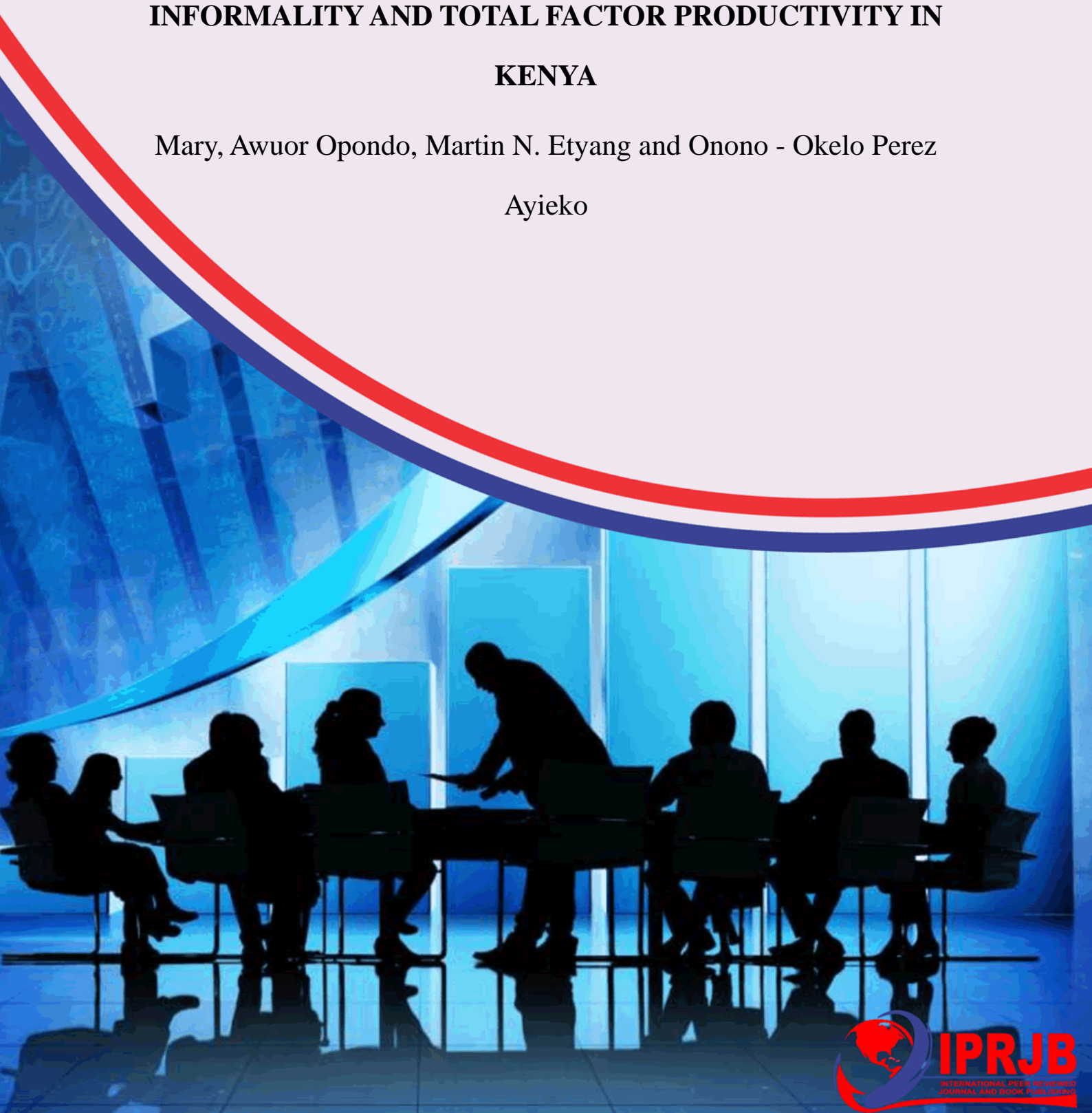


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INFORMALITY AND TOTAL FACTOR PRODUCTIVITY IN KENYA

Mary, Awuor Opondo, Martin N. Etyang and Onono - Okelo Perez

Ayieko



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^{1*} Mary, Awuor Opondo

Post Graduate Student: Kenyatta University

*Corresponding Author's E-mail: mawuor2003@yahoo.com

² Martin N. Etyang

School of Economics, Kenyatta University, P. O. Box 43844-00100

³ Onono - Okelo Perez Ayieko

School of Economics, Kenyatta University, P. O. Box 43844-00100

Abstract

Purpose: The Kenyan economy is largely informal. The objective of the study was to establish the effect of size of the informal sector on total factor productivity in the country.

