

## Understanding Informal sector Employment in Rwanda

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### Abstract

*The objective of this paper is to analyze the informal sector employment with a special focus on Rwanda. For this purpose the paper is built on a theoretical framework to estimate the importance of different variables on informal employment. Using Probability Model we found that covariates; training, education, mode of payment, wage explain the outcome: informality in our model. The paper demonstrates empirically that if the level of education is increased, informality would decrease slightly. Further, results indicate differences in employment status between informal and formal sector. The findings, therefore lead to two main conclusions; education determines individuals' employment in the informal sector and as wages increase, employment in the informal sector reduces. The informal sector employees are the majority youth, for their living, a basis for further policy initiatives on improving the informal sector employment.*

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**JEL Classification:** E24, E26, F63, J21

**Key words:** Informal sector, education, income, informal savings, age, probit

## **1. Introduction**

The Informal sector in Rwanda since 2000 been undergoing a gradual transition towards a growing economy. The informal sector plays an important role in the African economies accounting for a large share of gross domestic product (GDP) and even greater share of employment. A large, unexpected growth of the informal sector would jeopardize the economic stability of developing countries. Their expenditures mostly depend on foreign aids and debts due to unpredictable government revenue through tax collection. Unexpected growth of the informal sector would risk the stability of fiscal policy that depends on government revenue. Continuing growth of the informal sector threatens the private sector that operates formally. When the informal sector grows, it is a burden for firms in the formal private sector and they are the ones paying taxes providing government revenue. Formalization of the informal sector offers various benefits to public and private sector. Economic stability is an important factor helping all economic agents to make effective investment, saving, production, and consumption decision. A drive from the informal sector to a formal sector provides firms to effectively plan for their future investment to expand their business activities.

In addition, formal sector would help governments to make effective policies and activity planning through predictable government revenue. However, establishing formal sector has its own cost as it requires efforts and resources to transform from operating informality. One of the important reasons why people continue operating informally is the lack of tax enforcement capacity of a country. Firms operating informally are less regulated and less taxed than those operating formally. Informality distorts “natural” competitive process as informal firms enjoy “unfair” cost advantage through tax avoidance (Lewis, 2004). Farrell (2004) reported that some informal firms reduce their scale of operation in order to remain undetected by the government which makes them less efficient and Levy (2008) stated that informality is a drag on the development process, because it subsidizes employment in low productive activities. A large informal sector would constrains the structure of labor market in the country and inhibit the quality of employment.

Despite the extensive literature (like Schneider and Enste (2002)) on drivers contributing to the persistence of firms in the informal sector, the importance of individual drivers to the growth of informal sector continues to be a contentious issue. Commonly cited distortions (as in Rectuccion and Rogerson (2008), Guner et al. (2008) and Hsieh and Klenow (2007) might arise because of a large informal sector including distortion of competition, efficiency and the burden on productivity. First, informality distorts the natural competitive process as firms operating in informal sector enjoy an unfair cost advantage through tax avoidance. Secondly,

some informal firms reduce their scale of operation in order to remain undetected by the government, which makes them less efficient. Thirdly, informality is a drag on the development process because it subsidizes employment in less productive activities. An additional cause of informality is the lack of reliable, up-to-date information on supply and demand for labor, unemployment rate, and labor export opportunities. For instance, export of labor is increasingly seen as the most profitable way of global trading, with less capital investment and risks on the part of the sending country and the expectation of high returns in the form of remittances.

The immediate goal of informal sector analysis is to derive information about the significant factors behind informal sector employment. With the use of this information, one would be able to develop recommendation of how to control the evolution of informal sector in an economy. This study seeks to analyze informal and formal sector employment connection in Rwanda. Exploratory data analysis is applied and Linear Probability Model is developed to measure and understand the relative importance of each key factor in explaining the informal sector employment in Rwanda. I use information on employers to probit model informality and understand its structure in Rwanda, and employees' information is used to explore the impact of informal sector on the structure of labour market and quality of employment in Rwanda.

