DETERMINANTS OF INCOME AND JOB LOSSES DURING COVID-19 PANDEMIC IN ETHIOPIA: BIVARIATE PROBIT REGRESSION APPROACH

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ABSTRACT

COVID-19 remains a global economic shock that is affecting economic activities in many nations of the world. The impacts of the pandemic on households' welfare through income and job losses are alarming, depending on some socioeconomic and demographic attributes. In this study, the determinants of income and job losses during the pandemic in Ethiopia were studied. The data were the Ethiopia's first wave of COVID-19 High Frequency Phone Survey of Households in 2020 comprising 3249 households. The data were analyzed with Bivariate Probit regression model. The results showed that job losses were mostly experienced among respondents from Somali (34.13%), Addis Ababa (29.65%), Dire Dawa (26.14%) and Tigray (20.78%). Also, 20.92% of the respondents from rural area indicated loss of jobs, as against 12.7% for urban areas while nonfarm business income was mostly affected. The probability of income or job losses was among others significantly influenced by residence in Afar, Amhara, Benishangul-Gumuz, SNNPR, Gambela, Dire Dawa and Somali regions, age, engagement in farming, nonfarm business, wage employment, receipt of pension and restrictions in movement. It was recommended that efforts at reducing the impacts of the pandemic should target some vulnerable regions, younger people and those engaged in non-farm businesses, among others.

Keywords: COVID-19, Pandemic, Income losses, Job Losses, Ethiopia.

INTRODUCTION

Corona virus disease (COVID-19) is a global health pandemic that destabilizes many nations' economies since the beginning of 2020 (Tamrat, 2020). The pandemic is a perplexing confirmation of interconnectedness of nations and our extant vulnerability due to globalization. It also reemphasizes our ineptness in understanding the proverbial saying that "a stitch in time saves nine", which is a perplexing conundrum that now mitigates against our cultural norms and development. The pandemic is more importantly a pathetic revelation of the weaknesses of some nations' economies. It is also revealing the geometrically revolving pattern of the consequences of political dissension and negligence of timely interventions in addressing some pressing health concerns.

Globally, the economic impacts of COVID-19 cut across all sectors of every economy. The pandemic is now redefining global economic development goals with primary focuses on reduction in infection, mortality and minimization of associated economic losses. The economic impacts of COVID-19 would be more felt by developing economies, given their high poverty level, low foreign reserves, economic stagnation, poorly maintained health infrastructure and absence of functioning social security programmes. In addition, sporadic increases in government expenses on medical supplies due to COVID-19 outbreak would compromise ability of some countries to meet the budgetary obligations for some other essential social services. Some projections have indicated the likelihood of 5-8% economic contraction with the number of people living below international poverty line of US $1.90 increasing by 71-100 million (Tamrat, 2020). Therefore, COVID-19 portends some disastrous consequences for global economic development with significant potentials to reverse the tilde of global economic growth and development.

In Africa, COVID-19 infection seems to be lower than previously predicted, although its economic impacts may be quite alarming. Specifically, Ethiopia, like other developing countries exhibits significant vulnerability to economic losses resulting from COVID-19. After the index case was discovered in March, 2020 (Alemayehou, 2020), government undertook several initiatives to forestall its spread and mitigate its impacts. With estimated 36 million people living below international poverty line of US $1.9 per day in 2020, about 32% of the population was living below the poverty line (World Poverty Clock, 2020). Using the national poverty line, it had been noted that Ethiopia's relative poverty decreased from 30% in 2011 to 24% in 2016 (World Bank, 2020). However, COVID-19 presents a significant threat to poverty reduction in Ethiopia given the perplexing expectations of income and job losses. Projections have shown that 'low epidemic', scenario, would lead to reduction in GDP by 1.53% for every month of implementing lockdown and a loss of about 1.34 million jobs. Moreover, the GDP will contract by 2.59% for every month of lockdown under the scenario of 'epidemic of intermediate virulence' and 3.7 million jobs would be lost. In addition, a monthly contraction of 3% in GDP had been projected under the worst-case scenario involving a full lockdown with about 6 million job losses (Tamrat, 2020).