Methodology: The study was based on the dualist theory of the economy. Data covering the period 1974 to 2016 was sourced from government publications (Economic Surveys and Statistical Abstracts), the Global Financial Development Database and the World Development Indicators. A growth accounting exercise was conducted using the Cobb-Douglas production function based on the Solow growth model. This enabled the decomposition of output growth to the contributions of labour and capital with a residual, commonly referred to as the total factor productivity which was the dependent variable in the study. The study was non-experimental and utilized a longitudinal research design using macro-level data thus limiting the possibility of data manipulation. Various theoretically and empirically recognized determinants on TFP were included as control variables. The analysis was conducted using ordinary least squares.

Findings: The findings show that the size of the informal sector has a negative and statistically significant effect on total factor productivity in Kenya. Given the large informal sector, the study concluded that there is need to increase productivity of the sector in the country for improved economic performance.

Unique contribution to theory, practice and policy: From the study findings, the informal sector has a negative and statistically significant effect on total factor productivity in Kenya. The study recommends the development and implementation of policies to enhance productivity in the sector. These include market and technological development, improved infrastructure and access to credit facilities.

Key Words: *Informal Sector, Total Factor Productivity (TFP), Economic Growth*

INTRODUCTION

The existence of the informal sector has been explained by the dualist, structuralist and legalist theories. The dualists led by Harris and Todaro (1970); and Lewis (1954) and Kuznets (1955), state that the economy is by nature composed of the rural/ informal, and urban/ formal sectors which co-exist and serve different market segments (Todaro & Smith, 2015); while the structuralists led by Alexandro Portes and Caroline Moser say that the informal sector is composed of small firms which serve large firms in the formal sector (Chen, 2012). The large firms source the services of small informal firms to keep operating costs low and maximize profit. The legalists pioneered by Hernando de Soto in the 1980s and 1990s view the sector as being comprised of micro-enterprises which operate informally to avoid state detection and the costs of formalization (Chen, 2012). The existence of the informal sector in Kenya can be explained by all the three theories.

The traditional informal sector was defined at the International Conference of Labour Statisticians (ILCS) conferences in 2003 and 1993 based on the characteristics of the sector which include small scale of operation, low levels of organization, labour intensive and the use of locally available resources (Chen, 2012). However, structural changes in the labour market in many countries have resulted in increased informalization of previously formal employment opportunities creating work that has no social or legal protection commonly referred to as casual or informal employment. The informal sector is therefore composed of workers in the informal sector and in informal employment in the formal sector (Chen, 2012).

The sector contributes to economic development through the generation of employment, income and output. It facilitates increased resource utilization, entrepreneurship, research leading to inventions and innovations, and investment without the hindrance of formal costs. The contribution of the sector to total output in the developing and developed countries is one third and between 10 to 20 per cent, respectively (Benjamin, Beegle, Recanatini, & Santini, 2014). Additionally, the sector provides employment to 72 per cent of non-agricultural workforce in Sub-Saharan Africa; 65 per cent in Asia; 51 per cent in Latin America, and 48 per cent in North Africa (Benjamin et al, 2014). In Africa, the sector provides 90 per cent of new employment opportunities and 20 per cent to 80 per cent of gross domestic product – GDP (Steel and Snodgrass, 2008).

Theories of economic growth state that output growth in an economy depends on the accumulation of capital and labour as modelled in the general production function. However, according to the Solow growth model, the two inputs do not fully explain output growth (Romer, 2012). The residual growth has been attributed to factor productivity, commonly referred to as total factor productivity (TFP). The endogenous growth models state that TFP is dependent on knowledge and technological progress, access to financial services, skill and education of the workforce, the availability of and quality of infrastructure, strength of property rights and institutional development, cultural attitude towards work and geographical and climatic conditions (Romer, 2012). Economic growth is in the present day

largely attributed to productivity growth as opposed to factor accumulation (Park, 2012; Kim & Park (2017).

According to Houghton (2012), total factor productivity contributed between 1 and 3 percent of GDP growth in the developed countries and 6 percent for other nations in the Organisation of Economic Co-operation and Development (OECD) between 1985 and 2006. Yalsinkaya et al, (2017) found that TFP explained 81.71 percent and 55.55 percent of variations in GDP in developed and rapidly developing economies, respectively over the period 1992 to 2014. Park (2012) in analyzing sources of economic growth in The Newly Industrialized East Asian countries (NIEs) of Hong Kong, Singapore, Korea and Taiwan found that TFP contributed 23.6 percent, 9.7 percent, 29.5 percent and 23.5 percent of GDP growth, respectively over the period 1970 to 2000; and 39.2 percent, 24.1 percent, 39.4 percent and 12.0 percent between 2000 and 2007. Kalio et al, 2012 found that TFP accounted for 3.6 percent of GDP growth in Kenya while capital and labour accumulation accounted for 71.4 percent and 25 percent, respectively. However, the period covered in the study was not indicated. Hammouda et al, (2010) found that TFP accounted for -0.07 percent of the average GDP growth of 2.89 percent over the period 1981 to 2000 in Kenya; while Opondo et al, (2020) found the contribution of TFP to output growth in Kenya from 1974 to 2016 as 0.482 percent with an average GDP growth rate of 2.96 percent.

