

**The Informal Sector and Gender in the Caribbean:  
The Case of Trinidad & Tobago**

by

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**Abstract**

Data from Trinidad and Tobago is used to examine the relationship between the informal sector and gender. A multinomial logit model is used to identify the socio-demographic and economic characteristics of informal sector participants, the Heckman selection model is then used to estimate wage regressions and the Oaxaca decomposition technique is used to measure wage discrimination between formal and informal sector workers and males and females in the informal sector. There is evidence that formal sector workers earn more than informal sector workers and that men tend to work for higher wages than women in the informal sector. Most of the observed difference may be attributed to wage discrimination rather than to human capital differences between males and females.

Keywords: multinomial logit, informal sector, gender, Heckman selection model, Oaxaca decomposition, Trinidad & Tobago

JEL classification: J16, J31, J71, N360

## 1. Introduction

This study has 2 major objectives: first, to determine the socio-economic and demographic characteristics of individuals engaging in informal sector activity in Trinidad and Tobago, and, second, to ascertain whether there is any wage differential between workers in the formal and informal sector, and between males and females in the informal sector. A multinomial logit model is used to attain the first objective and a combination of the Heckman selection model and the Oaxaca decomposition technique the second. Our data source is the Trinidad and Tobago Continuous Survey Sample of the Population (CSSP) for 2006.

There has been a resurgence of interest in informal sector activity due, in the main, to an increase in such activity, especially in developing countries (Losby and Edgcomb 2002). Like most of the countries in the developing world, Caribbean economies have sizeable informal sectors<sup>1</sup>. However, the phenomenon has not been widely investigated and published work on the size of the informal sector in the English-speaking Caribbean exists for a few countries only, for example, Guyana (Thomas 1989 and Faal 2003), Jamaica (Witter and Kirton 1990 and Bennett 1995) and Trinidad & Tobago (Lloyd-Evans and Potter, 2002, Maurin et al. 2005, Sookram et al. 2006, Sookram and Watson, 2007)<sup>2</sup>.

Within recent times, more and more recognition has been given to the importance of targeting women to reduce poverty (World Bank 2002). Further, and as noted by Chen (2001), there is a relationship between women participating in the informal sector and their level of impoverishment. Work done by Sethuraman (1998) provides evidence that women

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<sup>1</sup> Although no cut-off point was given by the 15<sup>th</sup> International Conference of Labour Statisticians for the employee-size characteristic of the informal sector (later adopted by the revised System of National Accounts) they do mention that many studies classify firms that employ 5 or less persons (or some similar categorization) as part of the informal sector (for example, see Marcouiller, D. et al 1997).

<sup>2</sup> The studies cited show the size of the informal sector to be, in: Guyana, between 26% and 99% of GDP during the 1960s-1980s., in Jamaica between 8% and 78.1% during the 1970s and 1980s and, in Trinidad & Tobago, between 14% and 36% during the 1970-1999 period.

who work in the informal sector usually operate at a lower level than men since they tend to be 'employees' rather than 'employers'. Added to this, males and females also tend to be involved in different types of activities in the informal sector: men tend to be involved in activities that yield high remuneration, whereas women tend to be involved in low paying work. This is supported in the case of Trinidad & Tobago by studies done by Sookram et al (2006) and Sookram and Watson (2007), who found that men tend to dominate in the 'business' informal sector, whereas women tend to lead in the 'household' informal sector.

Many studies explore the link between the informal sector and poverty and provide evidence that a positive correlation exists between informal sector participation and poverty (for example, Chen 2001 and Katungi et al 2006). For instance, in a study done on Mexico, El Salvador and Peru (Marcouiller et al. 1997) evidence is found that the average income earned in the informal sector is lower than that earned in the formal sector. Furthermore, Charmes (2000) provides evidence that there is a gender wage-gap in the informal sector and, moreover, this gap appears wider in the informal than in the formal sector. He attributes this disparity to two factors: the fact that men undertake higher level jobs and that men are more likely to undertake more lucrative work than women. This has been attributed to the fact that informal sector jobs tend to be inferior to formal sector work in terms of remuneration, working conditions and job security.

