



# Employment Status during the COVID-19 Pandemic: Evidence from Ethiopia

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Accepted: 25 March 2022 / Published online: 19 April 2022

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## Abstract

Since the beginning of the year 2020, the world has been suffering from an unprecedented situation due to the Corona Virus Disease (COVID-19). The negative impact of COVID-19 is one of the worrisome issues across the globe. Among others, employment is one area affected during the COVID-19, which requires considerable scientific studies to identify factors affecting employment status throughout the disease crisis. Therefore, this study has mainly aimed to investigate the factors affecting the employment status during the COVID-19 pandemic in Ethiopia, taking a total of 2,396 respondents who had jobs before the COVID-19 outbreak. To achieve the stated objectives, the study has employed a binary logit regression model considering the employment status of respondents who lost their job (unemployed) and who secured their job (employed) during the pandemic. The model result indicates that females were more likely to be unemployed than males, persons living in a rural area were more likely to be unemployed than persons living in an urban area, and persons engaged in industry, service, and trade were more likely to be unemployed than people engaged in agriculture during the pandemic. Furthermore, during the pandemic, people living in the capital city of Ethiopia (Addis Ababa) were more likely to be unemployed compared to people living in the other regions of the country. Finally, based on these findings, critical recommendations were forwarded to the government and policymakers for their intervention.

**Keywords** Addis Ababa · Binary logit · COVID-19 · Employment status · Ethiopia

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## 1 Introduction and Problem Justification

Since the beginning of the year 2020, the world has been in trouble as a result of the Corona Virus Disease (COVID-19) (Asante & Mills, 2020). The first cases of COVID-19, a novel coronavirus (SARS-CoV-2), were reported in China and spread across the attracting worldwide attention (Zanke, et al., 2020). The daily increasing numbers of cases and deaths due to COVID-19 have led to worldwide lockdowns, isolation, and restrictions (Atalan, 2020). COVID-19 has been an astonishing health and economic crisis for the world (Hensher, 2020). The complete lockdown was the only measure taken to stop the exponential contagion rates of the virus, but this measure highly has affected the entire global economy (Dutta, et al., 2020) and the daily lives of people across the world (Ousmane, 2020). In Ethiopia, predictions by the National Planning Commission have also indicated possible reductions of 2.8 percent to 3.8 percent in the national economy and potential reductions in GDP by at least 5.6 percent for 2020–2021 (Tamrat, 2020).

As the entire socio-economic consequences remain uncertain, the pandemic's impact on the labour market has become an issue of global concern. In particular, low-income earners with jobs in precarious, informal sectors of the economy, without unemployment insurance, limited access to healthcare, and no back-up savings, are most at risk due to the adverse effects of the pandemic (Danquah, et al., 2020). The COVID-19 has severely affected employment ubiquitously (Betcherman & Testaverde, 2020), mainly for mothers due to the absence of childcare and homeschooling requirements (Petts & Carlson, 2020). As a result of COVID-19, many countries recorded unexpected rises in unemployment (Hensher, 2020). One of the major challenges that the world is facing is the problem of unemployment (Kassa, 2012; Aynalem & Mulugeta, 2018), as 345 million full-time equivalent jobs were lost worldwide in the third quarter of 2020 alone (ILO, 2020). The economic shock brought on by the COVID-19 pandemic resulted in reductions in income for over 770,000 workers, reductions in working hours for over 700,000 workers and layoffs for over 42,000 workers in Ghana (World Bank, 2020), and an increased unemployment rate by 0.3 percent in Germany (Bauer & Weber, 2020).

Like most countries in the world, Ethiopia has been dealing with the unprecedented social and economic consequences of the COVID-19 pandemic. The country is the second most populous country in Africa after Nigeria, with a population of about 115 million people and a labour force of 53,546,648 (the Ethiopian labour force is nearly ten times that of the total population of Norway). It is, however, one of the poorest, with a gross national income per capita of \$890. Ethiopia's main challenges are sustaining its positive economic growth and advancing poverty alleviation. Among other things, the challenges necessarily require significant progress in job creation (World Bank, 2021). The Ethiopian economy and labour market are structured in such a way that they exhibit both resilience and vulnerability (JCC and ILO, 2020). The pandemic has had a significant impact on unemployment rate metrics in particular. Ethiopia's unemployment rate

