Impact of COVID-19 on poverty and living standards in Ghana: A micro perspective

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Abstract

The novel Coronavirus disease 2019 (COVID-19), which has become a global epidemic, hit Ghana on 12th March 2020 and, in less than a week, increased by over 300 percent with two deaths. As of 11th June 2020, Ghana had recorded over 11,000 cases with 48 deaths. This study seeks to provide a micro-level evidence on how COVID-19 is posing a threat to some of the Sustainable Development Goals, particularly poverty and hunger in Ghana. Specifically, the study examined the effect of COVID-19 on poverty and living standards of Ghanaian households. It also analyzed which class of persons within the income distributions is mostly hit by the pandemic. Data on 3,905 households were obtained via concurrent online survey and telephone interviews. Multiple analytical approaches were employed: Ordinary least squares, probit model and simultaneous quantile regressions. The results showed that COVID-19 had significantly increased the poverty levels of households, while deteriorating living standards. The study also showed that gender and locational heterogeneities exist regarding the impact of COVID-19 with females and rural dwellers mostly disadvantaged. However, the simultaneous quantile regression showed that in terms of overall household consumption, those in the middle and upper classes were heavily affected compared to those in the lowest class. A key policy implication from this study is that Ghana needs to broaden its social protection programmes to assist both the new poor and existing poor.

Introduction

In the history of the world, one of the infectious diseases that has disturbed world leaders is the Coronavirus disease 2019 (COVID-19). Globally, infectious diseases kill approximately 50,000 people daily and claim over 17 million lives yearly, making it among the world's leading causes of death (World Health Organization [WHO], 2015). In the last two decades, over 30 new diseases had been recorded with majority being incurable. At the same time, a new and highly infectious disease: novel coronavirus (COVID-19), which for now appears incurable, is emerging to pose further threats to the world. Unlike most dangerous infectious diseases that kill humans, originate in Africa (Fenollar & Mediannikov, 2018), COVID-19, started in Asia, specifically Wuhan, in last quarter of 2019. The disease had caught the world in darkness and public fear has been growing geometrically (Ma et al., 2020). COVID-19 is taking its clang on the global community, causing several deaths and continuous economic despair. Thus, there have been several projections and discussions that COVID-19 situation might be worse in developing and lower middle-income countries where public healthcare systems are weak, although there are no empirical validations yet (Fenollar & Mediannikov, 2018). For instance, projections from the World Bank suggest that COVID-19 will push 49 million people into extreme poverty in 2020 out of which 23 million are expected to be in sub-Saharan Africa (Mahler, Lakner, Aguilar & Wu, 2020).

More importantly, the virus is taking its highest toll on two factors: (i) the impact of the virus on economic activity and (ii) the number of people living close to the global poverty line (Mahler, Lakner, Aguilar & Wu, 2020). Disturbingly, the outbreak of COVID-19 and the nonexistence of a cure have several key implications. First, the pandemic is a threat to the achievement of the Sustainable Development Goals (SDGs), as it is entrenching poverty and hunger in most sub-Saharan African countries. Before COVID-19, more than half of the extreme poor lived in sub-Saharan Africa and alarmingly, the number of poor people in the region increased by 9 million (World Bank, 2018). It was projected even in the absence of COVID-19 that, by 2030, nearly 9 out of 10 extreme poor would be in sub-Saharan Africa. Now with COVID-19, current estimates suggest that the world's progress in achieving zero poverty in this region by 2030 will be slog back by three years owing to COVID-19 (Mahler, et al., 2020). The present study looked at how COVID-19 is posing a threat to some of the SDGs, particularly poverty and hunger in Ghana. The most recent estimates from the Ghana Living Standards Survey (GLSS 7) suggest that the battle to end poverty in all its forms everywhere in Ghana is far from over and in some regions, getting harder to achieve as the proportion of Ghana's poor remains unacceptably high (Ghana Statistical Service [GSS], 2018). Distressingly, poverty is becoming more entrenched and harder to root out in half of the sixteen regions which experienced worsening poverty incidence rates. Half of the nation's sixteen regions have their poverty rates high above the national average of 24.5 percent. According to the report, more Ghanaians are becoming extremely poor as the number of people living in extreme poverty increased from 2.2 million in 2013 to 2.4 million in 2017 based on the 2010 Population and Housing Census (PHC) projections (GSS, 2018. p. 5). Now with COVID-19, these estimates are expected to worsen.

Within the policy framework of SDGs, meeting the objective to leave no one behind implies understanding and addressing the 'last mile' of exclusion through deeper knowledge of the forces that cause people to fall into and remain in poverty. Thus, this study's primary objectives are to examine the impact of COVID-19 on poverty and living standards of Ghanaians since the outbreak in Ghana and to draw relevant lessons for policy actions that will help achieve the agenda 2030. A profound question this study seeks to address is: How is COVID-19 affecting various categories of persons within the income distribution? That is, is COVID-19 hurting the very bottom of the distribution or the middle class and upper class are also affected?

The rest of the paper is structured as follows: section two focused on the literature review where empirical studies have been critiqued and synthesized. Next is section three which mainly dealt with the methodological issues surrounding the study, while section four is devoted to results and discussion of the study? Section five gives the conclusion and policy implications of the study.

