

Firm's Annual Labor Productivity Growth Determinants: Sub-Saharan Africa

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Abstract

Understanding the determinants of company productivity and annual employee productivity growth is essential, especially for companies in sub-Saharan Africa. The existing literature has not differentiated the effects of skilled labor (permanent and temporary) in production from all skilled workers in the firm, which will have differential effects on annual labor productivity growth. Current literature also needs to empirically document the top management experience contributing to labor productivity growth. This paper explores the multifaceted aspects of labor productivity growth, focusing on the portion of skilled workers, years of the top manager's working experience in the firm's industry, a portion of permanent workers, and capital equipment, utilizing the micro-level data from the Enterprises Survey database (2006-2018).

The findings identified the top manager's experience in the industry and permanent workers as the most significant yearly labor productivity growth contributors, followed by the firm's capital equipment. In contrast, the combination of skilled workers (temporary and permanent) in production has an insignificant relationship with annual labor productivity growth, implying that permanent workers' and top managers' experience matters in a firm's productivity growth.

Keywords: Productivity Growth, Manager Experience, Permanent Workers, Equipment, Skilled Labor

1. Introduction

Understanding and optimizing labor productivity growth has become paramount for organizational success in the dynamic landscape of contemporary business and economic environments. Understanding the determinants of company productivity and annual employee productivity growth is important, especially for companies in sub-Saharan Africa. Previous studies have underscored the significance of labor productivity growth as a key determinant of competitiveness, profitability, and overall sustainability. According to the literature, organizations with a higher proportion of skilled workers often experience enhanced efficiency and innovation because the skilled workers bring specialized knowledge and expertise, contributing to the development and implementation of more advanced processes and technologies. Understanding the factors that influence labor productivity is essential for businesses aiming to enhance their operational efficiency, stressing the importance of skilled labor within a workforce that plays a crucial role in influencing labor productivity growth in sub-Saharan Africa. The existing literature has not differentiated the effects of skilled labor (permanent and temporary) in production from all skilled workers in the firm, which will have differential effects on annual labor productivity growth. The existing literature has not differentiated the effects of skilled labor (permanent and temporary) in production from all skilled workers in the firm, which will have differential effects on annual labor productivity growth. Current literature also needs to empirically document the top management experience contributing to labor productivity growth.

This paper explores the multifaceted aspects of labor productivity growth with a particular focus on the portion of skilled workers, years of the top management's experience working in the firm industry, portion of permanent workers, and percentage of firm buying fixed assets (capital equipment), accessing the firm-level data from the World Bank Enterprises Survey database. Unlike previous studies about skilled labor productivity growth contributions, this study found the adverse effects of skilled labor (temporary and permanent workers in production) on labor productivity growth. Temporary workers reduce labor productivity growth and severely damage the skill-based sectors (Lisi & Malo, 2017). The study shows that a top manager's experience in the firm's industry has a statistically and positive significant relationship with annual labor productivity growth, supporting

(Bartelsman & Doms, 2000; Black & Lynch, 2001); Liu et al., 2010). The data was collected from companies in the sub-Saharan, where firms have similarities and dissimilarity characteristics from the rest of the world regarding culture and economics. Therefore, results could have both generalizable and specific geographical effects.

2. Literature Review

Labor productivity growth is paramount for individual firms and entire economies. At the microeconomic level, improved labor productivity directly contributes to a company's competitiveness and profitability. However, by increasing the amount of output produced per unit of labor, businesses can achieve cost savings, enhance their capacity to meet demand, and potentially lower consumer prices. Productivity growth in manufacturing industries highlighted the role of labor skills, management experience, and the proportion of permanent workers (Wenban-Smith, 1982). Kahn (1998) and Mello (2008) found that productivity growth is increasingly concentrated in high-skill industries. Jurison (2002) defines it as the value of output produced per hour worked.