increased from 2.325% in the fiscal year 2019/2020 to 3.23 percent in the fiscal year 2020/2021 (World Bank, 2022). The pandemic has reduced employment and household incomes in Ethiopia (Ousmane, 2020). Currently, nearly 15% of those who attended post-secondary education are unemployed (Tamrat, 2020). In Ethiopia, due to disruption of employment, individuals lost their income indicating, it is most explicit impact on the well-being of the households and individuals apart from the health crisis (Yimer, et al., 2020). Employment is the situation whereby a person gets a job to work in exchange for certain stipulations, like a monetary value used to satisfy his or her personal needs. Even if, most people reach an agreement that a job is an indispensable part of life, others view it simply as a means of monetary compensation, but for others, it is what defines their social status (Abuhashesh, et al., 2019). One of the series of challenges in Ethiopia is the problem of unemployment (Tamrat, 2020). Thus, unemployment should be given prior attention and necessary policy measures should be designed as it causes socio-economic crisis and political unrest (Rekik, 2012).

Albeit employment has had both social and economic significance for a country and individuals, to the best of the researchers' efforts, the factors affecting employment status during COVID-19 are not yet studied in Ethiopia. Like most other low- and middle-income countries, there is a dearth of timely economic data in Ethiopia (Hirvonen, 2020), which makes it difficult to see the socio-economic impact of the COVID-19 pandemic and the associated factors. The World Bank collected the COVID-19 High-Frequency Phone Survey Data from Households in Ethiopia. Thus, this study used these data and investigated the factors affecting employment status during COVID-19 in Ethiopia to add evidence to the existing limited literature.

Political, environmental, social, legal, and economic factors have a positive and significant impact on employment during a crisis (Hasan, 2018). Age greater than 40 has had a positive association with employment status (Cohen, et al., 2013). Age, marital status, education above primary school, and living in Addis are the factors determining urban unemployment in Ethiopia (Kassa, 2012). Ethiopia's economy is highly dependent on agriculture which is mostly based on family labor. The effect of COVID-19 on employment is small in rural areas, but employment is highly affected in urban areas (Hirvonen, 2020). Indirectly through their effects on attitude, subjective norm, and perceived behavioral controls, the demographic factors were found to affect employment status choice intentions (Kolvereid, 1996).

The rates of employment, unemployment, and labor force participation can be affected by the amount of usable vision, gender, and the presence of other disabling conditions for working-age adults with visual impairments (La Grow, 2004). Compared to persons who had completed only elementary education, persons who completed secondary education had no advantage in gaining employment and even in another province persons who had completed secondary education had a significantly higher unemployment rate than those with only an elementary education (Thongchunnum, et al., 2008). Lack of information about the job market, experience, political connection is factors affecting graduate unemployment, but differently, age, race, and self-confidence are the factors that do not affect graduate unemployment (Mncayi, 2016).

## 2 The Objective of the Study

This study aims at determining the impact of the Covid-19 pandemic crisis on the Ethiopian employment status in general and specifically focused on gender, location (rural/urban), and activity (agriculture, industry, service, and trade).

## 3 Research Methodology

### 3.1 Data

To attain the study objective, the cross-sectional data were directly taken from the World Bank COVID-19 High-Frequency Phone Survey of Households 2020. Moreover, additional data were collected from the latest report of the Central Statistics Agency, and other published and unpublished materials to substantiate the World Bank data.

### 3.2 Study Population

The researchers purposively interviewed 2,396 respondents with the criterion of having jobs before the COVID-19 outbreak, from the World Bank COVID-19 High-Frequency Phone Survey of Households 2020 data.

### 3.3 Description of the Variables

#### (i) Dependent Variable

The dependent variable included in this study is the employment status of respondents during COVID-19. Hence, the dependent variable  $Y_i$  for  $i^{\text{th}}$  respondent can be expressed as 1 and 0. Those respondents who lost their job (unemployed) during the pandemic were coded as (1) and those who secured their job (employed) were coded as (0).

#### (ii) Explanatory Variables

The independent variables used in the study were region, gender, location (rural/urban), and activity (agriculture, industry, service, and trade).

### 3.4 Method of Data Analysis

The quantitative data were analysed using both descriptive and econometric models. To characterise the socio-economic background of respondents, descriptive statistics including frequencies, percentages, and Chi-square tests were employed. On the other hand, to identify the potential factors that determine the change in employment status during the pandemic in Ethiopia, the binary logistic regression model was applied.