Literature

As of May 2020, over 3,000 papers have been published on the COVID-19 pandemic. This is an indication that even though the pandemic did not start early, news and research about it have travelled far and that literature on it abound. Lau et al. (2020) examined the positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. They found that domestic air traffic negatively correlates with the spread of COVID-19 although the relationship is weak. At the same time, Chinazzi et al. (2020) observed that travel quarantine of the epicenter (Wuhan) of the pandemic delayed the overall epidemic spread by averagely 5 days and this effect was much greater at the international front where imported cases reduced drastically by approximately 80 percent until mid-February. Considering the highly infectious rate of COVID-19, some scholars (Anderson, Heesterbeek, Klinkenberg & Hollingsworth, 2020) had already postulated that world governments would be overwhelmed by both deaths from coronavirus and its economic impact. Thus, models that help governments and other policy makers to minimize mortality while putting in place measures to amend the unavoidable economic downturn become the most intriguing. Along the same lines, Lipsitch, Swerdlow and Finelli (2020) underscore that urgent research is needed to address several critical questions. Key among such questions are: What is the full spectrum of COVID-19 severity within and across countries? Who are the most infectors? (i.e., gender, rural-urban, age group, and other demographics). In this paper, effort has been made to address some of these questions in the case of Ghana. While studies (e.g., Porcheddu et al., 2020) have shown that COVID-19 fatality rate in Italy and China are identical at 2.3 and in mostly the elderly, the rate of spread in Italy outpaced that of China. Following lessons from Italy and China, some scholars (Lazzerini & Putoto, 2020; Remuzzi & Remuzzi, 2020) have stressed that empirical studies are required to support decision-making and to build public awareness. In the view of Gilbert et al., (2020), the management and control of a country's COVID-19 importation heavily depends on its health capacity. In terms of preparedness and vulnerability against importation of COVID-19 in Africa, the authors found that countries like Ghana, Ethiopia, Sudan, Angola, Tanzania and Kenya are at moderate importation risk and high vulnerability risk.

Poverty-gender heterogeneities have a long standing history with women continuously being disfavoured (Grossbard-Shechtman, & Neuman, 1988. 1998; Grossbard, 2014; Depew, & Price, 2018; Betti, Mangiavacchi, & Piccoli, 2020). Thus, the outbreak of COVID-19 pandemic has received growing concerns (Alon, Doepke, Olmstead-Rumsey & Tertilt, 2020; Wenham, Smith & Morgan, 2020) that the existing gender inequalities is likely to exacerbate given that labor markets and family obligations often constrain females in competition against men on the economic front. Others (Wenham, et al., 2020) underscored that the differential effect of COVID-19 on women results from differences in employment status where most women are engaged in informal care within the household with the consequences of limiting their work and economic opportunities. In this study, we test whether this COVID-19-gender heterogeneity proposition holds for Ghana.

Another relatively significant strand of literature on COVID-19 are those who assert that the effect of COVID-19 is not the same across locations. The weak health care systems and negative consequences of health disparities for persons living in rural areas will further place them at the mercy of the pandemic relative to their urban counterparts. van Dorn, Cooney and Sabin (2020) found that in the United States, the impact of COVID-19 on people who lived in rural areas was much greater than those in the cities. The authors further observed that the high cost of medical care and high proportion of rural uninsured and underinsured person have further compounded the problem. In support of this assertion, Kashnitsk and Aburto (2020) and Emanuel et al, (2020) emphasized that in order to overcome or contain the impact of COVID-19, there is the need for a fair allocation of scarce resources, taking into cognizance deprived areas such as rural communities. Motivated by these assertions and findings, this study tests whether the differential effect of COVID-19 exists across rural-urban locations in Ghana.

Epidemiology of COVID-19 in Ghana

This section looks at the distribution, pattern and the incidence of COVID-19 in Ghana. Even though it is said that coronavirus existed, may be, for many Ghanaians, it was not known until recently, 12th March 2020. The novel coronavirus, COVID-19 belongs to the *coronaviridae* family in the largest order *Nidovirales* (Banerjee, Kulcsar, Misra, Frieman & Mossman, 2019; Zhang & Liu, 2020). It belongs to the family of communicable diseases which spreads through personal contacts. Thus, geographical distance matters a lot for its spread. Ghana shares borders with Togo, La Cote d'Ivoire and Burkina Faso. Before the disease was identified in Ghana, all the neighboring countries had recorded cases. Ghana recorded the first two cases of COVID-19 in the same day on 12th March, 2020. By the second day, the number of confirmed cases increased by 200 percent and alarmingly by 21st March 2020, the number of confirmed cases had gone up to 21 with one death (Ghana Health Service, 2020). This was over a 300 percent increase within a week. Given that within seven days, 21 cases had been detected, some health workers and experts were of the opinion that in the weeks ahead, the infection rate might be geometric. In terms of the origin of the infected persons, Ghana's Ministry of Health revealed that the first two cases were two individuals who had returned from Norway and Turkey. As of 20th March 2020, the infected persons were reported as persons living in three cities of Accra, Tema and Kumasi. In Ghana and like other parts of the world, the pandemic has been identified as very contagious because it travels from person-to-person through contacts. Unfortunately, in Ghana, the pandemic turned to be spreading at the community level by 20th March, 2020 when the latest cases were identified. The Ministry of Health and the Ghana Health Service put tracer teams together to trace the contacts that infected persons and as at 20th March 2020, 300 contacts had been identified. Health workers observed that the pandemic seems airborne and rolled out further preventive measures to curtail the spread of the virus. Current update shows that Ghana has recorded over 11,000 cases with 48 deaths as of 11th June, 2020.

