Estimating Gender Earnings Gap in the Informal Sector *Kayayei* Labour Market: Micro-Level Empirical Evidence from Kumasi, Ghana

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Abstract

The existence of differential-payment for labour market services between male and female is taken as a universal phenomenon in almost all countries regardless of the nature and structure of the economic system. The few previous studies that have compared male and female earnings in Ghana have concentrated on the formal sector, notably the public sector labour market, to the neglect of that of the informal sector. To overcome this deficiency and to aid in future policy formulation, this paper used a formalized method to analyze the log monthly earnings differential between male and female Kayayei migrants in the Kumasi informal sector labour market to determine what portion of this differential is due to different market skills and labour market discrimination. An important feature of the paper was the emphasis on discrimination in hiring that pertains in the Kumasi Kayayei informal sector labour market which suggests that male Kayayei operating in the informal sector labour market in Kumasi with sample average female characteristics earn 43% more on average and ceteris paribus than their female counterparts.

Key words: *Kayayei* migrants, labour market, gender, earnings gap, informal sector, *ceteris paribus*.

Introduction

The existence of differential payment for labour market services between males and females is taken as a universal phenomenon in almost all countries regardless of the nature and structure of the economic system. In Becker (1957) model, discrimination in earnings due to discriminatory tastes of employers, co-workers, or customers can lead to a segregated workforce. A gender earnings gap in the labour market could arise due to statistical profiling. Statistical profiling occurs where employers discriminate based on differences in expected productivity or the reliability of predicted productivity between groups (Solberg, 2005). Mincer & Polachek, (1974) and Blau & Ferber (1991) argued that women choose occupations in order to minimize the losses associated with their more intermittent attachment to the labour market. As such, women may avoid jobs requiring large investments in skills unique to a particular employer or occupation if those skills are subject to rapid obsolescence because the returns on them depend on staying with that employer or in continuous employment in that occupation. Bergmann (1974) and Bren & Garcia-Penalosa (2002) crowding hypothesis posited that excess supply of women in "female" jobs depresses wages for otherwise equally productive workers. *Kayayei* migrants in Kumasi are internal labour migrants from the Northern territories of Ghana who are mostly female school drop-outs, who view self-participation in the informal sector labour market as the only way to acquire minimum assets for either better marriage prospects or greater economic stability (Agarwal 1994). Typical of a developing economy, two forms of economic activities, namely formal and informal sector activities, exist side by side in Ghana. The distinction between formal and informal employment opportunities had over the years been based on the difference between workers who earn monthly salaries (wage-earners) and those who are self-employed and enjoy no monthly salary opportunities. The formal sector in Ghana operates under the support of accepted rules and regulations which are enacted and implemented by the government (Ray, 1998). The formal sector has organized and recognized associations like the Ghana Trade Union Congress (TUC), Ghana National Association of Teachers (GNAT) and other similar bodies.

The Ghanaian informal sector on the contrary, represents a loose combination of usually small scale organizations and self-employed persons who operate independently of many of the regulations and benefits that exist in the formal sector. Employees in the Ghanaian informal sector mostly do not have access to the privileged facilities that exists in the formal sector. The Ghanaian informal sector does not adhere to the requirement of paying minimum wages, and does not have retirement plans and benefits or compensation for employees in case of termination of appointment. The sustained growth of the informal sector in Ghana holds the key to generating new employment opportunities as is evidenced by the growth in the sector in recent times particularly, the retail and wholesale sub-sectors, (McKay & Aryeetey 2007). Hart (1973) pioneered work on the informal sector employment in Ghana at a suburb called Nima in the national capital of Accra. Abdul-Korah (2004), Abdul-Korah (2006), Songsore (1983), Songsore (2003), Lentz (1994) and Nicholas van Hear (1982) are all part of the rich and extensive literature that addresses colonial labour policies toward northern Ghana migrants. However, none of these scholarly works analysed the gender earnings gap of northern labour migrants operating in the informal sector. This paper therefore attempts to bridge the gap by empirically analysing the gender earnings gap using micro-level data on *Kayayei* migrants operating in the Kumasi informal sector labour market. Although empirical evidence indicate that male porters are generally not from northern Ghana, for the purpose of this paper, *Kayayei* is defined to include all male and female porters from the northern sectors of Ghana operating in the informal sector labour market in the Kumasi Metropolis and *Kayayoo* is used to refer to an individual migrant working as a courier or porter in the informal sector labour market in the Kumasi Metropolis. The structure of the paper is outlined as follows: the next section deals with the methods used. The penultimate section evaluates the empirical estimates and the final section offers the conclusion and recommendations.