Since studies also show that women more than men tend to work in the informal sector (for example, Sookram et al 2006) and that wage discrimination exists in the informal sector (Sethuraman, 1998) as it does in the formal sector (Olson and Coppin (2001)<sup>3</sup>), the gender dimension is yet another aspect of the link between the informal sector and poverty, especially if informal sector work serves as the primary source of household income. This is

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<sup>3</sup> Olson and Coppin (2001) found evidence to show that, in 1993, the male-female income differential was 19% in Trinidad and Tobago.

all the more important for the Caribbean where Handa (1996) found evidence of a high number of female-headed households, on average far higher than even in African countries. It is therefore possible that, in the Caribbean region, perhaps more than anywhere else in the developing world, the informal sector contributes to the gender bias in poverty.

Despite the implications of informal sector participation for the gender bias in poverty, gender aspects of informal sector activity have remained essentially unexplored in the Caribbean region (Lloyd-Evans and Potter 2002). In addition, where such studies do exist, concerning both the Caribbean and rest of the developing world, they are limited to largely descriptive studies (see, for example, Sethuraman 1998 and Charmes 2000).

The results of this study are expected to add to the literature and understanding of informal sector activity in two main ways. Firstly, the socio-demographic and economic factors that motivate individuals to participate in informal sector employment will be isolated. Secondly, the results will provide a measure of the formal-informal sector wage-gap as well as a measure of the male-female wage-gap in the informal sector

The remainder of the paper is organized as follows. The following section reviews the literature focusing on the link among the informal sector, poverty and gender. Section 3 outlines the methodology and section 4 describes the dataset used in this study while the results obtained from applying this methodology to the data are provided in Section 5. Section 6 concludes the paper.

## **2. Methodology**

The methodology consists of three stages. In the first stage, a multinomial model is employed to explain the level of activity in both the formal and informal sectors in Trinidad & Tobago. The dependent variable  $y_i$  is categorical and is defined for the  $i^{\text{th}}$  individual as:

$$y_i = \begin{cases} 1 & \text{Works only in the formal sector} \\ 2 & \text{Works only in the informal sector} \\ 3 & \text{Works both in the informal and formal sectors (base category)} \end{cases}$$

The ‘works both in the formal and informal sector’ category is designated as the base category so that the corresponding vector of coefficients in the model is normalized to zero<sup>4</sup>. The ‘works only in the formal sector’ category includes all those individuals from the sample admitting that they earn income from the formal sector only. The ‘work only in the informal sector’ category encompasses those from the sample who reveal their source of income is an establishment which employs 5 or less individuals. Finally, the ‘works both in the informal and formal sectors’ category is constructed from the sample observations for which the individuals have two sources of income, one of which is from a job in the formal sector.

The explanatory variables are introduced in the following section and are either categorical (eg. sex, marital status) or continuous (eg. age). Each of the categorical variables consists of two or more ‘modalities’, one of which is a ‘reference’ modality which, in the multinomial logit model, is the modality that is not used in the estimation of the model.

The second stage involves the estimation of four wages equations: the first explains how formal sector wages are formed, the second informal sector wages, the third male wages in the informal sector and the fourth female wages in that sector. A standard earnings function, informed by the work of Mincer (1974), may be used in which education and working experience are two of the main determinants of earnings. However, one of the problems likely to be encountered in estimating wages in this framework by Ordinary Least Squares (OLS) is sample selection bias, which may result in overestimation or underestimation of the predicted wage. This problem arises because the decision to work or

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<sup>4</sup> The purpose of this normalization is to identify the model’s parameters. See Greene (2003) for a more detailed discussion of the estimation procedure.

not to work in either the formal or informal sector is made by an individual so that the individuals not working in either sector constitute a self-selected sample rather than a random sample. It is possible that individuals who are likely to earn a wage below their reservation wage<sup>5</sup> may not work in a particular sector and this could account for discrepancies in the wage data.

One way to overcome this problem is to use the Heckman two-step selection model. The first step involves a *selection equation*

$$\Pr(z_i = 1) = q_i' \alpha + e_i$$

where  $z_i$  is a binary (0-1) variable and  $q_i$  a vector of exogenous variables explaining this variable<sup>6</sup>. A binary probit model may therefore be used to estimate the coefficients of the  $\alpha$  vector and four such models are fitted, one each for the formal sector and informal sector ( $z_i=1$  if individual works in the given sector, 0 if not) and then one for each sex in the informal sector ( $z_i=1$  if individual is of the given sex, 0 if not). The estimates in the first step are used to construct consistent estimates of the Inverse Mill's Ratio (IMR)<sup>7</sup> (Greene 2003, p.759).