Labor productivity growth is a crucial determinant of economic prosperity and competitiveness for both firms and nations. Several factors have been identified as contributors to labor productivity growth. One important factor is the portion of skilled workers within a firm. Research has shown that firms with a higher proportion of skilled workers tend to experience higher labor productivity growth (Li & Su, 2022; Haltiwanger et al., 1999). A firm's productivity heavily relies on the skills of its labor force and the availability of capital. This relationship between skill and productivity has been supported by research evidence and practical experience (Keep et al., 2006). Moreover, the impact of skills on productivity can be observed at both the national level, particularly in the industry and service sectors, and at the organizational level, where individual skills contribute to overall productivity (Cette et al., 2022; Keep et al., 2006). This could be attributed to skilled workers possessing specialized knowledge and expertise, allowing them to perform tasks more efficiently and effectively.

On the contrary, an expanding body of literature suggests that temporary employment could potentially impact labor productivity. Temporary workers reduce labor productivity growth and severely damage the skill-based sectors (Lisi & Malo, 2017). Similarly, temporary workers may be less inclined to collaborate with their employers in creating innovations, as they may not expect to benefit from them significantly (Kleinknecht, 1998). This argument is particularly pertinent for temporary workers who lack formal employment status with the user firm. Additionally, temporary workers may prioritize developing broad skills that enhance their employability in the job market instead of acquiring company-specific skills, especially when workers have no long-term commitment from their employers (MacLeod & Navakachara, 2007).

Furthermore, the availability of hiring new temporary workers creates a situation where firms lack the motivation to invest in "functional" (internal) flexibility. This lack of investment contrasts with the potential benefits of fostering innovation and promoting productivity growth (Michie & Sheehan, 2003; Zhou et al., 2011). Consequently, a significant prevalence of temporary employment could hinder a firm's capacity for innovation. The challenges posed by temporary employment extend beyond its impact on productivity and innovation. In response to the transient nature of these contracts, companies may adopt a pragmatic approach by setting a lower productivity threshold for terminating temporary workers compared to their permanent counterparts. This strategy is a risk mitigation measure, allowing firms to navigate direct and indirect firing costs more efficiently (Lisi, 2012). Additionally, the allure of temporary employment tends to attract a demographic characterized by youth, lower educational attainment, and limited professional experience. Such individuals often face constrained opportunities for participation in training programs (Personal & Archive, 2014).

Furthermore, the years of top management's experience working in the firm sector also significantly contribute to labor productivity growth. Studies have found that firms with top management who have more experience working in the firm sector tend to have higher labor productivity growth (Bartelsman & Doms, 2000; Black & Lynch, 2001; Liu et al., 2010). This may be because experienced managers have a deeper understanding of the firm's operations and make informed decisions that positively impact productivity. Managers can positively affect worker productivity by bearing workers' feelings in mind; therefore, management should be aware of employees' feelings toward productivity (Savery, 1998).

According to (Shaw, 2019), good managers can positively influence their workers' productivity performance and even reduce employee turnover, which substantially costs the firms. Years of experience allow top executives to deeply understand industry dynamics, market trends, and best practices. This knowledge, however, can be leveraged to make informed decisions, implement effective strategies, and navigate challenges unique to the sector. Organizations benefit from experienced leadership that can steer the company through industry-specific

challenges and capitalize on emerging opportunities. Conversely, adapting to industry and market changes would be challenging for inexperienced management, potentially hindering productivity growth.

Additionally, the number of permanent workers within a firm has been shown to impact labor productivity growth positively. Firms with a higher percentage of permanent workers tend to have higher labor productivity growth due to greater investment in their training and development and increased commitment and loyalty from permanent employees (Liu et al., 2010). Moreover, Workers who remain with the company for an extended period tend to exhibit higher productivity than temporary or recently hired counterparts, owing to their extensive experience and proficient know-how (Warsame, 2023).

The percentage of firms investing in fixed assets has been identified as affecting labor productivity growth. Studies have found that firms that allocate a larger portion of their resources towards investing in fixed assets tend to experience higher labor productivity growth. This could be because fixed assets, such as machinery and equipment, can enhance the efficiency and effectiveness of production processes, leading to increased productivity (Wacker et al., 2006). As a result, Adequate access to financing options is crucial for companies to support fixed assets, working capital, trade, and innovation endeavors, ultimately enhancing productivity, and encouraging expansion. Businesses lacking proper access to financing are at greater risk of economic shocks, may struggle to procure inventory, meet timely payment obligations to suppliers and employees, and encounter limitations in making capital investments and embracing new technologies (Li & Su, 2022; Cette et al., 2022; Villalba, 2020). Aggrey (2010) emphasizes the importance of human capital, particularly the proportion of skilled workers and education levels.