Moreover, the effect of COVID-19 on the Ethiopian economy is potentially going to be aggravated by the country's debt burden, weakness of the birr against major international currencies and projected decline in international remittances (Alemayehou, 2020). The economic consequences are likely going to reverse some significant economic gains already achieved in poverty alleviation with expected number of people below the poverty line projected to be increasing from 26 million in 2019/2020 to 31 million in 2020-2021 (Alemayehou, 2020). Therefore, there is the need to understand the factors influencing welfare losses through unprecedented reduction in incomes as a result of job losses after COVID-19 outbreak. This paper is therefore contributing to existing body of knowledge on COVID-19 by analyzing the factors explaining reported experiences of job and income losses during COVID-19 outbreaks using the Bivariate Probit regression approach. The findings will promote proper initiatives into implementation of assistances for mitigating the impacts of the pandemic. It will also facilitate the understanding of policy makers in clearly identifying COVID-19 economically vulnerable households that could be qualified for some proactive interventions and marginal reforms.

Materials and Methods

The Study Area

Ethiopia, officially known as the Federal Democratic Republic of Ethiopia is one of the countries in Eastern part of Africa. Although English is the official language, other languages that are being spoken in Ethiopia are Amarigna (32.7%), Oromigna (31.6%), Tigrigna (6.1%), Somaligna (6%), Guaragigna (3.5%), Sidamigna (3.5%), Hadiyigna (1.7%) and others (14.8%). The landlocked country lies within latitude 3N to 15N and longitude 33E to 48E with a total land area of 1,127,127 square kilometers (435,186 square miles) and constituting most of the land areas in the Horn of Africa. The continuous land boundaries of Ethiopia is 5,328 kilometers (3,311 miles) with Eritrea in the North, Djibouti and Somalia in the East, Kenya in the South and Sudan in the West (Marine Corps Intelligence Activity, Undated).

Data and Sampling Procedures

The data for this study were downloaded from the Microdata Library of the World Bank, and collected as the COVID-19 High Frequency Phone Survey of Households in 2020. The purpose of the survey was to assist selected African countries with research evidence based policies for addressing the impacts of COVID-19. A subset of the Ethiopia Socioeconomic Survey (ESS) that was implemented among 6770 households in 2019 in urban and rural areas formed the sampling frame for the HFPS-HH. These were the households with access to mobile phones in the urban and rural areas of all the regions in Ethiopia. In the course of conducting the survey, 5621 households that provided valid phone numbers in the ESS were called. The number comprised of 4,626 households that owned a phone and 995 households that provided some reference phone numbers. Because of different phone penetration rates in urban (90%) and rural (40%) Ethiopia, the survey was only a representation of those households that owned phones in Ethiopia. In order to ensure representativeness of the data, 3300 (1330 from rural and 2000 from urban areas) households were targeted. Attempts were made to call all the respondents that provided phone numbers in the ESS comprising with 1,413 that owned phones and another 771 provided reference numbers in rural areas, and 3,213 that owned a phone and 224 households provided reference phone numbers in urban areas. In the first round of the data, which this study is based on, data were collected between April 22 and May 13, 2020 from 3,249 households (978 in rural areas, 2,271 in urban areas) (World Bank, 2020).

Bivariate Probit Regression Model

The data were analyzed with Bivariate Probit regression model. This model is applicable when there is the need to provide a joint model for two binary dependent variables on the assumption of high correlation between their error terms. The model is ideal for a situation where we have a dichotomous dependent variable estimated as dummy variable being proposed to be influenced by some independent variables among which there is a qualitative variable that had been estimated as a dummy variable which, a priori is suspected to endogenous (Li et al., 2016). This model is a generalization of the index functional expression of the one latent variable to a case where we have two latent variables with some suspected correlation. The estimated models are presented as follows:

$$Y_i = \alpha + \beta_k \sum_{k=1}^{33} X_{ik} + \delta L_i + \varepsilon_i \qquad \ldots 1$$

$$L_i = \mu + \varphi_k \sum_{k=1}^{33} X_{ik} + \epsilon_i \qquad \ldots 2$$

The variables are defined as follows: urban area (yes=1, 0 otherwise), regional variables - Afar region (yes=1, 0 otherwise), Amhara (yes=1, 0 otherwise), Oromia (yes=1, 0 otherwise), Somali (yes=1, 0 otherwise), Benishangul-Gumuz (yes=1, 0 otherwise), SNNPR (yes=1, 0 otherwise), Gambela (yes=1, 0 otherwise), Harar (yes=1, 0 otherwise), Addis Ababa (yes=1, 0 otherwise) and Dire Dawa (yes=1, 0 otherwise), gender (male =1, 0 otherwise), age of household head (years), farming income (yes=1, 0 otherwise), business income, wage income (yes=1, 0 otherwise), domestic remittance as income source (yes=1, 0 otherwise), foreign remittances income (yes=1, 0 otherwise), property income (yes=1, 0 otherwise), pension income (yes=1, 0 otherwise), government assistances income (yes=1, 0 otherwise), NGO support income, medical services needed during lockdown (yes=1, 0 otherwise), banking services needed during lockdown (yes=1, 0 otherwise), advised citizens to stay at home (yes=1, 0 otherwise), restricted travel within country/area, restricted international travel (yes=1, 0 otherwise), closure of schools and universities (yes=1, 0 otherwise), curfew/lockdown (yes=1, 0 otherwise), closure of non essential businesses (yes=1, 0 otherwise), building more hospitals or renting hotels to accommodate patients (yes=1, 0 otherwise), provide food to needy (yes=1, 0 otherwise), open clinics and testing locations (yes=1, 0 otherwise) and stopping or limiting social gatherings.