While many studies have examined this information in isolation, it is important to account for contributing factors all together to access any underlying effects. To improve the social well-being of Rwandans, different socio-economic policies have been formulated and the government of Rwanda initiates a process of shifting from subsistence agriculture based economy to a semi-industrialized private sector led service economy. This, however, presents a number of challenges not least of how to raise productivity, providing full and productive employment, and ensuring the poor benefit from economic growth. These problems arise from different forms of distortions that would be caused by the growth of informal sector, which, significantly contribute to the country's GDP with 46% (edition Source de Nil, 2011). Although there is a need of controlling informal sector in Rwanda, the main problematic issue remains to be the provision of reliable, up-to-date information on employment, and production drivers in informal sector.

Generally, it is argued that the informal sector uses labor-intensive technologies. High labour intensity of production is the main reason for large employment generation in the informal sector. There is need to expand upon the earlier studies by analyzing the determinants of informal sector employment in Rwanda using firm level data.in order to bridge these gaps, this paper sets out to explore opportunities for the promotion of the

informal sector in terms of employment generation. The estimation also tests the hypothesis that determinants of informal sector employment are based on what firms offer and individuals. Therefore understanding determinants, characteristics, and lenses in which Rwandan informality can be studied is essential for understanding the dynamics, constraints, and potential of informal sector in quality of employment. This article provides answers to the following questions: what factors determine employment in the informal sector? In particular, how much impact does employment in the informal sector have on the individuals?

## **2. Theoretical Background**

Of the factors considered in this study, the literature on the effects of informal and formal sectors on economic development is extensive (Chen, 2012 and Godfrey, 2011), while the literature on the effects of informal employment in developing countries is much less so. The primary motivation of studying the cause of informality has changed in recent years. Evidence from the recent informality analysis indicates that most of the literatures on informality have focused on understanding the determinants of informality (Anton and Hernandez, 2010).

One of the most important determinants of informality has been the tax enforcement quality often presented in developing countries. The assertion that tax enforcement quality in developing countries contributed to an increase in the informal sector is rooted in the notion that a heavy burden of taxes, bribes, and bureaucratic hassles has driven many producers towards the informal sector (Hernando De Soto 1989). While the responsiveness of the informal sector to achieve a balance between labor supply and employment and productivity is not new, the recent economic growth and resulting labor supply growth experienced in developing countries has brought this issue to the forefront. The informal sector is considered as hindrance for positive economic growth and improving economic policies (Sean Dougherty et al. 2013).

Self-employment remains the predominant type of occupation in many developing countries, where the number of self-employed workers, mainly in informal economy, has often been rising in the recent decades (Kingdon et al; 2006). A positive view on this phenomenon is that the progressive relaxation of credit constraints that were imposed on people has allowed an increasing number of workers to reap the benefits from profitable investment opportunities which they venture in. On the other hand, a growing informal economy could result from the failure to create a sufficiently large industrial sector that provides workers with desirable wage-opportunities (Paolo Falco; 2010).

The informal sector employees (comprising the informal wage labor, self-employed, paid domestic workers, those earning a monthly salary or those working on casual basis), the

formally employed and the unemployed form three main categories of the urban labor market, Sean Dougherty & Octavio Escobar (2013)

The informal sector is highly heterogeneous; Fields' (1990) work characterizes informal employment as easy-entry and Upper-tier (with no contractual obligations). Clusters formulated by Fields disentangle between low productive informal firms and highly productive informal firms. This work exhibited dramatic heterogeneity within sectors formal and informal and even within sub-sectors in terms of productivity. For instance, output gap across both sectors could arise due to differences in labor and physical capital. Hence, differences in technology play a small part in determining the productivity gap among the sectors.