Methods

Data

A unique individual-level survey comprising 209 *Kayayei* migrants operating in the Kumasi Metropolis was conducted by the author. The survey was conducted from July to September 2007. It has always been difficult to gather reliable estimates on the number of *Kayayei* residing and operating in the Kumasi metropolis as they hardly have residential addresses. The Kumasi Metropolitan Assembly (KMA) was handicapped in providing the author with reliable estimates regarding the number of *Kayayei* migrants in the metropolis. The key informant sampling methodology was adopted using migrant *Kayayei* who are fluent in the Twi dialect to elicit an extensive useable array of information from respondents. The individual-level survey obtained information on:

a) The individual migrant's demographic characteristics;
b) The place of abode of the individual migrant;
c) The socio-economic difficulties confronting the individual *Kayayoo* migrant and his or her monthly earnings;
d) Their migration and remittance history.

In addition to the conventional biases associated with obtaining complete and correct responses from a sample survey, a survey on migrants engaged in informal activities encounters difficulties arising from the zeal of respondents to reveal or over emphasize the difficulties and problems confronting them. In order to attenuate the effect of this systematic bias on survey responses, the approach of interviewing was modified to minimize respondent bias. The confidential nature of the survey was emphasized and the *Kayayei* were assured that the information would only be used for research purposes. The sequence and wording of the questions on the questionnaire were adjusted to elicit as honest a response from the migrants as possible under the circumstances. 12 respondents were excluded as they could not provide appropriate responses. The sample mean age is 21.7 years and the average *Kayayei* had spent up to 14.5 months operating in the Kumasi metropolis by the date of interview. The data, however, does not permit an explicit examination of the statistical or the crowding models of the gender earnings gap in the *Kayayei* informal sector labour market in Kumasi.

Empirical variables

The key dependent variable is the log of *Kayayoo* monthly earnings expressed in Ghanaian cedis and is defined as the total value of the money a *Kayayoo* migrant earns from the informal sector labour market. A variety of explanatory variables are used and these are described in Table 1.

Table 1: Description of Variables

Variable	Description
lnmot	Natural log of *Kayayoo* monthly earnings in Ghanaian Cedis
GENDER	=1 if individual *Kayayoo* is male; = 0 if female
NOTHREG	=1 if individual *Kayayoo* is from the northern region; = 0 otherwise
UPEAST	=1 if individual *Kayayoo* is from the Upper East region; = 0 otherwise
UPWEST	=1 if individual *Kayayoo* is from the Upper West region; = 0 otherwise
ASHREG (**default**)	=1 if individual *Kayayoo* is from the Ashanti region; = 0 otherwise
AGE	The age of the *Kayayoo* respondent in years
AGE2	The age of the *Kayayoo* respondent in years squared
NOED (**default**)	=1 if individual *Kayayoo* respondent has no formal education; 0 otherwise
PRIMARY	=1 if individual *Kayayoo* respondent has primary education; 0 otherwise
BASICED	=1 if individual *Kayayoo* respondent has basic education; 0 otherwise
MARRIED	=1 if individual *Kayayoo* respondent is married; 0 otherwise
CHILD	=1 if individual *Kayayoo* respondent has a child; 0 otherwise
TIMESPENT	The total time spent in the Kumasi *Kayayoo* market by the respondent expressed in months
TIMESPENT2	The total time spent in the Kumasi *Kayayoo* market by the respondent expressed in months squared
SUSU	=1 if individual *Kayayoo* respondent do save by means of susu; 0 otherwise

Characteristics of individual *Kayayoo* migrants
A set of individual characteristics capturing the *Kayayoo* migrant's age, gender and marital status are included in the regression analysis.