The model was tested for multicollinearity by examining the level of the variance inflation factor. A VIF that is closer or higher than 5 often raises some econometric analyses concerns (Akinwande et al, 2015).

Results

Income and Job Losses During COVID-19 Outbreak
Table 1 shows the distribution of the respondents' demographic characteristics across their experiences of income and job losses after COVID-19 outbreaks in Ethiopia. It shows that the experiences differ from one household to another with some jobs reportedly lost, giving rise to complete loss of means of households' livelihoods, while others indicated reduction in their incomes. However, some households did not witness any change in their incomes and some recorded some increase in their incomes. The results in Table 1 reveal that across the Ethiopian regions, job losses were mostly experienced among respondents from Somali (34.13%), Addis Ababa (29.65%), Dire Dawa (26.14%) and Tigray (20.78%).

Moreover, 11.93% and 9.04% of the respondents from Addis Ababa and Tigray respectively lost all their incomes. These can be compared with 0.53% and 0.60% for the respondents from Gambela and Somali regions respectively. Furthermore, the results showed that more than half of the respondents from Somali (83.83%), Tigray (57.53%), Oromia (56.70%) and Harar (56.44%) reported reduction in their incomes. However, more than half of the respondents from Afar (59.49%), Gambela (56.15%), Dire Dawa (51.96%) and SNNPR (50.96%) indicated that there was no change in their incomes.

Table 1: Distribution of income and job losses among respondents' selected demographic characteristics

	No Answer		Increased		Stay the same		Reduced		!00% loss		Lost Jobs		
	Freq	% of total	Freq	% of total	Freq	% of total	Freq	% of total	Freq	% of total	Freq	% of total	Total
Regions													
Tigray	0	0.00	3	0.90	108	32.53	191	57.53	30	9.04	69	20.78	332
Afar	0	0.00	3	1.54	116	59.49	64	32.82	12	6.15	20	10.26	195
Amhara	0	0.00	10	3.04	156	47.42	145	44.07	18	5.47	34	10.33	329
Oromia	0	0.00	1	0.22	174	38.84	254	56.70	19	4.24	53	11.83	448
Somali	3	1.80	9	5.39	14	8.38	140	83.83	1	0.60	57	34.13	167
Benishangul-Gumuz	1	0.49	3	1.47	100	49.02	97	47.55	3	1.47	17	8.33	204
SNNPR	0	0.00	0	0.00	106	50.96	90	43.27	12	5.77	34	16.35	208
Gambela	1	0.53	3	1.60	105	56.15	77	41.18	1	0.53	12	6.42	187
Harar	2	0.66	3	0.99	104	34.32	171	56.44	23	7.59	55	18.15	303
Addis Ababa	0	0.00	4	0.70	241	42.28	257	45.09	68	11.93	169	29.65	570
Dire Dawa	0	0.00	1	0.33	159	51.96	131	42.81	15	4.90	80	26.14	306
Sector													
Rural	4	0.18	17	0.75	982	43.24	1,086	47.82	182	8.01	475	20.92	2,271
Urban	3	0.31	23	2.35	401	41.00	531	54.29	20	2.04	125	12.78	978
Gender													
Male	2	0.09	26	1.15	953	42.28	1,165	51.69	108	4.79	377	16.73	2,254
Female	5	0.50	14	1.41	430	43.22	452	45.43	94	9.45	223	22.41	995
Age groups													
<20	0	0.00	0	0.00	19	52.78	15	41.67	2	5.56	8	22.22	36
20<30	2	0.29	9	1.30	308	44.44	311	44.88	63	9.09	149	21.50	693
30<40	0	0.00	12	1.19	390	38.58	541	53.51	68	6.73	182	18.00	1,011
40<50	1	0.16	7	1.09	263	40.78	340	52.71	34	5.27	121	18.76	645
50<60	3	0.67	6	1.35	193	43.27	222	49.78	22	4.93	68	15.25	446
60<70	1	0.39	4	1.57	124	48.63	119	46.67	7	2.75	44	17.25	255
>=70	0	0.00	2	1.23	86	52.76	69	42.33	6	3.68	28	17.18	163