In Rwanda, official economic statistics do not fully record trade by the informal sector, which contributes to a significant proportion of economic activity. By large, informal sector is the major employing sector in Rwanda. Informal sector accounts for 64% of output in industry in Rwanda. However, being informally employed does not automatically mean being poor, of low productivity or excluded from services and social security. In Rwanda as many parts of the world, the informal economy also includes small-scale entrepreneurs who are not poor and have a large capacity for innovation and a large potential to grow. In addition, quite a few working people may actively choose informality to avoid paying taxes and complying with regulations, and also to opt out of social insurance schemes and other public services that they consider low quality.

IPAR's (2010) study identifies three constraints that hamper the development of firms, workers, and untaxed activities in informal sector of Rwanda on one hand; and which ultimately constraint the growth of the economy on the other hand. These constraints include: constrained market (they cannot take government contracts); constrained potentially resource (they can access finance only on the informal market and cannot participate in donor-funded projects); and they are likely to be unable to participate in capacity building program. As many other studies, IPAR's (2010) study outlines high cost of taxes as the main reasons for remaining in informality and the lack of information as the barrier to formalization in Rwanda. The study also identifies the lack of access to finance as the main disadvantage to informality and to give access to finance as the main incentives to formalization. The study recommended that government should disseminate information, revise the social security laws, and improve business support services including access to finance. However, policies to encourage informal sector firms to formalize should hinge on reducing bureaucratic hurdles and at the same time providing incentives to firms to move to the formal sector. IPAR's (2010) study also argues that there has been no specific research into household enterprises in

Rwanda and research on informal sector has failed to include the vast majority of household enterprises in sampling frames or to look at them as a separate type of enterprise from others in the informal sector.

In Rwanda, there have been efforts in integrating women and youth in the employment systems of the country and what is equally important to note is the means deployed to ensure employment of these categories in terms of informal and off-farm employment. Even though, the oldest theories on informal sector show that informal employment limits productivity, and as consequence, economic growth and that informal sector represents a segment which is often associated with less productive jobs, the informal sector is important in many transition countries as well as in some developed economies.

The motivation for this study arises from the trends in unemployment in Rwanda, where formal and informal sector employments have changed significantly. IPAR (2010) stated out that the government of Rwanda's vision 2020 explicitly promotes private sector development, and recognizes the informal sector as a key part of the economy. This is closely linked to the fact that informality has important implications for productivity, economic growth, and inequality of income.

A key message emanating from the works reviewed on informal sector is the importance of many producers in informal sector, clusters and changes in the informal sector structure, and determinants of the informal sector. IPAR (2012) found clear evidence that to lessen the effects of increased unemployment and poverty in Rwanda, the informal economy has to be rapidly developed. The rapid growth of this sector has contributed to partial reduction of unemployment. The 2002 population census shows that craft activities and small retail trade dominate this sector. Regardless it's booming, the major problem in informal sector in Rwanda remains to be the absence or inappropriateness of credit and capacity building policies for quality employment and unfair environment for employee in the sense that firms operating in informal sector are not motivated to contribute to social security to protect their employees. However, the background and context of this study is one where the size of the labor-force has been growing much faster than the rate of growth of formal sector jobs and the fact that both private and informal sectors are expected to play the leading role in employment creation and productivity increase.

### **3. Empirical Design**

#### **3.1 Data sources**

In this study, I decide to use data sets for employees who are mainly employed informally in small and medium enterprises engaged in food processing. Data set for employees consist a sample of 600 respondents. Data were collected across all provinces of Rwanda (East, North,

