economy may be rationed (Chen et al. [5]; Meagher [17]; Pahl [19]; Hart [12]). Fields [9] suggests that, in certain cases, it may be desirable to elaborate dual labor market models by recognizing the duality that may be apparent in the informal economy itself. The policy implications are potentially significant. Traditional dual labor market theories frequently stress the regulatory and institutional distortions in the formal wage labor market, often arguing for less regulation and greater flexibility. However, if barriers to opportunity and constraints on mobility exist in the informal economy, then a failure to address these factors may perpetuate inequalities, limit improvements in living standards, and fail to address endemic poverty and deprivation, even if the efficiency of formal labor markets were improved.

A number of factors could explain observed patterns of segmentation in informal employment. For example, differences in earnings may simply reflect returns to human capital and the distribution of skills in the workforce. Alternatively, other constraints - outside of the labor market - may limit mobility and produce employment patterns in which otherwise equivalent workers receive different earnings for an hour's work. For example, imperfections in

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[1]For example, Stiglitz [22] develops a model in which replacing workers is costly, thereby creating an incentive to keep wages above the market clearing level in order to reduce turnover.

credit markets could create patterns of employment segmentation if the lack of credit produces cash flow problems or prevents individuals from undertaking investments that would raise average earnings. An unequal distribution of assets, together with imperfect credit markets, can yield an unequal distribution of income-earning opportunities. Analysts have also stressed the role of social capital, for example kinship networks, in determining access to opportunities within the informal economy (Collier and Garg [6]; Hart [12]).

This paper investigates patterns of labor market segmentation in Ghana. As in dual labor market approaches, employment is divided into formal and informal categories. However, this basic dichotomy is complicated by including divisions based on employment status (wage- and self-employment), sector (agricultural and non-agricultural), and the worker's sex. We estimate earnings functions for employed individuals in Ghana using household survey data. Under conditions of complete labor mobility, hourly earnings should be equal across types of employment, controlling for individual characteristics such as experience and education. In contrast, persistent earnings differentials are one indication of barriers to employment mobility, between the formal and informal economy, but also between types of informal employment.

2 Employment in Ghana

Data from the fourth round (1998/99) of the Ghana Living Standards Survey (GLSS 4) were used in the study. The data, covering $5,998$ households, are representative at the national and regional level. Three other national living standard surveys had been administered in Ghana prior to the GLSS 4. A special focus on employment, labor force characteristics, and employment income were integrated into the fourth round of the GLSS, making it a particularly suitable data set for the current study [2]. Only individual adults-fifteen years of age and older-who reported that they were employed during the past seven days were included in the analysis.

Data on employment earnings and types of employment feature prominently in the current study and merit additional attention. Average hourly earnings were used as the measure of employment earnings, defined as total weekly income from employment divided by total hours of work per week[3].

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[2]A fifth round of the GLSS is underway at the time of writing.

[3]Respondents could report earnings and hours of work on a daily, weekly, fortnightly, monthly, or annual basis. These responses were converted into average weekly earnings and hours of work before calculating average hourly earnings. Individuals who reported working more than 125 hours per week were dropped from the sample.

The GLSS 4 allows for multiple estimates of self-employment income. However, the reliability of income estimates derived from reported gross revenues less operating expenses are questionable (for a discussion of the problems see [7]. Instead, direct reported net earnings from a given self-employment activity is used. The market value of goods produced through self-employment activities but consumed at home is imputed and added to self-employment income. In addition, the monetary value of in-kind payments is included in estimates of employment earnings.

Self-employment earnings for family enterprises with unpaid family labor present a particular challenge for estimating individual hourly earnings. The estimates of self-employment earnings attribute all earnings from a given family enterprise to a single individual, although other family members[4] worked in the enterprise. Using the earnings and hours work as they are reported would overstate the hourly earnings of the individual to which all earnings were attributed. To correct for this potential bias, total self-employment income from the family enterprise is divided by total hours worked on the enterprise, including the hours worked by unpaid family members. This average hourly rate is then multiplied by each individual's working hours to re-estimate each individual's self-employment income. This technique imputes earnings to unpaid family workers - an estimate of the unpaid worker's contribution to employment income.