Methods

This study was entirely quantitative and, therefore, adopted the positivism research paradigm. The ex post facto design was used to examine the effect of the COVID-19 pandemic on poverty and living standards of Ghanaian households. It helped in a comparative analysis of the before-and-after situation of Ghanaian households in terms of their poverty levels and living standards. Descriptive design was also employed to understand and describe the effect of the novel COVID-19 pandemic on poverty and living standards of Ghanaians. This was, especially useful since little is known about the effects of the pandemic in Ghana. The study covered 10 administrative and political regions in Ghana.

The data were obtained using online survey and telephone interview. The study was conducted from 12th May 2020 to 2nd June 2020. Before the roll out of the online survey and telephone interview, the instrument (questionnaire) was first pilot-tested among 20 participants with similar socioeconomic background in the Western North Region (which was not part of the sample) to ensure its feasibility having met the institutional review Board (IRB) of University of Cape Coast standard safeguards on research ethics. The pilot group was first asked to complete the online questionnaire and comment on the comprehensibility of the questions. This led to minor modifications of the questionnaire to improve understanding. The questionnaire was structured into four sections: socio-demographic, COVID-19's impact on poverty and living standards. Questions on poverty were adopted from Afro barometer survey. The survey uses six main questions to measure lived poverty. The precise questions asked under poverty is presented in Box 1 in the Appendices. The socio-demographic variables include age, sex, education, employment status, region, income, expenditure and presence of dependents in the household. The sampling frame for the study was household heads. Persons who were 18 years or older at the time of the survey and had continuously lived in the household for at least five months were eligible to participate in the study. The rationale behind the five months reference period is that COVID-19 started in Ghana two months preceding the survey (12th March 2020 to 12th May 2020), so respondents who had continuously lived in the household for at least three months before the outbreak of the pandemic and had continuously lived in the household during COVID-19 period for at least two months preceding the survey would be able to compare living conditions of the household for both periods.

Potential respondents were excluded from the survey, because they had not continuously lived in the household for the past five months preceding the survey (to reduce recall bias). Ten out of the 16 regions were randomly sampled for the study. The regions included in the survey were Greater Accra, Western, Central, Oti, Ashanti, Bono, Eastern, Northern, North East and Upper West regions. Both the online survey and telephone interviews ran concurrently for four weeks (12th May to 9th June 2020) in all the ten regions. The telephone interviews mainly targeted household heads with no formal education or at most primary education. In each region, 90 household heads were interviewed (3 household heads per day). Ten days to the start of the interviews, several household heads were contacted to purposely explain the upcoming survey and its importance to them and the nation as a whole, as well as to obtain their telephone contacts due to the social distancing protocol. The respondents were also assured of their anonymity and confidentiality of the information they would give. After the ten days exercise, a large number of telephone contacts of household heads were obtained. Though each household head was first contacted to consent to the study before taking the telephone contact, the research team still ensured that respondents were not forced to participate in the study. Thus, participation in the study was purely on voluntary basis. During the telephone interview, a household head's contact is randomly picked from the pool of contacts obtained. The interviewer re-briefs the household head about the exercise and then seeks for his or her consent. If a household head consents to participate in the survey, the interviewer finally proceeds with the interview. In a case where the household head declines to the interview, that household head was dropped and a new contact was drawn from the pool. In total, 900 household heads were interviewed, while the online survey recorded 4,115 household heads. However, the online survey had a lot of missing observations. As a result, the observations from the online survey reduced to 3,005 after cleaning the data. This therefore gave a total sample size of 3,905 household heads for the analysis. The location and gender dimensions of the sample were as follows: rural versus urban were 1,841 and 2,064 representing 47.14 percent and 52.86 percent, respectively. The females were 1,878, while males were 2,027, giving 48.09 percent and 51.91 percent, respectively.

Dependent Variables: The dependent variables were poverty and living standards.

Poverty: As stated earlier, the study adopted the six Afro barometer questions as indicators for lived poverty. These six core questions were used to construct an index called the Lived Poverty Index (LPI) which is an experiential measure that is based on a series of questions about how frequently individuals actually go without basic necessities during the course of a year. The rationale behind LPI is that the value of one's standard of living or poverty lies in the living itself and thus, people are the best judges of their own interests and quality of life (Afro barometer, 2016; Sen, 1999). Box1 shows the precise questions.

All the six items under the Lived Poverty section were used to compute a composite Lived Poverty Index (LPI) using Principal Components Analysis (PCA). A Cronbach's alpha (scale reliability coefficient) of 0.89 was obtained prior to the generation of the composite score. As shown in Table 1, only one factor (component) had an Eigenvalues greater than 1, indicating that all the items loaded on one construct. Based on Kaiser's criterion, we retained this factor which also explained almost 69 percent of the variance in the response variable. The indicators were coded 0-never to 4-always and thus, higher scores on the response variable correspond to lower poverty level. The likelihood ratio test indicated a good model fit.

Table 1: Principal components analysis

Lived Poverty Index (LPI)				
Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.46865	2.61999	0.6937	0.6937
Comp2	.848663	.474067	0.1697	0.8635
Comp3	.374596	.17871	0.0749	0.9384
Comp4	.195887	.0836813	0.0392	0.9776
Comp5	.112206	.	0.0224	1.0000
N	3,905			
KMO overall	0.8197			
Living Standards Index (LSI)				
Comp1	2.84383	1.28473	0.4063	0.4063
Comp2	1.5591	.694758	0.2227	0.6290
Comp3	.864337	.144995	0.1235	0.7525
Comp4	.719342	.145707	0.1028	0.8552
Comp5	.573635	.237509	0.0819	0.9372
Comp6	.336126	.232487	0.0480	0.9852
Comp7	.103639	.	0.0148	1.0000
N	3,905			
KMO overall	0.7623			

Another main interest of the study was to explain how the COVID-19 pandemic affected household living standards.