West and South provinces plus Kigali City). To obtain the whole sample size, 120 respondents were interviewed in each province. The basis for the sample selection was the survey carried out by the National Institute of Statistics for Rwanda in 2011. From this survey, it was easier for me to locate at district level-the informal food processing establishments which helped me generate a sample size to my study. I used a questionnaire that was developed based on the objectives of the study to carry out interviews to the respondents. As our study was focusing on the informally employed, I only interviewed the employees in the food processing establishment without prior information on whether they were formally or informally employed. A team of enumerators was trained on how to undertake the interview exercise with each province allocated five enumerators and a research assistant (Supervisor) in a period of one month (July), 2013. The informal food processing in Rwanda comprises of 30.6 percent according to the National Institute of Statistics for Rwanda (2011) which is second to whole sale and trade that comprises of 54.7 percent and the sample of respondents used in this study is generated from approximately 10 percent of the food processing establishments. However, this study could have possible limitations in terms of the variations in the food establishments since it was based on the national study undertaken in 2011. There could be possibilities that these establishments may have increased or decreased in number.

### **3.2 Methodology**

In order to explain the informal employment in Rwanda, and understand the dynamics, constraints and potential of the informal sector, a probit analysis has been used. Linear Probit analysis has been used as an appropriate model for qualitative data and important tool to analyze many kinds of binomial response experiments in a wide variety of fields. Probit analysis is a specialized regression model of binomial response variable. Probit model imposes linear structure to capture the dependency of outcome on covariate (explained variable on independent variable) as a simple function, particularly when there are several explanatory variables. By doing so, it allows for the identification of model parameters, and also provides parameters' significance (*P*-value) to conclude covariates that significantly explain dynamics in the outcome.

I propose a six-variable linear probit model, whose outcome is informality and covariates which are employment and production factors. For the outcome I created a binary variable and restricted our dependent variable to informality (1) and formality (0). First, employment factors are used to capture the effect of employment dynamics on informality. High education background level, training and special skills reduce the probability of operating informally and make production relatively formal. From the literature I expect wages and age of

employee in the informal sector negatively correlated with informality. To explain the quality of employment in informal sector besides formal sector, I use two categorical variables comparing the quality of employment in informal sector with main domestic competitors and the value added to the product. I expect that due to the lack of capacity building policies for quality employment in informal sector, the lower quality of employment predominate in informal sector.

### 3.3 Estimation strategy

The basic model in (1) is estimated to compute the probability of being in informal sector employment given the configuration of socioeconomic determinants and estimated parameters  $\beta$ .

The LPM presentation is:  $Y_i = \beta_1 + \beta_2 x_{i2} + \dots + \beta_k x_{ik} + \varepsilon_i$  where  $Y_i \in \{0,1\}$  (1)

The main interest is the importance of each covariate in explaining the outcome. Therefore the reduced-form Probability Model based on the LPM is:

$$Y_i = \beta X_i + \varepsilon_i, \text{ and } Y_i = \text{Informality}_i \in \{0, 1\} \quad (2)$$

where  $X_i$  is a set of employment factors as described above, of column vector matrix elements that capture the contemporaneous interaction across the outcome and  $\varepsilon_i$  denotes the error terms which should be independent and normally distributed. The coefficients in  $\beta$  are unknown, and I achieve the recursive structure of the LPM by assuming that not all variables of interest will respond to the variability in the model. To achieve this, I generate coefficients in  $\beta$  and test their significance to explain the outcome variable and then I generate marginal probability effects and test if each of these marginal probability effects equals zero.

### 3.4 Variables description

The dependent variable is informality, which measures the nature of employment of an employee in a food processing establishment or firm. Turning to the explanatory variables, the main distinction between formality and informality has been placed to the employment factors and these are: training, the level of education, the level of special skills for the job employed on, the mode of payment to the employee, age of the employee and wage or benefit derived from being employed in the informal food processing sector.