Also, 20.92% of the respondents from rural area indicated loss of jobs, as against 12.7% for urban areas. In rural areas, 8.01% indicated complete loss of incomes as against 2.04% in urban areas. However, 54.29% and 47.82% of the urban and rural households respectively had their incomes reduced after COVID-19 outbreak. Based on respondents' gender, 22.41% of the females reported loss of jobs as against 16.73% of their male counterparts. A higher percentage of the female respondents (9.45) lost all their incomes, while more than half of male respondents (51.69) reported reduction in income. Within the age groups of household heads,

more than 20% of the respondents that were less than 30 year lost their jobs while more than 50% of the respondents

Affected Income Sources During COVID-19 Outbreak
Figure 1 shows the distribution of the affected income sources during COVID-19 outbreak. It indicates that nonfarm business income was mostly affected. This is followed by farm and wage incomes. The least affected income sources are pension, NGO and government transfers. Table 2 also shows that across the regions, 121(27.00%), and 74 (24.18%) of the respondents from Oromia and Dire Dawa respectively indicated changes in nonfarm business incomes. Also, 84 (48.5%), 117 (26.12%) and 44 (21.57%) of the respondents from Somali, Oromia and Benishangul-Gumuz respectively indicated that there were some changes in farm incomes. The results also indicate that changes in wage incomes were largely reported by respondents from Dire Dawa (24.51%), Addis-Ababa (23.86%) and Harar (14.19%) regions.

Table 2: Distribution of income sources that changed after COVID-19 outbreak in Ethiopia

| Region	Farm	Nonfarm business	Wage	Remittances (internal)	Remittances (foreign)	Property and Savings	Pension	Govt	NGO	Total
Tigray	59	75	40	5	19	20	0	9	1	332
Afar	23	22	10	6	10	22	0	21	2	195
Amhara	49	78	39	15	12	15	1	10	6	329
Oromia	117	121	36	21	11	12	0	6	5	448
Somali	81	7	8	1	0	0	0	2	2	167
Benishangul-Gumuz	44	48	9	1	2	7	0	3	0	204
SNNPR	34	39	23	4	6	10	0	3	0	208
Gambela	11	33	15	9	3	7	0	1	4	187
Harar	45	66	43	13	8	21	1	2	1	303
Addis Ababa	5	128	136	15	26	41	2	4	0	570
Dire Dawa	2	74	75	7	15	21	1	0	0	306
Total	470	691	434	97	112	176	5	61	21	3249
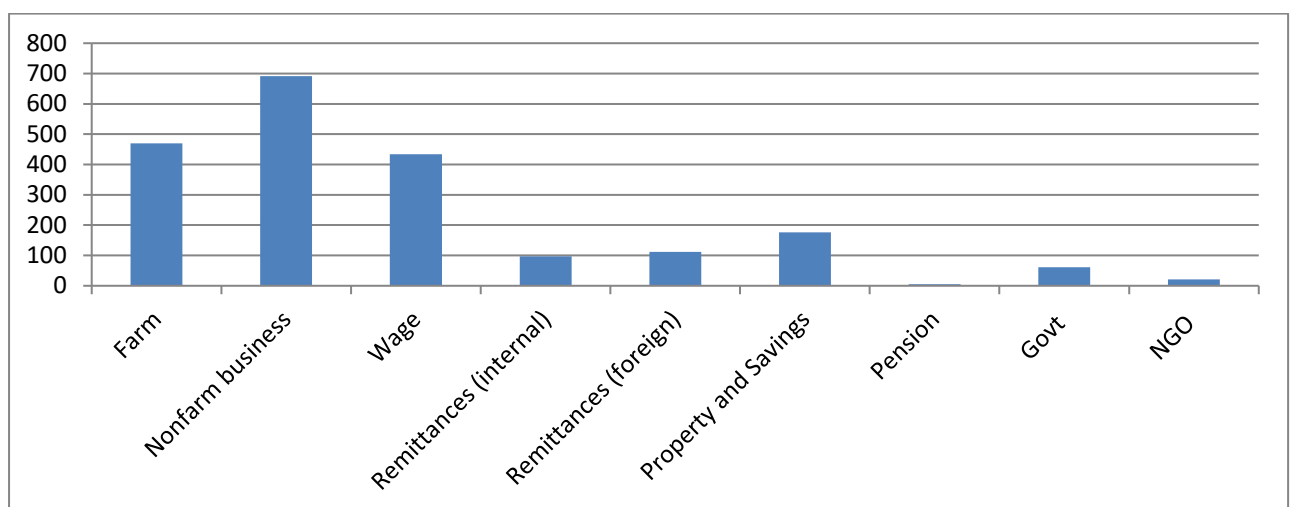
Figure 1: Frequencies of respondents that indicated changes in selected income sources during COVID-19