#### Binary Logistic Regression model

The logistic regression model was developed to predict a binary dependent variable as a function of the predictor variables which is a suitable technique to use for binary response variables (Agresti, 2018). Therefore, to explore the implied association between dependent and independent variables the study used logistic regression analysis. For estimating the probability of a dichotomous response for various values of explanatory variables we used the binary logistic regression analysis. In this model, the logit is the natural logarithm of the odds or the likelihood ratio that the dependent variable, those who secured their job (employed) was coded as (0), and respondents who lost their job (unemployed) during the pandemic were coded as (1).

The model for the predicted probabilities is given as:

$$\ln \left[ \frac{P(Y)}{1 - P(Y)} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \tag{1}$$

$$P(Y) = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k}}$$

where  $n \left[ \frac{P(Y)}{1 - P(Y)} \right]$  is the log (odds) of employment status.

Y is the dichotomous outcome which represents whether they secured their jobs (employed) or lost their jobs (unemployed) during the pandemic, X1, X2, ..., Xk are the predictor variables,  $\beta_0, \beta_1, \beta_2, \dots, \beta_k$  are the regression (model) coefficient.

**Odds Ratio**

Logistic regression analysis utilises the odds ratio for interpretation. The odds are simply the ratio of the probabilities of the two possible outcomes. It is the ratio of the probability of success p (the probability that the individual is still employed during the pandemic) to the probability of failure 1-p (the probability that the individual lost his/her job due to the pandemic). That is

$$\text{odd} = \frac{p}{1 - p}$$

The odds are non-negative with a value greater than one when success is more likely than failure. The odds ratio (OR) is defined as the ratio of the odds for Y=1 to the ratio of Y=0 and is given by

$$\text{Odds ratio(OR)} = \frac{\frac{p_1}{1-p_1}}{\frac{p_0}{1-p_0}}$$

The odds ratio is an estimate of the risk of an exposed group relative to a control group or unexposed (reference group). An odds ratio of less than 1 indicates a negative relationship and an odds ratio greater than 1 indicates a positive relationship, and an odds ratio equal to 1 indicates no difference between the exposed and control group.

**The Goodness of Fit Test**

**The Hosmer–Lemeshow Test**

The Hosmer–Lemeshow test is used for assessing the goodness of fit of a model. The null hypothesis is that the model is adequate to fit the data and if the p-value for the Hosmer–Lemeshow goodness of fit test is greater than 0.05, we will not reject the null hypothesis that there is no difference between observed and model-predicted values, implying that the model estimates are adequate to fit the data at an acceptable level (Hosmer and Lemeshow, 2000).

#### The Likelihood Ratio Test

The likelihood ratio test is a general test to compare two models, a full model (L1) and a simpler (reduced) model (Lo). It tests that the parameters in the full model are equal to zero. The test uses the likelihood function. The maximum likelihood estimates maximise this function.

The likelihood ratio equals:

$$G^2 = -2 \log(Lo) - \log(L1)]$$

Significance at 0.05 level or less means the reduced model with the explanatory variables is significantly different from the one with the constant only. It measures the enhancement in fit that the explanatory variables make compared to the null model. Chi-square is used to evaluate the significance of this ratio. When the probability is unable to reach the 0.05 significance level, we do not reject the null hypothesis that knowing the explanatory variables has no more effects predicting the response variable.

#### The Wald Test

The Wald statistic is used to test the significance of individual parameters in the logistic regression. It is used to test:  $H_0: = 0$  against  $H_1: \beta_i \neq 0$ . The Wald test statistic is:

$$W = \left( \frac{\hat{\beta}_i}{\text{se}(\hat{\beta}_i)} \right)^2$$

$$i = 1, 2, \dots, j$$

Under the null hypothesis  $w \sim (0,1)$ . When the computed value of  $|w| \leq Z_{(1-\frac{\alpha}{2})}$  we do not reject the null hypothesis, while if  $|w| > Z_{(1-\frac{\alpha}{2})}$ , then the null hypothesis can be rejected at the given alpha level.

## 4 Results and Discussion

The result of the statistical analysis is presented in two parts. In the first part, we present the result of descriptive analysis with its Chi-square test of association and the second part focuses on the results of logistic regression.