The informal sector employs 84 per cent of the total work force in Kenya (Republic of Kenya, 2019). Most firms in the sector are small-scale with 92.2 per cent of the enterprises employing between 1 to 9 workers (World Bank, 2016), and 70 per cent being own account firms (Republic of Kenya, 1999). Theoretical literature and empirical studies have established a positive relationship between firm size and productivity (Bento & Restuccia, 2014; Bigsten, Kimuyu & Söderbom, 2010; Lee, Kim, Park & Sanidas, 2010; Taymaz, 2009). Small firms were found to be labour-intensive, employing poor and outdated technology with limited access to credit, infrastructure and markets. The firms are inefficient as they do not enjoy the benefits of economies of scale and lack skilled manpower, have low levels of investment and face unsophisticated demand. Informal firms do not comply to government regulations hence do not remit tax. This reduces government revenue thus restricts state ability to provide public infrastructure and crowds the existing facilities which are important for increased productivity. Additionally, informal firms in Kenya face financial constraints which hinder investment, research and innovation; and have limited access to external markets, technology and information (Bigsten, Kimuyu, & Söderbom, 2010). According to World Bank (2016), labour productivity in the sector in five regions in Kenya (Nairobi, Mombasa, Nyanza, Central and Nakuru) was lower than that of labour engaged in the formal sector.

Studies on the determinants of TFP in Kenya include Kalio, Mutenyi and Owuor (2012) who analysed the effects of institutions, terms of trade, human capital and openness on TFP in Kenya between 1970 and 2003; Hammouda, Karingi, Njuguna, and Jallab (2010) who studied the relationship between economic growth, total factor productivity and export

diversification in Africa using panel data from 35 countries from 1981 to 2000; and Oduor and Khainga (2010) who analyzed the implication of economic policy on total factor productivity in Kenya from 1982 to 2006. Kenya has a dual labour market composed of formal and informal labour with wide differences in firm and labour productivity which by taking labour as one component was not considered in the studies. This study adds to the literature on TFP in the country by investigating the effect of the informal sector on total factor productivity.

STATEMENT OF THE PROBLEM

The informal sector in Kenya employed 95.4 thousand workers (19 per cent of the total labour force) in 1973 and 13.4 million workers (84 per cent) in 2016. The sector accounted for 92.2 per cent of all new employment opportunities in the country in 2016 (Republic of Kenya, 2019). The 1972 ILO study on the labour market in Kenya noted the employment, output and income generating potential of the sector. These are the policy objectives for the development of the sector in the country. Given its' size, the sector is pivotal in the achievement of the country's macro-economic goals of increased economic growth of 10 per cent per year and a reduction in poverty rates from 46 percent in 2008 to 28 per cent by the year 2030.

Despite the increase in the size of the informal sector, total factor productivity estimated from a preliminary growth accounting exercise was found to be largely negative over the study period. This finding is shared by Kalio et al (2012), Hammouda et al (2010) and Oduor and Khainga (2010). However, positive effects were recorded over the periods 1976-77, 1980-81, 1986, 1996,2006, 2009-2011 and 2014 – 2016.

Studies on the informal sector in Kenya largely address hindrances to firm growth (Kimenyi, Mwega & Ndungu, 2016; Akoten, 2006; Omolo & Omiti, 2005; Ongile & McCormick, 1997); and firm productivity (Bigsten et al, 2010, 2004, 2000); while studies on the determinants of TFP in the country which include Kalio et al (2012), Hammouda et al (2010), Oduor and Khainga (2010) and Onjala (2002) have not considered the effect of the informal sector. Given the dominance of the sector, there is a need to understand the effect of the size of the sector on total productivity in the country. This study therefore sought to determine the effect of the informal sector on total factor productivity in Kenya.