Determinants of Income and Job Losses

Table 3 shows the results of Bivariate Probit regression model. The results indicate that the model properly fitted the data, going by statistical significance of the Wald Chi Square statistics (p<0.01).The computed VIF of 1.61 indicates that there was no serious problem of multicollinearity. Moreover, the Wald test on the presence of correlation among the error terms indicates that the correlation (rho) is statistically significant (p<0.01). This implies that estimating the models separately using conventional Probit regression model would produce biased estimators.

The results in Table 3 further show that among the regional variables, compared to those in Tigray, residence in Afar, Amhara, Benishangul-Gumuz, SNNPR, Gambela and Dire Dawa significantly reduced the probability of income losses (p<0.05) during COVID-19 outbreak. In addition, residence in Somali significantly increased the probability of losing incomes during COVID-19 outbreak. Among the regional variables, similar results are obtained for the job loss model except that the variables for SNNPR and Dire Dawa did not show statistical significance at 5% level.

The parameters of age in the income and job loss models showed statistical significance (p<0.05). This implies that as respondent's age increases, probability losing incomes and jobs decreases. The results further show that out of the parameters of the income sources, engagement in farming significantly (p<0.05) reduces the probability of losing jobs. However, households that were engaged in nonfarm business have significantly higher (p<0.01) probability of losing incomes and jobs during COVID-19 outbreak. Engagement in wage employment significantly (p<0.01) reduces the probability of losing incomes during COVID-19 outbreak, while it increased the probability of losing job significantly (p<0.01). The households that received domestic remittances have significantly (p<0.05) higher probability of losing jobs during COVID-19 outbreaks, while receipt of pension significantly (p<0.01) decreased the probability of losing income. Also, at 10 percent level, receipt of government assistances significantly reduced the probability of losing incomes during COVID-19 pandemic.

In addition, the respondents who needed banking services had significantly lower (p<0.05) probabilities of losing incomes and jobs. Also, those who indicated that citizens were advised to stay at home and restrictions in movement had lower probability of losing income while those who indicated restrictions in international movements had higher probability of losing income. Also, those who indicated that food were provided to the needy and stop or limit in social gathering had higher probability of losing incomes.

