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Exploring the relationship between job quality and firm productivity in the manufacturing sector: Panel data evidence from Ethiopia

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Abstract

By leveraging firm-level panel data from 400 agro-processing and leather manufacturing firms in Ethiopia, this paper investigates links between firm productivity and monetary and non-monetary dimensions of job quality. The results point to a positive impact of higher salaries on firm productivity, but limited effects of non-monetary job quality indicators. Specifically, a 10% increase on each of the salaries of tenured medium- and high-skilled workers increase sales per worker by 1.79% and 1.46%, respectively, ceteris paribus. Similarly, increasing the starting salary of medium-skilled workers by 10% increases profit per worker, sales per worker and value-add per worker by 2.27%, 2.43% and 2.44%, respectively. Non-monetary job quality indicators had a weak impact on productivity, however, reducing the incentive of employers to invest in job quality improvements. Impact of productivity increases on monetary and non-monetary job quality indicators follow a similar pattern. An increase in profit per worker was found to increase the salaries of both tenured employees and new hires. For instance, a 10% increase in profit per worker increases tenured salaries of low-and medium-skilled workers by 0.2% and 0.3%, respectively, and starting salaries for low, medium and high-skilled workers by 0.21%, 0.28% and 0.27%, respectively. However, a statistically significant impact of profit per worker and value add per worker on non-monetary aspects of job quality was not.

Keywords: productivity, salary, job quality, labour compensation, firm performance

JEL Codes: D24, E24, J24

1. Introduction

There is growing interest among the academia, international organizations, governments, and other stakeholders in the quality of jobs being created (Block et al., 2018; Findlay et al., 2017; ILO & MoLSA, 2013). Job quality is important for the health and wellbeing of workers (Munoz de Bustillo et al., 2011; Takala et al., 2014) as well as to society at large (Miller, 1997; Miller & Galbraith, 1995). Poor quality jobs can lead to poor heath, lower job-satisfaction, and overall lower productivity (Burton et al., 2005; Hoboubi et al., 2017).

However, improving the quality of jobs requires investments, which may have implications on profitability of firms and on employment (Bartling et al., 2012; Findlay et al., 2017). On the one hand, investments in job quality (e.g., increased monetary compensation for labour and improved working conditions) may increase production costs and reduce profits of firms that face competitive markets and may negatively affect employment. For instance, analyzing data from France, Germany, Italy, Japan, Spain, the UK, and the US over the period from 1960 to 2008, Karanassou and Sala (2014) found that part of the gap between productivity and wage goes to higher employment. They also found trade-offs between share of labour in income and employment. On the other hand, good quality jobs may motivate workers, reduce labour-turnover, decrease workplace shirking and increase productivity (Artz, 2010; Dale-Olsen, 2006; Fitzroy & Kraft, 1987; Mefford, 1991; Morris, 2009). Studies found also that policies that increase wage rate enhances productivity (Kim & Jang, 2019), while wage inequality reduces productivity (Policardo et al., 2019).

Hence, it is important to understand the direction and magnitude of the casual link between the two to provide insights for interventions and actions (Findlay et al., 2017). Using two rounds of a random sample of small firms and censuses of large and medium firms in Ethiopia, this paper provides investigate the link between job quality and productivity (and profitability) of firms.

A few studies documented two-ways causal positive link between wage rate and productivity (Foon Tang, 2012; Strauss & Wohar, 2004). They found that higher productivity leads to higher wage rate (Bhattacharya et al., 2011; Dosi et al., 2020; Dunne et al., 2004; Stansbury & Summers, 2017; Vedder & Gallaway, 1982). For instance, Stansbury and Summers (2017) found a statistically significant link between wage rates and productivity in the USA, ranging between a 0.4% to 1% increase in median and mean wage growth rates, respectively, for one percentage growth in productivity. Meanwhile, a study in Australia found that a one percentage increase in wage rate leads to 0.5% to 0.8% increase in productivity (Kumar et al., 2012). Foon Tang (2012) found bilateral causality between real wages and labour productivity in the manufacturing sector in Malaysia, where the impact of real wages on productivity was found to be non-monotonic. Similarly, using firm-level data in China for the period from 1998 to 2007, Dosi et al. (2020) found a consistently positive, but weak link between value-add per

worker and wage rate. At their best relationship, they found that a 1% increase in productivity leads to 0.3% increase in wage rates. In most cases where productivity positively affects wage rates, the magnitude of the impact has been less than one, which is attributed to contributing to the overtime decline of the share of labour income in USA (Strauss & Wohar, 2004).

However, there are gaps to fill in the literature about the casual link between productivity and the quality of jobs. First, the link between the two variables has important policy implications and is also of interest to workers and employers, thus demonstrating the need for thorough and contextualized investigation. Second, studies found that the causal relationship between wage and productivity varies by country (Van Biesebroeck, 2011), by sector type (Baffoe-Bonnie & Gyapong, 2012) and by age, sex and education level of workers (Ilmakunnas & Maliranta, 2005). Third, most of the previous studies investigated the link between wage and productivity, with little attention being given to the link between productivity and non-wage job attributes (Feldstein, 2008). Although wage earnings continue to make up the majority of labour compensation, it is not the only labor compensation and its share of the total labour compensation has been declining over time (Feldstein, 2008). For instance, workplace health and safety issues cause substantial costs to workers, employers, and the public (Buhai et al., 2017; Miller & Galbraith, 1995, 1995). Moreover, raises in wages do not guarantee job satisfaction since the higher earnings could come at the expense of hard and stressful work (Clark, 2005).

Moreover, only a handful of studies investigated the link between job quality and productivity in the case of developing countries (Dosi et al., 2020). Using macroeconomic level data, Wakeford (2004) found a long-term wage-productivity elasticity of 0.58 in South Africa, indicating that wages are growing at a lower rate than the productivity growth rate. Consistently, Burger (2015) found in the same country that labour share in gross value-added has been declining since 1994. Using data from 39 African countries, Mawejje and Okumu (2018) found that labour productivity positively and statistically significantly affect wage rates. Researchers have found no previously published studies investigating the causal link between job quality and both monetary and non-monetary aspects and productivity in the context of a developing country.

Using panel data from Ethiopia, this study contributes to this dearth in literature. Two surveys, conducted in 2017 and 2018, collected job quality indicators in addition to detailed production, managerial, and worker characteristics data. In addition to this, firm-label data for the period from 2014 to 2016 were collected from the records of the firms. The data includes censuses of large and medium and random sample of small agro-processing and leather firms in Ethiopia, which are among priority sectors of the Ethiopian government (UNIDO, 2022).[1] As indicators of job quality, the study considers earnings for starting and tenured jobs

[1] https://www.unido.org/stories/ethiopia-spotlight-leather-and-agribusiness

disaggregated by skill level, availability of on-the-job training opportunities, whether the firms have occupational safety and health protocols, whether the firm has a formal written grievance handling dispute resolution mechanism and job security as measured by the share of permanently employed workers. These indicators were because of their relevance in the Ethiopian context and to the overall literature in labour economics (Block et al., 2018; Cazes et al., 2015; Findlay et al., 2013; Green et al., 2013; Lewandowski et al., 2017). For instance, the wage rates in the manufacturing sector in Ethiopia has been the lowest, resulting in very high labour turnover (Blattman & Dercon, 2018; Gebrehiwot, 2021; Kiruga, 2019). Productivity is measured using five indicators, including total factor productivity (TFP) estimated parametrically from sales (TFP sales, henceforth), TFP estimated parametrically from value-add (TFP value-add, henceforth), sales per worker, value-add per worker, and net profit per worker.

The paper contributes to the existing literature in a number of ways. First, previous studies focused on the link between wage and productivity, providing little attention to non-wage indicators of job quality. Because wage is only one indicator of the many attributes of job quality (Arranz et al., 2019; Block et al., 2018; Findlay et al., 2013), it is important to also investigate the link between productivity and non-wage compensation. Second, this study contributes to the literature by investigating the link between productivity and job quality by controlling for both firm *and* worker characteristics, while most previous studies controlled for either of the firm *or* worker characteristics. Failing to control for these variables may result in misleading conclusions about the link between job quality and productivity. Third, the paper explores the link between the two key policy variables in the case of Ethiopia, where the manufacturing sector is emerging, but has is characterized by extremely low wage rates and high labour turnover (Blattman & Dercon, 2018; Gebrehiwot, 2021; ILO & MoLSA, 2013; Kiruga, 2019; Shiferaw & Söderbom, 2023). Investigating the link between productivity and job quality helps to provide policy recommendations that can help break the cycle of low wages rate and high turnover. Finally, we use census data of large and medium farms (and random sample of small farms), which helps to avoid biases caused by sampling design errors.

The rest of the paper is presented, as follows: Section 2 details the data used for the study, while Section 3 delves into the methodology. Section Fou4r then presents the findings of the study and Section 5 provides concluding remarks.

