

DETERMINANTS OF INCOME IN THE INFORMAL SECTOR: A CASE OF SELECTED SLUMS IN GHANA

Zogli L.J, Durban University of Technology
Lawa E, Durban University of Technology
Dlamini B.I, Durban University of Technology

ABSTRACT

This paper investigates the determinants of income earned in two informal slum economies in Ghana, using OLS regression analysis. Amongst factors, operator's social networks, locus of control, type of economic activity, educational level, age of business and labour size, it was found that labour size was the main determinant of average daily income in slum activities in Ghana, with a 25% increase in average daily income for every extra person employed. Also, an extra year of experience in running the same business increases income by 10%. This reflects that, a slum operator's continuous operation (learning and earning by doing) over the years, helps to augment income. An extra year of formal education on the other hand only increases daily income by 1%.

Keywords: Slums, Informal Entrepreneur, Income, Labour, Locus of Control.

JEL Classification: JEL O17.

INTRODUCTION

The informal sector in Sub-Saharan Africa plays a crucial role. In such countries like Ghana, where in 2019, only 2% of individuals entering the labour market are absorbed in the formal sector (Ghana Business News, 2019), the informal sector supports the meagre formal sector in preventing the economy from collapsing. However, although the informal sector may aid in short run economic growth, Hassan, (2016) postulates that it cannot lead to long run development due to less productivity. In addition to that, Rothenberg et al, (2016) study in the Indonesian informal sector posit that since these businesses are not registered, they mostly have no desire to expand due to the avoidance of government regulation.

Although these informal operators are assumed to be engaging in such activities solely to avoid government regulation, studies also show that most engage in the sector for financial security and to earn higher incomes (Stephan et al., 2015). These informal operators have been discovered to earn incomes way above the international poverty line (Zogli et al., 2019). For developing economies to reap the benefits from the industry of the informal sector, there is a need for accurate information about the sector's value chain. Hence the aim of this paper is to find out the determinants of income. Knowing the determinants of income will aid policy makers in coming up with programmes that will augment the strengths of these operators while helping them overcome their constraints in a bid to grow and formalise their operations.

LITERATURE REVIEW

Stephan et al. (2015) posit that, amongst others, income generation as one of the major motives for informal sector entrepreneurship. This finding is corroborated by the study of Zogli et al. (2017) which discovered that, quest for higher income is a major motive for starting an informal business. However while operating in the informal sector; there are many factors that determine the level of income earned. In this section, factors such as gender, type of activity industry, level of education, networks, and size of labour, age of business and locus of control are discussed.

In the informal sector, women numerically outnumber men, but although there are more women in the informal sector activities than men, studies in developing countries have found that, female informal workers earn a lot less than males (Sethuraman, 1998; Chen et al., 2005; Chingono, 2012). These authors studied informal sector in developing countries, including Ghana, India, South Africa, Costa Rica, Egypt and El Salvador, concluded that male-dominated informal activities earn higher than female-dominated ones. Figure 1 (Source: Chen et al., (2005)) outlines the average earnings of informal activities based on gender.



FIGURE 1
INFORMAL SECTOR AVERAGE EARNING WITH RESPECT TO GENDER

Figure 1 breaks down informal sector activities into 5 main categories. The category of employers, regular informal wage workers, own account operators, casual and domestic workers and homeworkers. In this categorization, it is seen that earnings are highest in the Employers, who can also be referred to as the entrepreneurs category, which is male dominated. Furthermore, earnings are low in the Homeworkers category which is female dominated (Chen et al., 2005).

One of the main reasons for the low earnings by female informal workers, according some studies, is due to the fact that women have extra responsibility of making a home (Sethuraman, 1998; Nichter & Goldmark, 2009; Ndabeni, 2013). Implications of women's responsibility mean that, women will have to take time off work during crucial times of their pregnancy as well as spend time in doing household chores on a daily basis. This implies that, one's gender can be a determining factor of income levels generated in the informal sector and this theory will be tested in this paper.

Nichter & Goldmark, (2009) further found that education and gender are factors that

influence the income of small scale enterprises in developing countries. Chingono's (2012), study singled out education as a key factor in determining the type of enterprise and incomes earned in the informal sector. According to a World Bank (2012) report, the return on education is low in the informal sector, as many operators in Sub-Saharan Africa are people with low educational levels (Debrah, 2007). Firm age also plays a crucial role in informal sector as older firms seem to peter out and join the formal sector; this is an informal sector experience found in Kenya (Bigsten et al., 2004; Gurtoo & Williams, 2009). This paper introduces firm size as a determinant of income to see how it affects income levels in the selected slums.