Regional-level characteristics
Variables relating to the regional and geographic characteristics of the *Kayayei* migrants at the destination are also included in the analysis. The set includes a dummy variable for whether the migrant comes from the Northern, Upper East, Upper West and Ashanti regions respectively.

Duration of Stay at the destination
In an attempt to examine the effect of the duration on the gender earnings for *Kayayei* migrants operating in the Kumasi Metropolis, variables for the time spent at the destination and the time spent squared are included as explanatory variables. The *Susu* is designed to capture among other things the savings culture among the *Kayayei* operatives in the market.

The Oaxaca Decomposition

In modelling the gender gap in earnings in the Kumasi *Kayayei* informal sector labour market, the Oaxaca (1973) earnings decomposition model is used. The variant of the Oaxaca & Ransom (1994) technique is however not pursued here. The model measure the difference in earnings by decomposing the difference in *Kayayei* earnings into a part attributed to skill and another part attributed to discrimination based on gender characteristics. The Oaxaca (1973) decomposition is modelled as:

$$\frac{Wm}{Wf} \neq \frac{Wm^o}{Wf}, \tag{1}$$

Where $\frac{Wm^o}{Wf}$ is the ratio that prevails in the absence of discrimination. $\frac{Wm}{Wf}$ is the observed male/female *Kayayei* earnings ratio and m and f refers to males and females in the *Kayayei* labour market respectively. In the absence of discrimination in earnings in the *Kayayei* market,

$$\frac{Wm^o}{Wf} = \frac{MPm}{MPf} \tag{2}$$

where *MP,* is the marginal product of males and females respectively. Unfortunately however, $\frac{Wm^o}{Wf}$ is an unknown expression. A general wage equation is therefore expressed as follows:

$$W = \beta_0 + \beta_1 \overline{Z} + u \tag{3}$$

Where W represents the predicted mean earnings for a group, $\beta_{j's}$ are the estimated parameters from the regression and $\overline{Z}$ is a vector containing individual traits like age, educational level, gender and marital status. An ordinary least squares (OLS) regression estimate of the earnings for each group takes this form of expression (3).

Thus, $W_m = \beta_{0m} + \beta_{1m}\overline{Z}_m + u_i$ (3')

Expression (3') is the male *Kayayei* earnings structure and expression (3'')

$W_f = \beta_{0f} + \beta_{1f}\overline{Z}_f + u_i$ (3'')

gives the female *Kayayei* earnings structure. The, difference in mean earnings is therefore given as:

$$\Delta W_{m-f} = W_m - W_f = (\beta_{0m} + \beta_{1m}\overline{Z}_m) - (\beta_{0f} + \beta_{1f}\overline{Z}_f) \tag{4}$$

Expressing equation (4) in a natural logarithm form gives:

$$\Delta \ln(W_{m-f}) = \ln(W_m) - \ln(W_f) = (\beta_{0m} + \beta_{1m}\overline{Z}_m) - (\beta_{0f} + \beta_{1f}\overline{Z}_f) \tag{5}$$

Equation (5) is decomposed into a part based on the individual *Kayayoo* productivity characteristics ($\Delta \overline{Z}_{mf}$) and a part based on the *Kayayoo* market earnings due to the individual traits ($\Delta\beta_{mf}$). After some algebraic manipulation, equation (5) can be specified as:

$$\Delta \ln(W_m \text{-} W_f) = (\beta_{0m} - \beta_{0f}) + \overline{Z}_f(\beta_{1m} - \beta_{1f}) + \beta_m(\overline{Z}_m - \overline{Z}_f) \tag{6}$$

given:

$$\Delta \ln(W_m \text{-} W_f) = [(\beta_{0m} - \beta_{0f}) + \overline{Z}_f(\beta_{1m} - \beta_{1f})] + [\beta_m(\overline{Z}_m - \overline{Z}_f)] \tag{6'}$$