**Table 1:** Variable description and expected signs of variables

| Dependent Variable    | Description                                       | Regression Model    |
|-----------------------|---------------------------------------------------|---------------------|
| $Y_1$                 | Employed informally                               | 1                   |
| Explanatory Variables | Description                                       | Expected Sign $Y_1$ |
| $X_1$                 | Training attained by the informal employees       | +                   |
| $X_2$                 | Education level of informal employees             | -                   |
| $X_3$                 | Specialized skills in food processing             | +                   |
| $X_4$                 | Mode of payment to the informal employee          | -                   |
| $X_5$                 | Age of the informal employee in the establishment | -                   |
| $X_6$                 | Wage                                              | +                   |

Source: Authors

## 4. Estimation Results and Analysis

### 4.1 Linear Probit Model

I first determine the significance of each covariate to explain the outcome. To examine the significance of each covariate I use LPM. The table below presents the significance of each covariate to explain the outcome. The significance of each covariate helps to verify the influence of each covariate on the outcome as discussed in the methodology section. The empirical results show that level of training, level of education, mode of payment, and employment benefit or profit are the covariates that significantly explain the outcome (informality) in our model.

**Table 2:** Regression and marginal effects results for the informally employed individuals

| Informal        | Coefficients. | Standard Errors | Marginal Effects | Standard Errors |
|-----------------|---------------|-----------------|------------------|-----------------|
| Training        | 1.540*        | 0.204           | 0.226*           | 0.040           |
| Education       | -0.440*       | 0.106           | -0.064*          | 0.016           |
| Special Skills  | 0.106         | 0.203           | 0.015            | 0.030           |
| Mode of payment | 0.273**       | 0.140           | 0.040**          | 0.019           |
| Age of employee | -0.003        | 0.044           | 0.000            | 0.006           |
| Wage            | 0.851*        | 0.173           | 0.125*           | 0.026           |
| _cons           | -2.729*       | 0.555           |                  |                 |
| Number of obs   | 532           |                 |                  |                 |
| LR chi2 (6)     | 186.36        |                 |                  |                 |
| Prob > chi2     | 0.000         |                 |                  |                 |
| Pseudo R2       | 0.402         |                 |                  |                 |

Notes: \*, and \*\*, represent, 1% and 5% levels of significance, respectively.

Source: Authors' calculation

Following the restrictions made on covariate variables in our model, the results of our LPM verify the restrictions on: increase in education level (-), training attained in the employment (+), employment profit (+), mode of payment (+), as set in the methodology, but the results do not verify our restrictions on special skills and age of employee.

The results indicate that training attained on the job is positively significant to the informality, as a number of training tend to make the employee settle for the same job in the informal sector. The level of education has a negative significance on informality. The higher the levels of education by individuals, the lower they are employed in the informal sector. This confirms the finding of Tannuri-Pianto and Pianto (2002) that illiteracy is highly penalized and college education is highly rewarded in the formal sector in Brazil, but they also found that the marginal benefit of elementary education is higher in the informal sector. There is evidence that less educated workers are usually more employed in the informal sector than formal sector mainly due to limited capital in the informal sector. Amaral and Quintin (2006) also attempted to explain why workers in the formal sector are more educated on average. In their model, this result is due to restricted capital financing in the informal sector, making informal firms to substitute low-skilled labor for capital. The mode of payment in the informal sector is significant since the informally employed are either paid on a daily, weekly, or monthly basis. The employees prefer payment of this nature since it matches with that they are not guaranteed of their employment. From the interviews conducted among the respondents, the majority more than 78 percent revealed that they are not sure of their employment status and would therefore wish to be paid weekly for what they have worked for. This confirms the findings of Maloney (2004) who argued (based mostly on evidence from surveys) that most informal workers voluntarily choose informality because of non-pecuniary advantages (for instance, more independence in the case of self-employed workers), which could compensate for lower earnings.

#### **4.2 Marginal effects**

The LPM shows that covariates; Training (\*), Education (\*), Employment (\*), wage(\*) Mode of payment (\*\*), and are statistically significant at 10%, 5%, levels of significance respectively to explain the outcome, informality in our model. Therefore, interest is in explaining the effect of unit change of each statistically significant covariate on the probability P (Informality = 1). This is addressed by computing marginal probability effects based on LPM estimates. Marginal probability effect allocates each variable's single number that expresses the effect of each covariate on Probability (Outcome = 1).