**Table 1** Bivariate analysis results. *Source:* Own computation, 2021

Variable	Levels	Current employment status				Total (row)		P-Value
		Employed		Unemployed		Freq	%	
		Freq	%	Freq	%			
Gender	Female	489	20.4	174	7.3	663	28	0.0000
	Male	1422	59.3	311	13.0	1733	72	
	Total	1,911	79.7	485	20.3	2,396	100	
Region	Addis Ababa(AA)	293	12.2	135	5.6	428	18	0.0000
	Afar (AF)	78	3.3	19	.8	97	4	
	Amhara (A)	200	8.3	31	1.3	231	10	
	Benishangul-Gumuz (BG)	132	5.5	14	.6	146	6	
	Dire Dawa (DD)	124	5.2	63	2.6	187	8	
	Gambela (GA)	163	6.8	8	.3	171	7	
	Harar (H)	186	7.8	50	2.1	236	10	
	Oromia (O)	295	12.3	47	2.0	342	14	
	SNNPR (S)	140	5.8	27	1.1	167	7	
	Somali (SO)	127	5.3	28	1.2	155	6	
	Tigray (TG)	173	7.2	63	2.6	236	10	
	Location	Rural	581	24.2	96	4.0	677	
Urban		1330	55.5	389	16.2	1719	72	
Activity	Agriculture	608	25.4	57	2.4	665	28	0.0000
	Industry/ma	236	9.8	87	3.6	323	13	
	Service	819	34.2	238	9.9	1057	44	
	Trade(Whole	248	10.4	103	4.3	351	15	

#### 4.1 Descriptive Analysis

The bivariate analysis was used to determine the association between the employment status of the respondents after the occurrence of COVID-19 and the factors that determined the employment status.

Table 1 shows that 1,911 (79.70 percent) of the total respondents were secured their job and the remaining 485 (28 percent) were lost their job during the pandemic. Out of these respondents, 28 percent are females and the remaining 72 percent are males. Besides, 28 percent of the total respondents are from rural areas and the remaining 72 percent were from urban areas.

Moreover, the result indicated that there is an association between the explanatory variables (household head gender, location, region, activities) and the dependent variable current employment status at a 5 percent level of significance.

**Table 2** Binary logistic regression analysis results. *Source:* Own computation, 2021

Variable	Coefficient	SE	Z-value	P-value
<i>Dependent: Employment status (Unemployed = 1, Employed = 0).</i>				
Gender(G) (Female = 1, Male = 0)	0.326	0.1141	2.86	0.004
Location(L) (Rural = 1, Urban = 0)	0.4095	0.1713	2.39	0.017
Age(Ag)	- 0.0012	0.0041	- 0.3	0.772
Activity (Agriculture)				
Industry/manufacturing/Constr(I)	1.3876	0.232	5.98	0.000
Service(S)	1.1476	0.2063	5.56	0.000
Trade(Wholesale & Retail)(T)	1.5348	0.2277	6.74	0.000
Region(Reference AA)				
AF	- 0.4337	0.2863	- 1.5	0.130
A	- 0.8242	0.2283	- 3.6	0.000
BG	- 1.2084	0.3065	- 3.9	0.000
DD	0.0859	0.1893	0.45	0.650
GA	- 1.9898	0.382	- 5.2	0.000
H	- 0.4933	0.1934	- 2.6	0.011
O	- 0.7246	0.2003	- 3.6	0.000
S	- 0.6235	0.246	- 2.5	0.011
SO	- 0.1624	0.2641	- 0.6	0.539
TG	- 0.1107	0.1897	- 0.6	0.559
_cons	- 2.1124	0.2953	- 7.2	0.000

## 4.2 Binary Logistic Regression Analysis

As indicated in Table 2, the Wald test result of binary logistic regression using a maximum likelihood estimation approach indicated that except for age, all the explanatory variables such as gender, location, region, and activities have a statistically significant effect on the employment status during the pandemic in Ethiopia.

The fitted logistic regression model:

$$P(EP = 1/X) = \frac{e^{-2.11+0.325G+0.4L+1.38I+1.14S+1.53T-0.82A-1.2BG-1.9GA-0.49H-0.72O-0.62S}}{1 + e^{-2.11+0.325G+0.4L+1.38I+1.14S+1.53T-0.82A-1.2BG-1.9GA-0.49H-0.72O-0.62S}}$$

Table 3 reveals that the explanatory variables (gender, location, activity (sector), and regions) have a significant influence on the employment status during the pandemic.