2. Data and methods

2.1 Data

The sample for this study is drawn from two sectors in Ethiopia: agro-processing and leather. For the agro-processing survey, a sampling frame was built using a list produced by the Ministry of Industry and the Federal Food, Beverage and Pharmaceutical Industry Development Institute. All large and medium agro-processing firms found in Addis Ababa and its surrounding areas were consulted for data collection, as well as those in the five most populous cities in the country (Adama, Dire Dawa, Gondor, Hawassa, and Mekelle) where the vast majority of the firms in the sector were located during the survey year. Similarly, for the leather industry survey, a census of all large and medium sized enterprises engaged in production of leather products including tanneries were considered. A random sample of small-sized enterprises was also incorporated. Using the aforementioned procedure, the Policy Studies Institute (PSI) of Ethiopia conducted the first-round survey of firms and workers between June and September 2017. In total, baseline data was collected from 476 firms located in different parts of the country. The follow-up survey was conducted between September and December 2018. Out of the 476 firms, 400 were located and successfully re-interviewed. Reasons for not interviewing 76 firms included that they were closed (42%), they could not be reached because the firms changed their location (32%), they were dropped from the sample because they were found to employ fewer workers than size cut-off size (14%), they were dropped because of duplicate identification number (8%), or they refused to offer responses (4%).[2]

The data were collected using Computer-Assisted Personal Interviews (CAPI) with enterprise operators who are knowledgeable about the information needed from the firms. The structured instrument used for data collection includes questions about job quality indicators, aggregated worker characteristics and entrepreneur and manager profiles, such as education, age, gender, and experience. Moreover, the data include information about enterprise characteristics, such as employment size, years of operation, market orientation, as well as business performance and productivity indicators (e.g., wages, industrial relations and management practices). In addition to this, firm characteristics data were collected from records for the period from 2014 to 2016, which includes information about employment size, sales, costs, profit and initial capital of the firms. However, this recorded data does not include job quality indicators, and, hence, the variables were used as proxy for some of the outcome variables to control for the potential endogeneity problem between productivity and job quality, as discussed below. To

[2] In addition to the firm level data, worker level data were collected from 610 and 552 production workers working at 76 firms at the first and second rounds of surveys, respectively. However, this information was not used due to the small size of the sample used to conduct firm level analysis.

control for overtime price changes, all prices and salaries were adjusted to 2014 prices using the producer price index obtained from the Central Statistics Agency of Ethiopia.

2.2 Empirical strategy

In addition to descriptive statistics, different models are employed to investigate the potential causal link between job quality and productivity. Productivity is measured using five indicators, including total factor productivity (TFP), parametric sales estimates (TFP sales, henceforth), TFP estimated parametrically from value-add (TFP value-add, henceforth), sales per worker, value-add per worker, and net profit per worker. Hence, obtaining estimates of the production function to obtain total factor productivity (TFP) is of primary concern.

2.2.1 Estimating the production function

To estimate TFP, production function models are used. The production function of firm *i* at time *t* is given by the equation noted below, whereby *y* is the natural logarithm of sales and value-add (estimated separately) the firm, and *L* is a vector of variable inputs in logarithm form (such as the different qualities of labour). Three qualities of labour are considered: labour performed by high-school graduates, labour performed by technical and vocational education and training (TVET) graduates, and labour performed by college/university graduates.

$$y_{it} = \alpha + L_{it}\beta + C_{it}\gamma + v_{it} + \varepsilon_{it} \qquad (1)$$

C denotes observed state variables (such as capital) in logarithm form, v_{it} denotes unobserved productivity and ε is a sequence of shocks that are assumed to be conditional mean independent of current and past inputs (Wooldridge, 2009).

Estimating equation (1) using the ordinary least squares (OLS) method poses methodological challenges, including endogeneity of input choices in that the unobserved productivity could affect input selection, endogeneity of attrition, and omitted price bias when firm level price is not available (Levinsohn & Petrin, 2003; Marschak & Andrews, 1944; Olley & Pakes, 1996; Van Beveren, 2012; Wooldridge, 2009).

To curtail such methodological challenges, scholars propose different approaches. Typical approaches include using investment as a proxy variable to the unobserved productivity (Olley & Pakes, 1996) [OP for short]. However, investment could be truncated at zero for non-investing firms. To address this problem, Levinsohn & Petrin [LP] (2003) proposed instead using intermediate inputs as a proxy to the unobserved productivity. Wooldridge (2009) proposed an efficient estimation approach using the generalized method of moments (GMM) framework, which has advantages over the two-stages approach used by both OP and LP.

In this paper, both the Wooldridge (2009) and LP approaches are used to check the robustness of estimates. However, the OP approach is not used because some 57-62% of the firms did not invest in the 2017 and 2018 surveys and the OP model truncates these firms.

After obtaining TFP from Equation 1, the links between productivity and job quality were then investigated.

2.2.2 Estimating the link between productivity and job quality

To investigate the link between job quality and productivity, the paper follows the literature to specifying the empirical models and to select exogenous variables (Abegaz & Nene, 2023; Aubert & Crépon, 2003; Conti, 2005; Dosi et al., 2020; Fox & Oviedo, 2008; Ilmakunnas & Maliranta, 2005).

This study considers contemporaneous impact of job quality on productivity. Productivity of a firm can change multiple times even within a year, depending on various factors facing the firm. Among these factors that have an impact on productivity are wage rates, the physical and experiential working environment, safety and health conditions at the worksite, availability of on-the-job training, existence and power of labour unions in the firm, the ways in which managers handle disputes and grievances, manager and entrepreneur characteristics, worker characteristics, etc. Hence, following the literature, it is likely that there is a contemporaneous relationship between job quality and productivity. Indeed, previous years job quality conditions may have impacts on current and future productivity; however, the fixed effects approach we use controls for time-invariant heterogeneities.

Salaries are upgraded usually based on a worker's previous year's performance. However, there could be differences among countries and firms based on how quickly salaries shift in line with productivity. Since our data is annual report data and since it is less common in Ethiopian context for the firms to change salaries in less than one year interval, we consider one year lagged data of productivity. Moreover, taking lagged values of productivity helps to control for the potential contemporaneous reverse causality problem of salaries affecting productivity (Aterido et al., 2011).

The productivity of firm *i* at time *t* is estimated as follows:

$$lnP_{it} = \mu + Q_{it}\delta + X_{it}\theta + \tau T_i + u_i + \Psi_i + \varepsilon_{it}, \qquad (2)$$

where lnP_{it} is a log of real productivity indicators discussed before; Q_{it} denotes job quality indicators; X denotes firm, manager/owner, and worker characteristics; T is time variable denoting year of survey and included to control for any shocks and policy changes during the survey years; u_i denotes city fixed effects; Ψ_i denotes Mundlak fixed effects (Mundlak, 1978); and ε_{it} is an error term assumed to be white noise.

To estimate the impacts of productivity on job quality, different models are used depending on the indicators of job quality. The first indicator of job quality considered is salaries of low, medium, and high skilled workers. Monthly entry-level salaries and the salaries after one year tenure are estimated for the different qualities of labour (i.e., low skilled, medium skilled, and high skilled workers) at firm *i* at time *t* as follows:

$$\Delta lnW_{it} = \sigma + lnP_{i,t-1}\pi + X_{it}\vartheta + \tau T_i + u_i + \Psi_i + \varepsilon_{it} \quad , \qquad (3)$$

where lnW_{it} is log of average salaries of low, medium, and high skilled workers and $lnP_{i,t-1}$ represents a vector of previous year productivity measures defined before (all in logarithm form, and all other terms are as defined earlier).

Job security, as measured by the share of full-time employed workers, is the second job quality indicator for which the fractional model was used because the variable is designated by a value between zero and one inclusive (Papke & Wooldridge, 2008). The model is estimated using the following:

$$S_{it} = \sigma_2 + lnP_{i,t-1}\beta_2 + X_{it}\gamma_2 + \tau T_i + \Psi_i + u_i + \varepsilon_{it} \qquad (4)$$

where S_{it} denotes the share of full-time employed production workers to their respective total number of production workers; all other terms are as defined earlier.

Similarly, we use the Mundlak (1978) random effects Probit model to estimate binary response variables of non-wage job quality indicators, including whether the firm provides training to production workers (1/0), whether the firm has written OSH policy (1/0), and whether the firm has a formal written grievance handling mechanism (1/0):

$$P(q_{it} = 1|X_{it}, P_{i,t-1}, Time, u_i) = \sigma_3 + lnP_{i,t-1}\beta_3 + X_{it}\gamma_3 + \tau T_i + u_i + \Psi_i + \varepsilon_{it} \quad , \qquad (5)$$

where q_{it} denotes job quality indicators with a binary response, as discussed above, P denotes the probability that the firm provides the job quality indicators, and all other terms are as defined earlier.