The indicators for type of employment used in this study classified employment along three dimensions: employment status (wage employment or self-employment, including own-account workers), formality of the employment activity (formal or informal), and sector (agricultural v. non-agricultural, public v. private). Individuals were classified based on their primary job[5]. The methods chosen for differentiating informal employment from formal employment were adapted from the recommendations of the 17th International Conference of Labor Statisticians [14]. The 17th ICLS suggested that the definition of informal employment should include both (1) employment in informal enterprises (including all forms of self-employment) and (2) wage employment in informal jobs outside of informal enterprises.

This general approach to defining informal employment was applied in the current study as follows. Self-employed individuals were considered to be operating informally if their enterprise was not registered with any gov-

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[4]This technique makes the implicit simplifying assumption that productivity of all workers, including unpaid family members, is identical. The GLSS 4 does not have enough information to calculate the precise productivity differential between different workers in each family enterprise.

[5]Approximately one third of all employed individuals in the GLSS 4 survey had multiple jobs.

ernment agency. Wage workers were considered to be working informally if they did not have any kind of employment contract[6]. In addition, self-employed workers were further divided into own-account workers and other self-employed[7]. By defining informal employment based on characteristics of the enterprise or employment relationship, we avoid problems of selection bias associated with definitions of informality based on income or earnings (see, for example, [13]).

Table 1 presents descriptive statistics for the data used in this study. Agricultural employment accounts for just over 50 percent of total employment in Ghana. Wage employment, both formal and informal, is relatively uncommon, accounting for 16 percent of total employment[8]. In particular, very few women are employed as wage employees. The most important form of employment for women is employment as non-agricultural informal own-account workers.

Table 1: **Distribution of employment by sex and employment type (Ghana, 1998/9)**.

	Men		**Women**	
	Obs.	Percent	Obs.	Percent
1. Non-Agricultural Formal Private Wage Employment	127	3.7	28	1.2
Continued on next page				

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[6]An alternative criterion used to distinguish formal from informal jobs is whether a worker is covered by a set of basic social protections (Hussmanns [14]). We chose to use legal/regulatory criteria in this study to distinguish formal from informal employment, since similar distinctions would then be used for both the self-employed and wage workers. We explored an alternative definition of informal wage employment that classified a worker as informal if they lacked paid leave and an employer-provided pension. Interestingly, although the same (rather small, 3.7%) proportion of individuals fall under each definition of formal employment, the overlap is not perfect (2.9% of the individuals have both a contract and social protections, i.e. roughly 80% overlap). The regression results, discussed in the next section, were not dramatically altered by the choice of definition.

[7]Presumably, employers would constitute the "other" self-employed. However, the GLSS 4 questionnaire is ambiguous on the precise employment status of individuals who report being self employed but do not report being own account workers. Therefore, some caution is needed in interpreting this category.

[8]According to Mazumdar [16], most African countries follow this pattern. His calculations show that in 1990 the share of wage employment in the Ghanaian labor force was only 3.78 percent. The estimated African average (18 countries) was 9.10 percent. Canagarajah and Thomas [4] use the three first rounds of the GLSS (1987, 1988 and 1991) to document the decline in the share of wage labor and the increasing absorption of workers into the informal sector.

Table 1 – continued from previous page

	Men		Women	
	Obs.	Percent	Obs.	Percent
2. Public Formal Wage Employment	301	9.4	120	3.4
3. Agricultural Formal Wage Employment	21	0.6	4	0.1
4. Non-Agricultural Registered Self-employed	154	4.4	225	6.5
5. Non-Agricultural Unregistered Self-employed, Not Own-Account	59	1.9	58	1.8
6. Non-Agricultural Unregistered Self-employed Own-Account	481	15.4	1537	45.1
7. Non-Agricultural Informal Private Wage Employment	237	7.5	85	3.0
8. Public Informal Wage Employment	74	2.0	24	0.6
9. Agricultural Registered Self-employed	105	2.8	55	1.4
10. Agricultural Unregistered Self-employed	1926	50.1	1472	36.7
11. Agricultural Informal Wage Employment	75	2.3	9	0.3
Total	3560	100.00	3617	100.00

Source: Authors' calculations based on the GLSS 4 (see text).