In the second step of the Heckman selection model, the following Mincer-type *outcome equation* is estimated by OLS for each of the four cases corresponding to the selection equation:

$$w_i = x_i' \beta + u_i$$

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<sup>5</sup> This is the lowest wage at which an individual would participate in the labour market.

<sup>6</sup> The variables to be included in the  $q_i$  vector include education and working experience (Mincer 1974) as well as other explanatory variables.

<sup>7</sup> The inverse mills ratio is the ratio of the probability density function to the cumulative distribution function.

$w_i$  is the level of wages (logs) earned by individual  $i$  while the explanatory variables are the IMR expression and, following Mincer (1974), age (to proxy potential working experience) and years of schooling (to indicate level of education). The Heckman model, therefore, facilitates the use of data from unemployed individuals to improve the estimates of the parameters in the regression model. Any sample selection bias will have in effect been corrected by the selection equation, which does the task of determining whether an observation is included in the non-random sample.

In the third stage of the analysis, the estimated formal and informal sector wages equations are used to calculate the difference between formal and informal sector wages (the ‘informal sector’ remuneration penalty), while the estimated informal sector male and female wages equations are used to calculate the difference between male and female wages in the informal sector (the ‘informal sector gender’ remuneration penalty). This is done using the Oaxaca (1973) (or Blinder (1973)) decomposition<sup>8</sup> method to disaggregate the differentials observed in these equations into explainable and unexplainable components. This technique allows us to identify the role of each explanatory variable in contributing to the wage differential and, in the case of the male-female differential in earnings, the Oaxaca decomposition in earnings may be expressed as follows:

$$\ln \bar{W}^m - \ln \bar{W}^f = \bar{X}^f (\beta^m - \beta^f) + (\bar{X}^m - \bar{X}^f) \beta^m$$

where  $\ln$  indicates the natural logarithm,  $\bar{W}^m$  and  $\bar{W}^f$  the mean -wage of male and female informal sector workers, respectively;  $\bar{X}^m$  and  $\bar{X}^f$  (3x1) vectors of the mean ages,

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<sup>8</sup> Each of the different decomposition techniques proposed in the literature (for example, the Reimers Method, the Juhn-Murphy-Pierce Decomposition) has its strengths and weaknesses. Silber and Weber (1999) compared five decomposition methods (including the Oaxaca decomposition) and found no important differences in the different techniques.

education and a constant term for males and females, respectively and  $\beta^m$  and  $\beta^f$  the corresponding vectors of parameters obtained from the estimated outcome equations. In the equation above there are two components on the right hand side of the equation: the second component is the share of the wage differential that may be explained by wage-determining personal characteristics and the first represents the differences in rewards that may not be explained and is therefore considered an approximate measure of wage discrimination for female workers. A similar decomposition exists for the differential wages due to gender in the informal sector.

### 3. Data

The data to be used in the models developed in the previous section is obtained from the 2006 CSSP for Trinidad & Tobago. To obtain the sample, observations from all four quarters of 2006 are used in order to ensure that the sample is not influenced by seasonal elements that, in some cases, may affect one or more particular quarters. In addition, since the CSSP is based on a rotating survey design and some individuals could be interviewed as many as three times in any one year, data is used from only the first observation on any individual. In summary, therefore, the sample includes only the first observation of any individual for 2006 provided that the individual is older than 15 years and participated in economic activity within the last week.