Living standards: The final dependent variable was living standard. Using six items (See Box 2 Appendices), the study computed a living standard index using PCA. As shown in Table 1, a Cronbach's alpha (scale reliability coefficient) of 0.742 was obtained prior to the generation of the composite score. Only two factors (components) had Eigenvalues greater than 1, indicating that all the items loaded onto two constructs. Based on Kaiser's criterion, we retained these factors which also explained almost 63 percent of the variance in the response variable (living standards)

Independent Variables: The independent variables for the study comprised the individual and household characteristics. They included employment status, sex, and education, region of the household head, household income, expenditure and presence of dependents in the household. For the definition and measurement of these independent variables, please refer Table A under the Appendices.

Empirical Model Specification and Estimation Method

The empirical model to be estimated is specified in equation (1) as;

$$Y_i = \beta_0 + \beta_2 X + \varepsilon_i \quad (1)$$

Where Y_i is the poverty level of household i . β_s is a vector of unknown parameters and ε_i is the error term that is normally distributed with mean zero and δ^2 as the variance. X is a vector of individual and household characteristics that affect the poverty level of a household. Table A show the definitions and summary statistics of these variables. Household characteristics which were likely to affect poverty are included in the estimation. These variables are the age, employment status and education of the household head, as well as the size and presence of dependents in the household. To capture disparities in the labour market, households' regional and rural/urban locations are included as controls. Hence, an Ordinary Least Square (OLS) was used to estimate equation (1).

To ensure the robustness of the results, we implemented the distributional (quantile) regression technique and Probit estimations. While the quantile regression enabled us to determine which class of persons within income distribution is most affected, the probit estimation determined the likelihood of persons being poor by multidimensionality.

Results And Discussion

Effect of COVID-19 on poverty levels of households

One of the main focuses of the study was to analyze how the COVID-19 pandemic is affecting the poverty levels of households. As stated under previous section, six core questions from Afrobarometer on lived poverty were adopted. Figures 1 to 6 show the distribution of responses on how COVID-19 is affecting household by each poverty indicator. Each figure consists of three panels (A, B & C). In each figure, Panel A shows the current impact of the pandemic on the indicator, Panel B illustrates a comparison between pre-COVID-19 and COVID-19 era on the same indicator, while Panel C gives a non-parametric Pearson's Chi-square test of associations between those categorical distributions. As illustrated in Figure 1, majority (57.76 percent) of the households indicated that in COVID-19 era, there were several times that they had to go without enough food to eat due to the pandemic. Panel B indicates that the household food insufficiency situation was worse in the COVID-19 compared to the pre-COVID period. As shown by the non-parametric Pearson's Chi-square test of independence for the three categorical distributions (Better, Same, and Worse), the hypothesis that household food insufficiency is independent of COVID-19 was rejected. Besides, the Cramer's V statistic shows that there is a statistically significant association between COVID-19 period and food insufficiency.

As shown in Figure 2, majority (50.52percent) of the households had several times with clean water for home use in the covid-19 period. From Panel B, it is clear that the household water problems had worsened in the COVID-19 period compared to the pre-COVID period. From the non-parametric person's Chi-square test of independence for the three categorical distributions (Better, Same, Worse), we failed to accept the hypothesis that household water problems are independent of COVID-19. The Cramer's V statistic also showed a statistically significant association between COVID-19 period and water problems.

Most (52.22percent) of the household (see Figure 3) had at least reported several times of not being able to access medicines or medical treatments due to COVID-19. Those who reported of never experiencing such situations were just 18.05 percent. Compared to the pre-COVID-19 period (see Panel B), majority (52.27percent) of the households indicated that the situation in the COVID-19 period was worse, implying that COVID-19 is truly having a deleterious effect on the medical conditions. Evidently, the households, in several times, had clean water for home use in the COVID-19 period. At one percent level of significance, we fail to accept the null hypothesis that household's inability to get medicines or medical treatments was independent of COVID-19. The Cramer's V statistic also showed that the association is statistically significant.

Evidently (see Figure 3), about 34.21 percent of the households indicated that, on several occasions, they could not get enough fuel to cook food for their households. About 14.9 percent and 6.38 percent also reported that incidence many times and always, respectively. A comparison of the pre-COVID-19 period to the COVID-19 period (see panel B) also shows that the inadequacy of cooking fuel is worse in the pandemic era. Clearly, there was a significant association between inadequate cooking fuel and the COVID-19 period, as evidenced by the Pearson's Chi-square test of independence. The Cramer's V statistic also showed that the association is statistically significant.

Figure 4 shows the case for household cash income. It indicates that about 60.72 percent of the households had at least, on several times, gone without enough cash income for the household. Remarkably, approximately 45 percent had indicated that the situation is worse (see panel B) in the COVID-19 period compared to the pre-COVID-19 era. The Pearson's Chi-square test of independence (see Panel C) showed that there is a strong link between income shortages and the COVID-19 period.