Table 3: Determinants of income and job losses in Ethiopia

Coefficients	Income Loss			Job Loss		
	Parameter	Std error	t-stat	Parameter	Std error	t-stat
Urban	-0.1193*	0.0724	-1.65	-0.0588	0.0846	-0.69
Region						
Afar	-0.5229***	0.1359	-3.85	-0.5674***	0.1616	-3.51
Amhara	-0.3899***	0.1186	-3.29	-0.5086***	0.1404	-3.62
Oromia	-0.1791	0.1151	-1.56	-0.3565***	0.1303	-2.74
Somali	0.5449***	0.1646	3.31	0.6259***	0.1611	3.89
Benishangul-Gumuz	-0.4474***	0.1350	-3.31	-0.5635***	0.1671	-3.37
SNNPR	-0.3145**	0.1326	-2.37	-0.1856	0.1493	-1.24
Gambela	-0.6037***	0.1338	-4.51	-0.7905***	0.1766	-4.48
Harar	0.0558	0.1200	0.47	-0.2041	0.1299	-1.57
Addis Ababa	-0.0599	0.1145	-0.52	0.0733	0.1227	0.60
Dire Dawa	-0.3306***	0.1249	-2.65	-0.0614	0.1328	-0.46
Male	-0.0724	0.0540	-1.34	0.1063*	0.0587	1.81
Age	-0.0056***	0.0018	-3.08	-0.0044**	0.0021	-2.08
Farming	-0.1125	0.0711	-1.58	-0.2534***	0.0832	-3.05
Business	1.0420***	0.0641	16.27	0.4164***	0.0644	6.47
Wages	-0.4819***	0.0566	-8.52	0.3446***	0.0623	5.53
Domestic Remittances	0.0220	0.0898	0.25	0.1943**	0.0972	2.00
Foreign Remittances	0.1900*	0.0983	1.93	0.0769	0.1062	0.72
Property	0.1057	0.0752	1.40	0.1223	0.0822	1.49
Pension	-0.3304***	0.1110	-2.98	-0.0797	0.1219	-0.65
Government assistances	-0.1610*	0.0961	-1.67	0.0116	0.1169	0.10
NGO support	0.1796	0.1913	0.94	0.2194	0.2227	0.99
Medical services needed	-0.0968	0.0632	-1.53	-0.0160	0.0722	-0.22
Banking services needed	-0.1636***	0.0506	-3.23	-0.1313**	0.0563	-2.33
Advised citizens to stay at home	-0.1263**	0.0568	-2.22	-0.0032	0.0643	-0.05
Restricted travel within country/area	-0.1445**	0.0717	-2.01	0.0361	0.0826	0.44
Restricted international travel	0.3371***	0.1258	2.68	-0.0640	0.1399	-0.46
Closure of schools and universities	0.1000	0.0640	1.56	-0.0228	0.0766	-0.30
Curfew/lockdown	0.1632*	0.0855	1.91	0.0714	0.0971	0.74
Closure of non essential businesses	0.0924	0.0812	1.14	0.0647	0.0897	0.72
Building more hospitals or renting hotels to accommodate patients	-0.0868	0.1575	-0.55	-0.1669	0.1846	-0.90
Provide food to needed	0.2603***	0.0779	3.34	0.0976	0.0853	1.14
Open clinics and testing locations	-0.0415	0.1359	-0.31	-0.1085	0.1533	-0.71
Stopping or limiting social gatherings	0.1206**	0.0583	2.07	-0.1502**	0.0655	-2.29
Constant	0.7095***	0.1608	4.41	-0.7791***	0.1770	-4.40

Wald test of rho=0:	chi2(1) = 103.735	Prob > chi2 = 0.0000	
Number of obs = 3249, Wald chi2(68) = 841.45***			
Mean VIF – 1.61			

DISCUSSION

The results show that COVID-19 is having some significant impacts on Ethiopian households' incomes through job and income losses. These results are in accordance with global expectations on the potential impacts of COVID-19 pandemic, especially in developing countries. Specifically, it had been projected that COVID-19 would lead to income and job losses due to mandatory compliance with lockdowns, social distancing, quarantine and self

isolation and general disruptions or mandatory changes in some business protocols [Economic Commission for Latin America and the Caribbean (ECLAC) (2020), (ILO), 2020]. In Ethiopia, some regional and socioeconomic differences differentiate the intensity of COVID-19 impacts among the households. Precisely, the results indicate that in terms of job losses, residents in Somali, Addis-Ababa, Tigray and Harar regions reported the highest percentages. It should also be noted that compared to Tigray region, the probability of losing incomes and jobs are significantly lower in all the regions (except in Somali).

These results are proportionately pointing at the differences in regional features that can promote vulnerability to COVID-19, thereby aggravating its impacts. The results are in line with expectation since Tigray region is an epicenter of crises and perplexing collapse of healthcare delivery systems (Anna, 2021). These conditions, coupled with rising incidence of corona virus and climate-induced locust infestations have raised international concerns given the high number of people that are requiring some humanitarian assistances (Oxfam International, 2021). The implication of this climatic shock on agricultural income through farm productivity losses can also buttressed by the fact that farm income is among the income sources that are mostly affected. COVID-19 problem in Tigray is therefore aggravating income and job losses in a previously vulnerable society given that before eruption of recent conflicts, more than one million of the residents relied on humanitarian assistances and more than 600,000 were hunger stricken (Oxfam International, 2021).

Income losses among the residents in Somali region is also worth reemphasizing given the high number of infection in the region. In a study by Mercy Corps (2020), it was noted that COVID-19 poses a severe risk to the expenditure patterns of households in the Somali Region. Although it was a small set of household interviews, the results indicated that 96% of the households reported that their monthly food expenditures have decreased, 75% reduced their frequency of eating and 21% reduced their portion sizes between early March and the middle of May 2020. It was further reported by sampled enterprises that profit had declined (95%) and 24% had been forced to lay-off workers.