LITERATURE REVIEW

Theoretical Framework

The Kenyan economy is dual where both the formal and informal sectors co-exist. According to the dualist theory of the economy pioneered by Arthur Lewis in the 1950's and Harris and Todaro (1970), the economy is composed of the rural and urban sectors (Todaro & Smith, 2015; Harris & Todaro, 1970). The analysis is also applied to urban economies where the formal and informal sectors co-exist (Todaro & Smith, 2015; Fields, 2007; Khan, 2007). The formal sector is capital-intensive with large-scale production, while the informal sector is

labour-intensive and production is small-scale (Todaro & Smith, 2015). In Kenya as in most developing countries, economic changes arising from globalization and increased competition have resulted in a reduction in the rate of growth of formal employment and seen an increase in informal employment. This is worsened by the existence of a labour force that is largely composed of low skilled and poorly educated workers who are not able to secure high paying formal employment (Omolo, 2010). The informal sector accounts for 84 percent of total employment in Kenya.

Empirical Review

Informal sector firms in Kenya are predominantly small. According to the Micro, Small and Medium Enterprises (MSME) Survey Basic Report of 2016 (Republic of Kenya, 2016) and the World Bank (2016) report on Informal Enterprises in Kenya, 90 percent and 92.2 percent of the MSEs in the country employ between 1 to 9 workers with most being own account firms. Empirical studies conducted to establish the relationship between firm size and productivity include Biesebroeke (2005) who investigated the effect of firm size on productivity in nine Sub-Saharan African countries which included Kenya, Zambia, Tanzania, Ethiopia, Burundi, Zimbabwe, Ghana, Cameroon and Cote d'Ivoire using descriptive analysis of firm characteristics between 1992 and 1996. The study sample was composed of both formal and informal firms with firm size measured by the number of employees and productivity measured by labour productivity and total factor productivity. 200 firms were selected from each country using stratified sampling based on firm size and then geographic location. From the study findings, many firms in developing countries are either micro or small sized which have high employment creation potential. However, the firms were found to be less productive than large firms employing 100 or more workers and that large firms have higher growth potential with significantly higher total factor productivity attributed to access to external markets and finance.

Taymaz (2009) studied the causes of productivity differentials between formal and informal firms in Turkey using firm-level and individual-level analysis. Firm-level analysis was done using switching regression models based on a Cobb Douglas production function, and matching propensity scores, while individual-level analysis was done by using a multinomial selection model to compare wage differentials between the formal and informal employees. Among the causes of low productivity in informal firms sighted include the size of the firms which are usually small hindering the exploitation of economies of scale, use of poor and outdated technology, lack of credit, and poor access to markets and social infrastructure.

Bigsten et al (2010) acknowledged the importance of the informal sector in Kenya but observed that due to low private and public investment and technological limitation, the firms remain small and are unable to enjoy economies of scale which limits their contribution to output and income. The failure to grow was also attributed to their inability to produce competitive products and penetrate the export market, indivisibility of capital goods, financial constraints, lack of adequate skilled manpower, poor physical and information infrastructure

that hinders information flow and successful innovation, and low unsophisticated demand.

Lee et al (2010) conducted a study of the impact of big firms on economic performance based on global data on the largest companies in the world from 1994 to 2005 using annual sales and market capitalization as benchmarks. Using dynamic panel data and regression residuals, the study regressed the number of large firms against GDP, and per capita GDP while controlling for the rate of investment, human capital formation and population growth. The study found that large firms have a positive effect on economic growth. This was attributed to economies of scale in production, increased market sizes, and the ability of large firms to compete in an increasingly global business environment and to engage in Research and Development (R & D). Additionally, through linkages with small firms, large firms improve efficiency in small firm production.

Informal sector firms in Kenya as already observed are small in size (Republic of Kenya, 1999: 2005: 2016; Kimenyi et al, 2016). The low productivity has been explained by the use of outdated technology, low levels of skill among the workers, lack of credit facilities and low investment, poor social infrastructure and inability to enjoy economies of scale which are constraints faced by firms in the informal sector in Kenya (Republic of Kenya, 2016; World Bank, 2016).

METHODOLOGY

Conceptual Framework

Acknowledging the existence of a dual economy where the formal and informal sectors coexist, the study decomposed total national employment into formal and informal in order to assess the contribution of the informal sector, the formal sector, capital and total factor productivity to output growth. While Leung et al (2008) used the value of sales per employee as a measure of labour productivity, this study used the average annual real wage in the informal sector as an indicator of labour productivity in the sector following the classical assumption that workers are paid in line with their marginal productivity.