Table 2 presents estimates of average hourly earnings and average weekly hours for men and women by type of employment. Average earnings differ significantly across the various categories of employment. Earnings are lowest for agricultural workers and informal non-agricultural workers. As predicted by dual labor market theories, average hourly earnings are significantly higher for formal wage employment. Hours of work are shortest in agricultural and public employment, and are longest in private wage employment and non-agricultural self-employment. Women earn less than men on average and work slightly fewer hours[9].

The significant differences in earning across types of employment and between men and women suggest that labor markets could be segmented in

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[9]Only in formal agricultural wage employment are women's hourly earnings higher than men's. However, in this category of employment, women's average earnings are based on only four observations and are not statistically reliable.

Table 2: **Mean Hourly Earnings (cedis) and Weekly Hours by Sex and Employment Type (Ghana, 1998/9).**

	Men				Women			
	Average Hourly Earnings		Average Weekly Hours		Average Hourly Earnings		Average Weekly Hours	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
1. Non-Agricultural Formal Private Wage Employment	1,499.0	168.8	50.3	2.6	951.2	141.0	47.2	3.0
2. Public Formal Wage Employment	1,353.3	99.9	47.3	1.5	1,096.2	80.9	42.9	2.2
3. Agricultural Formal Wage Employment	1,054.3	212.2	43.1	1.6	1,552.2	556.3	35.1	6.3
4. Non-Agricultural Registered Self-employed	1,087.2	145.4	61.5	2.2	555.9	48.6	59.2	2.3
5. Non-Agricultural Unregistered Self-employed, Not Own-Account	953.2	182.6	58.8	3.5	595.7	158.2	58.1	4.6
6. Non-Agricultural Unregistered Self-employed Own-Account	694.0	48.4	58.5	1.3	579.5	29.1	53.8	0.8
7. Non-Agricultural Informal Private Wage Employment	761.2	77.7	59.4	2.0	513.3	127.3	60.0	3.8
8. Public Informal Wage Employment	1,340.8	174.3	54.3	3.2	784.0	109.2	43.6	4.0
9. Agricultural Registered Self-employed	590.1	70.9	58.2	3.2	438.0	89.4	45.9	3.6
10. Agricultural Unregistered Self-employed	511.8	59.3	40.1	0.6	332.2	14.9	36.5	0.6
Continued on next page								

Table 2 – continued from previous page

	Men				Women			
	Average Hourly Earnings		Average Weekly Hours		Average Hourly Earnings		Average Weekly Hours	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
11. Agricultural Informal Wage Employment	465.9	82.8	52.6	2.8	429.9	87.4	36.3	7.3
Total	728.4	35.1	47.8	0.5	507.8	16.1	47.4	0.5

Source: Authors' calculations based on the GLSS 4 (see text)

Ghana. However, the patterns observed in the simple tabulations presented in Tables 1 and 2 could be driven by differences among individual workers and not by structural characteristics of the Ghanaian labor market. Specifically, inequality in earnings is not sufficient for demonstrating labor market segmentation. What is needed is evidence of barriers to labor market mobility which prevent some individuals from taking advantage of employment opportunities available to others with similar characteristics [10]. A more rigorous analysis—in which we control for individual characteristics—can better test for the existence of segmented labor markets.

3   Regression Results

Earnings equations were estimated using data from the GLSS 4. Following the extensive literature beginning with Mincer [18], we used a log-linear specification with hourly earnings as a dependent variable. The basic model can be expressed as:

$$\ln(hour\_earn_{hh,pid}) = \alpha \cdot X_{hh} + \beta \cdot Y_{hh,pid} + \epsilon_{hh,pid}$$

where X is a set of household specific variables, Y are the covariates of earnings at the individual level and the last term correspond to a random error. All estimates where obtained using weighted ordinary least squares[10]. Definitions of the complete set of variables used are presented in Table 3.

Our specification includes a set of education and literacy indicators. Ghana's educational system is quite complex (an individual's education could comprise up to 6 stages). It also has gone through a substantial reform recently.

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[10]The weights are those provided by the Ghanaian Statistical Office and represent the inverse of the probability of selection in each cluster.

Our indicators attempt to signal what could be roughly considered primary, secondary and higher education levels. "Koranic stage" and courses other than the official ones were assumed not to contribute towards human capital formation. Indicators of reading ability—both for English and any Ghanaian language—and a numeracy variable were also included to control for human capital.