The first part of equation (6') presents the portion of earnings difference due to market returns based on gender and is known in the labour economics literature as the 'discrimination' effect. The second grouped term is the difference in earnings which is due to differences in individual *Kayayoo* traits estimated in the labour market. In calculating the gender earnings gap in the Kumasi *Kayayei* informal sector labour market, the summary statistics for the log monthly earnings for the mean pooled model, the mean male and female *Kayayei* sub-sample characteristics are used. A standard (Mincer, 1974) earnings function with the log monthly earnings as the dependent variable estimation procedure is adopted in estimating the log monthly earnings function in the Kumasi Kayaye informal sector labour market.

Empirical Results

The regression analysis was performed separately for the pooled sample as well as the male and female sub-samples using the STATA (version 10) statistical software package. The reported mean pooled model, the mean male sub-sample and the mean female sub-sample characteristics statistics are presented in Table 2.

Table 2: Mean Statistics for the Kumasi *Kayayei Market*

VARIABLE	POOLED SAMPLE	MALE SUB-SAMPLE ($\bar{Z}_m$)	FEMALE-SUB SAMPLE ($\bar{Z}_f$)
lnmot	3.956576	4.121483	3.869649
gender	0.3451777	1.000	0.000
nothreg	0.4467005	0.3235294	0.5116279
upeast	0.2639594	0.3529412	0.2170543
upwest	0.2335025	0.25	0.2248062
age	21.6599	22.04412	21.45736
age2	476.736	494.2794	467.4884
primary	0.4873096	0.5441176	0.4573643
basiced	0.4568528	0.3823529	0.496124
married	0.1218274	0.1029412	0.1317829
child	0.6091371	0.1470588	0.8527132
timespent	14.54315	15.01471	14.29457
timespent2	236.5025	251.5441	228.5736
susu	0.6497462	0.1470588	0.9147287
Sample size	**197**	**68**	**129**

The pooled and sub-sample Mincerian earnings function estimates are also presented in Table 3. Table 4 immediately follows and shows the (Oaxaca, 1973) decomposition in earnings due to endowment in the Kumasi migrant *Kayayei* labour market. Table 5 also presents the Oaxaca decomposition in earnings due to discrimination in the Kumasi migrant *Kayayei* labour market. The total gender earnings gap in the Kumasi *Kayayei labour* market is computed and presented in Table 6.

TABLE 3: Log Monthly Earnings Estimates In The Kumasi *Kayayei Labour* Market.

VARIABLE	POOLED SAMPLE	MALE SUB-SAMPLE	FEMALE-SUB SAMPLE
constant	4.896743 (..6604907)	5.922847 (1.337138)	5.28318 (1.125312)
gender	.2612478* (.0565004)	N/A -	N/A -
nothreg	.0815353* (.0672621)	-.0079854 (.1118767)	.1016881 (.1117421)
upeast	.0395489* (.0569502)	-.0259384 (.097549)	.0695081 (.0779553)
upwest	.0797217* (.0588007)	-.11959 (.1109437)	.1920511 (.0825388)
age	-.1137369* (.0578194)	-.1633329 (.1172473)	-.1523628 (.1033921)
age2	.0026148* (.0013109)	.0034284 (.0025678)	.0036176 (.0024149)
primary	.0250186 (.0728117)	.1543414 (.0955722)	-.0691017 (.0911964)
basiced	.0377992 (.0787533)	.1654497 (.1046377)	-.0302984 (.1254573)
married	-.0007873 (.049808)	-.0339586 (.0950396)	.0048462 (.0637948)
child	.0745685* (.0507164)	.0986592 (.0979395)	.0368018 (.0808517)
timespent	.0083635 (.0138538)	.0047837 (.025199)	.0036741 (.0185943)
timespent2	-.0001489 (.0005074)	-.0003129 (.0008586)	.0001319 (.0006574)
susu	-.0616764 (.0654357)	-.0348825 (.1007963)	-.0150678 (.1046718)
R^2	**0.30**	**0.18**	**0.10**
Sample size	**197**	**68**	**129**