Data are of two kinds: continuous variables and discrete-valued “attributes”. Summary statistics of the two continuous variables used in this study are given in Table 1a below:

**Table 1a: Summary descriptive statistics of continuous variables**

Statistic	Entire Sample	Formal sector Only	Informal Sector Only	Both Formal and informal
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				simultaneously
AGE				
• Mean	36.831	36.818	36.458	40.219
• Std. Dev	12.258	12.105	13.202	10.979
• Skewness	0.303	0.274	0.497	-0.211
• Kurtosis	2.144	2.010	2.691	2.308
EDUCATION				
• Mean	7.397	9.284	8.058	9.590
• Std. Dev	3.419	2.729	2.361	2.741
• Skewness	0.076	0.523	0.264	1.075
• Kurtosis	2.850	3.266	3.674	2.904

The average age of individuals included in the sample is 37 years (roughly the same for males and females). The average remains approximately the same for participants in the formal and the informal sectors but it increases to 40 for those who participate in both sectors. The average amount of schooling in the sample is just over 7 years, but somewhat over 9 for those who work in the formal sector only or in both sectors and just over 8 for those who work in the informal sector only.

A list of demographic and socio-economic attributes used as exogenous variables in the models outlined in the previous section is shown in Table 1b below. Table 1b also shows the full listing of “modalities”, including a “reference” modality, for each attribute. Each attribute is made up of two or more mutually exclusive modalities (for instance the modalities of the sex attribute are “male” and “female”). The table also shows the frequency distribution of the modalities of each attribute as well as the distribution of these modalities by the type of participation.

**Table 1b: Frequency Distributions (%)**

<b>Attributes (Modalities in Italics)</b>	<b>Sample Frequencies</b>	<b>Formal Sector Only</b>	<b>Informal Sector Only</b>	<b>Both Formal and Informal Sector</b>
Sex: <i>Male</i>	60.40	60.75	56.57	73.97

<b>Attributes (Modalities in Italics)</b>	<b>Sample Frequencies</b>	<b>Formal Sector Only</b>	<b>Informal Sector Only</b>	<b>Both Formal and Informal Sector</b>
<i>Female*</i>	39.60	39.25	43.43	26.03
Head of Household				
<i>Yes*</i>	29.49	41.24	45.09	74.36
<i>No</i>	70.51	58.76	54.91	25.64
Marital Status:				
<i>Single*</i>	39.28	39.60	39.78	21.92
<i>Married</i>	12.04	11.93	12.04	16.44
<i>Common Law</i>	35.42	35.39	34.12	46.58
<i>Separated</i>	13.26	13.08	14.05	15.07
Ethnicity:				
<i>African</i>	40.05	40.62	33.76	63.01
<i>Indian</i>	41.04	39.34	52.55	27.40
<i>Mixed*</i>	18.91	20.04	13.69	9.59
Area of Residence:				
<i>Urban*</i>	10.75	10.90	9.56	12.86
<i>Sub-Urban</i>	52.08	52.30	51.82	44.29
<i>Rural</i>	37.17	36.80	38.63	42.86
Highest Education Level:				
<i>Primary*</i>	12.97	12.51	16.79	4.11
<i>Secondary</i>	54.22	54.66	52.55	47.95
<i>Tertiary</i>	22.53	21.38	27.55	34.25
<i>Vocational</i>	10.28	11.46	3.10	13.70
Location of Business:				
<i>Residence</i>	10.88	9.49	18.43	13.70
<i>Fixed Location</i>	85.81	87.31	78.28	78.08
<i>Mobile*</i>	3.31	3.20	3.28	8.22
Sector of Activity:				
<i>Agriculture, Hunting, Forestry &amp; Fishing and Mining &amp; Quarrying ....</i>	6.58	6.48	6.20	13.70
<i>Manufacturing ...</i>	10.10	10.47	8.03	9.50
<i>Electricity and Water*...</i>	1.41	1.69	0.00	0.00
<i>Construction ...</i>	17.05	17.17	16.79	13.70
<i>Wholesale &amp; Retail Trade, Restaurants &amp; Hotels ...</i>	19.07	17.47	29.01	12.33
<i>Transport, Storage and Communication ...</i>	6.79	7.05	4.93	9.59
<i>Financing, Insurance, Real Estate &amp; Business Services Community, Social &amp; Personal Services .....</i>	39.00	39.64	35.04	41.10

\*Reference modality

Table 1b shows that, of the 3,755 individuals included in the sample, 60.40% are male and 39.60% female. Of the total amount of individuals who work in the informal

sector, 43.43% of them are female. Approximately 26% of the total persons who work in both sectors are women.