There is also an ordered response variable, where the job quality index presents the number of job quality indicators that the firms provide to their workers. It is constructed using eight dummy job quality indicators including (1) availability of a formal grievance handling procedure, (2) if training was provided for production workers in the last three years (1/0), (3) existence of OSH policy at the firm (1/0), (4) whether the firm makes employees aware of OSH conditions at the worksite (1/0), (5) whether workers are represented in the decision-making committee (1/0), (6) whether the firm records accidents that may have occurred at the worksite, as the law requires (1/0), (7) availability of hand-washing facilities (1/0), and (8) whether wage rates are higher than the median wage rate in the sample (1/0). Hence, the value ranges between zero (where the firm provides none of the nine job quality indicators) and eight (where the firm provides all of the eight job quality indicators).[3] With this considered, an ordered Probit random effects model, as follows, was proposed:

[3] While the index may show the number of job quality indicators that a firm provides, higher values may not necessarily mean higher satisfaction or gain for the workers. This is because there is an implicit assumption that

$$
\begin{aligned}
&P(q_{it}=0\,|\,W_{it}) = P(W_{it}\eta+\varepsilon_{it}\le 0\,|\,W_{it}) = \Phi(0-W_{it}\eta)\\
&P(q_{it}=1\,|\,W_{it}) = \Phi(1-W_{it}\eta)-\Phi(0-W_{it}\eta)\\
&.\\
&.\\
&.\\
&P(q_{it}=9\,|\,W_{it}) = 1-\Phi(9-W_{it}\eta),
\end{aligned}
\tag{6}
$$

where W_{it} is used to denote $X_{it}, S_{it}, O_{it}, C_{it}$ and ω_i; $W_{it}\eta = lnP_{i,t-1}\beta_4 + X_{it}\gamma_4 + \tau T_i + u_i + \Psi_i$, q_{it} denotes the job quality indicator taking the values 0, 1, 2, …, 9.

2.3 Descriptive statistics

Table 1 below presents summary statistics of key indicators of firm productivity, job quality, and other covariates used in the regression equations, disaggregated by survey year. A two-way mean comparison t-test of the variables was conducted by survey year.

Overall, the results show that net profit per worker and sales per worker remained fairly the same over the survey years, while value-added per worker and TFP declined in 2018, when compared with the previous year. There are mixed results in terms of overtime changes on job quality indicators. While there is no statistically significant overtime change on most of the non-monetary job aspects, both entry level and tenured job salaries increased in a statistically significant way for low and medium skilled workers. Even seven percent of the firms that reported in the first-round survey the presence of a written occupational safety and health standard policy noted in the follow-up survey that they do not have the policies any more. The International Labour Organization report noted also that following up on the implementation of the policies has remained a challenging in Ethiopia (ILO & MoLSA, 2013). This may indicate that improving non-monetary job qualities may need more time and effort since some of the workers and firms may not be aware of the importance of job qualities and the laws that mandated firms to ensure some of the job quality indicators. For instance, firms should have written occupational health and safety standards (Federal Negarit Gazeta: Labour Proclamation, 2019). Even though the overtime change is positive, there is no statistically significant salary increase for high skilled workers. Both the entry level and tenured jobs salaries of high skilled workers were the smallest in magnitude and statistical significance, when compared with low skilled and medium skilled workers. Regarding other covariates, the majority of the covariates remain unchanged over the survey period. The changes include the fact that the percentage of firms which moved in to industrial parks increased from about 17%

there is an equal weight for each of the indicators, which may not be the case for the workers. For instance, having OSH policy, accident recording and training only (which imply three index value) could be less valued by workers than earning higher than the median value, even when the values for other indicators is zero (which implies an index value of one).

to 35% during the survey period. The direct involvement in the management of the business owners declined overtime as well in a statistically significantly way.

Table 1. Summary statistics

Variables (all monetary values in ETB, 2014 price)	Total	2017	2018	Mean dif. (2017 – 2018)
Firm productivity indicators				
Profit per worker	32.67	32.42	32.91	-0.49
Sales per worker	32.67	376.62	386.01	-9.40
Value-added per worker	240.69	305.41	180.36	125.05***
Total factor productivity (from sale)	386.36	107.45	45.20	62.25***
Total factor productivity (from value-add)	63.42	465.11	266.98	198.13***
Job quality indicators				
Job quality index[ξ]	1.32	3.27	3.08	0.19
Provided training to production workers in the last 3 years (1/0)	0.19	0.21	0.17	0.04
Made workers aware of OSH issues (1/0)	0.63	0.63	0.63	0.00
Has a formal written grievance handling and dispute resolution mechanism (1/0)	0.22	0.25	0.20	0.04
There are workers who are members of trade unions (1/0)	0.20	0.19	0.21	-0.03
Has a written OSH policy (1/0)	0.41	0.44	0.37	0.07**
Average monthly starting salary for low-skilled production workers (ETB, real)	1106.96	1016.15	1193.68	-177.53***
Average monthly starting salary for medium-skilled production workers (ETB, real)	1622.39	1458.60	1778.79	-320.19***
Average monthly starting salary for high-skilled production workers (ETB, real)	2581.21	2498.18	2660.49	-162.31
Average monthly salary for low-skilled production workers with one-year tenure (ETB, real)	1212.59	1127.36	1293.97	-166.61***
Average monthly salary for medium-skilled production workers with one-year tenure (ETB, real)	1718.84	1592.08	1839.88	-247.80***
Average monthly salary for high-skilled production workers with one-year tenure (ETB, real)	2749.33	2707.75	2789.04	-81.29
Other/independent variables				
Capital per worker (ETB, real)	323.70	804.74	1662.40	-857.66
No. of total labour	80.97	84.77	95.02	-10.25
No. of production workers	54.18	57.25	63.57	-6.32
Number of high-school graduate workers	19.66	19.89	23.21	-3.32
Number of TVET graduate workers	0.65	0.58	0.74	-0.16
Number of college/university graduate workers	3.05	3.37	4.02	-0.65
Number of low-skilled production workers	33.09	34.68	31.55	3.13
Number of medium-skilled workers (IHS)	22.10	22.13	22.08	0.06
Number of high-skilled workers (IHS)	15.24	15.43	15.06	0.37
Share of male labour	0.64	0.62	0.62	0.01
Average age of low-skilled production workers	25.31	25.09	25.54	-0.46
Average age of medium-skilled production workers	28.09	27.71	28.48	-0.77***

Variables (all monetary values in ETB, 2014 price)	Total	2017	2018	Mean dif. (2017 – 2018)
Average age of high-skilled production workers	31.87	31.57	32.16	-0.59
Low-skilled production workers' average worked years in the firm	2.19	1.77	2.60	-0.83****
Medium-skilled production workers' average worked years in the firm	3.47	2.79	4.15	-1.36***
High-skilled production workers' average worked years in the firm	4.81	3.92	5.70	-1.79***
The firm located inside the industrial parks (1/0)	0.26	0.16	0.35	-0.20***
Major owner(s) of the business actively participate in management (1/0)	0.84	0.87	0.81	0.06**
Married owner/manager (1/0)	0.81	0.81	0.81	0.00
Age of the owner/manager	44.30	43.80	44.79	-0.99
Male owner/manager (1/0)	0.88	0.88	0.88	0.00
Ethiopian owner (1/0)	0.94	0.94	0.94	0.00
Total years of schooling of the owner/manager	11.94	11.94	11.94	0.00
Manager's/owner's years of work experience	13.37	13.37	13.36	0.01
The manager/owner has previous managerial experience (years)	0.10	0.10	0.10	-0.01
Average tenure of workers (in months)	4.99	5.01	4.96	0.06
The firm exports (1/0)	0.19	0.19	0.19	0.01
The firm advertises (1/0)	0.22	0.24	0.21	0.03
The firm exports (1/0)	0.17	0.16	0.16	-0.00
Number of firms	800	400	400	

Note: All values are in 2014 prices. Asterisks *, **, and *** denote 10%, 5% and 1%, respectively, in terms of level of significance from two-sample t test with equal variances. ζ the job quality index is constructed using nine equally-weighted dummy job quality indicators including (1) availability of formal grievance handling procedure, (2) if training was provided for production workers in the last three years (1/0), (3) existence of OSH policy at the firm (1/0), (4) whether the firm makes employees aware of OSH conditions at the worksite (1/0), (5) whether workers are represented in the decision-making committee (1/0), (6) whether the firm records the accidents occurred at the worksite, as the law requires (1/0), (7) availability of hand-washing facilities (1/0), and (8) whether wage rates are higher than the median wage rate (1/0). It is between 0 & 8 inclusive.

Table 2 presents mean values of value-added per worker and profit per worker (both in natural logarithms) at each value of the job quality index. The results show that, overall, it seems that there is a positive unconditional correlation between value-add per worker and job quality index, as well as between profit per worker and job quality index. A simple OLS regression of value add per worker and profit per worker on job quality index shows that they respectively increase by 22.6% and 23.5% as job quality increases by a unit. Although the direction of the causation, if any, is unclear at this point, the results of a Pearson parametric correlation test show that the correlation between the two productivity indicators and job quality index are statistically significant (1% level of significance).

Table 2. Job quality index versus productivity

	Value-add per worker (ln)		Profit per worker (ln)	
Job quality index values	Mean	Std.	Mean	Std.
0	3.10	2.01	1.47	1.74
1	3.71	1.77	1.74	1.62
2	3.83	1.87	2.05	1.61
3	4.60	1.64	2.65	1.70
4	4.67	1.62	2.69	1.63
5	5.32	1.35	2.93	1.94
6	5.34	1.29	2.86	1.38
7	5.13	1.29	2.79	1.84
8	5.64	0.97	3.69	1.09
Number of firms	728		713	

Table 3 further presents different indicators of firm performance disaggregated by three indicators of job quality. Consistent with the results we saw before, the results in the table show that firms which offer relatively higher quality jobs perform better in terms of productivity. For instance, net profit per worker, sales per worker, value-added per worker and TFP are higher for firms that provide well in terms of job quality indicators than firms without the job quality indicators. A T-test comparing the mean values of these productivity indicators show that most of the mean differences between firms that provide and those that do not provide the job quality indicators presented in the table are statistically significant. The results in the table further reveal that firms that provide relatively high-quality jobs also have higher capital per labour, and, hence, it is not clear at this stage whether the observed productivity difference is driven by higher capital per worker and other factors or because of the provision of quality jobs or vice versa, which we investigate later.

