Labour Diversity and Domestic Firm's Productivity in Kenya

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Abstracts

This study attempted to empirically examine the effect of labour diversity on firm's productivity in Kenya. To achieve this objective primary data was collected from various firms. Thereafter analysis was done using Feasible Generalized Least Square method (FGLS). According to the study, firms that had more labour diversity in terms of skills and gender were more productive. But ethnic diversity had no impact on productivity. This is a crucial finding given the ongoing debate on the role of gender in development. Additionally, other variables like size of the firm and research & development expenditure had an influence on firms' productivity.

1.0 Introduction

Labour diversity is increasingly becoming a reality in many developing and developed countries. This labour diversity results from several factors; anti discrimination measures on gender, growth from immigration from other countries, educational and skills upgrading of work force. All these have led to an increasing diversity of labour force in terms of skills, gender and ethnicity. (Parrota, Pozzolli and Mariola, 2010). Labour diversity being a new phenomenon few studies have been done in developing countries, most of these studies have looked at only one aspects of labour diversity while others have taken a multi dimensional view. Diversity in skills, education and gender may generate spillovers and skills complementarities among employees and thus it can have a positive effect on firm's productivity (Lazear, 1998). Theoretically and also from empirical literature, most studies have consensus that diversity in skills have a positive effect but ethnic diversity is controversial.

According to Basset- Jones (2005), ethnic diversity is a recognizable source of creativity and innovation that can provide a basis for competitive advantage. In addition, a more ethnically diverse domestic firm may provide better information and access to global markets, which can be used to increase firms' productivity, compared to less ethnically diverse firms (Osborne, 2000). With increased access to different markets and diverse market information, ethnically diverse firms are able to use foreign technology more beneficially to increase their productivity.

On the other hand, ethnic diversity may also be a cause of misunderstanding, suspicion and conflict in the work place which can result to absenteeism, poor quality of work, low morale and loss of competitiveness. The conflict may go to an extent that the firm may not take full advantage of the available foreign technology to improve their productivity (Basset-Jones, 2005). In addition, an ethnic diverse labour may hinder potential knowledge transfers among workers due to linguistic and cultural barriers (Parotta, Pozzoli and Mariola, 2010).

2.0 Selected Empirical literature Review

Alesina and Ferrara (2002) did a study on labour diversity by conducting a study on effect of ethnicity on economic performance and focused on villages in developing country. The study focused on ethnic heterogeneity and economic performance in the informal settlement in Nairobi. The study used an original data set on production cooperatives in the informal settlement of Nairobi and had information on all members of the surveyed group. This allowed constructing exact measures of group composition in terms of income, education, age and ethnicity. The study used ethno linguistic fractionalizations index to calculate ethnic diversity. The study found that ethnicity matters for gaining access to group resources especially in form of cheap loans.

Members who shared the same ethnicity as the chairperson were 25 to 30 percent more likely to borrow from the group or from other members. Ethnic heterogeneity also seemed to influence the organization of production. Members of more ethnically heterogeneous groups were less likely to specialize in different tasks and more likely do all job, this seemed to contrast the assumptions of the positive complementarities in production among different ethnic groups in production. However the conclusion of the study was that ethnic diversity had a major influence on economic performance of firms in Kenya.

Hamilton, Nickerson and Owan (2004), conducted a study on the impact of labour diversity on productivity in production teams. The study used a novel data set from garment factory at Korea. The study captured the multidimensionality of labour diversity in demographic, skill and ethnic diversity. Using ELF index to capture skills, ethnicity and demographic diversity, the study found that demographic and ethnic diversity reduced team productivity. According to the study, demographic and ethnic diversity harmed productivity by making learning and peer pressure less effective and by increasing team membership turnover. But skill diversity increased team productivity. Teams that were more heterogonous in worker abilities were more productive which indicated that there was a significant mutual learning and task coordination within the team. However the weakness of the study was that it was just limited to one factory over three years, instead the study could have considered a sample of many firms.