Single persons make up the majority of respondents (39.28%) and those in a common law union come in second (35.42%). Of those working in both sectors, persons in common law relationships comprise the largest number. With regard to ethnicity, approximately the same percentage of persons of African and Indian descent is included in the sample, with a lesser percent being ‘mixed’ (multiracial or biracial individuals). Of the workers in the formal sector the highest percentage is African (40.62%), in the informal sector it is persons of Indian descent (52.55%), and Africans make up the highest percentage (63.01%) of persons working in both sectors.

For ‘Area of Residence’, most of the sample (52.08%) is from sub-urban areas and these persons represent the highest percentages when disaggregated according to sector(s) worked. With regard to the ‘highest level of education attained’, individuals with secondary level education comprise most of the sample. Of the total working in the informal sector, 52.55% have a secondary level education. A little over 85% of the sample work at a fixed location. For persons working in the informal sector, 78.28% are at a fixed location.

The data, disaggregated by sector of activity, reveals that the highest percentage of individuals (39%) is from the services sector. With regard to informal activity, the highest percentage of persons again falls in the services sector (35.04%).

#### 4. Results

The estimated coefficients of the multinomial logit model are presented in Table 2 below:

**Table 2: Multinomial Logit Model Estimates**

<b>Explanatory Variables</b> (modalities of attributes in Italics)	<b>Works Only in the Formal Sector</b>	<b>Works Only in the Informal Sector</b>
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<b>Explanatory Variables</b> (modalities of attributes in Italics)	<b>Works Only in the Formal Sector</b>	<b>Works Only in the Informal Sector</b>
Age	-0.002 (0.013)	-0.007 (0.013)
Sex: <i>Male</i>	-0.902*** (0.314)	-1.105*** (0.328)
Marital Status: <i>Married</i>	-1.155*** (0.445)	-1.235*** (0.470)
<i>Common Law</i>	-1.026*** (0.361)	-1.215*** (0.379)
<i>Separated</i>	-0.621 (0.446)	-0.637 (0.466)
Ethnicity: <i>African</i>	-1.055** (0.419)	-0.849* (0.442)
<i>Indian</i>	-0.239 (0.456)	0.412 (0.475)
Area of Residence: <i>Sub-Urban</i>	0.652** (0.297)	0.796** (0.325)
<i>Rural</i>	0.895** (0.357)	1.104*** (0.384)
Highest Education Level: <i>Secondary</i>	-1.251** (0.625)	-1.517** (0.638)
<i>Vocational</i>	-1.607*** (0.629)	-1.560** (0.643)
<i>Tertiary</i>	-1.521** (0.695)	-3.327*** (-0.766)
Location of Business: <i>Residence</i>	0.941 (0.634)	1.216* (0.690)
<i>Fixed Location</i>	1.260** (0.548)	0.922 (0.608)
Sector of Activity: <i>Agriculture, Hunting, Forestry &amp; Fishing and Mining &amp; Quarrying ..</i>	-21.225*** (0.000)	-1.356 (1.123)
<i>Manufacturing .....</i>	-20.264*** (0.520)	-0.614 (1.125)
<i>Construction .....</i>	-19.812*** (0.476)	0.110 (1.112)
<i>Wholesale &amp; Retail Trade, Restaurants &amp; Hotels ...</i>	-20.189*** (0.493)	0.212 (1.075)
<i>Transport, Storage and Communication ...</i>	-20.018*** (0.585)	-0.518 (1.040)
<i>Financing, Insurance, Real Estate &amp; Business Services Community, Social &amp; Personal Services</i>	-20.185*** (0.408)	-0.244 (1.042)
Constant	25.569*** (1.123)	4.163*** (0.000)
Hausman Test of IIA assumption	8.449 [p=0.982]	0.055 [p=1.000]
Small-Hsiao Test of IIA assumption	16.097 [p=0.711]	9.726 [p=0.982]
No. of Observations	3650	
Likelihood Ratio	250.07 (p=0.000)	

Standard errors in parentheses. p-values in [], \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.  
The base category is “Works both in the Formal and Informal Sectors”.