Research by Barr, (1998) in Ghana & Jeong's, (2019) study of the Amish Community in Illinois, USA, found that operators with more networks earn more income than those with fewer. Thus, operators who have broad networks which range from family to tribal and religious affiliations tend to earn higher incomes as compared to others who have limited networks. Cornwell, Laumann & Schumm (2008); Al Mamun et al. (2016) agree with the notion that, having diverse social networks helps in income generation as well as business success. Mitra's (2004) study in Indian slums further concludes that, one's social networks determine the type of economic activity one engages in in Indian slums.

Achievement of rewards is crucial to every individual in his or her everyday activities. The main causal factor to this reaction stems from the degree to which individuals attribute rewards to their own efforts as against the thinking that the reward was brought about by factors independent of one's personal actions. Locus of control refers to an individual's opinions and beliefs as to what determines the rewards or outcomes in the individual's life (Rotter, 1966). A person is said to have a high level of internal locus of control when he or she perceives occurrences to be hinged on his or her own actions. On the other hand, a person high in external locus of control perceives occurrences as a result of luck, fate or actions of others. Individuals, who are high in internal locus of control more often than not, establish their own businesses (Rotter 1966; Evans & Leighton, 1989; Bandura 1990) and earn a higher income, according to Piatek & Pinger, (2010); Cobb-Clark, Kassenboehmer & Sinning, (2013). Bridge & O'Neill (2012) postulate the relevance of a personality approach to entrepreneurship. Individual personal traits determine their course of action and it makes some individuals better entrepreneurs as compared to others. A few of these personal traits include locus of control, achievement motivation, self-confidence and creativity. Individuals with these strong personal traits have a higher desire to achieve, hence are motivated to undertake challenging entrepreneurial tasks. Studies in slum activities in Ghana have not investigated the determinants of income. Hence, the current study sought to examine the income determining factors in slum activities in Ghana.

METHODOLOGY

Cross sectional quantitative was data collected with a structured questionnaire. Two biggest slums in Ghana which are Sodom & Gomorrah (S&G) in Accra & Akwatia Line (AL) in Kumasi were surveyed and in total, 344 respondents were interviewed. After the data was coded, Multiple regression analysis was to find out how factors such as type of slum activity industry, level of education, gender, networks, size of labour, age of business and locus of control influence a slum operator's average daily income. The Ordinary Least Square (OLS) regression method is used in the current study. The OLS method seeks to find the line of best fit for a data set by minimizing the sum of squared vertical distances from the fitted line to the observed data points (Gujarati & Porter 2009).

The variables considered for the paper are measured as follows:

Dependent Variable

Average daily income

Respondents were asked to state their average income after meeting all expenses in Ghana Cedes (currency of Ghana).

Independent Variables

Sector

Two economic sectors are considered in the study: services and manufacturing. The sector a slum operator is involved in is introduced into the regression function as a dummy variable, taking a value of 1 if he/she is involved in the manufacturing sector, and 0 if not.

Education

Years of education according to the Ghanaian educational system is rated as follows: 0 year (no schooling), one to six years for primary school, seven to nine years for junior secondary school, 10 to 12 years for senior secondary school and above 13 years for tertiary education.

Gender

The state of a slum operator being a male or female is represented in the regression as a dummy variable. The female group is the reference category.

Networks

The degree of an operator's social connectedness is measured by his/her networks. The degree on connectedness (networks) is measured on a five point Likert scale, with five being very connected and one being poorly connected. The value of networks hence ranges from 1-5.

Size of labour

The size of labour is measured by the number of people a slum operator employs. Labour size is measured as continuous numbers.

Age of business

Age of business represents the number of years the business has been in existence at the time of the survey. Age of business is measured in years.

Locus of control

The Rotter's scale contains 23 questions used in measuring an individual's locus of control. However, literature survey by Lumpkin (1985) indicates that, there is no unanimity on

the number of questions or dimensions one could use for locus of control. Adeyemi-Bello’s (2001) further concluded that 23 items were too many in measuring one construct. Hence, in line with the study of Bugaighis & Schumm (1983), 3 internal locus of control items were chosen from the Rotter’s scale for the current study. The respondents had to rate the variable on a seven- point Likert scale. A respondent’s locus of control score therefore, ranges between the values of 3 and 21. The higher the locus of control score, the higher a respondent’s internal locus of control. On the other hand, the lower the score, the higher a respondent’s external locus of control.