Parrota, Pozzolli and Mariola (2010), using a comprehensive employee dataset of firms in Denmark, investigated the effects of labour diversity. The study captured the multidimensionality of labour diversity in ethnic, cultural, skill and demographic characteristics and the different implication related to each of the three dimensions, in terms of total firm productivity (TFP) of firms. The study used Herfindahl index to measure various labour diversity aspects such as demographic, cultural diversity and ethnic. Herfindahl index was presented as

$$index_{hit} = \sum_{w=i}^{W} \frac{N_w}{N_i}\left(1 - \sum_{s=1}^{H} Pswt\right)^2 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2.11$$

where $index_{hit}$ was the diversity index of firm i at time t calculated along the h dimension (cultural, skill-related and demographic), W is the total number of workplaces belonging to firm i, N_W and N_i are respectively the total number of employees of the workplace w and of firm i. The proportion of the workplace labour force that falls into each category s of the h_{th} dimension at time t is represented by the term psw. The diversity index has a minimum value equal to 1 if one category dominates all the others or there is only one category represented within the workplace, and a maximum value equal to the number of categories if all categories are equally represented. The study found that a standard deviation increase in skill diversity increased productivity by approximately 5 percent. The results gave support to the existing theory on knowledge spillovers. Differently, diversity in demographic and ethnicity had negative effect on TFP. This showed that the negative effect which comes from communication and integration cost connected to a more demographically and culturally diverse workforce counteracted the positive effects of diversity on firm TFP coming from better problem solving a abilities, creativity and knowledge spillovers. On skills diversity the results supported the existing theory by Osborne (2000), which states that workforce diversity provides useful information to the firm's ability to compete in global markets. The study concluded that government policies actively promoting greater equality will not bring any detrimental effects on business in terms of firm performance. One of the limitations of the study was measurement errors which are common in attitude surveys hence measuring ethnicity could be inaccurate and this could have affected the robustness of the results.

Parrota, Pozzolli and Mariola (2010) additionally conducted another study on nexus between labour diversity and innovation. Using a linked –employee data set from Denmark, specifically exploiting information retrieved from a comprehensive data base and implementing a proper instrumental variable. The study used multidimensional aspects of labour diversity by computing diversity in cultural, ethnic and skills and relating all these indexes with firm innovation. The workforce diversity measures used in this study were computed at the firm level based on the Herfindal index. A separate measure was computed along each of the cited dimensions diversity. Skills and Ethnic diversity coefficients were significant.

This implied that ethnic and skill diversity is an important driver for the creation of new ideas since they create a spectrum of perspectives which in turn facilitate innovation in different technological fields. However the coefficient of demographic characteristic diversity was not significant. Cheung and Tsang (2011) did a study on relationship between gender diversity onboard and firm performance in Hong Kong industries. The study adopted Ethno-Linguistic fractionalization index (ELF) to calculate gender diversity and Tobin Q as a proxy for firm financial performance. The results obtained in the model found a significantly negative association between gender diversity in the boardroom and Tobin Q. The study concluded that a greater number of female board representation led to lower performance of the firms. However the study did not take care of endogeneity problems and hence the robustness of the results could be doubted.

3.0 Methodology

3.1 Theoretical Framework on Production Theory

Production is the economic process of converting inputs into outputs. The inputs or resources used in production are called factors of production. Consider a firm that uses x inputs to produce a single output y.

$$Y = f(X)$$…………………………………………………….. 3.1

An efficient transformation of the inputs into output is characterized by production function f(x) which shows the maximum possible output obtainable with a given technology from a given set of inputs. Beginning with aggregate production function with Hicksian neutral shift in production at given levels of labour and capital.