Meanwhile, the respondents from Addis-Ababa also showed high vulnerability to income and job losses. Being the capital city, Addis-Ababa residents are going to be highly affected by lockdowns, especially when regular business activities are affected (Alene et al., 2021). The results also showed that residents from urban areas had significantly lower probability (p<0.10) of losing incomes during COVID-19 outbreak. However, the parameter for job losses does not show statistical significance (p>0.10). Although all sectors of the economy are affected, urban residents who are working in government jobs may have their incomes less affected because of continuity in paying salaries during lockdowns. More precisely, around 8% of rural residents lost all their incomes due to COVID-19 outbreak. This is so since there are higher tendencies of rural dwellers being laid off from their jobs due to their engagement in casual or unskilled employment. Similarly, lockdowns interfere with inter-city transportation of farm and other produce, thereby rendering many to be jobless.

The results further show that as respondents' ages increase, the probabilities of losing income and jobs significantly decreased. This shows that young people are mostly affected by COVID-19. This is the case because unemployment and poverty seem to be concentrated among young people before the inception of the pandemic (United Nations, 2020). Specifically, several

authors had predicted that the impacts of COVID-19 would be more severe on economic activities of young people. However, Ethiopian economy presents a peculiar case given that about 70% of its workforce is less than 35 years of age while youths constitute close to 30%. To understand the impact on jobs, it is essential to look at the structure of employment in Ethiopia. Government remains by far the largest single employer in the formal sector (representing 48% of total wage employment) with the remaining 52% accounted for by the private sector. According to the Ethiopian Civil Service Commission, there are 1.7 million civil servants in Ethiopia (United Nations, 2020). It had been noted that youths often face long history of unemployment, due to existence of fewer career development opportunities, low wage, poor prospects of getting better jobs, and lower pensions (OECD, 2016). The pandemic is aggravating vulnerability of young people to poverty because of their higher likelihood of being engaged in part-time jobs, thereby predisposing them to job and income losses (OECD, 2019).

The results further show that receipt of income from farming significantly reduces the probability of job loss during COVID-19 pandemic. This is expected because majority of the farmers were self employed. Similar results have been found in India where it was noted agriculture is quite resilient to some regulatory business protocols during COVID-19 pandemic and farmers were still able to engage in some moderate farming activities (World Bank, 2021). Moreover, non-farm business income increased the probability of losing incomes and jobs. This is expected because of restrictions that are always imposed on business transactions whenever there is lockdown. Similarly, wage income reduced the probability of reporting income reduction but increased the probability of losing jobs. This buttresses the fact that COVID-19 brings about closure of some businesses thereby resulting in some wage earners losing their jobs. The peculiarity in the manner in which restrictions were placed in the operations of some businesses makes it difficult for them to break even. Therefore, the major way of coping were either to reduce the amount of salaries paid or dismiss some workers.

Another interesting result is the relationship between loss of jobs and receipt of domestic remittances. The results indicate that households that received domestic remittances had higher probability of losing jobs. This implies that the households that may have lost their jobs were getting assistances from relatives in the country. However, receipt of government assistances reduced the probability of losing income. The implication is that those who received government assistance did not suffer significant income losses due to some compensative roles that were played by such assistances. Similar finding had been reported by Abay et al. (2021) and one good explanation was that the Productive Safety Net Program (PSNP) through which relief materials were given to vulnerable households had effectively targeted the poor.

The results also showed that probabilities of losing incomes and jobs reduced with the need for banking services. This is expected because those who would require banking services during lockdown may not be households that are extremely vulnerable to poverty due to lack of jobs or regular sources of incomes. In addition, perceptions of the lockdown rules in the place where households resided such as compulsory stay at home, restrictions in movement, cancellation of international travels, social distancing and limits on social gatherings influenced income losses. These results are emphasizing the fact that lockdown rules would affect individuals differently depending on the primary sources of livelihoods.

CONCLUSION

This study analyzed the determinant of income and job losses during COVID-19 pandemic in Ethiopia. The results have shown that the pandemic had significant impacts Ethiopian households depending on some socioeconomic characteristics. The major findings are reemphasizing some regional differences in the impacts of the pandemic and the need to consider such in every effort channeled at cushioning the impacts of the pandemic. More importantly, civil unrests and climatic shocks seemed to account for aggravated impacts of COVID-19 in some regions. Interventions for addressing COVID-19 impacts should also consider the rural-urban impact differences with emphasis on assisting vulnerable rural households. In addition, youths and young people should be targeted in government's renewed efforts at revitalizing the entire economy through job creation. Ethiopians that were engaged in non-farm businesses would require significant interventions to ensure revitalization of lost business opportunities. Government assistances through Safety Net Program should be used to ensure proper targeting of vulnerable households in every effort at assisting poor households during the pandemic. Finally, lockdown rules affect economic and business activities of rural and urban households, government therefore needs to carefully evaluate the peculiarities of every sector of the economy in implementing lockdown during the ongoing pandemic.