The Likelihood-Ratio test provides evidence that the overall model is highly acceptable ( $\chi^2$  statistic of 250.07 and associated p-value=0.000). McFadden’s Pseudo- $R^2$  is calculated as 0.07, a value considered ‘conservative’ in studies using the multinomial logit model

(Domencich and McFadden 1975). Two specification tests are used to verify the Independence of Irrelevant Alternatives (IIA) assumption<sup>9</sup>: the one proposed by Hausman and McFadden (1984) and the other by Small and Hsiao (1985). Both tests provide no evidence that the IIA assumption has been violated. The coefficients show the effect of the corresponding attribute's modality, relative to the omitted reference modality, on the probability of selecting any of the two categories (work in the formal sector only and work in the informal sector only) relative to the probability of working both in the formal and informal sectors (the base category). As may be seen in Table 2, the 'age' variable is not significant (so that a person's age does not explain whether or not he or she works in any of the sectors or both). All of the remaining attributes are significant in at least one of its modalities.

The highly significant negative coefficients attached to the 'sex' attribute in both the 'formal sector work only' and 'informal sector work only' categories indicate that women are more likely than men to work in only one sector of the economy, and that men are more likely to work simultaneously in both sectors. This contrasts with the findings of Gerxhani and Schram (2001) and Isachsen and Strom (1980) that males tend to participate more in informal activity alone. But the result obtained here is not totally unexpected since, in Trinidad & Tobago and the wider Caribbean region, there is a high incidence of female-headed households (Lloyd-Evans and Potter 2002 and Barrow 1996) and it could be that females, due mainly to time constraints, are the ones more likely to participate in 'formal sector work only' or 'informal sector work only'. Men may also have higher level skills making the demand for their time higher in both sectors.

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<sup>9</sup> The Independence of Irrelevant Alternatives (IIA) implies that, in a choice between two alternatives, the relative odds of choosing either one should be independent of the presence of a third (irrelevant) alternative (McFadden 1974).

Married persons and those in a 'common law' union are more inclined than 'single' persons to work simultaneously in both the formal and informal sectors, as opposed to working only in either the formal or informal sector (highly significant negative coefficient). This result is similar to that obtained by Anderson (1998) in his study of the informal sector in Mongolia.

Persons of African descent are more inclined to work simultaneously in both the formal and informal sectors than persons who are 'Mixed' (reference modality). Studies that examine ethnicity and the informal sector provide evidence to show that "ethnicity matters" in that it influences the size of the informal sector (Lassen 2003) and earnings in the informal sector (Teilhet-Waldorf and Waldorf 1983).

The results indicate that individuals who live in both 'sub-urban' and 'rural' areas are more likely to work either in the formal or work informal sector than simultaneously in both. This is consistent with findings of Portes and Sassen-Koob (1987) and Sassen-Koob (1989) who both provide evidence that informal activity is likely to emerge in areas where particular industries make up a substantial portion of the regional economy since these industries permit informal activity to thrive. In Trinidad & Tobago, most of the industrial areas (for example, the Point Lisas Industrial Estate) are located in areas which are in rural and sub-urban areas.

Highly significant negative variables provide overwhelming evidence that persons with secondary, vocational and tertiary level education operate in both the formal and informal sector simultaneously, rather than in one only. This is not a surprising result since, in many instances, a person with more skills would find it easy and profitable to operate both in the formal and informal sector, especially when there is a high demand for their

particular skill or area of expertise. This result is comparable to the findings of Stulhofer (1997) who discovered that work in the informal sector increases with the level of education.

Persons who work at a fixed rather than a mobile location tend to be in the formal sector only and those that work in businesses located at their residences (rather than at a mobile location) are likely to work only in the informal sector.

Highly significant, negative coefficients provide evidence that that all persons employed in the various industrial sectors are more likely to perform both formal and informal activities rather than work in the formal sector alone. This is consistent with the findings of Marcelli et al. (1999) and Losby and Edgcomb, (2002) and provides further evidence that any person with a job in the formal sector and with special skills would attempt to operate in the informal sector as well.

The explanatory variables in the Heckman two-stage procedure are age and education (Mincer 1974), as well as other attribute-type variables<sup>10</sup> as shown in Table 3 below where the results for the four Heckman sample selection models (formal sector, informal sector, males working in the informal sector and females working in the informal sector) are presented:

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<sup>10</sup> The attributes 'Marital Status' and 'Location of Business' are here collapsed into binary variables. Marital status is equal to 1 if the individual is in a relationship (married or common-law) and 0 otherwise while Location of Business is equal to 1 if it is a residence and 0 otherwise.