In determining the best model, the stepwise backward regression is used in the study. The dependent variable (income) is log-transformed so it can be interpreted as elasticity, which is consistent with other studies and (Card, 1999; Benoit, 2011).

Model 1 stated as:

$$\text{Ln (Income)} = \beta_0 + \beta_1 (\text{Type of industry}) + \beta_2 (\text{level of Education}) + \beta_3 (\text{Gender}) + \beta_4 (\text{Networks}) + \beta_5 (\text{Size of labour}) + \beta_6 (\text{Age of business}) + \beta_7 (\text{Locus of control}) + \mu$$

ANALYSIS AND DISCUSSION OF RESULTS

In running Model one a Variance Inflation Factor (VIF) test, was undertaken to test for the presence of multicollinearity. The VIF test for multicollinearity, shows tolerance levels higher than 0.1 and VIF coefficients less than 10. The mean VIF of Model one is 1.5 which is less than 10, hence it can be concluded that there is no multicollinearity between the variables (Wooldridge, 2013). In regression analysis, one has to check whether the variances associated with the predicted variables tend to be the same. If the spread of the residuals at each level of the predictor variable is unequal, then the regression is said to suffer from heteroscedasticity. To check for heteroscedasticity, the Breusch-Pagan/Cook-Weisberg test is used. The results of the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity has a p-value of 0.0161, which is less than the critical value of 0.05; hence one rejects the null hypotheses of homoscedasticity and concludes that there is heteroscedasticity present in the data.

The Robust standard errors method is used to correct heteroscedasticity. Hence, a second regression is run. This time, a Robust Backward Elimination Stepwise regression is run using STATA. The Backward Elimination Stepwise regression eliminates insignificant variables, giving us results of only significant variables. Thus, through this stepwise regression, variables such as gender, sector and network have been eliminated from the second analysis.

Model 2 presents results from the Robust Backward Elimination Stepwise regression:

$$\text{Ln Income} = 2.1863 + 0.0098(\text{Age of business}) + 0.0826(\text{Locus of control}) + 0.0225(\text{Size of labour}) + 0.1488(\text{Type of industry})$$

$$t = (20.02)(6.08)(2.59)(3.37)(7.44)$$

Model 2 is adjusted for heteroscedasticity with the robust standard errors method (Table 1).

Table 1 DETERMINANTS OF INCOME IN SLUM ACTIVITIES (REGRESSION RESULTS, MODEL 2)						
Robust						
Ln Income	β	St.	t	p value	VIF	1/VIF

(Independent var)		Error				
Labour size	0.0826	0.0136	6.08	0	1.91	0.525
Education	0.0098	0.0038	2.59	0.01	1.35	0.74
Locus of control	0.0225	0.0067	3.37	0.001	1.53	0.654
Age of business	0.148	0.02	7.44	0	1.41	0.709
Constant	2.1863	0.109	20.02	0		
Mean VIF					1.55	

R-squared = 0.597; F (4,339) = 82.25; Prob > F= 0.0000; Root MSE = 0.2910.

The F test for the overall significance of the model is Prob > F= 0.0000, signifying that the explanatory variables (education, labour, locus of control and age of business) together, have an effect on the dependent variable (Ln Income) with an R^2 of about 60% (Table 1). This implies that the significant explanatory variables together explain about 60% of the variation in the dependent variable, income.

The new model shows that, Ln Income has a positive relationship with labour size, education, locus of control and age of business. Since Ln Income is the log transformed version of income, Ln Income is interpreted as a semi-elasticity.

In terms of labour size ($\beta=0.0826$), the results indicate there will be an 8.3% increase in income if one additional person is hired, holding all the other variables constant. An extra year of education ($\beta=0.009$) increases an operator's income by almost 1%. If locus of control ($\beta = 0.0225$), which Rotter (1966) refers to as the degree to which one attributes rewards to their own efforts or factors independent of one's personal actions, increases by one point, this is likely to increase an operator's income by 2.25%.

The age of the operator's business ($\beta=0.148$), has the highest effect on income, reflecting that, an additional year in business, increases income by about 15%, other variables assumed to be constant.