$$Y = A_t F(K_t L_t)$$………………………………………………… 3.2

A_t measures the shift in production at given levels of labour and capital. To measure it, Solow (1957) used non parametric index approach (i.e. an approach that does not impose specific form on the production function). Total differentiation of equation 3.2 gives,

$$\frac{\dot{Y_t}}{Y} = \frac{\partial Y}{\partial K} \frac{K_t}{Y_t} \frac{\dot{K}}{K_t} + \frac{\partial Y}{\partial L} \frac{L_t}{\partial Y_t} \frac{\dot{L_t}}{L_t} + \frac{\dot{A_t}}{A}$$................……………...………....…... 3.3

This equation shows that the growth of the real output of the firm on the left hand side can be factored into growth rates of capital and labour both weighted by their output elasticity's and growth rate of the Hicksian efficiency index.

The output elasticity's in equation 3.3 are not directly observable but if each input is paid the value of its marginal product that is;

$$\frac{\partial Y}{\partial K} = \frac{r_t}{p_t} \text{ and } \frac{\partial Y}{\partial L} = \frac{\omega_t}{p_t}$$……………………………………….. 3.4

Where, r_t is rent, ω_t is wages and p_t is price. Then relative prices can be substituted for the corresponding marginal product. This in turn converts the unobservable output elasticity's to observable income shares α^K and α^L, then equation 3.4 becomes;

$$\Re_t = \frac{\dot{Y_t}}{Y} - \alpha_t^K \frac{\dot{K}}{K_t} - \alpha_t^L \frac{\dot{L}}{L_t} = \frac{\dot{A_t}}{A_t}$$…………………………… 3.5

$\Re_t$ is the Solow residue and is the TFP.

Where, Y is firms total output at time t, (K_t) is capital at time t and L_t is labour at time t. α_L and α_K represented elasticity of capital and labour respectively.

In the business cycle literature, λt random variable is added that takes account of temporary changes in the production function.

$$\Re_t = \frac{\dot{A_t}}{A_t} + \frac{\lambda_t}{\lambda} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad 3.6$$

This random variable is usually ignored by economist as it occurs in short run and TFP is left with the variable that is of a permanent nature which is technological progress (Solow, 1957). The Solow residue from equation 3.6, can basically be decomposed into two major components: efficiency and technological growth (Solow, 1957)

$$\Re_t = \frac{\dot{A_t}}{A_t} = f(\xi_t, \phi_t)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.7..$$

Where, ξ_t is efficiency at period t and ϕ is technological growth at period t.

3.3 Empirical Model on Productivity

Following the theoretical argument, to achieve the study, the TFP obtained from equation 3.7 was regressed against factors that determine growth and efficiency. Technological growth was determined by research and development while efficiency was determined by size of the firm, skills, ethnic diversity and gender diversity. According to Greene (2006) a multiple linear regression should be used to study the relationship between a dependent variable and more independent variables. Therefore combining all these variables:

$$TFP_{it} = \alpha + \beta_1 ETHIC_{it} INDEX + \beta G_2 ED_{it} INDEX + \beta_3 SKL +$$

$$\beta_4 R\&D_{it} + \beta_5 SZ_{it} + \beta_6 S_1 D_{it} + \beta_9 S_2 D_{it} + \mu_i + \varepsilon_{it} \dots\dots\dots\dots\dots 3.8$$

ETHIC INDEX was an index used to calculate ethnic diversity in a firm, GED INDEX was an index used to calculate gender diversity in a firm, SKL was skills of employees. R&D was research and development, SZ was size of the firm, $S_1 D$ and $S_2 D$ are sectoral dummies. These dummies captured sectors heterogeneity. μ_i, is the firm specific error term, which is constant through time and captures unobserved firm heterogeneity effects. ε_{it} is the error term, i, is firm and t is time.