Econometric estimation of effect of COVID-19 on poverty and living standards

Table 2 presents results of the effect of COVID-19 on poverty and living standards of Ghanaian households. In this analysis, both poverty and living standards are composite indices. Both the poverty model and the living standard models are log-level (semi-elasticity). In this analysis, unemployed due to covid-19 refers to workers who loss their jobs due to the pandemic. As shown in Table 2, compared to households whose heads were employed, the poverty levels of households whose heads were unemployed due to COVID-19 increases significantly by 55.7 percent, while their living standards decreased by 65.7 percent generally. The study also found supportive evidence of the gender-covid-19 heterogeneities. The poverty levels and living standards in male-headed household who loss their jobs due to the pandemic increased and decrease by 54.3 percent and 61.4 percent for poverty and living standards respectively. However, poverty increased by 58 percent for female-headed household whose heads loss jobs due to covid-19 while their living standards decreased by 71 percent. The differential magnitude of 3.7 percentage points in favour of male-headed household is indicative of the gender gap. Similar trends holds for other individual and household characteristics. This finding supports the findings of Wenham, et al. (2020) and Alon, et al. (2020) who observed that COVID-19 pandemic is widening the gender inequality gap with females continuously disfavoured.

Again, for households whose heads were unemployed due to factors other than the pandemic, their poverty levels dropped by 14.2 percent with a 40.6 percent decrease in living standards. The differential effects of one percentage points and 15.1 percentage points for poverty and living standards respectively in female-headed household again validates the gender-COVID-19 heterogeneity hypothesis. By, implication, the pandemic generally had a significant deleterious effect on households in terms of poverty and living standards and that the pandemic's impact is more pronounced in households headed by females. Similar findings had been reported by Suryahadi, et al. (2020) in Indonesia.

Table 2: Effect of COVID-19 on poverty and living standards

	Poverty (Lived poverty Index-LPI)					Living standards				
VARIABLES	Full	Male	Female	Rural	Urban	Full	Male	Female	Rural	Urban
Unemployed due to COVID-19	0.557***	0.543***	0.580***	0.670***	0.450***	-0.657***	-0.614***	-0.710**	-0.734**	-0.591**
	(0.048)	(0.070)	(0.067)	(0.067)	(0.069)	(0.0415)	(0.0584)	(0.0594)	(0.0530)	(0.0647)
Unemployed due to other factors	0.142***	0.159***	0.169**	0.154***	0.133**	-0.406***	-0.331***	-0.482**	-0.443**	-0.377**
	(0.043)	(0.060)	(0.063)	(0.056)	(0.065)	(0.0409)	(0.0567)	(0.0593)	(0.055)	(0.0608)
Age	-0.003***	-0.004**	-0.003**	-0.004**	-0.003**	0.015	0.0708	0.003	0.049	0.028*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	-0.006	-0.004*	0.003	0.001	-0.002	-0.007***	-0.007***	-0.017*	-0.067**	-3.59e-07
	(0.002)	(0.002.)	(0.002)	(0.002)	(0.004)	(1.38e-07)	(1.19e-07)	(0.043)	(0.002)	(0.007)
Female head (ref=male head)	0.063**			0.095**	0.042	-0.055**			-0.060**	-0.051**
	(0.030)			(0.041)	(0.044)	(0.0284)			(0.0376)	(0.0435)
Rural (ref=urban)	0.105***	0.047	0.151***			-0.077**	-0.160**	-0.101**		
	(0.035)	(0.049)	(0.049)			(0.0331)	(0.040)	(0.0482)		
Household size	0.0233**	0.032***	0.016**	0.017**	0.030***	-0.011**	0.046**	-0.084**	-0.039**	0.018**
	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)	(0.00488)	(0.00663)	(0.00733)	(0.007)	(0.0061)
Dependents(ref=no dependents)	0.185***	0.199***	0.169***	0.093**	0.269***	-0.454***	-0.476***	-0.438**	-0.505**	-0.394**
	(0.035)	(0.050)	(0.049)	(0.047)	(0.051)	(0.0357)	(0.0495)	(0.0521)	(0.0479)	(0.0537)
Primary education	-0.152***	-0.191**	-0.113	-0.206**	-0.074	0.0918*	0.123*	0.0863	0.0547	0.106*
	(0.050)	(0.068)	(0.074)	(0.060)	(0.088)	(0.0491)	(0.0733)	(0.0673)	(0.0783)	(0.0637)
Secondary education	-0.216***	-0.273**	-0.169**	-0.124**	-0.305**	-0.103**	-0.156**	-0.0487	-0.0749	-0.168**
	(0.047)	(0.066)	(0.067)	(0.061)	(0.077)	(0.0439)	(0.0611)	(0.0639)	(0.0639)	(0.0645)
Tertiary	-0.282***	-0.312**	-0.264**	-0.218**	-0.369**	0.0132	0.0351**	0.0614**	0.0123**	0.0353**
	(0.043)	(0.060)	(0.062)	(0.054)	(0.072)	(0.0404)	(0.0564)	(0.0588)	(0.0616)	(0.0549)
Household income(log)	-0.011***	-0.213	-0.028**	0.001	-0.027	0.0567***	0.0737***	0.0413*	0.0480**	0.0569**
	(0.018)	(0.025)	(0.025)	(0.024)	(0.026)	(0.0163)	(0.0235)	(0.0227)	(0.0215)	(0.0247)
Western Region	0.186***	0.257***	0.118	-0.085	0.230***	0.281***	0.197***	0.369***	0.317***	0.316***
	(0.056)	(0.081)	(0.078)	(0.129)	(0.072)	(0.0531)	(0.0750)	(0.0759)	(0.0709)	(0.112)
Central Region	-0.087	-0.152	-0.030	-0.304**	-0.119	0.192***	0.258***	0.127*	0.131*	0.326***
	(0.072)	(0.104)	(0.100)	(0.145)	(0.096)	(0.0529)	(0.0756)	(0.0736)	(0.0690)	(0.113)
Oti Region	0.007	0.064	-0.040	-0.194	-0.116	0.0393	-0.0132	0.0844	-0.114	0.179
	(0.070)	(0.098)	(0.099)	(0.135)	(0.112)	(0.0611)	(0.0837)	(0.0899)	(0.0880)	(0.115)
Bono Region	0.193***	0.175**	0.227***	-0.107	0.242***	0.479***	0.493***	0.461***	0.430***	0.586***
	(0.060)	(0.089)	(0.083)	(0.132)	(0.080)	(0.0547)	(0.0763)	(0.0792)	(0.0671)	(0.118)
Ashanti Region	-0.036	0.039	-0.104	-0.367**	0.019	0.439***	0.453***	0.420***	0.426***	0.540***
	(0.057)	(0.079)	(0.081)	(0.135)	(0.067)	(0.0478)	(0.0664)	(0.0686)	(0.0559)	(0.115)
Eastern Region	-0.162**	-0.154	-0.161*	-0.439**	-0.131	0.567***	0.586***	0.548***	0.587***	0.618***