*denotes statistical significance at the 0.05 level using two-tailed tests.
(White, 1980) Standard errors in parentheses

The semi-logarithmic form for the Mincerian equation has formed the basis for estimating richer specifications that capture racial or gender differences in earnings. This is done by introducing dummy variables into the semi-logarithmic specifications so that when $MALE_i = 0$, $e^0 = 1$ and when $MALE_i = 1$, we have e^π. Thus, in going from female ($MALE_i = 0$) to male ($MALE_i = 1$), $\ln(W_i)$ changes by $e^\pi - 1$. Since a change in the log wage is a proportional change, $[e^\pi - 1] \times 100$ yields a percentage change. Thus, if MALE =1 the male wage is: e^π; and if MALE=0, the female wage is e^0. The percentage change in wages between the male and female gender groups is then expressed as: $[(e^\pi - e^0) \div e^0] \times 100 = [(e^\pi - 1) \div 1] \times 100 = [e^\pi - 1] \times 100$.

Hence, in interpreting a dummy coefficient when the dependent variable is in logarithms, one has to take the antilog, subtract one and multiply the result by 100. This gives the *ceteris paribus* effect on the dependent variable of being in the dummy category relative to the base category. Thus, a male *Kayayoo* earns on average and *ceteris paribus* $[e^{.2612478} - 1] \times 100 = 30$ % more than female *Kayayoo*. This is an indication of the existence of discrimination in earnings at the informal sector labour market. Migrant *Kayayei from* the Northern region earn on average and *ceteris paribus* $[e^{.0815353} - 1] \times 100 = 9$ percent more than *Kayayei from* the Ashanti region. Married *Kayayei* earn on average and *ceteris paribus* $[e^{-.0007873} - 1] \times 100 = 8$ % less than unmarried *Kayayei*. *Kayayei* with children earn on average and *ceteris paribus* $[e^{.0745685} - 1] \times 100 = 8\%$ more than *Kayayei* without children. The Oaxaca difference in earnings due to skills is also presented in Table 4.

Table 4: The Oaxaca Decomposition for Difference in Earnings Due To Skills in the Kumasi *Kayayei* Market

VARIABLE	MALE WAGE COEFFICIENT ESTIMATES β_m	GENDER DIFFERENCES $(\bar{Z}_m - \bar{Z}_f) = \Delta\bar{Z}$	WAGE DIFFERENTIAL DUE TO SKILL $\beta_m (\Delta\bar{Z})$
nothreg	-.0079854	-0.1880985	0.0015020417619
upeast	-.0259384	0.1358869	-0.00352468876696
upwest	-.11959	0.0251938	-0.003012926542
age	-.1633329	0.58676	-0.095837212404
age2	.0034284	26.791	0.0918502644
primary	.1543414	0.0867533	0.01338962577662
basiced	.1654497	-0.1137711	-0.01882339436367
married	-.0339586	-0.0288417	0.00097942375362
child	.0986592	-0.7056544	-0.06961929858048
timespent	.0047837	0.72014	0.003444933718
timespent2	-.0003129	22.9705	-0.00718746945
susu	-.0348825	-0.7676699	0.02677824528675
Total			-0.06006045541022

Again, the gender earnings differential due to skill or endowment is $[e^{-0.06} - 1] \times 100 = -6\%$. That is, a male *Kayayoo* in the informal *Kayayei* market who has sample average female characteristics is less 'skilful' by 6%, indicating that females are more 'skilful' in the Kumasi *Kayayei* informal sector labour market than their male counterparts on average and *ceteris paribus*. Despite female *Kayayei* being more 'skilful' than their male counterparts in the Kumasi informal sector *Kayayoo* market, they are offered less compensation. Table 5 presents the computation of the Oaxaca decomposition of discrimination in earnings.