Danquah (2010) highlights the significant contribution of total human capital to productivity growth, with different levels of education playing distinct roles. Ndambiri (2012) adds that physical capital formation, a vibrant export sector, and human capital formation are key contributors to economic growth in the region. (Warsame, 2023) further points out that the growth of labor productivity results from boosting a company's productivity capacity by enhancing the skills of workers and improving equipment. The study assesses the significant factors influencing labor productivity growth to improve our understanding of which factors impact labor productivity growth in sub-Saharan Africa. The study analyzes the factors influencing labor productivity growth in sub-Saharan countries. The study accessed the firm-level data from the World Bank Enterprises Survey (WBES) database.

3. Data Analysis

This paper investigates the factors that impact the annual labor productivity growth in sub-Saharan countries, utilizing the Ordinary Least Squared (OLS) techniques. The study applies micro-level survey data from the Enterprise Survey datasets (WB). The data are cross-sectional data collected from Sub-Saharan African countries from 2006 to 2018. Enterprise Surveys collected firm-level data on the business environment from years of experience of top managers in the firm's industry and human capital using standard survey instruments. The survey covers firm productivity measures, employment, and management. The survey focuses on only registered enterprises having more than five workers. The survey data employed in the paper was collected in 2006, 2007, 2009, 2010, 2011, 2013, 2014, 2015, 2016, 2017, and 2018. The data also provides basic information about the firms, the proportion of skilled labor, the percentage of production workers, and the percentage of permanent workers of all workers. The surveyed countries are Sub-Saharan African countries. All variables are in percentage form except the years of top manager's experience in the enterprise's industry.

Table 1 is a summary of statistics providing descriptive information on the data. These descriptive statistics help readers easily digest the results. The explained variable is real annual labor productivity with a negative mean and relatively large standard deviation because the data has some negative values, indicating huge fluctuation in productivity growth. Further, the yearly labor productivity growth differs from the independent variables in size: it has the smallest mean and the most significant standard deviation compared to others. It is also the only variable with negative values in the data.

Table 1. Summary Statistics

Variable	Obs.	Mean	SD
<i>Outcome Variable</i>			
Annual Labor Productivity Growth %	505	-2.47	16.38
<i>Independent Variables</i>			
Skilled Labor %	505	71.48	14.29
Top Manager's Years of Experience	505	14.11	3.78
Permanent Labor % of all Workers	505	93.67	4.42
Capital Equipment %	505	42.06	14.78

The independent variables have no negative values in the data set. Skilled labor represents the percentage of

skilled workers (temporary and permanent employees) in the production section. Although productivity growth is attributed to combined resources and efforts ranging from top managers to capital machines, skilled labor is vital in skilled and knowledge-based industries. The data contains firms in different industries and sizes that reduce the data quality and representativeness. Data from firms in the same sectors produce better-quality inferences, which could be a data shortcoming.

4. Methodology

This research examines the factors that influence the annual labor productivity growth in sub-Saharan countries, utilizing the Ordinary Least Squared (OLS) techniques. The factors influencing labor productivity are tools used for production, management leadership, and attitudes of employees. The R-squared is low before going to the interpretation of the results, as the result table indicates. However, a low R-squared in empirical work does not necessarily imply poor, but what matters in scientific research is that the independent variable has a statistically significant impact on the explained variable. Besides, an argument suggests that R-squared greater than 0.5 is acceptable in social science. However, there is another argument about the level of good R-squared in an empirical social science because the empirical study's purpose is not to predict productivity growth. However, we are testing whether certain explanatories significantly impact the study's outcome (Ozili, 2023).

Therefore, the study utilizes yearly labor productivity as a dependent variable. At the same time, the influencing factors are the percentage of skilled employees, all production workers (permanent and temporary workers), and years of top managers' experience working in the firm's industry, which matters because it gives good planning and leadership to enhance labor productivity. Usually, the proportion of permanent workers (out of all workers) is a crucial factor affecting productivity because permanent workers used to work, and being a permanent worker positively impacts workers' attitudes toward the work.