The results indicate that gender positively and statistically affected employment status in Ethiopia during the pandemic indicates the odds ratio of being unemployed increases by 1.38 if the individual is female compared to male, which implies that during the pandemic females were more likely to be unemployed than males were. This result is in line with the findings of Julie (2020) who found that due to COVID-19, the number of women dropped out of labor was four times higher compared to



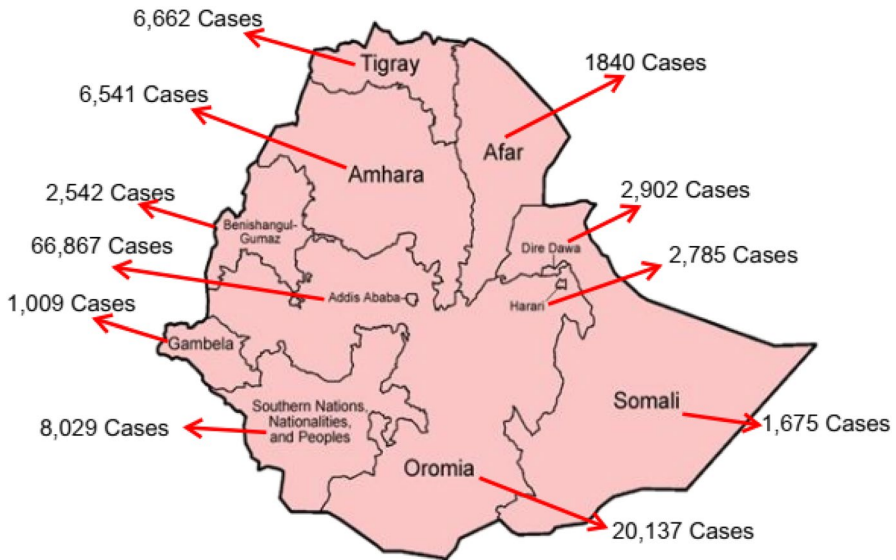
**Table 3** Odds ratio results. *Source:* Own computation, 2021

Variable	Odds ratio	SE	Z-value	P-value
Gender(G) (Female = 1, Male = 0)	1.3854	0.1581	2.86	0.004
Location(L) (Rural = 1, Urban = 0)	1.5061	0.2581	2.39	0.017
Age(Ag)	0.9988	0.0041	- 0.29	0.772
Activity (Agriculture)				
Industry/manufacturing/Construction(I)	4.0052	0.9291	5.98	0.000
Service(S)	3.1506	0.6499	5.56	0.000
Trade(Wholesale and Retail)(T)	4.6405	1.0566	6.74	0.000
Region (Reference AA)				
AF	0.6481	0.1856	- 1.51	0.130
A	0.4386	0.1001	- 3.61	0.000
BG	0.2987	0.0915	- 3.94	0.000
DD	1.0897	0.2063	0.45	0.650
GA	0.1367	0.0522	- 5.21	0.000
H	0.6106	0.1181	- 2.55	0.011
O	0.4845	0.0970	- 3.62	0.000
S	0.5361	0.1319	- 2.53	0.011
SO	0.8501	0.2245	- 0.61	0.539
TG	0.8952	0.1698	- 0.58	0.559
_cons	0.1209	0.0357	- 7.15	0.000

male. Furthermore, this result is supported by the findings of Azcona, et al., (2020) who found that due to COVID-19, more women have lost their jobs or businesses. According to World Bank (2022) the pandemic has also widened the gender unemployment gap or the positive difference in unemployment rates between men and women. In 2019, the ILO estimated that 2.99% of females and 1.73% of males were unemployed. However, in just one year, the female unemployment rate rose to 4.04% and the male unemployment rate rose to 2.545% (World Bank, 2022).

In contrary to the researchers' expectation, location positively and statistically affected employment status in Ethiopia during the pandemic. It indicated the odds ratio of being unemployed increases by 1.50 if the individual was living in rural areas compared to urban ones. This result indicated that a person living in a rural area is more likely to be unemployed during the pandemic, which is supported by the finding of Mueller (2020) who found COVID-19 has severely affected the rural population with a significant negative impact on unemployment. However, this result is against the findings of Cho, et al., (2020) who indicated that compared to the rural areas unemployment rate increased in urban areas during the COVID-19 pandemic.