The study used the standard theory of production which shows the relationship between inputs (capital and labour) and output, and is frequently used in growth accounting (Romer, 2012). Capital stock was estimated from gross fixed capital formation using the Perpetual Inventory Method (PIM) following Berlemann and Wesselhoft (2012). The Solow growth model (Solow, 1956) which allows the isolation of the contributions of various factor inputs to output growth was adopted in the analysis. According to the model, economic growth at any given time period $Y(t)$, is determined by the amount of capital employed $K(t)$, the amount of labour employed $L(t)$, and labour effectiveness $A(t)$. (Romer, 2012; Solow, 1956) expressed as:

$$Y(t) = F[K(t), A(t)L(t)] \quad (3.1)$$

Advancement in technology can influence output through labour thus be labour-augmenting or Harrod-neutral as presented in equation (3.1); through capital hence capital-augmenting as presented in equation (3.2), or be Hicks-neutral where it is transmitted through both labour and capital, affecting the productivity of both factor inputs - equation (3.3) (Romer, 2012).

$$Y(t) = F[A(t)K(t), L(t)] \quad (3.2)$$

$$Y(t) = F\{A(t)[K(t), L(t)]\} \quad (3.3)$$

Kuuya (2003), in a study on the adoption of adapted technology in Kenya's informal sector found that the informal sector in the country also uses technology. The study therefore assumed Hicks-neutral production function as presented in equation (3.3) to isolate the contribution of TFP to output growth.

The study adopted the Cobb-Douglas production function and assumed constant returns to scale following Euler's theorem which states that the production function is homogenous of degree one (Greene, 2012), and other growth accounting studies for the country (Hammouda et al, 2010; Oduor & Khainga, 2010; and Njuguna, Karingi & Kimenyi, 2005). The specific production function is therefore presented as:

$$Y(t) = A(t)K(t)^\alpha L(t)^\beta \quad (3.4)$$

Where the parameters α and β , are the elasticities of output with respect to capital, and to labour. The function was transformed into log-linear form as expressed in equation (3.5) and estimated using ordinary least squares (OLS) to obtain the corresponding elasticities. TFP was then estimated as a residual from the growth accounting equation (3.7).

TFP has been explained by endogenous growth models which include the Romer and the Lucas (1988) growth models. The models attribute TFP to the level of education and skill of the worker (human capital); finance; technological progress; the degree of openness; cultural attitude towards work and entrepreneurship; the quality of physical infrastructure; social infrastructure which includes policies, institutional development, strength of property rights and corruption; geography and climate (Romer, 2012). An increase in social and institutional requirements breeds rent-seeking behavior. The higher the number of rent-seekers, the more time producers devote to protection of their investments which reduces productivity. An increase in human capital, improvement of social infrastructure and reduction of rent-seeking behavior will all have positive effects on productivity (Romer, 2012). The large informal sector in Kenya has been attributed to the retrogressive nature of all the three factors in the

country (Republic of Kenya, 2008b: 2005: 2003: 1997: 1992; 1986).

According to the dualist theory of the economy, worker productivity in the informal sector is lower than in the formal sector as the workers have low levels of education, are unskilled, with limited financial capital (Todaro & Smith, 2015). Assuming that labour is paid in line with its marginal productivity and following efficiency-wage theories, increased wages attract workers (Romer, 202). The informal sector wage was therefore used both as an indicator of worker productivity and of variations in the number of workers engaged in the informal sector in the country.

Empirical Model

The production function as presented in equation (3.4) was first linearized (equation 3.5), and estimated using ordinary least squares while assuming constant returns to scale.

$$\text{Log } Y = \text{Log } A + \alpha \text{Log } K + \beta \text{Log } L \quad (3.5)$$

The output growth equation (3.5) was differentiated with respect to time as shown in equation (3.6).

$$\frac{\partial \text{Log } Y}{\partial t} = \frac{\partial \text{Log } A}{\partial t} + \alpha \frac{\partial \text{Log } K}{\partial t} + \beta \frac{\partial \text{Log } L}{\partial t} \quad (3.6)$$

The above equation can also be presented as:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \alpha \frac{\dot{K}}{K} + \beta_1 \frac{\dot{L}_F}{L_F} + \beta_2 \frac{\dot{L}_I}{L_I} \quad (3.7)$$

Where: $\frac{\dot{Y}}{Y} = \frac{Y_t - Y_{(t-1)}}{Y_{(t-1)}} ; \frac{\dot{K}}{K} = \frac{K_t - K_{(t-1)}}{K_{(t-1)}} ; \text{ and } \frac{\dot{L}}{L} = \frac{L_t - L_{(t-1)}}{L_{(t-1)}}$

are annual growth rate in factor inputs

Equation (3.7) states that the growth in output is a weighted summation of the effect of growth in the capital and labour with a residual attributed to TFP which was estimated as presented in equation (3.8).

$$\frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \alpha \frac{\dot{K}}{K} - \beta_1 \frac{\dot{L}_F}{L_F} - \beta_2 \frac{\dot{L}_I}{L_I} \quad (3.8)$$

The choice of explanatory variables was guided by theoretical and empirical literature.