Table 3. Indicators of firm performance disaggerated by job quality indicators.

Firm performance indicators (ETB)		Provided on-the-job training		Has written OSH policy		Has grievance handling mechanism	
		No	Yes	No	Yes	No	Yes
	Total						
Net profit per worker	33	30	38	27	41	30	41
Sales per worker	386	343	455	286	521	340	532
Value added per worker	211	212	296	168	348	205	370
Capital per worker	1244	895	1916	998	1599	1000	2119
No. of observations	791	641	150	461	325	611	175

It is also important to examine the cumulative probability distribution curves of net profit per worker and value-add per worker across the different indicators of job quality, namely,

provision of on-the-job training, availability of OSH policy, and availability of a formal grievance handling and dispute resolution mechanism. The graphs presented in Figure 1 show that both profit per worker and value add per worker are higher for firms that offer the job qualities than the firms that do not provide the job qualities. Results from the Kaplan (2019) equality of distributions test rejected the null hypotheses of equality of distributions of net profit and value-add per worker between firms which provide and which do not provide quality jobs along the distribution curve even though it seems that the distribution curves seem similar at the tails.

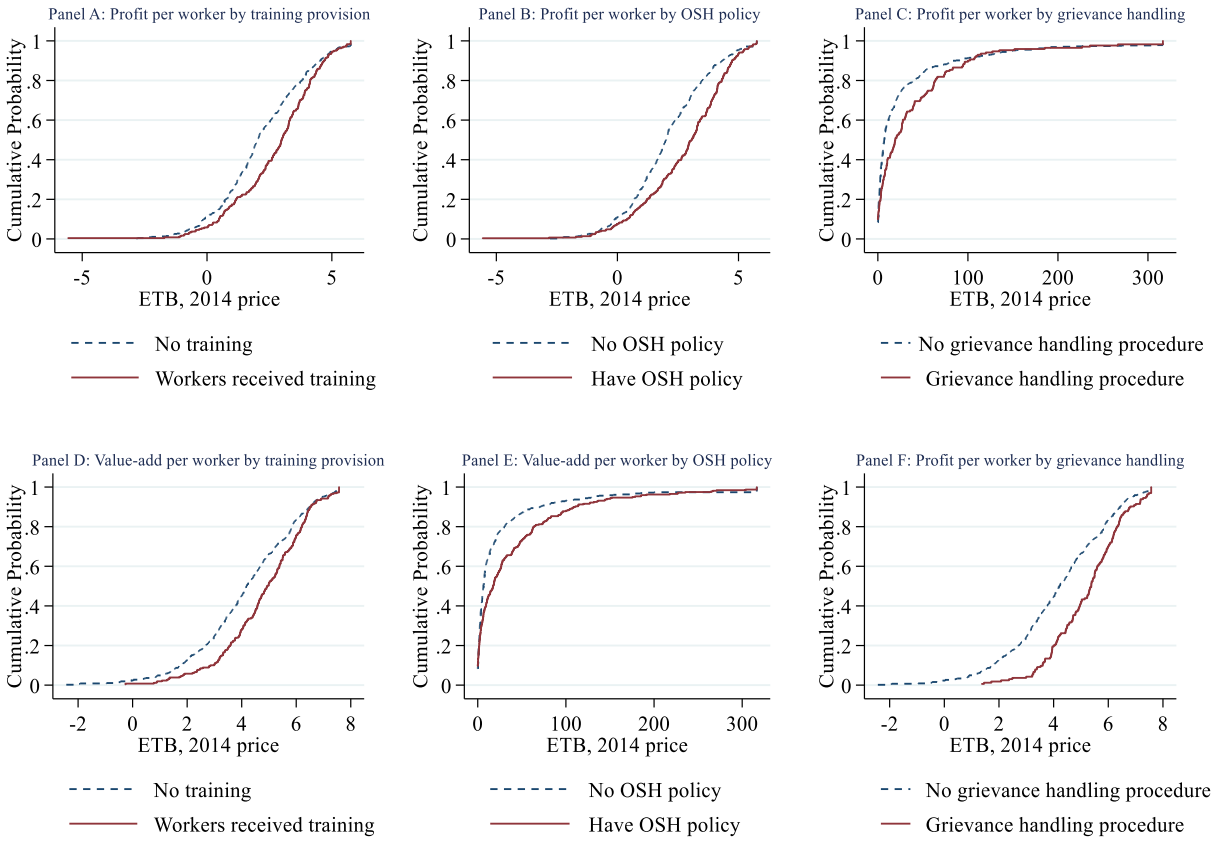

Figure 1. Cumulative probability distribution of profit and value-add per worker disaggregated by job quality indicators

The results found in the descriptive statistics show basic facts about productivity of firms and job quality. For instance, it was observed that, overall, there is a positive correlation between job quality and productivity. However, the results are insufficient since the observed job quality and productivity correlation could be driven by other factors, such as firm, managerial, and worker characteristics as well as due to potential confounding factors. Hence, it is important to control for other factors to investigate any causal link between job quality and firm productivity, which is addressed in the next section.

3. Econometric results

To begin presenting the regression results, this section first focuses on production function estimates. Then, regression results of the determinants of productivity are presented, followed by job quality and the relationship between productivity and job quality.

3.1 Production function estimates

Table 4 presents regression results from the Levinsohn and Petrin (LP; 2003) and Wooldridge (2009) approaches of production function estimates. The results show that the estimated coefficients from the two approaches are more or less similar for the majority of inputs. For instance, the return to high-school graduates are similar in the two approaches, both in terms of sales and value-added estimations. The estimates for the return to TVET graduates, however, is statistically significant only in the value-added estimation by the Wooldridge approach. Similarly, the return to capital is not statistically significant in the sales estimation of the LP approach. The results from the LP and Wooldridge approaches differ in statistical significance of raw materials. In contrast, the return to college/university graduates is higher than the return to high-school graduates, as expected. These results are consistent across all estimates. Previous studies also found differences between the production function estimation approaches (Van Beveren, 2012), which complicates policy recommendations.

Table 4. Production function estimates

Inputs & key controls	Sales (ETB, log)		Value-added (ETB, log)ς	
	LP	Wooldridge (GMM)	LP	Wooldridge (GMM)
High-school graduate workers (IHS)	0.087***	0.084**	0.160***	0.125***
	(0.005)	(0.036)	(0.033)	(0.041)
TVET graduate workers (IHS)	0.000	0.008	0.047	0.105**
	(0.075)	(0.045)	(0.034)	(0.051)
University graduate workers (IHS)	0.202***	0.186***	0.334***	0.264***
	(0.039)	(0.038)	(0.052)	(0.049)
Capital (ln)	0.107	0.178***	0.156***	0.201***
	(0.073)	(0.035)	(0.024)	(0.032)
Raw materials (ln)	0.208***	0.045		
	(0.035)	(0.030)		
Electricity expense	0.213***	0.165***		
	(0.067)	(0.056)		
Observations	1703	1304	1645	1224

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. ς is to denote that raw material and electricity costs are proxy variables in the estimation of value-add.

3.2 Impact of job quality on productivity

As indicated earlier, productivity is measured using five indicators: TFP estimated from sales and from value-added, profit per worker, sales per worker and value-added per worker (all are measured in logarithm form). The models are estimated using Mundlak random effects model after controlling for various firm- and worker-level characteristics as well as city (where the firms are located in), fixed effects, and survey year. The impact of job quality as measured in terms of aggregated job quality index and the impacts of salary on productivity are also estimated.

Table 5 presents the disaggregated impacts of various job indicators on productivity. The results show that almost none of the job quality indicators have statistically significant impacts on the five productivity indicators, after controlling for firm, manager, and worker characteristics, as well as Mundlak fixed effects, city fixed effects, and time fixed effects. The only statistically significant impact that emerged is that firms that have written occupational safety and health standard policy earned lower profits per worker than firms what do not have safety and health standards. However, this impact is statistically insignificant when separately run for the leather and agro-processing sectors, while we do not find differences on all other job quality indicators in terms of statistical significance whether we pool the two sectors data together or run separately (results not reporter). The training and OSH standard statistically significantly and positively affects all of the productivity indicators when firm size and Mundlak fixed effects are excluded (results not reported), but their coefficient becomes statistically insignificant when the Mundlak fixed effects and firm size are included. The statistical significance of job quality indicators remain the same when each indicator of job quality turn-by-turn is considered instead of including all the indicators together. This is also the case when the job quality index is considered instead of taking each job quality indicator individually.