The study used two diversities i.e. ethnic and gender diversity; these diversities were used to capture multidimensionality of labour diversity (Parrota, Pozzoli and Mariola, 2010). Ethno-linguistic Fractionalization index (ELF), was used to calculate both diversities. Specifically, the study calculated two separate indices to measure gender and ethnic diversity. Gender diversity (GED INDEX) index was represented by two categories of employees' i.e. male or female while ethnic diversity (ETHIC INDEX) was represented by employees' nationality of all the employees in a firm based on the following categories Kenyan, Asian, other Africans, Whites and Chinese. The index used was represented as;

$$ELF = 1 - \sum_{k=1}^{K} P_K^2 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.9$$

Where P_k is proportion of employees who belong to different categories in each firm, k is the number of categories.

3.4 Data Collection, Type and Sources

Firm level primary and secondary panel data were collected for the period 2010 to 2013 using specified research instruments. A structured questionnaire was administered to both domestic and foreign firms from different sectors in Kisumu, Nairobi, Nakuru and Mombasa. The number of sampled firms was 204. Since a panel data of three years was used, equivalent to 612 observations, the achieved sample was a good representative of the total number of firms. The target respondent was the director, human resources managers or financial directors of each firm. The collected data was cleaned, coded, entered in the data sheet and then analyzed.

3.5 Definitions and Measurement of the Variables

Size of the firm (SZ): This was measured by total number of employees in the firm.

Ethnic Diversity (ETHNIC INDEX) was referred to as employee nationality in a firm and it was based on the following categories, Kenyan, Asian, Other African, Whites and Chinese. To calculate ethnic diversity in each firm ethno linguistic   fractionalization (ELF) index was used.

Gender Diversity (GED INDEX) was the proportion of female to male working in a firm**.** It was measured by calculating gender diversity of each firm using ELF index.

Skills (SKL) was a segment of the workforce with a high skill level that created a significant economic value through the work performed. It was proxied by total number of workers who had some special skills and has gone through college level, university or technical training.

Research & Development (R&D) was the total amount of money in Ksh. used by each firm on research and development.

4.0 Research Findings

4.1 Regression Results

The model in equation 3.8 was then estimated after conducting various diagnostic tests. FGLS (Feasible Generalized Least Square) method of estimation was used for the analysis. Table 4.1 shows the FGLS results of the regression analysis for all the firms sampled that is both domestic and foreign.

Table 4.1 FGLS Results of Effects of Labour Diversity on Productivity

TFP	Coefficient	Robust Std. Err.	Z	P>|z|
Ethnicity Div	-0.1787	0.5315	-0.34	0.737
Skills	0.0136***	0.019	0.715	0.000
Gender Div	0.068102***	0.03478	1.96	0.05
R & Devpt	0.0028**	0.0011	2.25	0.015
Size	9.48e-06**	3.74e-06	2.66	0.008
Sectorial Dummy(Man)	-0.1134	0.2714	-0.42	0.676
Sectorial Dummy(Agric.)	-0.2641	0.5659	-0.47	0.64
cons	4.282***	0.2742	15.60	0.000
No of observations 600				
Number of groups 201				
Wald χ^2 68.30				
Pro>ch 0.0000				

***, ** and * Significant at 1%, 5% and 10% respectively
Source: Constructed from survey Data

The study investigated the effect of labour diversity on the firms' productivity by looking at three relevant dimensions namely skills, ethnic diversity and gender diversity, and the implications related to each of the dimensions in terms of productivity. From Table 4.1, the coefficient of ethnic diversity was positive and insignificant, meaning that it was not a major variable that determined productivity of firms. This may be because ethnicity here was looked on the ground of the nationality of employees and very few firms had employees from other countries. This does not give support to the theory by Osborne (2000) which states that labour diversity in terms of ethnicity provides useful information to the firm about national and foreign products and in this way it enhances the firm's ability to compete in global markets. The results of this study were contrary to the findings of the study done in Kenya by Alesina and Ferra (2005) who found that ethnic diversity had major influence on productivity of Kenyan firms.

As expected and consistent with many studies, the coefficient of skills was positive and significant, meaning it is a factor that determines firm productivity. From Table 4.1, increasing firms' skills by one unit, increases firms' productivity by 0.0136. Skilled workers are expected to be more innovative and able to work efficiently and hence their productivity is higher in comparison with the unskilled workers. In addition, skilled workers are able adopt new technology from rival companies more easily and were normally eager to learn.