On the other hand, sectors of investment positively and statistically affected employment status in Ethiopia during the pandemic. Compared to agriculture odds ratio of being unemployed increased by 4, 3.15, and 4.64 on persons engaged in industry, service, and trade, respectively. This implied that, during the COVID-19, persons engaged in industry, service, and trade were more likely to be unemployed



**Source: MOH, Ethiopia (December 23, 2020)**

**Fig. 1** COVID-19 confirmed cases as of December 23, 2020, across regions in Ethiopia. Source: MOH, Ethiopia (December 23, 2020)

than persons engaged in agriculture. In Ethiopia, the share of agriculture in Ethiopia's gross domestic product was 35.45 percent and the sector employed 65.617% of the total employment. Next to the agriculture, the service sector plays a critical role in the Ethiopia economy by contributing about 36.81 of the national GDP and by creating employment opportunity for 24.033% of the total employment. The industry also contributed approximately 23.11 percent to the national GDP, and the sector employed 10.35% of the total employment (World Bank, 2022 and global EDGE 2022).

Furthermore, regions of respondents were negatively and statistically affected by employment status in Ethiopia during the pandemic. The result indicated that, among the whole regions in Ethiopia, Amhara(A), Benishangul-Gumuz (BG), Gambela (GA), Harar(H), Oromia(O), and SNNPR(S) were relatively less likely to be unemployed than individuals who live at Addis Ababa. The results showed that during the pandemic a person living in the capital of Ethiopia (Addis Ababa) is more likely to be unemployed compared to other regions of the country. This result can be supported in Fig. 1, indicating 66,867 confirmed cases counting 55 percent of the COVID-19 case were registered in Addis Ababa which is by far greater compared to other regions in Ethiopia. This implies that compared to other regions, an individual living in Addis Ababa is more likely affected during COVID-19 compared to other regions which could have a direct effect on the employment status of an individual.

#### **The Goodness of Fit Test**

**Table 4** Goodness fit test results of logistic regression. *Source:* Own computation, 2021

Number of observations	2,396
LR Chi <sup>2</sup> (16)	187.89
Prob > Chi <sup>2</sup>	0.0000
Log likelihood	- 1113.0173
Pseudo-R <sup>2</sup>	0.0778
Hosmer–Lemeshow Chi <sup>2</sup> (8)	13.85
Prob > Chi <sup>2</sup>	0.0859

For categorical data, after we fit the logistic model, it is necessary to check the appropriateness, adequacy, and usefulness of the fitted model. The results of the goodness of fit test of logistic regression analysis showed that all the independent variables considered in the full model together are statistically significant at a 5 percent significant level (as of Table 4). Moreover, it can be observed that the *P*-value of the Hosmer–Lemeshow goodness of fit test (*P*-value=0.0859) is greater than 0.05, which indicated the estimated model is adequate to fit the data at a 5 percent level of significance.

## 5 Conclusion and Policy Recommendations

The main aim of the study is to investigate the factors affecting employment status during COVID-19 in Ethiopia. The research was done by taking respondents who were employed before the COVID-19 outbreak to examine the respondents who secured as well as lost their job during the pandemic and the factors associated with the employment status change. Based on the results of the study, during the pandemic females were more likely to be unemployed than males were, persons living in a rural area are more likely to be unemployed than persons living in urban areas, and persons engaged in industry, service, and trade were more likely to be unemployed than persons engaged in Agriculture. Furthermore, during the pandemic, a person living in the capital city of Ethiopia (Addis Ababa) is more likely to be unemployed compared to persons living in other regions of the country.

Based on the findings of the study, the following recommendations were forwarded to the government and policymakers for their intervention:

- Efforts should be made to provide income support to the most affected groups during the pandemic.
- A longer-term plan should be prepared and used to reduce the still severe effects of COVID-19
- As outbreaks of novel infections are not likely to disappear soon, proactive national and international actions are required not only to save lives but also to protect economic prosperity.

**Funding** There are no funding sources for this study.

## Declarations

**Conflict of interest** We confirm that this manuscript entitled; “*Employment Status during the COVID-19 Pandemic: Evidence from Ethiopia*” is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere.

**No Conflict of Interest** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Moreover, the corresponding author will take responsibility for informing co-authors of editorial decisions, reviews received, and any changes or revisions made.

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