Residual Analysis

Residual analysis was performed to ascertain the appropriateness of linear regression for the data set. The generated residuals of Model 2 were plotted against the fitted model and individually with the independent variables to see the dispersion.

Firstly, the residuals were plotted with the fitted model (Model two). The scatter plot of the residuals and fitted model (Figure 2) shows fairly dispersed plots around the zero line. The shape of the plot might however suggest that, one of the variables might have a parabolic effect on the model (Gujarati & Porter, 2009).

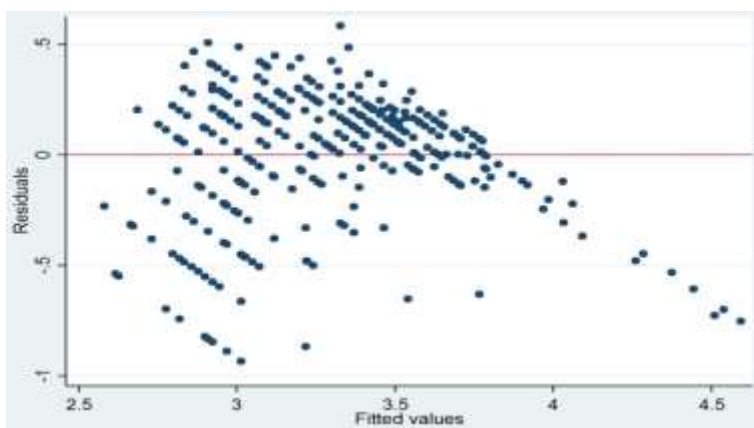


FIGURE 2
SCATTER PLOT OF THE RESIDUALS AND FITTED MODEL 2

Again, the residuals were plotted with the explanatory variables. The residuals plotted against labour size, as an explanatory factor, showed a biased but homoscedastic plot which was parabolic in nature. This is an indication that, labour might have a quadratic effect on the model and needs to be squared. Hence a new regression is run with labour squared to see if the parabolic shape will be corrected. Results of the model are shown in the next section.

New Regression with Labour Squared

The regression is re-run with labour squared and the residual plot drawn. This helps to ascertain if labour does have a quadratic effect on income. Both labour and labour squared are included in the regression to prevent omitted variable bias and misspecification bias.

Table 2						
DETERMINANTS OF INCOME IN SLUM ACTIVITIES (REGRESSION MODEL 3)						
Robust						
Ln Income	β	St. Error	t	p value	VIF	1/VIF
Gender	-0.58	0.03	-1.81	0.071	1.35	0.743
Education	0.01	0.003	3.19	0.002	1.42	0.705
Industry	0.028	0.027	1.1	0.273	1.33	0.743
Work Exp	-0.001	0.003	-0.37	0.708	6.2	0.161
Labour	0.25	0.015	16.34	0	7.78	0.129
Network	0.007	0.02	0.37	0.711	1.32	0.757
Locus	0.01	0.006	1.3	0.195	1.74	0.575

Business age	0.104	0.03	3.35	0.001	6.19	0.162
Labour squared	-0.02	0.002	-10.55	0	5.59	0.179
Constant	2.4	0.125	19.14	0		
Mean VIF					3.38	

R-squared = 0.73; F (9, 334) = 98.27; Prob > F= 0.0000; Root MSE = 0.242

Model Three is stated as:

$$\begin{aligned}
 \text{Ln Income} &= 2.41 + 0.01(\text{Education}) + 0.25(\text{Labour}) + 0.10(\text{Business age}) - \\
 &\quad 0.02(\text{Labour squared}) \\
 t &= (19.14)(3.19)(16.34)(3.35)(-10.55)
 \end{aligned}$$

Model 3 is adjusted for heteroscedasticity with the robust standard errors method. The VIF coefficient for the model shows no signs of multicollinearity as the tolerance levels are higher than 0.1 and VIF coefficients are less than 10, as indicated in Table 2. The residual plots in the Figure 3 show that the scatter plots of residuals versus fitted model three and residuals versus labour squared are no longer parabolic in nature.