One reason, among other factors, why women may have lower earnings is that they are disproportionately responsible for unpaid, non-market activities such as taking care of children. Therefore, a variable controlling for the presence of young children (less than 7 years old) in the household was included. Because women must take responsibility for these non-remunerative activities, their ability to obtain and keep employment is reduced thereby causing lower earnings even after controlling for education, type of employment, and similar factors. Thus, one would expect a significant and negative estimate for the 'presence of a child' dummy, if the responsibility for child-care argument were the primary determinant or women's disadvantage in the Ghanaian labor market. Also, we would expect the 'female' indicator to either become insignificant or, at least, have an effect of smaller magnitude once the presence of a child is controlled for.

Controls for an individual's potential access to credit were included in the analysis. Specifically, dummy variables indicating whether the individual had been successful in obtaining credit in the past were used. If credit rationing and imperfect access to credit were responsible for observed differences in earnings, we would expect these variables to pick up the effect.

Column 1 of Table 4 presents the main regression results. As with many other earnings equations, the analysis showed workers obtain higher earnings as they grow older, with decreasing marginal returns to age. Interestingly, women's earnings fall significantly below those of men, after controlling for age, education, type of employment, and access to credit.

The literature linking schooling and earnings is vast. Starting with the model by Becker [2] and Schultz [21] education has been seen as an investment in human capital. Accordingly, the estimates corresponding to the level of education in Mincerian equations have been interpreted as providing proxies for a rate of return. The data in the GLSS show mixed evidence regarding returns to education. On the one hand, primary education and literacy in a Ghanaian language were statistically insignificant throughout the analysis. On the other hand, having completed higher levels education raised earnings. Numeracy-having the ability to perform written calculations-increased

Table 3: **Variable Definition**

Variable	Definition	Mean	Std.Dev.
Age	Age in years	40.82	0.19
Age2	Age squared/1000	1.86	0.02
Female	Female dummy	0.50	0.01
Primary	Primary education completed	0.45	0.01
Post-primary	Secondary or Higher education completed	0.17	0.01
Math	Ability to perform written calculations	0.56	0.01
Ghanaian lit	Literacy in any Ghanaian Language	0.43	0.01
English lit	Literacy in English	0.46	0.01
Akan	Akan ethnic group indicator	0.52	0.01
Loc 1	Accra (base category)	0.09	0.01
Loc 2	Urban location, other than Accra	0.24	0.01
Loc 3	Rural location, coastal	0.16	0.01
Loc 4	Rural location, forest	0.34	0.01
Loc 5	Rural location, savannah	0.16	0.01
Empstat1	Non-Agricultural Formal Private Wage Employment (base category)	0.02	< 0.01
Empstat2	Public Formal Wage Employment	0.06	< 0.01
Empstat3	Agricultural Formal Wage Employment	< 0.01	< 0.01
Empstat4	Non-Agricultural Registered Self-employed	0.05	< 0.01
Empstat5	Non-Agricultural Unregistered Self-employed, Not Own-Account	0.02	< 0.01
Empstat6	Non-Agricultural Unregistered Self-employed Own-Account	0.30	0.01
Empstat7	Non-Agricultural Informal Private Wage Employment	0.05	< 0.01
Empstat8	Public Informal Wage Employment	0.01	< 0.01
Continued on next page			

Table 3 – continued from previous page

Variable	Definition	Mean	Std.Dev.
Empstat9	Agricultural Registered Self-employed	0.02	< 0.01
Empstat10	Agricultural Unregistered Self-employed	0.44	0.01
Empstat11	Agricultural Informal Wage Employment	0.01	< 0.01
Own_land	Household member owns a plot of land somewhere	0.31	0.01
Agric assets	Value of agricultural assets owned by household (thousands of cedis)	368.55	65.44
Credit granted	Applied for credit to financial institution with positive result	0.02	< 0.01
Credit rejected	Applied for credit to financial institution with negative result	0.03	< 0.01
Non-Ag assets	Value of assets of enterprises owned by household members (thousands of cedis)	724.23	114.86
Pchild	Presence of any children (< 7) in household	0.57	0.01

remuneration levels as well[11].