The empirical results show that if Training, Mode of payment, and Employment profit change from zero to one, the probability for outcome informality taking value one increase respectively by 22.6%, 4.0%, and 12.5%. It is only Education that would decrease by 6.4% for the outcome informality taking value one. This emphasizes the negative relationship between education and informality in employment. This implies that formal firms have a greater probability of employing high-skilled workers. Regarding labor markets, while formal

workers usually have access to additional benefits (besides wages), individuals employed in the informal sector are excluded from them. A model based on this observation is presented by Rosen (1986), concluding that earnings should be higher in the less desirable informal sector to compensate the lack of fringe benefits. However, other authors (Carneiro & Henley, 2001; Menezes-Filho, Mendes, & de Almeida, 2004) conjectured that regulations create barriers to entry into the formal labor market, generating wage segmentation, i.e. earnings are higher in the formal labor market for similar workers than those in the informal sector.

The marginal effects of the explanatory variables confirm the regression results which show that education has a negative effect on informal employment whereas training and employment profit indicate a positive effect. The level of education plays an important role in employment either formally or informally. According to interviews, employees with a slight higher level of education would prefer to be formally employed where they ascertain that formal employment provides employment benefits that are nowhere in the informal sector. Furthermore, respondents from interviews indicated that the mode of payment facilitates them attain their wages as they aren't sure of the employment. The majority being casual workers (66%), they are satisfied with the mode of payment which is usually on a weekly basis which coincides with the finding of Fortin, Marceau, and Savard (1997), where their empirical results show that smaller firms operate in the informal sector that pays lower wages.

## **5. Conclusion**

This paper applied a linear probit model to analyze the informal sector employment in Rwanda. The paper identifies informality as a dependent variable. The linear probability model, using informality as the outcome, predicts that employees with lower levels of education predominate in Rwanda's informal sector. This paper demonstrates empirically that if the level of education is increased, the probability of being absorbed into the informal sector would decrease. The empirical results also show that training, wage and mode of payment have positive effects on informality. This predicts that firms operating informally are motivated to pay low wages and on a weekly basis (as per interview results) and that employers in informal sector do recognize trainings provided to informal employees.

According to interviews, even though the government of Rwanda is discouraging informality at significant fraction (74%), insufficient capital (82%) remains to be the main challenges forcing firms to operate informally. The tax avoidance fraction (13%) is small and can be corrigible through the establishment of reasonable tax rates favorable to new businesses with small capital and the implementation of appropriate strategies to the regular registration of new opening small businesses. The insufficient capital is a significant indicator that differentiates between formal and informal in Rwanda. The model provides insights in

the link between informal and formal employment where the latter employees enjoy the benefits of the official employment regulation, and provides for the employment more benefits than in the informal sector. This forms as a basis for increased productivity and ensuring growth of firms more than that in the informal sector.

Based on our empirical analysis, the suggested policies for informal workers are the following:

The main determinant of informal employment is the level of education. Education is the main variable for employment. Improved policies on the levels of education should be given emphasis as better education will drive individuals from being informally employed to formal employment. More so, improvements in the production units of the informal firms will improve the quality of jobs for educated individuals.

Youth employment in the informal sector provides less to the economy in terms of taxes. The majority of individuals employed in the informal sector are the youth, which comprise the highest percentage of Rwanda population. Therefore efforts to create formal employment for the youth would ultimately guarantee income to the economy and improve the welfare of the youth. Policy makers should take special initiatives to ensure that the youth are trained in specific careers that would lead them to the quality jobs they deserve.

The informal sector is a last resort for the poor individuals with less education to earn a living in a poor country like Rwanda, any effort to discourage the production by these firms would increase poverty levels and inequality, generate high rate of unemployment. In addition most of the firms support individuals as their off farm income generating ventures. Therefore, a policy on social security should be developing that would accommodate individuals working in the informal sector.

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