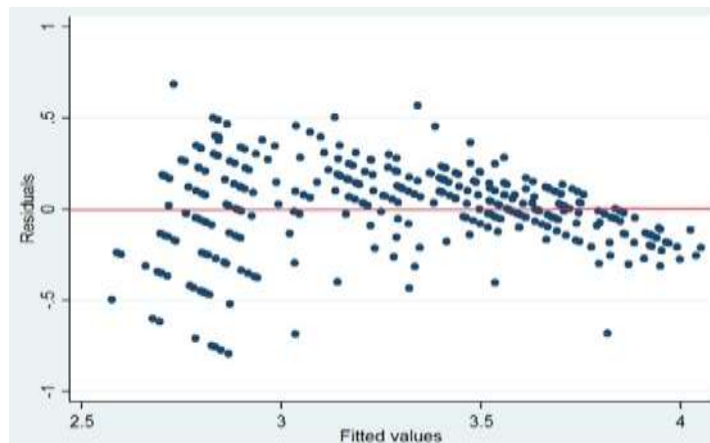


FIGURE 3
SCATTER PLOT OF THE RESIDUALS AND FITTED MODEL 3

Model 3 shows a positive and significant (at 5%) relationship between Ln Income and education ($\beta=0.01$), labour size ($\beta=0.25$), age of business ($\beta=0.104$) and a negative and significant (at 5%) relationship between Ln Income and labour² ($\beta=0.02$). Income can increase by about 1% if an operator achieves an extra year of education. An extra labour hired increases income by 25% up to a certain stage and an additional year in a business’s age contributes about 10.4% increase in income. Labour in the short run experiences the law of diminishing returns, hence the labour squared variable explains that a slum operator’s income will eventually decrease by 2% in the short run as more and more labour is employed. Model 3 therefore

reinforces the law of diminishing returns applied to labour, in that as more labour is employed in the short run, income increases up to a point and then starts to fall.

The R^2 of model three is 73%. This figure is higher than the R^2 model two (60%), showing model three explains the variations in Ln Income better than model two. Hence, one can conclude that Model three is a better fitted model.

CONCLUSION AND RECOMMENDATION

Of all the variables in the model, the most telling determinant of income in the AL and S&G slums is the size of labour employed. According to Gurtoo & Williams, (2009), just a minority of India's informal sector are waged workers, meaning that, most entrepreneurs are own account workers. However, the size of labour employed is an income determinant in the informal sector. This is corroborated by the findings of the current study, as an extra labour employed increases a slum operator's income by 25%. Labour however experiences diminishing returns in the short run. An extra year in a business's age increases income by 10%. Education has a significant impact on income in the slums under study and his result is in line with Chingono's (2012) study in Lesotho's informal sector; singling out education as a key factor in determining incomes earned. On the other hand, the results on education contradict a World Bank (2012) report which postulates that, returns (in terms of income) on skills is low in the informal sector of developing countries.

It is therefore recommended that:

1. Both government and non-governmental agencies should come up with training programmes for slum operators on labour recruitment and retention while they scale their businesses. As size of labour was discovered to positively impact income, training slum operators on how to attract and retain workers will help them grow their businesses.
2. Slum entrepreneurs also need general business training, as education and training was discovered to greatly augment income.
3. Experienced slum operators should come together to form incubator programmes in order to mentor new informal entrepreneurs by passing on operative wisdom to them.
4. A slum operator's gender, locus of control, sector and networks according to literature (Sethuraman, 1998; Cornwell, Laumann, and Schumm, 2008; Nichter and Goldmark, 2009; Chingono, 2012; Cobb-Clark, Kassenboehmer and Sinning, 2013; Ndabeni, 2013) are important determinants of income in the informal sector. However, these variables were found not to be significant in the regression results of this paper. It is therefore suggested that further research, preferably qualitative in nature is carried out to decipher why gender, social capital and personal attributes such as locus of control are not key in determining income earned in Ghanaian slums.

ACKNOWLEDGEMENT

The authors wish to thank all participants and resource persons for their contribution to the conducted study.

REFERENCES

- Adeyemi-Bello, T. (2001). Validating Rotter's (1996) locus of control scale with a sample of not-for-profit leaders. *Management Research News*, 24(7), 25-34.
- Al Mamun, A., Rajend, A., Muniady, L., Permarupa, P.Y., Zainol, N.R.B., Nawi, N.B.C., & Malarvizhi, C.A. (2016). Social capital and entrepreneurial competencies: A study among women micro-entrepreneurs in Malaysia. *The journal of developing areas*, 50(5), 363-370.