	(0.068)	(0.098)	(0.096)	(0.139)	(0.092)	(0.0600)	(0.0854)	(0.0849)	(0.0742)	(0.125)
Northern Region	0.225***	0.221**	0.233***	-0.018	0.210**	0.218***	0.204**	0.234***	0.200**	0.300***
	(0.062)	(0.087)	(0.087)	(0.127)	(0.095)	(0.0609)	(0.0848)	(0.0884)	(0.0924)	(0.113)
North East Region	0.266***	0.264***	0.278***	0.009	0.318**	0.458***	0.374***	0.544***	0.580***	0.511***
	(0.069)	(0.097)	(0.100)	(0.132)	(0.126)	(0.0773)	(0.107)	(0.112)	(0.167)	(0.121)
Upper West Region	0.403***	0.409***	0.408***	0.119	0.562***	-0.0589	-0.00536	-0.130	0.341**	-0.0627
	(0.067)	(0.092)	(0.097)	(0.129)	(0.134)	(0.0738)	(0.104)	(0.104)	(0.154)	(0.117)
Constant	-0.092	-0.117	-0.123	0.256	-0.019	-0.139	-0.208	-0.0112	0.0382	-0.342
	(0.148)	(0.212)	(0.204)	(0.227)	(0.218)	(0.137)	(0.192)	(0.197)	(0.180)	(0.221)
N	3,905	1,878	2,027	1,841	2,064	3,905	2,027	1,878	1,841	2,064
R-squared	0.131	0.133	0.136	0.145	0.107	0.238	0.236	0.248	0.186	0.298

*LPI is Lived Poverty Index. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Reference group for region is Greater Accra. Reference group for employment are the employed. Reference group for education is no formal education. Unemployed due to covid-19 refers to workers who loss their jobs due to the pandemic*

still on COVID-19-gender dimensions, compared to households headed by males, the poverty levels of female-headed households increased by 6.3 percent and their standard of living also decreased by 5.4 percent. These are statistically significant, indicating the relevance of such variations. This finding supports the findings of Alon, et al. (2020) who found that COVID-19 had exacerbated the gender equality gap. The authors found that closure of schools, and daycare centers have massively increased the poverty levels of females and the effect is likely to persist for a long while owing to high return to experience in the labor market. Similarly, Wenham, et al. (2020) observed that a huge gender heterogeneity exists regarding the impact of COVID-19 with women mostly disadvantaged. The authors underscored that the differential effect of COVID-19 on women results from differences in employment status where most women are engaged in informal care within the household with the consequences of limiting their work and economic opportunities. In terms of COVID-19-location nexus, Table 2 evidently show that household located in rural settings were heavily affected compared to their urban folks. As shown in Table 2, relative to urban households, poverty levels of rural households had increased by 10.5 percent owing to COVID-19 compared to their urban counterparts. Besides, the living standards of households in rural areas had fallen by 7.7 percent compared to those in the urban areas. Focusing on rural-urban sub-samples, although the poverty levels increased and living standards dropped for households in both rural and urban areas whose head loss their jobs compared to their employed counterparts, the differential effect of 22 percentage points and 14.3 percentages for poverty and living standards in rural households is statistically significant at one percent. This further confirms that the impact of COVID-19 is more pronounced in deprived areas. This finding supports the findings of van Dorn, Cooney and Sabin (2020) who found that in the United States, the impact of COVID-19 on people living in rural areas was much greater than those in the cities. Other studies such as Kashnitsk and Aburto (2020) and Emanuel et al. (2020) have also reported similar findings.

Households with large members were also adversely affected. For instance, every additional member of the household increased the poverty level by 2.3 percent and decreased living standards by 1.1 percent. Households with large dependents also had their poverty levels increased by 18.5 percent and living standards decreased by 47.6 percent compared to households without dependents. In terms of education, households whose head had higher educational attainments had their poverty levels fallen compared to those with lower or no formal education. The study also found supportive evidence that incomes cushion households' poverty levels and, thus, improves their living standards. Every additional Cedis decreases the poverty levels by 1.1 percent and increase the standard of living by 5.7 percent. With regard to regional dimensions, some regions of the country were more affected by others. For example, Greater Accra, which is the region most affected with the COVID-19 cases, was the reference categories. As shown in the table, compared to Greater Accra region, poverty levels of households in the Central, Ashanti and Eastern regions were lower.