Table 5: The Oaxaca Decomposition for Difference in Earnings Due To Discrimination in the Kumasi *Kayayei* Market

VARIABLE	Gender Coefficients estimates difference $(\beta_m - \beta_f) = \Delta\beta$	Mean Female Characteristics $\bar{Z}_f$	Wage Differential due to Discrimination $\bar{Z}_{f'} \times (\Delta\beta) + \Delta$ in Constant
change in constant			0.639667
nothreg	-0.1096735	0.5116279	-0.05611202249065
upeast	-0.0954465	0.2170543	-0.02071707324495
upwest	-0.0954465	0.2248062	-0.0214569649683
age	-0.0109701	21.45736	-0.235389384936
age2	-0.0001892	467.4884	-0.08844880528
primary	0.2234431	0.4573643	0.10219489702133
basiced	0.1957481	0.496124	0.0971153303644
married	-0.0388048	0.1317829	-0.00511380907792
child	0.0618574	0.8527132	0.05274662149768
timespent	0.0011096	14.29457	0.015861254872
timespent2	-0.0004448	228.5736	-0.10166953728
susu	-0.0198147	0.9147287	-0.01812507477189
Total			0.3605524317057

The market difference in returns between male and female *Kayayei* indicate that returns to males in the informal sector *Kayayei* market exceeds those of their female counterparts. The estimate of 0.36 is the total earnings differential due to discrimination and is explained as the female *Kayayei* sample average *ceteris paribus* unequal treatment or discrimination in the Kumasi informal sector *Kayayei* labour market. It suggests that males in the informal sector *Kayayei* labour market in Kumasi with sample average female characteristics earn $[e^{0.36} – 1] \times 100 = 43\%$ more than females with a matching level of characteristics. The total gender gap in earnings existing in the Kumasi *Kayayei* informal sector labour is computed and presented in Table 6. The computation indicates the prevalence of 20% discrimination in gender earnings against female *Kayayei* in the market.

Table 6: Total Gender Earnings Gap in the Kumasi *Kayayei* Informal Sector Labour Market

Earning Differences $\Delta\ln(W_{m-f})$ $= \ln(W_m) - \ln(W_f)$	Value	Total gender earnings gap
	0.30049197629548	
$\beta_m \times (\Delta \bar{Z})$	-0.06006045541022	(-0.06006045541022/0.30049197629548) x 100% = -20%
$\bar{Z}_{f} \times (\Delta\beta) + \Delta$ in Constant	0.3605524317057	(0.3605524317057/0.30049197629548) x 100% = 120%

Source: computed by author

The total gender gap in earnings in the Kumasi *Kayayei* informal sector labour market is computed and presented in Table 6 as:

Total Gender Earnings Gap = Discrimination Effect (120%) + Endowment Effect (-20%) = 100%. These demand side factors prevalent in the Kumasi *Kayayei* informal sector labour market result in 'discrimination in hiring' against female *Kayayei*.

The result is in resonance with the findings of Milne & Neitzert (1994) and Vijverberg (1993).

Conclusion and Recommendations

The questions addressed by this paper are important from a policy perspective. Very little information currently exists on gender differences in the demand for *Kayayei* services despite the fact that labour market discrimination is a universal phenomenon. This limitation has to be overcome considering the fact that gender policies to regulate the operation of the informal sector labour market in Ghana are not pronounced and are also not enforceable as regards affirmative action. Again, the very little research and scholarships on labour market discrimination in Ghana has only focused on the formal sector labour market to the neglect of the informal sector labour market, which employs the largest share of the Ghanaian labour force. The findings suggest an inverted U shaped *Kayayei* maximising age of 21.7 years. This implies that the human capital depreciation does not set in at a later age in the informal *Kayayei* labour market. This necessitates increasing *Kayayei* enrolment in the basic and secondary educational levels in Ghana as well as enacting social advocacy policies to help them to aspire to get more education. These measures will enable them to participate in the formal sector labour market where returns to education are higher and gender earnings discrimination is minimal. An analysis of selectivity bias using Heckman (1979) selection procedure to determine the selection of females into the informal *Kayayei* labour market in Kumasi and the reasons why male *Kayayei* earn more than their female counterparts and migrant porters from the northern regions are in such high demand were not explored and remain high on the agenda for future research.

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