Worker productivity is higher in the formal than in the informal sector (Todaro & Smith, 2015). The yearly growth rate in real average annual earnings of labour in the informal sector was used as an indicator of growth in the size of the sector and worker productivity. Assuming a perfectly competitive labour market, wages are determined by the forces of demand and supply of labour, and the workers are paid according to their marginal productivity (Romer 2012; Davis & Sanchez-Martinez, 2015). The efficiency-wage theories link wages to worker productivity explaining that higher wages attract good quality workers, facilitate good nutrition, improve worker effort, and win their loyalty resulting in improved worker productivity (Romer 2012).

Additional variables used as determinants of TFP in the study were human capital which according to the endogenous growth theory determines worker effectiveness (Romer, 2012); and openness which affects the level of trade, specialization, skill and technology transfer (Romer, 2012) following Hammouda et al (2010) and Kalio et al (2012); financial deepening (ratio of M3 to GDP) as an indicator of financial development which determines economic growth and economic stability (Cihak, Demirguc-Kunt, & Levine, 2012) following (Nachega & Fontaine, 2006; Hammouda et al, 2010; Oduor & Khainga, 2010); and conflict (Hammouda et al, 2010). This study used the secondary school enrollment as a measure of human capital following Kalio et al (2012) and Hammouda et al (2010). International trade which has been referred to as market orientation in Romer (2012) facilitates transfer of skills, knowledge and technology, economies of scale and improved competition thus impacts TFP. This was measured by the extent of openness using the proportion of exports and imports to GDP following Kalio et al (2012), Hammouda et al (2010), and Oduor and Khainga, (2010).

The following econometric model was estimated.

$$TFP = \beta_0 + \beta_1 W_{IS} + \beta_2 HCAP + \beta_3 OPEN + \beta_4 PR + \beta_5 INFL + \beta_6 LR + \beta_7 FIN + \beta_8 FDI + \beta_9 DTECH + \beta_{10} LEXP + \beta_{11} CONF + \varepsilon_t \quad (3.9)$$

Where:

TFP is total factor productivity

W_{IS} is the annual growth rate in real wages in the informal sector

$HCAP$ is human capital

$OPEN$ is the degree of openness

PR is passable roads

$INFL$ is the annual rate of inflation

LR is the lending rate

FIN is financial deepening

FDI is foreign direct investment

DTECH is digital technology (digital money)

LEXP is life expectancy

CONF is conflict

β_s are the parameters and ε_t is the regression error term.

FINDINGS AND DISCUSSIONS

A set of two variants of the model corresponding to equation (3.9) were estimated. The first variant was estimated with all the explanatory variables as specified in equation (3.9). The model had low explanatory power (R-squared of 0.0194) and was not statistically significant. Additionally, only four of the eleven explanatory variables were found to be statistically significant pointing at possible multi-collinearity. To check for multi-collinearity each of the explanatory variables were regressed against the others. Passable roads had the highest correlation with R-squared of 0.879. The variable was omitted and the second variant estimated. The model had good explanatory power (R-squared of 0.7752) and was statistically significant.

To test for conformity to the classical linear regression model assumptions, the model was subjected to various diagnostic tests. The test results are presented in Table 1.

Table 1: Results of Residual Diagnostic Tests for TFP

Test	F-Statistic	P-value
Jarque-Bera	0.3303	0.8477
Breusch-Godfrey Serial Correlation LM	0.4202	0.5344
Breusch-Pagan-Godfrey	3.9272	0.0098

Source: Author's Computation

The model was found to be free of serial correlation with normally distributed regression residuals, however, as the Breusch-Pagan-Godfrey test had a p-value of 0.0098 the model was found to be heteroskedastic. The estimated coefficients though unbiased and consistent were inefficient (Greene, 2012). The model was then re-estimated using robust least squares (RLS) which gives accurate estimates even in the presence of heteroscedasticity (Atkinson,

Riani & Torti, 2016). The results are presented in Table 2.

Table 2: Results for the Effect of the Informal Sector on TFP (RLS)

Dependent Variable: Total Factor Productivity			
Variable	Coefficient	Standard Error	P-value
Constant	-13.6096	9.4600	0.1503
Informal sector wage (growth rate)	-6.6940**	3.1434	0.0332
Life expectancy	0.1752	0.1381	0.2047
Human capital (growth rate)	-2.8283*	1.6063	0.0783
Openness	0.1948***	0.0487	0.0001
Inflation rate	-0.2679***	0.0497	0.0000
Lending rate	0.2336***	0.0724	0.0013
Financial deepening	-0.2576***	0.0964	0.0075
Foreign Direct Investment	1.7999***	0.5445	0.0009
Digital technology	0.0111	0.0084	0.1863
Conflict	-1.2025	0.8787	0.1712
Dummy capturing economic boom	4.8275***	0.7606	0.0000
Dummy capturing economic recession	-4.3065***	0.8502	0.0000
<i>Adjusted R-Squared</i>	0.8837		
<i>Prob. Rn Statistic</i>	0.00000		