Conversely, employee turnover always incurs high costs to the firm since workers walk away with learned knowledge, and hiring and training new workers incur huge costs. Therefore, being a permanent worker gives employees job satisfaction and learned skills, increasing annual labor productivity. Contemporary businesses heavily rely on capital-intensive production methods. The paper uses the percentage of firms buying fixed assets (capital equipment). It hypothesizes that capital tools used in production are vital organs in these competitive markets for workers to increase their productivity.

5. Research Model

$$y_{ti} = \alpha_0 + \alpha_1 x_{it} + \alpha_2 x_{it} + \alpha_3 x_{it} + \alpha_4 x_{it} + e_{it}$$

Where y_{ti} is a dependent variable, standing for real annual labor productivity growth (%) of firm i at period t . The $\alpha_1 x_{it}$ is a proportion of skilled workers (out of all production workers) (%), $\alpha_2 x_{it}$ the number of Years of top manager's experience working in the firm's sector. $\alpha_3 x_{it}$ is the proportion of permanent workers (out of all workers), and $\alpha_4 x_{it}$ is the percent of firms buying fixed assets (capital equipment). Lastly, the α_0 is the constant coefficient, and e_{it} is the noise of the study.

6. Results

This section explains the empirical results and provides an argument about the results. The explained and all explanatory variables are in percentages except the top managers' experiences in the firm's sector. Keeping that data in percentage units except for top managers' experience, a one percent increase in capital equipment will increase labor productivity by 0.0918 percent. Having sufficient resources and appropriate production equipment are prerequisites for improving productivity levels. For firms to maintain their competitiveness via achieving an economy of scale, using capital equipment is one of the significant preconditions to improve labor productivity levels. Companies invest in a piece of new equipment to increase labor productivity. Globalization forces labor-intensive enterprises to shift to capital-intensive ones. Large companies have a higher tendency to be capital-intensive than human-intensive to survive and stay sustainably competitive.

Managers' working experience in the firm's industry is crucial to company goal setting and monitoring productivity growth because experienced managers train the employees and provide needed assistance. A one-unit increase in top management experience increases labor productivity growth by 0.773 percent yearly. According to (Shaw, 2019), good managers can positively influence their workers' productivity performance and even reduce employee turnover, which substantially costs the firms. Top management experience in sector matters; it influences overall company performance through goal setting, putting performance measures in place, monitoring work, and giving employees necessary skill training and guidance. Top management experience in the sectors matters in employee retention, reducing employee turnover, and equipping them with the required tools and knowledge.

The proportion of all permanent workers is a positive and statistically significant relationship to annual labor productivity growth. A one-unit increase in permanent firm workers will also increase labor productivity by 0.53 percent. Permanent workers are vital to a firm's overall performance, particularly productivity growth. A firm's yearly productivity growth cannot be attributed only to labor in the production department; all other departments and managers contribute to it, resulting from collective and combined efforts and resources. Permanent workers play vital roles in any company because being permanent influences job satisfaction and their attitude toward the work. Permanent workers and those in other departments are well-informed and experienced in production. As results reveal, permanent workers have three-star statistical significance on labor productivity growth.

Table 2. Empirical Results

Variable	(1)	(2)	(3)	(4)	(5)
Capital Equipment	0.0918** (0.0465)	0.108** (0.0459)			
Top experience	0.773*** (0.214)		0.718*** (0.196)		
Permanent workers	0.531*** (0.167)			0.444*** (0.169)	
Skilled labor	0.0135 (0.0472)				0.0166 (0.0527)
Constant	-67.91*** (17.34)	-3.617 (3.842)	-12.57*** (2.865)	-43.97*** (15.85)	-7.032*** (2.237)
Observations	505	505	505	505	505
R-squared	0.053	0.10	0.027	0.014	0.01

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The relationship between skilled workers in production and labor productivity could be by chance, but no statistical significance exists according to regression results. A study indicated the adverse effects of temporary workers on labor productivity. The result produced the most minor, insignificant, and positive coefficients for skilled labor (permanent and temporary) in the production section. Temporary workers reduce labor productivity growth and severely damage the skill-based sectors (Lisi & Malo, 2017). Skilled workers are permanent and temporary workers working in the production section; this combination can cause insignificant relationships between skilled labor and labor productivity growth. Statistically, the insignificance of Skilled labor in production may be caused by the increasingly capital-intensive production, in which productivity heavily relies on machines instead of humans. Large companies have a higher tendency to be capital-intensive than human-intensive to survive and stay sustainably competitive.