Regarding the impacts of other covariates on productivity, the results show that micro-sized firms earned higher profit per worker than small- and medium-sized firms, but they are technically less efficient than large firms. The results further show that firms located inside industrial parks have lower value-add per worker than firms located outside the industrial parks. Economically large and statistically significant productivity differences were also observed between the leather and agro-processing sectors, where the former is less productive than the latter; however, statistically significant differences in profits per worker were not observed. Moreover, the results show that firms managed by Ethiopians earned less profit per worker than firms managed by foreign nationals, with managers' experience being an important determinant of productivity. Managers' years of work experience linearly affects productivity, where including the square of managers' years of work experience is not statistically significant and, hence, is excluded from the regression. Similarly, mean age and years of work experience of workers positively and statistically significantly affects

productivity. Public owned firms earned less profit per worker than other firms and evidence showing that foreign owned firms are more productive than domestically owned firms is weak. While there were no statistically significant differences in productivity between firms managed by men and women, profit per worker was found to increase with the share of male workers.

Table 5. Estimates of productivity using disaggregated job quality index

Covariates	TFP (sales, ln)	TFP (value-add, ln)	Profit per worker (ln)	Sales per worker (ln)	Value add per worker (ln)
Provided training to production	0.079	0.039	0.039	0.058	0.114
workers in the last 3 years	(0.092)	(0.112)	(0.113)	(0.082)	(0.111)
The firm has written OSH policy	0.069	0.077	-0.258**	-0.073	-0.025
	(0.100)	(0.132)	(0.110)	(0.095)	(0.135)
The firm has a formal written	0.093	-0.019	-0.037	0.029	-0.137
grievance handling and dispute	(0.129)	(0.141)	(0.165)	(0.120)	(0.144)
resolution mechanism					
Share of full-time workers	-0.064	-0.328	0.147	-0.128	-0.203
	(0.290)	(0.364)	(0.388)	(0.283)	(0.366)
Salary difference b/n high and low	-0.018	-0.033	0.020	0.009	-0.016
skill (ln)	(0.024)	(0.023)	(0.027)	(0.021)	(0.025)
There are workers who are	-0.241	0.057	0.031	-0.075	0.165
members of trade unions	(0.151)	(0.182)	(0.193)	(0.164)	(0.185)
Small-size (1/0: base dummy –	0.282	0.084	-0.322*	0.172	-0.132
micro-size)	(0.268)	(0.364)	(0.191)	(0.316)	(0.344)
Medium-size (1/0: base dummy –	0.212	0.238	-0.477**	-0.069	-0.259
micro-size)	(0.286)	(0.398)	(0.214)	(0.326)	(0.375)
Large-size (1/0: base dummy –	0.715***	0.828**	-0.262	-0.006	0.377
micro-size)	(0.271)	(0.360)	(0.170)	(0.317)	(0.338)
Firm's age, years	0.004	0.001	-0.011	-0.003	-0.004
	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)
The firm located inside the	-0.114	-0.288**	-0.035	-0.134*	-0.234*
industrial parks (1/0)	(0.086)	(0.120)	(0.112)	(0.078)	(0.122)
The firm advertises (1/0)	0.082	0.125	0.232	0.145	0.142
	(0.116)	(0.125)	(0.157)	(0.111)	(0.122)
Leather firm (1/0)	-0.546***	-0.523***	-0.365	-0.854***	-0.604***
	(0.153)	(0.187)	(0.242)	(0.194)	(0.186)
Major owner(s) of the business	-0.051	-0.088	-0.221	-0.159	-0.064
actively participate in the	(0.125)	(0.154)	(0.141)	(0.124)	(0.163)
management					
Manager's age	0.031	0.018	0.055	0.033	0.020
	(0.029)	(0.032)	(0.035)	(0.033)	(0.037)
Manager age squared	-0.000	-0.000	-0.001	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Covariates	TFP (sales, ln)	TFP (value-add, ln)	Profit per worker (ln)	Sales per worker (ln)	Value add per worker (ln)
Male manager	-0.088	-0.077	-0.160	-0.157	-0.107
	(0.164)	(0.186)	(0.220)	(0.176)	(0.198)
Ethiopian manager	0.477	-0.376	-0.636**	0.542	-0.165
	(0.471)	(0.404)	(0.266)	(0.472)	(0.303)
Manager's years of schooling	-0.010	-0.008	0.032	0.002	0.003
	(0.019)	(0.021)	(0.026)	(0.020)	(0.022)
Manager's years of managerial	0.024***	0.022**	-0.008	0.037***	0.025**
experience in trading business	(0.009)	(0.011)	(0.016)	(0.011)	(0.012)
Share of male labour	-0.235	0.306	0.815***	0.311	0.703**
	(0.225)	(0.275)	(0.316)	(0.243)	(0.313)
Mean age of production workers	0.033**	0.030**	0.032*	0.033**	0.026*
	(0.014)	(0.015)	(0.016)	(0.014)	(0.015)
Average working experience of	-0.010	-0.000	0.023**	-0.005	-0.001
production workers	(0.010)	(0.012)	(0.010)	(0.010)	(0.015)
Public-owned business	-0.127	0.179	-0.527**	-0.125	0.017
	(0.178)	(0.225)	(0.244)	(0.166)	(0.224)
Foreign-owned firm	0.548*	0.290	0.549	0.155	-0.129
	(0.312)	(0.393)	(0.382)	(0.251)	(0.356)
Location fixed effect	Yes	Yes	Yes	Yes	Yes
Mundlak fixed effect	Yes	Yes	Yes	Yes	Yes
Constant	2.627**	4.239***	-0.080	2.295**	2.568**
	(1.021)	(1.122)	(1.172)	(1.023)	(1.124)
Observations	770	727	707	776	728
r2_overall	0.458	0.555	0.335	0.542	0.429
chi2-joint significance of covariates	919.410	883.855	601.658	726.009	517.837

Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Unlike most of the previous studies which used aggregated mean salaries to investigate the nexus between wage and productivity (Bhattacharya et al., 2011; Flabbi & Ichino, 2001; Sethi & Kaur, n.d.; Vedder & Gallaway, 1982), the unique data in this study has skill- and tenure-disaggregated salary information. Table 6 presents these salary impacts, estimated separately, on productivity and profitability of firms. The results show that neither the starting nor tenured salaries of low skill workers have statistically significant impacts on the productivity and profitability of the firms. The results further show that a 10% increase on each of the salaries of tenured medium- and high-skilled workers increase sales per worker by 1.79% and 1.46%, respectively, ceteris paribus. However, statistically significant impacts on total factor productivity, profit per worker and on value-add per worker were not found. The results further show that increasing the starting salary of medium-skilled workers by 10% increases profit per worker, sales per worker, and value-add per worker by 2.27%, 2.43% and 2.44%, respectively; statistically significant impacts on total factor productivity were not found. The impact of starting salary of high skilled workers is weak, in that increasing salaries by 10%

increases sales per worker by a 1.19% at 10% level of significance, with no impact on other measures of productivity and profitability.

Table 6. Impacts of mean salaries on productivity and profitability

Covariates	TFP (sales, ln)	TFP (value-add, ln)	Profit per worker (ln)	Sales per worker(ln)	Value add per worker(ln)
Average monthly salary for low-skilled tenured production workers (ETB, ln)	-0.005	-0.018	0.025	0.110	0.066
	(0.116)	(0.160)	(0.142)	(0.123)	(0.167)
Average monthly salary for medium-skilled tenured production workers (ETB, ln)	0.047	0.118	0.168	0.179**	0.149
	(0.100)	(0.121)	(0.122)	(0.088)	(0.121)
Average monthly salary for high-skilled tenured production workers (ETB, ln)	0.103	-0.002	0.158	0.146**	0.020
	(0.081)	(0.100)	(0.118)	(0.067)	(0.097)
Average monthly starting salary for low-skilled production workers (ETB, ln)	0.043	0.149	0.081	0.111	0.206
	(0.123)	(0.163)	(0.149)	(0.128)	(0.171)
Average monthly starting salary for medium-skilled production workers (ETB, ln)	0.117	0.186	0.227*	0.243***	0.244**
	(0.102)	(0.116)	(0.134)	(0.083)	(0.118)
Average starting monthly salary for high skilled production workers (ETB, ln)	0.102	0.017	0.157	0.119*	0.017
	(0.088)	(0.103)	(0.121)	(0.066)	(0.096)
Other covariates	Yes	Yes	Yes	Yes	Yes
Mundlak fixed effect	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	2.606*	4.090**	-0.102	1.550	1.861
	(1.353)	(1.651)	(1.436)	(1.421)	(1.663)
Observations	770	727	708	778	728
r2_overall	0.453	0.553	0.332	0.544	0.429
chi2-joint significance of covariates	1214.513	922.955	594.940	711.699	514.293

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

This study also included estimation of the weighted mean of tenured salaries of low-, medium- and high skilled workers (weighted by their share in the total employment size) and an investigation of the impact on productivity and profitability. The results show that there is weak impact of weighted mean salary of tenured workers on various measures of productivity. The only statistically significant (at 10% level of significance) impact found is on sales per worker, where increasing the mean firm salary for tenured workers by 10% increases sales per worker by 1.7%. Similar results were found when weighted mean starting salary was used instead, whereby increasing the mean monthly salary by 10% increased sales per worker by 2.03% at 5% level of significance.