REFERENCES

Abay, K.A., G. Berhane, J. Hoddinott and K. Tafere (2021). COVID-19 and Food Security in Ethiopia Do Social Protection Programs Protect? Policy Research Working Paper 9475. Available online: http://documents1.worldbank.org/curated/en/917941605204533596/pdf/COVID-19-and-Food-Security-in-Ethiopia-Do-Social-Protection-Programs-Protect.pdf (Accessed 15th may 2021).

Akinwande, M.O., Dikko, H.G. and Samson, A. (2015) Variance Inflation Factor: As a Condition for the Inclusion of Suppressor Variable(s) in Regression Analysis. Open Journal of Statistics, 5, 754-767. http://dx.doi.org/10.4236/ojs.2015.57075.

Alemayehou, M. (2020). Ethiopia Battles the Pandemic and Its Economic Consequences https://www.csis.org/analysis/ethiopia-battles-pandemic-and-its-economic-consequences

Alene KA, Gelaw YA, Fetene DM, et al. COVID-19 in Ethiopia: a geospatial analysis of vulnerability to infection, case severity and death. BMJ Open 2021;11:e044606. doi:10.1136/ bmjopen-2020-044606

Anna, C. (2021). UN fears 'massive' COVID transmission in Ethiopia's Tigray. Available online: https://apnews.com/article/health-coronavirus-pandemic-abiy-ahmed-africa-ethiopia-609ab68c670a055db42e80c0ba8e5762 (Accessed on 4th May 2021).

Economic Commission for Latin America and the Caribbean (ECLAC) (2020). The social challenge in times of COVID-19 No. 3 Special Report COVID-19. Available at: https://www.cepal.org/sites/default/files/publication/files/45544/S2000324_en.pdf (Accessed 2nd May, 2021.

Li, C.; Poskitt, D.S. and Zhao, X. (2016). The Bivariate Probit Model, Maximum Likelihood Estimation, Pseudo True Parameters and Partial Identification. Monash Business School Working Paper 16/16. Available at: https://www.monash.edu/business/econometrics-and-business-statistics/research/publications/ebs/wp16-16.pdf (Accessed 2nd February 2021).

Marine Corps Intelligence Activity (undated). Ethiopia Country Handbook. Internet material available at: https://info.publicintelligence.net/MCIA-EthiopiaHandbook.pdf

Mercy Corps (2020). Economic Impact of Covid-19 in The Somali Region of Ethiopia. Available at: https://data2.unhcr.org/en/documents/download/77372 (Accessed 5th May, 2021).

OECD (2016), Society at a Glance, https://doi.org/10.1787/19991290 (Accessed 6th May 2021)

OECD (2019), Employment Outlook, https://doi.org/10.1787/9ee00155-en (Accessed 6th May 2021)

Oxfam International (2021). Conflict compounded by Covid-19 and climate change pushes millions in Tigray to the brink. Available at: https://www.oxfam.org/en/press-releases/conflict-compounded-covid-19-and-climate-change-pushes-millions-tigray-brink-oxfam (Accessed on 5th May, 2021).

Tamrat, W. (2020). Stemming the impact of COVID-19 on employment Available at: https://www.universityworldnews.com/post.php?story=2020072013572320

United Nations (2020). Socio-Economic Impact of Ethiopia COVID -19 in Ethiopia. One UN Assessment. Available at: https://www.undp.org/content/dam/undp/library/covid19/UN-Socio-Economic-Impact-Assessment-FINAL.pdf (Accessed 6th May 2021)

World Bank (2020). COVID-19 High Frequency Phone Survey of Households 2020. Ethiopia, 2020. Data documentation documents. Available online at: https://microdata.worldbank.org/index.php/catalog/3716/data-dictionary

World Bank (2020). Ethiopia Poverty Assessment: Poverty Rate Declines, Despite Challenges. https://www.worldbank.org/en/country/ethiopia/publication/ethiopia-poverty-assessment-poverty-rate-declines-despite-challenges

World Bank (2021). Economic Effects of Covid-19: Rapid Surveys of Rural Households in India. https://pubdocs.worldbank.org/en/645971613651626018/Economic-Effects-of-COVID19-Rapid-Rural-Surveys.pdf (Accessed 6th May 2021).

World Poverty Clock (2020). Ethiopia. https://worldpoverty.io/map