This helped the firm to be more productive. The results are consistent with those studies by Kokko (1993), Lazear (1999) and Alesina and Ferrara (2002). Gender diversity, previously considered a social issue and an issue of image, is increasingly being approached as a value driver in performance of a firm hence another variable that the study was interested in finding its impact. Gender diversity was found to be positive and significant at 10 percent level.   Specifically from Table 4.1, an increase of gender diversity by one unit, increased firms productivity by 0.068. This meant that gender diversity was a factor that influenced productivity of Kenyan firms. As such, in order to be productive, firms should be encouraged to entrench more gender diversity. This supports the business case argument which suggests that gender diversity translates into better decision and ultimately better products (Cox and Blacke, 1991). According to the resource based theory, a firm can gain sustainable competitive advantage if it takes advantage of its valuable, rarely inimitable and non substitutable resources like gender diversity (Barney, 1991). The author noted that gender diversity is a source of intangible and social complex resources that can provide a firm with sustained competitive advantage. The results conform to study done by Kulik and Metz (2008).

The coefficient of research and development was positive and significant. An increase in expenditure on research and development by one unit increased total productivity of the firm by 0.0028 units. This showed that firms that spent more money on research and development had higher productivity. This was in support of Griliches (1979) who was the first to consider R&D as a factor of production, arguing that R&D activities add to the existing stock of accumulated knowledge of the firm leading to higher productivity. Wang and Tsai (2004) also found that R&D was a major determinant of firm's productivity using data from 136 manufacturing firms in Taiwan.

Finally, the coefficient for Size was also found to be positive and significant at 5 percent level. From Table 4.1, an increase in the firm's size by one unit would increase productivity by small margin of 0.000095, but this could make an impact with large volume of firm's production. This implied that size had an influence in the firm's productivity. Baldwin (1997) found that large manufacturing firms are more likely than small firms to introduce both product and process innovation. Boothby, Lau and Songsakul (2008) also showed that the level of R&D rises with firm size.

5.0 Summary and Conclusions

Diverse labour force is increasingly a reality in Kenya and many developing countries. According to the study, firms that have more labour diversity in terms of skills and gender are more productive. This is a crucial finding given the ongoing debate on the role of gender in development. The finding supports the hypothesis that a firm that has equal number of males and females produces more because they motivate one another unlike a firm with employees of one gender. In addition, diversity in skills and gender benefited the firm due to better decision making, improved problem solving, more creativity and innovation, and more information about markets (Alesina and La ferrara, 2005). Diversity in skills also generated knowledge spillovers and skill complementarities among the employees and hence a positive effect on firm performance. Finally, in order for domestic firms to maximize benefits from foreign firms they should have more skilled labour which increases their absorption capacity. They should also invest more in research and development as this leads to innovation and adoption of foreign technology.

5.1 policy Implications

From the findings, skill was one of the variables found to be significant in determining domestic firms' productivity. This implied that firms should target skilled workers in employment and invest more in training their employees. The Government and policy makers in the firms should come up with policies that encourage investment on human capital. This could be through giving incentives to people who need further training and reducing the cost of developing skills. This could increase domestic firm's absorption ability of technology from foreign firms and hence increase productivity. It was also clear from the findings that expenditure in research and development had an impact on firms' productivity and in determining spillovers from foreign to domestic firms in Kenya. Firms should therefore focus more on investing on research and development as this would help them to be more innovative and enable them to have ability to imitate the new technology from foreign firms. Labour diverse firms in terms of gender balance were found to be more productive. Hence firms should come up with policies that are geared towards having gender balance during recruitment. Lastly, it was also evident that there was need for firms to invest in technology in all the sectors as this was found to increase productivity and determined spillovers from foreign to domestic firms.

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