Table 7. Impacts of wage on productivity

	TFP (sales, ln)	TFP (value-add, ln)	Profit per worker (ln)	Sales per worker(ln)	Value add per worker(ln)
Weighted mean salary for one-year experience (ETB, ln)	0.047	0.002	0.101	0.170*	0.087
	(0.101)	(0.122)	(0.128)	(0.095)	(0.127)
Small-size (1/0: base dummy – micro-size)	0.306	0.107	-0.321*	0.190	-0.095
	(0.268)	(0.364)	(0.195)	(0.313)	(0.344)
Medium-size (1/0: base dummy – micro-size)	0.228	0.243	-0.458**	-0.050	-0.238
	(0.289)	(0.399)	(0.221)	(0.325)	(0.377)
Large-size (1/0: base dummy – micro-size)	0.754***	0.856**	-0.282	0.008	0.399
	(0.270)	(0.361)	(0.180)	(0.312)	(0.339)
Firm's age, years	0.003	0.002	-0.012*	-0.003	-0.004
	(0.003)	(0.004)	(0.007)	(0.004)	(0.004)
The firm located inside the industrial parks	-0.117	-0.294**	-0.026	-0.111	-0.238**
	(0.085)	(0.118)	(0.111)	(0.080)	(0.120)
The firm advertises	0.078	0.142	0.216	0.124	0.158
	(0.117)	(0.128)	(0.155)	(0.110)	(0.123)
Leather firm (1/0)	-0.541***	-0.528***	-0.344	-0.834***	-0.589***
	(0.151)	(0.184)	(0.239)	(0.192)	(0.185)
Major owner(s) of the business actively participate in the management	-0.035	-0.101	-0.203	-0.153	-0.067
	(0.128)	(0.154)	(0.132)	(0.123)	(0.161)
Manager's age	0.026	0.019	0.053	0.033	0.022
	(0.029)	(0.032)	(0.035)	(0.032)	(0.037)
Manager age squared	-0.000	-0.000	-0.001	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male manager	-0.117	-0.083	-0.166	-0.196	-0.120
	(0.162)	(0.186)	(0.222)	(0.172)	(0.196)
Ethiopian manager	0.391	-0.389	-0.544**	0.548	-0.109
	(0.480)	(0.397)	(0.261)	(0.464)	(0.284)
Manager's years of schooling	-0.009	-0.007	0.029	-0.000	0.004
	(0.019)	(0.021)	(0.026)	(0.020)	(0.022)
Manager's years of managerial experience in trading business	0.025***	0.022**	-0.008	0.036***	0.026**
	(0.009)	(0.011)	(0.015)	(0.011)	(0.012)
Share of male labour	-0.238	0.321	0.773**	0.297	0.705**
	(0.225)	(0.277)	(0.312)	(0.242)	(0.312)
Share of full-time workers	-0.029	-0.334	0.170	-0.097	-0.208
	(0.287)	(0.363)	(0.398)	(0.280)	(0.371)
Mean age of production workers	0.036***	0.032**	0.027	0.033**	0.026*
	(0.013)	(0.015)	(0.016)	(0.013)	(0.015)
Average working experience of production workers	-0.010	-0.001	0.023**	-0.009	-0.003
	(0.010)	(0.012)	(0.010)	(0.011)	(0.015)
Public owned business	-0.149	0.189	-0.523**	-0.125	0.035
	(0.177)	(0.223)	(0.250)	(0.167)	(0.220)
Foreign owned firm	0.522*	0.347	0.557	0.174	-0.041
	(0.297)	(0.377)	(0.363)	(0.241)	(0.355)
Location fixed effects	Yes	Yes	Yes	Yes	Yes

	TFP (sales, ln)	TFP (value-add, ln)	Profit per worker (ln)	Sales per worker(ln)	Value add per worker(ln)
Mundlak fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	2.250*	3.956***	-0.628	1.108	1.712
	(1.251)	(1.403)	(1.398)	(1.240)	(1.426)
Observations	770	727	708	778	728
r2_overall	0.454	0.553	0.334	0.545	0.429
chi2-joint significance of covariates	1231.975	901.119	580.154	715.267	505.774

Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Overall, weak evidence was found to support the idea that non-monetary job quality indicators impacted productivity: in most cases, the coefficients of most of the indicators are not statistically significant. On the other hand, however, impacts of monetary labour compensation on productivity were found to be mixed.

3.3 Impacts of productivity on job quality

Productivity impact on salaries

For the purposes of assessing the impact of productivity on job quality, this study uses the mean salary of different skilled workers, the job quality index, and disaggregated measurements of job quality, as discussed earlier. Table 8 presents the impacts of productivity on the mean salary of low-, medium-, and high-skilled workers with a one-year tenure at firms and entry level salary. The results show that the previous year's profit per worker has a statistically significant and positive affect on tenured salaries of low- and medium-skilled workers, as well as entry level of salaries of all skill levels. Specifically, a 10% increase in profit per worker of the previous year increases the salary of low- and medium-skilled workers with one year tenure by around 0.19% and 0.25%, respectively. No statistically significant impacts on high-skilled workers were found. Similarly, a 10% increase in profit per worker increases the entry level salaries of low-, medium-, and high-skilled workers by 0.21% and 0.28% and 0.27%, respectively, ceteris paribus. A statistically significant impact of profit-per-worker on weighted mean salary (by skill of workers) of workers with one year tenure and entry level workers was also found.

As shown in Table 8, variations in earning exist due to firm, manager, and worker characteristics. For instance, tenured high-skilled workers at public owned businesses earned around 18.7% less income than their counterparts working in non-public sectors. Specifically, foreign firms pay 22.6% less salary for tenured low-skilled workers and 19.6% less salary for starting low-skilled workers. Firms located inside industrial parks pay lower salaries for medium- and low-skilled workers than other firms. Despite these substantial and statistically significant differences in productivity, there are no statistically significant differences in salaries between leather and agro-processing sectors. Surprisingly, the data reveals that

foreign owned firms pay less salary for low-skilled workers than domestic firms do, and the results are consistent with unconditional mean differences between the two firms. The results are robust to various sensitivity analyses, such as excluding/including nationality of the managers, firm size, all other covariates and Mundlak fixed effects. The results further show that firms managed by Ethiopians pay lower salaries for low-skilled workers, while firms managed by men pay higher salaries than firms managed by women. Specifically, firms managed by men pay 10.3%, 13.7% and 24.4% higher salaries for tenured low-, medium-, and high-skilled workers, respectively, than firms managed by women. Salaries for low-skilled workers increase with the share of male workers in the firms, a consistent finding with the existing literature addressing gender earning gaps. The results show that salaries increase with the mean age of the workers, but not with work experience (even when the mean age of workers is excluded from the analysis); this is possibly attributable to the salary variables already taking the tenure of the workers in to account.

Table 8. Impact of productivity on salaries

Covariates	Average monthly salary for one-year tenured worker (ln)			Average monthly starting (entry level) salary		
	low skill	medium skill	high skill	low skill	medium skill	high skill
Profit per worker (lag, ln)	0.019**	0.025**	0.025	0.021**	0.028**	0.027*
	(0.009)	(0.011)	(0.015)	(0.010)	(0.012)	(0.016)
Public owned business	-0.040	-0.105*	-0.187**	-0.015	-0.024	-0.110
	(0.054)	(0.062)	(0.082)	(0.060)	(0.079)	(0.084)
Foreign owned firm	-0.226**	-0.120	-0.154	-0.196**	-0.016	-0.128
	(0.095)	(0.112)	(0.140)	(0.079)	(0.088)	(0.128)
Firm's age, years	0.001	0.001	0.004*	0.002	0.002*	0.003*
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
The firm located inside the industrial parks	-0.079**	-0.072**	0.027	-0.055*	-0.047	0.043
	(0.033)	(0.036)	(0.043)	(0.032)	(0.038)	(0.043)
The firm is currently exporting	0.014	-0.088	-0.124	0.017	-0.030	-0.032
	(0.047)	(0.057)	(0.086)	(0.044)	(0.074)	(0.082)
The firm advertises	0.012	0.126***	0.103	0.010	0.071*	0.081
	(0.032)	(0.042)	(0.063)	(0.034)	(0.042)	(0.063)
Capital per worker (ln)	0.003	-0.001	0.013	0.004	-0.002	0.010
	(0.008)	(0.010)	(0.014)	(0.008)	(0.010)	(0.013)
Labour size	-0.002	0.030	0.068*	-0.002	0.020	0.077**
	(0.023)	(0.027)	(0.038)	(0.023)	(0.027)	(0.038)
Raw materials (ln)	-0.000	-0.002	-0.006	0.002	-0.004	-0.007
	(0.009)	(0.009)	(0.015)	(0.009)	(0.011)	(0.014)
Leather firm (1/0)	0.009	0.033	-0.033	-0.013	-0.021	-0.116
	(0.051)	(0.062)	(0.078)	(0.048)	(0.070)	(0.083)
Major owner(s) of the business actively participate in the management	0.031	0.047	0.049	0.023	0.044	0.054
	(0.037)	(0.044)	(0.058)	(0.038)	(0.046)	(0.063)