NB: *** Significant at 1 %, ** Significant at 5 %, * Significant at 10 %

Source: Author's Computation

The estimated coefficient for the growth in the average annual real wage in the informal sector was -6.694 and statistically significant at the five percent level of significance. An increase in the rate of growth of the informal sector by one percent as measured by the rate of growth in the average real wage causes a reduction in TFP by 6.694 percent. This is consistent with theoretical literature (Todaro & Smith, 2015; Romer, 2012) and empirical findings of other country studies (Bento & Restuccia, 2014; Taymaz, 2009; Elbadawi & Loayza, 2008; Cimoli, Primi & Pugno, 2006). According to the *efficiency-wage* models, workers are attracted by high wages (Romer, 2012) so that the increase in the rate of growth of informal sector wages causes more workers to join the sector. However, the increase in the size of the sector compromises total factor productivity in the economy. This can be explained by the small size of firms in the sector which limits firm productivity and compromises efficiency. Additionally, the fact that most firms in the sector do not pay tax crowds public infrastructure. Cimoli *et al* (2006) using the *efficiency-wage* theory attributed the reduction in output growth in Latin America from 1990 to 2000 to a growing informal sector, where workers were attracted by increasing wages, but total productivity and economic growth was compromised due to the inefficiency inherent in the sector. Elbadawi and Loayza (2008) found that informal firms operate sub-optimally to avoid state detection

and minimize operation costs. This results in resource misallocation, increased inefficiency and prevents the sector from enjoying the advantages of formalization which include state protection, formal credit and access to markets. Bigsten *et al* (2004) in a study of the implication of the size of the informal sector on economic growth in Kenya found that the productivity of the sector was lower than of the formal sector, implying that the growth of the sector compromises total factor productivity in the country.

Other variables that were found to have a negative and statistically significant effect on TFP in Kenya include the rate of growth in human capital (-2.8283), inflation (-0.2679) and financial deepening (-0.2576). Kenya has experienced a large increase in human capital measured by secondary school enrollment in this study. However, the negative effect which concurs with the findings of Hammouda *et al* (2010) and Oduor and Khainga (2010) point to a possible mis-match between the imparted skills and education, and the quality of labour that the country needs for improved TFP and economic growth (Oduor & Khainga, 2010). Though the rate of growth in enrollment has increased, the quality, therefore productivity of the workforce in the country has reduced. The estimated coefficient for inflation was -0.2679. A one percent change in the rate of inflation results in a 0.2679 percent change in TFP in Kenya in the opposite direction which was statistically significant at the one percent level. This finding is in line with theoretical literature. High inflation erodes purchasing power reducing aggregate demand and output as explained in the inflation-output trade-off (Romer, 2012). Inflation also creates uncertainty and increases both transaction and input costs which discourage investment. The study findings concur with those of Oduor and Khainga (2010) where inflation was found to have a negative, though insignificant effect on TFP in Kenya. Inflation is an indicator of macroeconomic stability so that increased macroeconomic instability results in a reduction in TFP in the country.

The estimated coefficient for financial deepening was -0.2576 and statistically significant at the one percent level of significance. This implies that increased monetization of the economy results in a reduction in TFP in Kenya which is contrary to theoretical expectation. Improvements in the financial sector boost TFP by reducing transaction costs, improving the speed and reliability of transactions in the economy; and increases the level of investment, research and innovation in an economy by linking savers and investors. The result casts doubt on the value of the transactions. It is possible that the increase is largely composed of low value transactions. However, these findings concur with those of Hammouda *et al* (2010), and Oduor and Khainga (2010) who analyzed the mediatory role of the sector. Hammouda *et al* (2010) used the domestic credit by the banking sector as a percentage of GDP while Oduor and Khainga (2012) used the interest rate spread where wide margins indicate an inefficient financial sector. Both studies found a negative but insignificant relationship. This negative relationship was explained by Hammouda *et al* (2010) as resulting from a failure of the financial sector to channel resources to the productive sector, limited investment opportunities, and the possibility that credit uptake may be directed to consumption as opposed to investment. Oduor and Khainga (2010) concluded that the decision to invest in

Kenya is not affected by the efficiency of the financial sector as the TFP declined despite increased efficiency in the financial sector.