In sum, the findings in Table 1 are supportive evidence that the COVID -19 pandemic had led to a significant rise in the poverty levels of households. Consistent with extant literature, while Baker, Farrokhnia, Meyer, Pagel and Yannelis (2020) found that the COVID-19 pandemic had increased the poverty levels of households in terms of decrease in overall household consumption, Van Lancker and Parolin (2020) found that COVID-19 had increased child poverty. At the same time, Sumner, Hoy and Ortiz-Juarez (2020) observed that the adverse effect of COVID-19 on poverty is global.

Robustness checks

The study conducted two additional robustness estimations as checks on the results mainly on two grounds. First, given that the effect of the use of essential or basic services may change along the distribution of household welfare, we apply a distributional (quantile) regression technique to examine the effect of the pandemic beyond mean household consumption expenditures. Secondly, there is a tendency that by simply varying the measurement of poverty, the adverse effects of COVID-19 on it might vary substantially. Under that context, the effect of COVID -19 on poverty

becomes sensitive and hence will depend on measurement and conceptualizations issues. Thus, to address this concern, we implemented Alkaire Foster methodology to measure poverty by multi-dimensionality. Poverty, in this study, has five core dimensions (food, water, cooking fuel, medical care, and cash income) and, thus, applying equal weights will yield $1/5=0.2$. In the context of multidimensional poverty (see Alkire & Foster, 2011), a household is multi-dimensionally poor, if it is deprived in at least two dimensions. Hence, the Multi-dimensional Poverty Index (MPI) threshold is MPI and households with are poor and those with are non-poor. Within the Alkaire Foster framework, the MPI is dichotomized such that a household is given a value of 1, if its and 0 otherwise. The effect of COVID -19 on the MPI is estimated with a probit model. To further ensure the robustness of the study's results, we carried out a sensitivity analysis by varying our MPI cutoff (, 0.6 and 0.8). Variations in the cutoff were highly insensitive to poverty estimates, hence we presented the conventional cutoff of .

Fundamentally, these checks are to account for any unobserved heterogeneity that could be found among the sampled households. The estimates for these additional robustness checks are presented in Table 3. From these robustness estimations, two key issues emerged: First, in terms of the overall household consumption, persons within the middle class and the upper class (highest) were highly affected though the poorest were also affected. For instance, while the overall consumption of households whose heads were unemployed due to COVID -19 decreases by 18 percent for those in the lowest quantile, it decreases more (18.5 percent) for their counterparts in the highest quantile. A possible explanation for this finding is that COVID -19 in Ghana is so much concentrated in its major cities compared to its rural areas. Second, those who were unemployed due to COVID -19 have a 10.5 percentage points probable risk of being multi-dimensionally poor compared to the employed. Households whose heads were unemployed due to factors other than COVID -19 have a 5.8 percentage points probable risk of being multi-dimensionally poor compared to the employed.