Location proved to be an important factor affecting earnings in Ghana, with people outside the main city (Accra) earning significantly less, ceteris paribus. Individuals living in households that owned a plot of land also experience higher earnings. In addition, having been granted credit by a financial institution led to higher earnings for those living in a household where a firm was being operated. Some of the other controls did not turn out to have a statistically significant effect on earnings. For example, the individual's ethnicity seems not to be relevant in explaining labor income in Ghana. Finally, including the 'presence of child' flag has neither of the expected effects described above. The estimate comes out insignificant and the 'female effect' retains the same importance.

The structure of earnings in Ghana responds strongly to the indicators of type of employment. As discussed previously, these indicators take into ac-

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[11]The initial specification also included a set of indicators for both parents' education level. We classified educational attainment into three categories: primary, secondary and higher. Out of the six educational indicators only one came out weakly significant.

Table 4: **Earnings Equation Estimation Results**

	(1)	(2)
Age	0.043	0.040
	[0.006]**	[0.006]**
Age2	-0.417	-0.419
	[0.067]**	[0.067]**
Female	-0.258	-0.342
	[0.033]**	[0.031]**
Primary	0.001	
	[0.051]	
Post-primary	0.175	
	[0.070]*	
Ghanaian lit	0.033	
	[0.045]	
English lit	0.047	
	[0.056]	
Math	0.176	
	[0.057]**	
Akan	-0.021	0.009
	[0.033]	[0.033]
Loc 2	-0.418	-0.452
	[0.056]**	[0.056]**
Loc 3	-0.788	-0.862
	[0.061]**	[0.061]**
Loc 4	-0.460	-0.499
	[0.057]**	[0.057]**
Loc 5	-0.664	-0.768
	[0.063]**	[0.063]**
Empstat2	-0.005	0.027
	[0.087]	[0.090]
Empstat3	-0.127	-0.181
	[0.175]	[0.189]
Empstat4	-0.665	-0.744
	[0.097]**	[0.098]**
Empstat5	-0.584	-0.715
	[0.119]**	[0.119]**
Empstat6	-0.700	-0.826
	[0.086]**	[0.085]**
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Table 4 – continued from previous page

	(1)	(2)
Empstat7	-0.748	-0.849
	[0.104]**	[0.106]**
Empstat8	-0.143	-0.145
	[0.121]	[0.124]
Empstat9	-0.907	-1.053
	[0.139]**	[0.138]**
Empstat10	-1.092	-1.251
	[0.087]**	[0.085]**
Empstat11	-0.829	-1.009
	[0.141]**	[0.138]**
Own_land	0.152	0.148
	[0.033]**	[0.033]**
Agric assets	7.72e-06	7.49e-06
	[2.57e-06]**	[2.55e-06]**
Credit granted	0.313	0.362
	[0.122]**	[0.121]**
Credit rejected	-0.082	-0.064
	[0.076]	[0.076]
Non-Ag assets	4.89e-06	5.34e-06
	[1.95e-06]*	[2.10e-06]*
Pchild	0.049	0.038
	[0.031]	[0.031]
Constant	5.950	6.424
	[0.168]**	[0.161]**
Observations	7137	7137
R-squared	0.22	0.22

Standard errors in brackets
* *significant at 5%; ** significant at 1%*

count employment status, sector, and degree of formality[12]. In the estimates presented here, the earnings of formal wage workers in the non-agricultural private sector is the baseline for interpreting the coefficients on the other employment indicators. As expected from duality theories, employment earnings in informal activities are considerably lower than those in formal activities. The one exception is in the public sector, where the contractual criterion of formality does not seem to have an impact on wages. Note that the negative effects of informality and self-employment on earnings, as captured by our coefficient estimates, are far larger in absolute value than the

positive effects of post-primary education or numeracy.

When the estimation was repeated removing all the human capital variables (Table 4, column 2), the coefficients on the employment indicator variables increased in magnitude suggesting that, despite the lack of statistical significance of the coefficients on these variables in column 1, human capital does affect earnings within employment categories and that average human capital endowments vary on average from one type of employment to the next. To avoid biased estimates due to the omission of relevant variables, the human capital variables should be included in the earnings equations. Therefore, we take the coefficient estimates from column 1 as the more reliable estimates[13].