Table 3: Heckman Selection Models - Estimates

Explanatory Variables (modalities of attributes in Italics)	EQUATION							
	Formal Sector		Informal Sector		Informal Sector – Males		Informal Sector – Females	
	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome
Age	-0.026*** (0.001)	0.023*** (0.001)	-0.012*** (0.001)	0.008*** (0.002)	-0.016*** (0.002)	0.020*** (0.002)	0.003 (0.004)	0.008*** (0.003)
Years of Education	0.063*** (0.007)	0.103*** (0.005)	-0.084*** (0.009)	0.064*** (0.013)	-0.058*** (0.012)	0.132*** (0.014)	-0.155*** (0.018)	0.071*** (0.016)
Head of Household: <i>Yes</i>	0.377*** (0.039)							
Marital Status: <i>In a Relationship</i>	0.186*** (0.034)		0.137*** (0.045)		0.352*** (0.053)		0.156** (0.080)	
Location of Business: <i>Residence</i>							1.696*** (0.131)	
Sector of Activity: <i>Manufacturing Sector</i>	0.036 (0.053)							
<i>Electricity and Water</i>	0.709*** (0.150)							
<i>Transport, Storage and Communication</i>	-0.156** (0.068)				0.680*** (0.097)			
<i>Agriculture, Hunting, forestry &amp; fishing and Mining &amp; Quarrying</i>			0.480*** (0.081)		0.271*** (0.097)			
<i>Construction</i>			-0.141** (0.068)		0.094 (0.065)			
<i>Wholesale &amp; Retail Trade, Restaurants &amp; Hotels</i>			0.357*** (0.063)		0.257*** (0.076)		0.761*** (0.123)	
<i>Financing, Insurance, Real Estate &amp; Business Services Community, Social and Personal Services</i>			0.185*** (0.062)				0.418*** (0.117)	
Constant	0.016 (0.089)	6.591*** (0.065)	0.084 (0.120)	6.036*** (0.130)	0.005 (0.150)	6.535*** (0.149)	-0.175 (0.252)	6.200*** (0.206)
Wald $\chi^2$	981.37 (p=0.000)		28.05 (p=0.000)		114.31 (p=0.000)		20.31 (p=0.000)	
Likelihood Ratio Test of Independent Equations	52.14 (p=0.000)		13.46 (p=0.000)		15.14 (p=0.000)		14.06 (p=0.000)	
Observations	5203		5194		2887		1484	

Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\*significant at 1%. The Selection Equations are Probit Models and the Outcome Equations are fitted by OLS with the corresponding wage (log) as the dependent variable.

The Likelihood Ratio Test of Independent Equations provides very strong support for the use of the Heckman two-step selection model on this dataset (p-value close to zero in all cases) as it implies that the use of simple OLS estimations would have produced biased and inconsistent estimators as a result of sample selection bias. The Wald  $\chi^2$  is also highly significant and this indicates that the fit of the overall model is very good.

The results show that all the variables are highly significant, with the exception of the manufacturing sector ‘dummy’ in the formal sector selection equation and the construction sector ‘dummy’ in the informal sector selection (male) equation. The selection equation results show that, for both men and women, being in a relationship and working in the other three sectors of activity play an important role in their decision to work (or not to work) in the informal sector (this was also highlighted in the multinomial logit model).

The coefficients obtained for the outcome equations have the expected signs and the variables were highly significant in all four cases. This suggests that working experience and qualifications are good predictors of the observed wage in both the formal and informal sectors, and for males and females in the informal sector.

The Oaxaca decomposition is used to estimate the informal sector remuneration penalty as well as the gender remuneration penalty in the informal sector and the results are displayed in Table 4 below:

**Table 4: Oaxaca Decomposition for Differences in Wages**

	<b>Informal Sector Remuneration Penalty</b>	<b>Informal Sector Gender Remuneration Penalty</b>
<b>Overall Penalty</b>	1.51951	1.328753
<b>Portion of Penalty due to differences in characteristics:</b>		
Age	-0.0227295	-0.0108148
Education	0.0793674	0.013934
Total	0.056638	0.0031193
<b>Portion of Penalty due to differences in rewards</b>		
Age	0.5878359	0.5090156
Education	0.3143937	0.4883327
Difference in constant term	0.5554961	0.3344371
Total	1.457726	1.331785

The informal sector remuneration penalty amounts to 1.52. Approximately 1.46 of this difference is due to differences in rewards (wage discrimination) and 0.06 is due to differences in characteristics. This suggests that the informal sector workers tend to be

rewarded less than formal sector workers for their experience and qualifications. The difference in rewards is due more to working experience (0.587) than to qualifications (0.314).