- Bandura, A. (1990). Reflections on nonability determinants of competence. In R.J. Sternberg & J. Kolligan, Jr. (eds.), *Competence Considered*. New Haven, CT: Yale University Press
- Benoit, K. (2011). Linear regression models with logarithmic transformations.
- Bigsten, A., Kimuyu, P., & Lundvall, K., (2004). What to do with the informal sector? *Development Policy Review*, 22(6), 701-715.
- Bridge, S., & O'Neill, K. (2012). *Understanding enterprise: entrepreneurship and small business*. Palgrave Macmillan.
- Bugaighis, A., & Schumm, W.R. (1983) Alternative measures of perceived locus of control. *Psychological Reports*, 52(3), 819-823.
- Card, D., (1999). The causal effect of education on earnings. *Handbook of labor economics*, 3, 1801-1863.
- Chen, M., Vanek, J., Lund, F., & Heintz, J. (2005). Progress of the world's women 2005: Women, work and poverty. United Nations Development Fund for Women.
- Chingono, M. (2012). Women, the informal economy and the state: The political economy of gender transformation in Lesotho.
- Cobb-Clark, D.A., Kassenboehmer, S.C., & Sinning, M. (2013). Locus of control and savings. *Ruhr Economic Paper*, (455).
- Cornwell, B., Laumann, E.O., & Schumm, L.P., (2008). The social connectedness of older adults: A national profile. *American Sociological Review*, 73(2), 185-203.
- Debrah, Y.A. (2007). Promoting the informal sector as a source of gainful employment in developing countries: insights from Ghana. *The International Journal of Human Resource Management*, 18(6), 1063-1084.
- Evans, D., & Leighton, L. (1989). Some empirical aspects of entrepreneurship. *The American Economic Review*, 79(3), 519-535.
- Gujarati, D.N., & Porter, D. (2009). *Basic Econometrics* Mc Graw-Hill International Edition.
- Gurtoo, A., & Williams, C.C. (2009). Entrepreneurship and the informal sector: Some lessons from India. *The International Journal of Entrepreneurship and Innovation*, 10(1), 55-62.
- Hassan, H. (2016). Determinants and Effects of the Informal Economy: Bangladesh Perspective. *Development Economics: Macroeconomic Issues in Developing Economies eJournal*.
- Jeong, S. (2019). The role of social capital for Amish entrepreneurs in pursuing informal economic opportunities. *Journal of Amish and Plain Anabaptist Studies*, 1(1), 6.
- Lumpkin, J.R. (1985). Validity of a brief locus of control scale for survey research. *Psychological Reports*, 57(2), 655-659.
- Ndabeni, L. (2013). *The informal sector and the challenges of development in South Africa*. Pretoria: Institute for Economic Research on Innovation, Tshwane University of Technology.
- Nichter, S., & Goldmark, L. (2009). Small firm growth in developing countries. *World development*, 37(9), 1453-1464.
- Piatek, R., & Pinger, P. (2010). Maintaining (locus of) control? Assessing the impact of locus of control on education decisions and wages. *Institute for the Study of Labor (IZA)*, Discussion Paper, 5289.
- Rothenberg, A.D., Gaduh, A., Burger, N.E., Chazali, C., Tjandraningsih, I., Radikun, R., Sutera, C. and Weiland, S., 2016. Rethinking Indonesia's informal sector. *World Development*, 80, 96-113.
- Rotter J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 609.
- Sethuraman, S.V. (1998). *Gender, Informality and Poverty: A global review of gender bias in female informal employment and incomes in developing countries*. Geneva: World Bank.
- Stephan, U., Hart, M., Mickiewicz, T., Drews, C.C. (2015). Understanding motivations for entrepreneurship. BIS Research Paper 212
- Wooldridge, J. (2013). *Introductory econometrics: A modern approach* (5th Edition). South Western, Cengage Learning.
- World Bank (2012). *World development report 2012; Gender Equality and Development*. Washington DC: World Bank.
- Zogli L.J. (2017). *Informal economic activities in Ghana: A case study of slums in Kumasi and Accra*. (Unpublished doctoral dissertation). University of KwaZulu Natal, South Africa.
- Zogli, L.J., Lawa, E., Dlamini, B., & Kabange, M. (2019). Exploring the Motives for Operating in Ghana's Informal Slum Sector', *Acta Universitatis Danubius. Economica*, 15 (6).