The estimates indicate that labor market segmentation exists beyond the formal-informal divide. Among the various types of informal employment, significant earnings differentials persist. Specifically, informally self-employed in non-agricultural activities earn more than informal non-agricultural wage workers, controlling for the various factors discussed here. The results of a Wald test show that the coefficients on the employment indicator variables corresponding to these two categories were statistically different at the 5% significance level. If no barriers to mobility among informal workers exist, then we would expect workers to move from informal wage employment to informal self-employment until the earnings differential vanishes. The existence of a sizeable and statistically significant earnings differential between these types of employment suggests that barriers may exist that limit entry into informal self-employment.

One potential difficulty with this analysis is that it may not adequately take into account the impact of multiple job holding. Remember—the employment indicators are defined at the individual level based on a person's primary occupation. Therefore, we estimated the same earnings equation, but switched the unit of observation from the individual to the job. In other words, an individual with multiple jobs would now contribute more than one observation to the estimation process. The estimated equation now had the form:

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[12]We eliminated unpaid family workers from the sample, but retained the adjustment to self-employment earnings as described in the text. Results from estimations that include unpaid family workers do not differ significantly from those presented here and are available from the authors.

[13]We broke up the sample between formal and informal workers and estimated separate earnings equations (available on request). We found that the effect of age (a possible proxy for experience) and post-primary education are much stronger in the formal sector. However, the effect of numeracy was stronger for workers in the informal sector.

$$\ln(hour\_earn_{hh,pid,occ\_rank}) = \alpha \cdot X_{hh} + \beta \cdot Y_{hh,pid} + \gamma \cdot Z_{hh,pid,occ\_rank} +$$
$$+ \delta \cdot rank_{hh,pid,occ\_rank} + \epsilon_{hh,pid,occ\_rank}$$

where hh, pid, and occ_rank identify the household, the individual within the household, and the jobs of each individual respectively. X is a vector of household level variables (region, presence of children, etc.). Y is a vector of individual characteristics (sex, education, ethnicity, etc.), Z is a vector of job characteristics (non-agricultural self-employed, informal private wage worker, etc.). Finally, $rank$ is a set of three job ranking dummies placed in the equation in order to allow for rank-specific shift effects in earnings.

The job-level regression suggests that the findings based on the individual-level earnings equation (Table 5) are robust[14]. The job level regression analysis confirmed that employment status effects are important, and that there seems to be segmentation in the informal sector. However, some of the variables that were significant in the previous analysis no longer seem to have an impact on earnings. Most notably, the dummies for non-agricultural self-employment—both with and without employees—do not show a negative effect on earnings when the regression is run at the job level. Informal wage employment and agricultural self-employment, on the contrary, still imply lower earnings on average.

These regressions include three job-rank dummy variables, all of which are strongly negative and significant. The implication is that second, third and fourth jobs pay less on average than the main job, all other things equal. When individuals take on additional employment activities, they diversify into lower-paid activities where the barriers to entry are presumably lower[15]. This is consistent with the existence of a segmented labor market. The female dummy variable shows a stronger negative effect on earnings than at the individual-level analysis. This is related to the fact that women earn relatively less than men in secondary jobs[16]. The opposite seems to be true for those individuals who identify themselves as belonging to the Akan ethnic group (this variable was insignificant in the individual-level regressions).

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[14]The type of employment indicators were narrowed in number by ignoring the distinction between registered and unregistered self-employed. Since registration is determined at the household level, including this distinction in the job level analysis makes little sense. On the contrary, contractual formality is determined on a job-by-job basis.

[15]For example, the secondary employment activity of the vast majority of non-agricultural workers (both formal and informal) with multiple job holdings is self-employment in agriculture. However, the majority of individuals with multiple job-holdings who report self-employment in agriculture as their primary occupation work as non-agricultural own-account workers in their second occupation.

[16]Jobs other than the main one.