Covariates	Average monthly salary for one-year tenured worker (ln)			Average monthly starting (entry level) salary		
	low skill	medium skill	high skill	low skill	medium skill	high skill
Manager's age	0.004	0.004	0.011	0.005	-0.005	0.004
	(0.007)	(0.008)	(0.010)	(0.007)	(0.009)	(0.011)
Manager age squared	-0.000	-0.000	-0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ethiopian manager	-0.205***	-0.041	0.060	-0.201**	-0.024	0.098
	(0.068)	(0.100)	(0.110)	(0.087)	(0.096)	(0.108)
Male manager	0.103**	0.137**	0.244***	0.058	0.126**	0.150**
	(0.051)	(0.061)	(0.074)	(0.042)	(0.062)	(0.076)
Manager's years of schooling	0.007	0.005	0.012	0.004	0.009	0.017**
	(0.005)	(0.006)	(0.008)	(0.005)	(0.007)	(0.008)
Manager's years of managerial experience in trading business	-0.000	0.001	0.001	0.000	0.002	0.001
	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
Share of full-time workers	-0.081	-0.075	-0.238*	0.003	-0.054	-0.215
	(0.119)	(0.114)	(0.143)	(0.104)	(0.116)	(0.150)
Share of male labour	0.199***	0.082	-0.042	0.188**	0.021	-0.016
	(0.073)	(0.081)	(0.096)	(0.074)	(0.082)	(0.103)
Mean age of production workers	0.012***	0.008*	0.009	0.012***	0.012**	0.009
	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)	(0.007)
Average working experience of production workers	-0.003	0.001	-0.000	-0.002	0.000	-0.001
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Average tenure of workers (in Months)	-0.002	0.002	0.003	-0.003*	0.000	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
The survey year is 2018 (base dummy: 2017)	0.147***	0.216***	0.108	0.112**	0.220***	0.102
	(0.046)	(0.058)	(0.083)	(0.051)	(0.063)	(0.089)
Small-size (1/0: base dummy – micro-size)	-0.028	-0.056	-0.161	0.033	-0.006	-0.145
	(0.071)	(0.103)	(0.100)	(0.076)	(0.108)	(0.107)
Medium-size (1/0: base dummy – micro-size)	-0.010	0.009	-0.155	-0.032	0.025	-0.166
	(0.079)	(0.110)	(0.111)	(0.083)	(0.119)	(0.119)
Large-size (1/0: base dummy – micro-size)	-0.028	0.004	-0.179	-0.071	0.028	-0.181
	(0.084)	(0.117)	(0.129)	(0.091)	(0.125)	(0.138)
Location fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.476***	6.583***	6.793***	6.356***	6.596***	6.906***
	(0.269)	(0.314)	(0.363)	(0.263)	(0.322)	(0.404)
Observations	701	701	701	701	701	701
r2_overall	0.211	0.251	0.269	0.213	0.240	0.248
chi2-joint significance of covariates	234.186	254.720	224.482	248.629	292.926	238.456

Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

The impact of value-add per worker (lagged) on salaries is also considered, instead of profit per worker. The results are generally similar, in that, the elasticity of salaries with respect to

value add per worker are statistically significant (with the exception of low-skilled workers) and positive. Specifically, a 10% increase in value add per worker increase next year salaries of tenured medium- and high-skilled workers by 0.3% and 0.28%, respectively, and that of starting salaries of medium- and high-skilled workers by 0.3% and 0.32%, respectively. Notably, firms also adjust starting salaries, possibly to attract productive workers, when profit and value add per worker increase.

Table 9. Value add per worker and salary

Covariates	Average monthly salary for one-year tenured worker (ln)			Average monthly starting (entry level) salary		
	low skill	medium skill	high skill	low skill	medium skill	high skill
Value-add per worker	0.010	0.030**	0.028**	0.007	0.030**	0.032**
(lag, ln)	(0.010)	(0.012)	(0.014)	(0.011)	(0.012)	(0.016)
Public owned business	-0.089*	-0.135**	-0.219***	-0.061	-0.061	-0.152**
	(0.049)	(0.056)	(0.070)	(0.055)	(0.069)	(0.072)
Foreign owned firm	-0.176**	-0.098	-0.189	-0.152**	-0.010	-0.157
	(0.089)	(0.108)	(0.139)	(0.076)	(0.090)	(0.129)
Firm's age, years	0.001	0.002	0.003*	0.002**	0.003**	0.003*
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
The firm located inside	-0.083***	-0.088**	-0.008	-0.068**	-0.082**	0.006
the industrial parks	(0.031)	(0.034)	(0.041)	(0.030)	(0.037)	(0.043)
The firm is currently	-0.001	-0.109**	-0.110	-0.009	-0.053	-0.048
exporting	(0.046)	(0.053)	(0.078)	(0.044)	(0.068)	(0.074)
The firm advertises	0.024	0.113***	0.073	0.030	0.066*	0.062
	(0.032)	(0.039)	(0.059)	(0.034)	(0.038)	(0.059)
Capital per worker (ln)	0.004	0.006	0.024*	0.008	0.009	0.024*
	(0.007)	(0.009)	(0.013)	(0.008)	(0.010)	(0.013)
Employment size	-0.009	0.017	0.055	-0.009	0.008	0.068*
	(0.022)	(0.026)	(0.035)	(0.021)	(0.026)	(0.035)
Raw materials (ln)	0.001	0.001	-0.003	0.004	-0.000	-0.005
	(0.008)	(0.009)	(0.014)	(0.008)	(0.011)	(0.013)
Leather firm (1/0)	-0.018	0.038	-0.022	-0.024	-0.002	-0.075
	(0.052)	(0.060)	(0.074)	(0.050)	(0.067)	(0.080)
Major owner(s) of the	0.014	0.034	0.038	0.007	0.044	0.027
business actively	(0.033)	(0.040)	(0.053)	(0.035)	(0.043)	(0.058)
participate in the management						
Manager's age	0.000	0.003	0.009	0.001	-0.006	0.004
	(0.007)	(0.008)	(0.010)	(0.007)	(0.009)	(0.011)
Manager age squared	-0.000	-0.000	-0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ethiopian manager	-0.203***	-0.071	0.000	-0.230***	-0.090	0.015
	(0.061)	(0.086)	(0.100)	(0.076)	(0.079)	(0.102)
Male manager	0.114**	0.135**	0.222***	0.059	0.111*	0.130*
	(0.048)	(0.057)	(0.067)	(0.042)	(0.058)	(0.069)

Covariates	Average monthly salary for one-year tenured worker (ln)			Average monthly starting (entry level) salary		
	low skill	medium skill	high skill	low skill	medium skill	high skill
Manager's years of schooling	0.007	0.004	0.011	0.003	0.007	0.015**
	(0.005)	(0.006)	(0.007)	(0.005)	(0.006)	(0.007)
Manager's years of managerial experience in trading business	-0.000	0.000	-0.001	0.001	0.001	-0.001
	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Share of full-time workers	-0.046	-0.031	-0.164	0.018	-0.033	-0.157
	(0.121)	(0.110)	(0.143)	(0.106)	(0.115)	(0.150)
Share of male labour	0.193***	0.069	-0.001	0.198***	0.035	0.018
	(0.069)	(0.074)	(0.093)	(0.070)	(0.076)	(0.098)
Mean age of production workers	0.011***	0.008**	0.009*	0.012***	0.013***	0.010*
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.006)
Average working experience of production workers	0.000	0.004	0.004	-0.000	0.002	0.002
	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)	(0.004)
Average tenure of workers (in Months)	-0.002	0.002	0.003	-0.003*	0.000	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
The survey year is 2018 (base dummy: 2017)	0.155***	0.248***	0.151*	0.122**	0.252***	0.143*
	(0.043)	(0.054)	(0.078)	(0.048)	(0.061)	(0.087)
Small-size (1/0: base dummy – micro-size)	0.025	-0.016	-0.130	0.068	0.023	-0.111
	(0.076)	(0.096)	(0.087)	(0.079)	(0.101)	(0.094)
Medium-size (1/0: base dummy – micro-size)	0.064	0.074	-0.114	0.036	0.101	-0.118
	(0.081)	(0.102)	(0.100)	(0.085)	(0.112)	(0.108)
Large-size (1/0: base dummy – micro-size)	0.041	0.081	-0.120	-0.008	0.094	-0.129
	(0.085)	(0.109)	(0.116)	(0.093)	(0.117)	(0.127)
Location fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.524***	6.466***	6.699***	6.448***	6.527***	6.780***
	(0.272)	(0.302)	(0.348)	(0.263)	(0.308)	(0.383)
Observations	759	759	759	759	759	759
r2_overall	0.194	0.244	0.259	0.197	0.236	0.240
chi2-joint significance of covariates	241.324	273.104	231.470	262.856	324.402	244.980

Robus standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Productivity impact on non-monetary job qualities

Investigating whether an increase in productivity improves non-monetary aspect of jobs is also investigated. Table 10 presents the impact of the previous year's profit per worker (in natural logarithm) on the job quality index, the probability of providing training, the probability of having OSH policy, the probability of having a formal grievance handling and dispute resolution mechanism, and the share of full-time workers. The results show that the coefficient of profit per worker is statistically significant on none of the dependent variables. Additionally, the results are robust for different exercises, such as when some of the

covariates including the Mundlak fixed effects are excluded. Instead of profit per worker, we also used to value-add per worker and sales per worker, and the results remain similar.