The informal sector gender remuneration penalty is measured as 1.33. Once again, almost all of the difference is attributable to wage discrimination. Similarly, participants in the informal sector are rewarded more for working experience than for higher qualification, though the difference this time is not as wide (0.51 compared to 0.49 out of the total of 1.33).

Caution should be used in interpreting these results. The observed gap may be overestimated due to elements that may have been omitted from the wage specifications due to non availability of data (e.g. job motivation), or the division of parental duties between couples in the home, for instance, mothers taking time off from their jobs to rear children resulting in their having less working experience or breaks in their working experience. Or, it could be the case that men work at the higher levels in similar jobs (for example, management positions) and persons in the higher positions are simply paid more than those in lower positions in the hierarchy. Some of these issues could be related to occupational choices that are made at the secondary school level or in the areas that are eventually chosen for specialization. While these points are important and worth mentioning, discrimination may have taken place, not at the remuneration level, but at the hiring and promotion stages.

## **5. Conclusion and Policy Implications**

A multinomial logit model is used to determine the characteristics of informal sector participants and evidence is found that that sex, marital status, ethnicity, education, residential address, location of business and sector of activity are influential in determining informal sector participation. Wage equations are estimated using the Heckman Selection

procedure and the Oaxaca decomposition is then used to examine the wage differential between the formal and informal sectors and males and females in the informal sector.

The results show that there is a penalty for working in the informal, as opposed to the formal sector and that, in the informal sector, a penalty is imposed for being female. The results also show that it is a person's working experience, more than his/her qualifications, that is the important determining component in the differential. In other words, in the informal sector, education is not rewarded in the same way as a person's working experience. The informal sector male-female wage differential also confirms that experience is the main factor contributing to the wage differentials between the sexes in that sector. Notwithstanding the flaws of the decomposition technique, the results indicate quite clearly that discrimination exists. Sometimes it is not necessary that policy intervention takes place at the level at which the discrimination is being observed, but strategies and policies aimed at reducing wage disparities could start as early as when males and females make their career and specialization choices.

As a first step, the findings from this study could form the necessary background analysis that would allow for the formulation of appropriate policies that address the role of females in the informal sector and its implied link to poverty. The findings establish the existence of wage discrimination, but they do not provide precise and detailed answers as to why it is observed. It is highly likely that wage discrimination will exist for some time and, in order to obtain further and more detailed evidence on its structure, it may be necessary to undertake additional investigations involving other research techniques, for example, using data from interviews.

During the past two decades, the structure of employment worldwide has been undergoing significant changes due to factors such as economic development and

globalization. One important characteristic has been increasing informal sector activity, which is generally assumed to be strongly linked to poverty (Baker 1997 and Gafar 1998). It is therefore imperative that researchers and policy makers, in the pursuit of alleviating poverty, develop new ways of conceptualizing, measuring and determining the features and characteristics of the informal sector. The informal sector by its very nature is difficult to target policy-wise because in many cases this sector is sometimes beyond the reach of governments. Participants in this sector may be dynamic and resourceful entrepreneurs who are adept at avoiding regulations and taxes, or they may be very poor and out of the government's policy reach. Further, there exists the question of the relationship between the type of policy and the structure of the informal sector; for instance, if the participants in the informal sector of Trinidad and Tobago consist mainly of individuals engaged in activities aimed at survival, then the policies should be as direct as possible to successfully assist those individuals.

The findings in this study suggest that formulating and implementing policy that are directed to the informal sector and, in particular female participants in this sector, may help in poverty alleviation. However, the link between the informal sector and gender, with its implications for poverty, suggests that there can be no one policy prescription but that policy has to be outlined and structured in such a way as to encompass policy goals, areas and strategies to ensure that the policy process is equitable and effective.

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