7. Conclusion

Understanding the determinants of company productivity and annual employee productivity growth is essential, especially for companies in sub-Saharan Africa. The existing literature has not differentiated the effects of skilled labor (permanent and temporary) in production from all skilled workers in the firm, which will have differential effects on annual labor productivity growth. Current literature also needs to empirically document the top management experience contributing to labor productivity growth. The paper investigated the determinants of labor productivity growth, focusing on the portion of skilled workers, years of the top manager's working experience in the firm's industry, a portion of permanent workers, and capital equipment, using the micro-level data from the Enterprises Survey (WB).

The findings showed that top managers' experience in the company's industry matters most, positively impacting labor productivity growth via goal setting, planning, leading, employee retention, guiding, encouraging, and awareness of employees' feelings toward productivity and overall firm performance. It also stressed the importance of permanent workers who are equipped with the required understanding and familiarity with the firm's performance. Productivity growth comes from collective efforts and combined resources, implying skilled workers (permanent and temporary) working in the production department do not necessarily contribute to productivity growth. For any firm to survive, technology and capital equipment are vital for current throat-cutting competitive global markets. Capital equipment helps firms standardize their products and services and is less expensive than human labor.

The paper recommends that the top manager's working experience in the industry matters in the firm's productivity growth, and therefore, the firm should give enough attention to this. Productivity growth results from combined resources and efforts led by the top management, so firms should effectively combine all resources to increase labor productivity. According to studies, not all workers contribute to productivity growth,

especially temporary workers.

Last, the data was collected from companies in the sub-Saharan, where firms have similarities and dissimilarity characteristics from the rest of the world regarding culture and economics. Therefore, results could have both generalizable and specific geographical effects. Previous productivity studies focused on country-level productivity growth determinants. The study encountered literature limitations, particularly firm-level productivity growth determinants.

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Authors contributions

Dr. Abdisalan was responsible for the whole paper except for some parts of the literature review. Mr. Muse was also responsible for part of the literature reviews.

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Data sharing statement

No additional data are available.

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Appendix A

Table A1. Definition of Variables

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1. Annual labor productivity growth (%)
 2. Percentage of skilled workers (out of all production workers) (%)
 3. Years of top manager's experience working in the firm's sector
 4. The proportion of permanent workers (out of all workers)
 5. Percent of firms buying fixed assets (capital equipment)
-

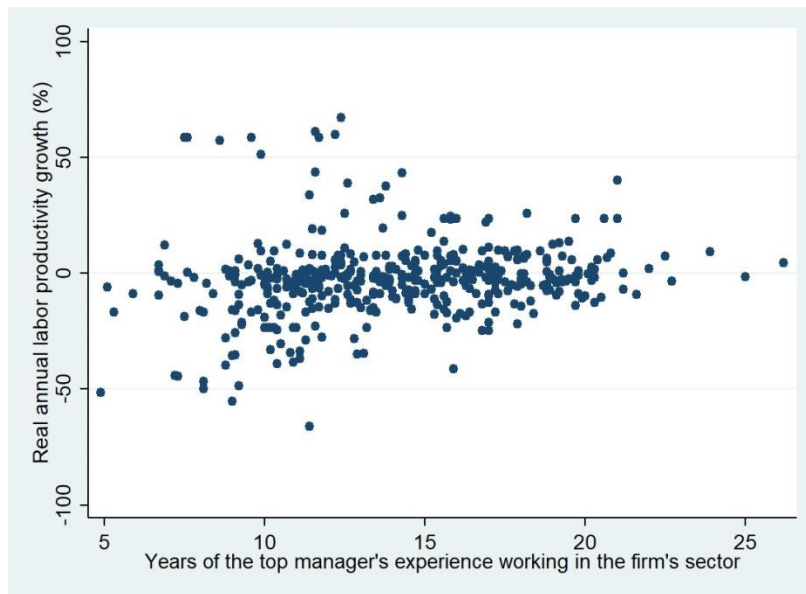


Figure A1. Top Manager's Years of Experience and Labor Productivity