Table 10. Impact of productivity on job quality

Covariates	Mundlak random effects ordered logit model	Mundlak random effects logit model			Mundlak random effects fractional model
	Job quality index	Provided training to production workers in the last 3 years (1/0)	The firm has written OSH policy (1/0)	The firm has formal written grievance handling mechanism (1/0)	Share of full-time workers
Profit per worker (lag, ln)	0.037	0.096	-0.092	-0.001	0.002
	(0.050)	(0.070)	(0.076)	(0.096)	(0.003)
Firm's age, years	0.002	-0.004	0.001	0.006	-0.001
	(0.006)	(0.007)	(0.010)	(0.009)	(0.000)
The firm located inside the	0.165	-0.119	-0.161	0.102	-0.027**
industrial parks	(0.190)	(0.233)	(0.264)	(0.313)	(0.012)
The firm is currently	0.135	-0.311	0.015	0.367	-0.034*
exporting	(0.260)	(0.314)	(0.321)	(0.372)	(0.017)
The firm advertises	0.573**	0.700**	0.103	0.564*	0.001
	(0.248)	(0.288)	(0.297)	(0.299)	(0.015)
Capital per worker (ln)	0.196***	0.126**	0.060	0.159**	0.001
	(0.046)	(0.050)	(0.057)	(0.068)	(0.002)
Employment size	1.034***	0.634***	0.910***	0.911***	0.013
	(0.139)	(0.173)	(0.225)	(0.232)	(0.008)
Raw materials (ln)	0.055	-0.026	0.002	0.025	-0.001
	(0.055)	(0.061)	(0.064)	(0.082)	(0.003)
Leather firm (1/0)	0.306	1.029***	-0.220	-0.364	0.040***
	(0.286)	(0.323)	(0.358)	(0.375)	(0.016)
Major owner(s) of the	0.348	0.513	-0.157	0.163	-0.015
business actively participate	(0.239)	(0.323)	(0.321)	(0.326)	(0.011)
in the management					
Manager's age	0.096**	0.048	0.095	-0.002	0.002
	(0.048)	(0.054)	(0.067)	(0.067)	(0.003)
Manager age squared	-0.001**	-0.000	-0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Ethiopian manager	0.009	0.305	-1.049	0.233	-0.002
	(0.547)	(0.638)	(0.867)	(0.633)	(0.024)
Male manager	-0.626**	-0.975***	-0.555*	-1.006***	-0.023
	(0.244)	(0.351)	(0.330)	(0.388)	(0.018)
Manager's years of	0.023	0.094**	0.029	-0.006	0.002
schooling	(0.028)	(0.043)	(0.038)	(0.050)	(0.002)

Covariates	Mundlak random effects ordered logit model	Mundlak random effects logit model			Mundlak random effects fractional model
	Job quality index	Provided training to production workers in the last 3 years (1/0)	The firm has written OSH policy (1/0)	The firm has formal written grievance handling mechanism (1/0)	Share of full-time workers
Manager's years of managerial experience in trading business	0.012	0.049***	-0.008	0.031	0.001
	(0.012)	(0.018)	(0.023)	(0.021)	(0.001)
Share of full-time workers	0.232	-0.297	-0.431	1.082	
	(0.490)	(0.985)	(0.879)	(0.820)	
Share of male labour	1.470***	0.349	1.552**	1.387**	0.021
	(0.394)	(0.568)	(0.613)	(0.619)	(0.023)
Mean age of production workers	0.037	0.060**	0.037	0.023	-0.002
	(0.026)	(0.030)	(0.036)	(0.037)	(0.001)
Average working experience of production workers	-0.015	-0.015	0.005	0.027	0.000
	(0.022)	(0.021)	(0.023)	(0.028)	(0.001)
Average tenure of workers (in Months)	-0.000	-0.017	-0.005	-0.019	0.001**
	(0.011)	(0.014)	(0.019)	(0.021)	(0.000)
The survey year is 2018 (base dummy: 2017)	-0.459	-0.526	-0.693	-0.271	-0.009
	(0.348)	(0.409)	(0.462)	(0.433)	(0.018)
Percent of imported inputs	0.012***	0.008	0.015**	0.007	0.000
	(0.004)	(0.005)	(0.007)	(0.006)	(0.000)
Small-size (1/0: base dummy – micro-size)	-0.324	0.329	0.384	-0.738	-0.016
	(0.458)	(0.556)	(1.157)	(0.694)	(0.020)
Medium-size (1/0: base dummy – micro-size)	-0.530	-0.069	-0.151	-0.053	0.016
	(0.505)	(0.648)	(1.194)	(0.466)	(0.021)
Large-size (1/0: base dummy – micro-size)	-0.417	-0.946	-0.013	0.000	-0.030
	(0.561)	(0.748)	(1.261)	(.)	(0.025)
City fixed effects	Yes	Yes	Yes	Yes	Yes
Mundlak fixed effects	Yes	Yes	Yes	Yes	Yes
Constant		-7.378***	-6.000**	-7.538***	0.940***
		(2.199)	(2.830)	(2.412)	(0.083)
Observations	701	686	701	675	701
chi2-joint significance of covariates	607.580	66.498	50.235	111.929	60.766

Robust standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01.

4. Discussion and conclusion

This study aims to investigate the nexus between productivity and job quality. Specifically, it investigates whether firms share the gains earned from productivity with workers in terms of higher wages and better non-wage amenities. Similarly, the paper explores whether firms offering quality jobs see a return in terms of higher productivity and profit. Answering these questions has policy relevance and helps understand whether there is a trade-off, reinforcement, or no link between policies that aim to improve job quality and those that aim to enhance firm productivity (Dosi et al., 2020). Understanding this interplay is crucial because productivity of firms is also necessary for economic growth and for job creation. Likewise, improving job quality is crucial for the wellbeing of workers who spend a significant part of their lives at the worksite (Munoz de Bustillo et al., 2011).

On the one hand, improving the quality of jobs requires reallocating some of the resources from production to investments, which reduces production. On the other hand, improving job quality has the potential to increase productivity by reducing labour turnover, absenteeism, and medical expenses. Improved job quality can also help motivate workers to increase productivity and increase the opportunity cost of shrinking. Hence, the link between productivity and job quality is not straightforward. Using a panel data of 400 agro-processing and leather firms in Ethiopia, this paper contributes to the dearth in literature exploring the links between productivity and job quality in a developing country context. The study also complements previously published studies conducted in different, yet related contexts (Aubert & Crépon, 2003; Flabbi & Ichino, 2001; Konings & Vanormelingen, 2015; Mawejje & Okumu, 2018).

Due to several constraints, the contribution of the manufacturing sector in the Ethiopian economy has been limited (World Bank, 2015). Cognizant of this, the Ethiopian government has made efforts to boost the sector through a number of measures such as the construction of industrial parks in different parts of the country, which have been leased out to firms. These dedicated industrial spaces help avoids constraints firms have been facing to build production houses (Weldesilassie et al., 2017). Consequently, there have been improvements in attracting both domestic and foreign firms However, the emerging sector has been marred by a poor job quality – high labour turnover – low productivity cycle (Kiruga, 2019), in that workers also prefer self-employment (Blattman & Dercon, 2018).

Non-monetary job quality indicators had a weak impact on productivity. Most of the results from the sample indicate that firms that provide improved non-monetary quality jobs do not obtain statistically significant different productivity, profit per worker, and value add per worker than firms that do. On the other hand, the data show that increasing the entry level and tenured salaries of medium- and high-skilled workers generates positive elasticity of sales

per worker, ranging from 0.12 to 0.24. However, no statistically significant impact on profit per worker was found, with the exception of the starting salary for medium-skilled workers. In this case, a 10% increase in salary increased profit per worker by 2.27% at 10% level of significance. The weak impact of job quality on profit per worker reduces the incentive of employers to invest in job quality improvements, which may call for intervention (Findlay et al., 2017).

In contrast, however, an increase in profit per worker was found to increase the salaries of both tenured employees and new hires. For instance, a 10% increase in profit per worker increases tenured salaries of low-and medium-skilled workers by 0.2% and 0.3%, respectively, and starting salaries for low, medium, and high-skilled workers by 0.21%, 0.28% and 0.27%, respectively. Similarly, an increase in value add per worker statistically significantly increases salaries of medium- and high-skilled workers. Even though previous studies do not disaggregate the salaries by the skill of the workers, the positive bidirectional causal link between productivity and salaries/wage is consistent with most previous studies (Flabbi & Ichino, 2001; Foon Tang, 2012; Mawejje & Okumu, 2018; Policardo et al., 2019). However, statistically significant impacts of profit per worker and value add per worker on non-monetary aspects of job quality were not found.

This paper is not without limitations, however. Only a few characteristics of workers are used to evaluate this complex issue. Data was collected only from agro-processing and leather firms, which is insufficient to estimate intra-sectoral productivity and job quality difference. While two rounds of data collection with short time gap were used for this study, investigating the bidirectional impacts of productivity and both monetary and non-monetary qualities of jobs using longer term time data is warranted. Moreover, additional insights could be gleaned through further research aimed at investigating the bidirectional impacts of different dimensions related to job quality, productivity, and profitability.

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