Variables that were found to have a positive and statistically significant effect on TFP in Kenya include openness, the lending rate and Foreign Direct Investment. The estimated coefficient for openness was 0.1948 implying that a one percent increase in the variable results in an increase in TFP of 0.1948 percent. Romer (2012) attributed the rapid growth in the Newly Industrialized Countries (NICs) to increased trade which facilitates both increased factor availability and more intensive use of inputs. The findings also concur with the findings of Hammouda *et al* (2010) and Kalio *et al* (2012). Increased trade improves output growth by opening new market, facilitates importation of inputs and the transfer of skills and technology which all facilitate increased productivity. However, Oduor and Khainga (2010) found a negative relationship which the study attributed to increased competition with liberalization and an unfavourable balance of trade position which stifles local production and TFP.

The estimated coefficient for foreign direct investment (FDI) was 1.799 which was statistically significant at the one percent level of significance. FDI facilitates increased capital, improved skill and technology, increased resource utilization, brings new employment opportunities thus has a positive effect on TFP. This is consistent with theoretical expectations. However, the findings contradict those of Oduor and Khainga (2010) and Kalio *et al* (2012) which found that FDI has a negative effect on TFP in Kenya. Oduor and Khainga (2010) attributed the negative relationship to the crowding out of local investment by foreign investors who repatriate most of their profit with limited transmission of skill and technology to the local population as the key jobs are held by foreigners. Kalio *et al* (2012) attributed the negative relationship to the use of technology that is not suited to local conditions, and the ability of FDIs to influence government policy in their favour e.g. tax rebates and terms for profit repatriation that do not favour the host country.

The study found that the lending rate had a positive (0.2336) and statistically significant effect on TFP in Kenya at the one percent level of significance. This is contrary to theoretical expectation as high lending rates are associated with low investment, low consumption and low economic activity (Romer, 2012) therefore a reduction in TFP. The finding implies that the level of investment and consumption which determine aggregate demand and productivity in the country increase with an increase in the lending rate. This result suggests that investment and consumption in Kenya is greatly influenced by other factors apart from the lending rate. Though the lending rate increases, it has over the study period been accompanied by increasing investment and TFP in the country. Other factors that affect investment and consumption decisions may include the business, economic and political environment.

Life expectancy, digital technology and conflict do not influence the level of TFP in Kenya. The three variables were not statistically significant.

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

Summary

The informal sector is the lead employer in Kenya accounting for 84 per cent of the total workforce and more than 90 per cent of new employment opportunities annually. The sector has over the last 50 years been developed for increased employment, economic growth and income generation for poverty alleviation. Economic growth theories attribute output growth to increased factor inputs, and to the productivity of both capital and labour, commonly referred to as total factor productivity (TFP). Given the productivity differential between the formal and informal sector, the study sought to analyze the effect of the informal sector on TFP in the country. Theoretically recognized determinants of TFP included in the analysis were the availability of finance for investment, the quality of infrastructure, the education and skill of the worker, degree of openness, and inflation.

Using time series data, the study employed ordinary least squares in analysis. The findings indicate that the informal sector has a negative and statistically significant effect on TFP in the country with a 1 per cent increase in the size of the sector resulting in a reduction in TFP by 6.694 percent over the study period. The increase in the size of the sector compromises TFP in the economy.

Conclusions

The informal sector is an important determinant of total factor productivity in Kenya. The increase in the size of the sector compromises TFP. This can be explained by the low firm productivity and inherent inefficiency arising from the small size of firms, lack of benefit from formal support systems, low capital/labour ratio, and the use of unskilled workers with low levels of education and outdated technology. The firms in the sector also face multiple challenges which include low external market access, lack of secured worksites and property rights, lack of access to credit, poor infrastructure, and low access to technology and information. These limitations and challenges compromise firm efficiency, resulting in the survival of inefficient firms and mis-allocation of resources. Additionally, the firms largely avoid tax payment therefore crowd the available public infrastructure which is important for increased efficiency in the economy.

Policy Recommendations

The significant size of the informal sector in the country makes it difficult to dismiss. There a need to enhance policy enforcement to encourage firm productivity in the sector for improved TFP in the economy. This should target firm growth as opposed to new entrants as worker and firm productivity increase with firm size. Various national policy documents have been developed to address firm productivity in the sector. These include the *2007-2012 Private Sector Development Strategy*, the Sessional Paper No. 2 of 2005 on the *Development of Micro and Small Enterprises for Employment Creation and Poverty Reduction*, the *Micro and Small Enterprises (MSE) Act No. 55 of 2012* and the *Kenya Vision 2030: First Medium Term Plan*

(MTP) 2008-2012 which provide a 25 percent public procurement from the sector, increased firm linkages, improved access to capital, development of SME Industrial parks in key towns in the country, technology and market development, among others.

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