Table 5: **Multiple Jobs Earnings Equation Estimation Results**

	(1)	(2)
Age	0.067	0.066
	[0.008]**	[0.008]**
Age2	-0.613	-0.621
	[0.084]**	[0.082]**
Female	-0.563	-0.639
	[0.045]**	[0.042]**
Primary	-0.149	
	[0.067]*	
Post-primary	0.022	
	[0.093]	
Ghanaian Lit	0.026	
	[0.061]	
English Lit	0.079	
	[0.074]	
Math	0.230	
	[0.076]**	
Loc 2	-0.434	-0.471
	[0.063]**	[0.063]**
Loc 3	-0.592	-0.684
	[0.073]**	[0.071]**
Loc 4	-0.155	-0.219
	[0.067]*	[0.066]**
Loc 5	-0.172	-0.283
	[0.079]*	[0.077]**
Akan	0.101	0.113
	[0.043]*	[0.043]**
Empstat2	0.100	0.171
	[0.120]	[0.120]
Empstat3	-0.147	-0.153
	[0.193]	[0.202]
Empstat5 (includes registered self-employed)	-0.284	-0.338
	[0.156]	[0.158]*
Empstat6 (includes registered self-employed)	-0.129	-0.205
	[0.115]	[0.114]
Empstat7	-0.552	-0.599
Continued on next page		

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Table 5 – continued from previous page

	(1)	(2)
	[0.125]**	[0.126]**
Empstat8	-0.022	0.010
	[0.140]	[0.142]
Empstat9 (registered and unregistered)	-1.471	-1.552
	[0.120]**	[0.119]**
Empstat11	-0.649	-0.746
	[0.265]*	[0.265]**
Land Ownership	0.265	0.264
	[0.047]**	[0.047]**
Ag Assets	-8.25e-06	-8.78e-06
	[5.39e-06]	[5.46e-06]
Credit granted	0.398	0.464
	[0.162]*	[0.163]**
Credit rejected	-0.196	-0.172
	[0.118]	[0.118]
Non-Ag assets	2.92e-06	3.53e-06
	[1.67e-06]	[1.81e-06]
Second Job	-1.414	-1.403
	[0.062]**	[0.062]**
Third Job	-1.176	-1.184
	[0.151]**	[0.155]**
Fourth Job	-1.266	-1.210
	[0.631]*	[0.679]
Constant	5.215	5.543
	[0.218]**	[0.205]**
Observations	9807	9807
R-squared	0.30	0.30

Standard errors in brackets
* *significant at 5%; ** significant at 1%*

4   Discussion

The findings presented here confirm the predictions of dual labor market theories in Ghana: earnings in informal employment are lower than earnings in formal employment, controlling for a range of relevant variables. However, our results also suggest that patterns of segmentation are more complex than a simple two-sector model would predict. Specifically, there is evidence of segmentation within non-agricultural informal employment in Ghana, char-

acterized by barriers to entry to informal self-employment. Moreover, limitations on mobility across different types of employment are not fully explained by human capital, physical asset, or credit market variables. Theoretical approaches that treat informal employment as a residual category with no barriers to mobility between different types of informal employment are inappropriate in the case of Ghana.

In addition, we found that women's earnings were consistently lower than men's after controlling for human capital, age, location, and type of employment. This finding holds true for both wage employment and self-employment. Labor market discrimination is often used to explain gender-based differences in wage employment. However, these results suggest that gender-based disadvantages in Ghana's labor markets extend to forms of employment without an employer/employee relationship. These results support the argument that labor markets in developing countries may be segmented in important ways that are not captured by dual labor market approaches.

This study says little about the factors that determine the type of labor market segmentation we find in the case of Ghana. As mentioned earlier, other studies of employment in Ghana suggest that social capital (e.g. kinship networks and information networks) may be important in determining wage differentials and access to employment opportunities (Barr and Oduro [1]; Collier and Garg [6]; Hart [12]). Similarly, social norms governing women's role in the economy may underpin observed patterns of gender segmentation. More research is needed to identify the factors behind patterns of labor market segmentation in Ghana and to develop appropriate policy responses.

The analysis presented here suggests that improved access to education and credit markets should help to improve labor market mobility among working Ghanaians, but will not eliminate the factors behind labor market segmentation. Others have reached similar conclusions with regard to the role of human capital in Ghana (Sackey [20]; Teal [24]). Specifically, non-linearities in the returns to education have been found in other studies, a result that is consistent with the positive effect of post-primary education on earnings in the analysis presented here [24]. However, our results suggest that improving access to education will have a limited effect in equalizing employment opportunities in Ghana.

This research does support the recommendations of some researchers to move beyond duality theory and to analyze employment in developing countries in terms of "multi-segmented labor market" (Chen, et al. [5]). For countries like Ghana, such an approach would improve our understanding of employment dynamics and ultimately improve the effectiveness of labor market policies.

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