Table 3: Effect of COVID -19 on poverty and living standards

Total household consumption expenditure						Multidimensional poverty				
Simultaneous Quintile Regression (SQR)						Full	Male	Female	Rural	Urban
VARIABLES	Lowest	Second	Third	Fourth	Highest	ME	ME	ME	ME	ME
Unemployed due to COVID -19	-0.180**	-0.203**	-0.199**	-0.226**	-0.185**	0.105**	0.145**	0.090**	0.149**	0.065***
	(0.059)	(0.0526)	(0.0416)	(0.0245)	(0.0411)	(0.019)	(0.029)	(0.027)	(0.029)	(0.024)
Unemployed due to other factors	-0.0231	-0.0691	-0.0749	-0.082**	-0.215**	0.058**	0.049	0.070**	0.057*	0.055**
	(0.0586)	(0.0554)	(0.0501)	(0.0369)	(0.0357)	(0.020)	(0.030)	(0.027)	(0.031)	(0.023)
Age	0.000923	0.026**	0.00110	-0.00128	-9.61e-06	-0.001	-0.001	-0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.00106)	(0.001)	(0.00107)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	3.01e-08	3.99e-08	-2.25e-07	-0.007	-1.61e-07	0.009	-0.003**	-0.007	0.002	0.001
	(0.007)	(0.007)	(2.38e-07)	(0.007)	(2.13e-07)	(0.009)	(0.001)	(0.009)	(0.001)	(0.001)
Female head (ref=male head)	-0.0298	-0.0493*	-0.062**	-0.064**	-0.076**	0.015**			0.020**	0.027**
	(0.0343)	(0.0292)	(0.0240)	(0.0235)	(0.0274)	(0.013)			(0.0200)	(0.016)
Rural (ref=urban)	-0.133**	-0.186**	-0.089**	-0.100**	-0.207**	0.004*	0.010**	0.007**	0.008**	0.0014
	(0.0536)	(0.0397)	(0.0296)	(0.0268)	(0.0362)	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)
Household size	-0.00753	-0.013**	-0.016**	-0.014**	-0.023**	0.084**	0.144**	0.096**	0.123**	0.038**
	(0.006)	(0.005)	(0.003)	(0.004)	(0.004)	(0.014)	(0.022)	(0.020)	(0.021)	(0.019)
Dependents(ref=no dependents)	-0.0318	-0.115**	-0.0473	-0.114**	-0.215**	0.007	-0.051	-0.019	0.004	0.007
	(0.0399)	(0.0531)	(0.0300)	(0.0336)	(0.0378)	(0.023)	(0.038)	(0.029)	(0.039)	(0.024)
Primary education	0.123	0.0441	0.0157	0.0149	0.0809*	-0.032	-0.029	-0.092**	-0.081**	0.007
	(0.0839)	(0.0565)	(0.0475)	(0.0386)	(0.0443)	(0.021)	(0.032)	(0.029)	(0.033)	(0.025)
Secondary education	0.228**	0.105	0.0724	0.0545	0.156***	-0.047**	-0.073**	-0.089**	-0.091**	-0.017
	(0.0905)	(0.0672)	(0.0486)	(0.0393)	(0.0485)	(0.019)	(0.029)	(0.026)	(0.031)	(0.022)
Tertiary	0.155**	0.0808*	0.0849**	0.0679**	0.225***	-0.023**	-0.003**	-0.027**	-0.032**	-0.013
	(0.0653)	(0.0456)	(0.0369)	(0.0297)	(0.0367)	(0.008)	(0.009)	(0.011)	(0.011)	(0.009)
Household income(log)	-0.0449	-0.0517	-0.235***	-0.324**	-0.218***	0.073***	0.111**	0.055**		
	(0.0765)	(0.0733)	(0.0530)	(0.0690)	(0.0607)	(0.015)	(0.024)	(0.021)		
Western	0.000466	0.0150	-0.0864	-0.228**	-0.138***	0.175***	0.143**	0.185**	0.178**	0.170***
	(0.0757)	(0.0852)	(0.0577)	(0.0619)	(0.0448)	(0.024)	(0.037)	(0.035)	(0.031)	(0.058)
Central Region	-0.0880	-0.123*	-0.226***	-0.296**	-0.134*	0.045	0.107**	0.034	0.0392	0.042
	(0.0980)	(0.0664)	(0.0701)	(0.0790)	(0.0715)	(0.031)	(0.044)	(0.045)	(0.041)	(0.064)
Oti Region	-0.0638	-0.148	-0.189***	-0.203**	-0.120**	-0.059*	-0.102**	-0.046	-0.021	-0.072
	(0.0896)	(0.0986)	(0.0701)	(0.0597)	(0.0511)	(0.034)	(0.047)	(0.048)	(0.054)	(0.063)
Bono Region	-0.00778	-0.0593	-0.162***	-0.183**	-0.0642	0.214***	0.160**	0.194**	0.231**	0.193***
	(0.0866)	(0.0675)	(0.0582)	(0.0932)	(0.0671)	(0.026)	(0.043)	(0.039)	(0.034)	(0.059)
Ashanti Region	-0.0277	-0.140*	-0.212***	-0.310**	-0.153*	0.086***	0.024	0.134**	0.091**	0.064
	(0.0719)	(0.0842)	(0.0823)	(0.0870)	(0.0908)	(0.025)	(0.037)	(0.034)	(0.030)	(0.061)
Eastern Region	-0.113*	-0.193**	-0.281***	-0.321**	-0.154**	0.152***	0.134**	0.149**	0.124**	0.177***

	(0.0649)	(0.0933)	(0.0609)	(0.0678)	(0.0726)	(0.030)	(0.046)	(0.044)	(0.041)	(0.061)
Northern Region	-0.342**	-0.217*	-0.246***	-0.232**	-0.0641	0.208***	0.208**	0.199**	0.242***	0.179***
	(0.116)	(0.122)	(0.0857)	(0.104)	(0.0669)	(0.027)	(0.044)	(0.040)	(0.039)	(0.058)
North East Region	-0.614**	-0.516**	-0.304***	-0.356**	-0.264***	0.249***	0.241**	0.286**	0.238***	0.227***
	(0.218)	(0.0869)	(0.0868)	(0.0605)	(0.0903)	(0.028)	(0.048)	(0.038)	(0.055)	(0.057)
Upper West Region	5.861***	6.522***	7.071***	7.686***	8.022***	0.316***	0.221**	0.352**	0.382***	0.260**
	(0.131)	(0.0930)	(0.0885)	(0.0892)	(0.0691)	(0.023)	(0.051)	(0.029)	(0.031)	(0.056)
Constant	3,905	3,905	3,905	3,905	3,905	3,905	2,027	1,878	2,064	1,841

ME is Marginal Effect. *Reference group for region is Greater Accra. Reference group for employment are the employed. Reference group for education is no formal education. Unemployed due to covid-19 refers to workers who loss their jobs due to the pandemic* Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Conclusions And Recommendations

This paper empirically provides a first view of the micro-effects of the COVID-19 pandemic in Ghana. Using primary data, the study demonstrates how COVID-19 affects household poverty and living standards in Ghana. The study showed that COVID-19 has negatively affected the poverty and living standards of households and that the adverse effect was much greater for the unemployed compared to the employed. The study also found supportive evidence that COVID-19 has a heterogeneous effect on demographic characteristics such as age, household size, income, educational attainments and employment status. Moreover, we validate that gender and local heterogeneities exist regarding the impact of COVID-19. While female-headed households were worse off in terms of poverty and living standards compared to their male-headed counterparts, rural households were largely affected than the urban households. This study has several policy implications. First, COVID-19 has widened the gender equality gap and thus, more efforts or gender-specific policies are required to close the new gaps and possibly narrow existing ones. Again, rural dwellers were more affected than those in the urban settings, although in both settings, a significant proportion had lost their jobs. Thus, there is the urgent need for the country to broaden its social protection programmes to assist both the new poor and existing poor. However, our study had some limitations. We caution that findings from this study were based on short-term responses meant to illustrate a close to a real-time view of COVID-19 micro-effect on household poverty and living standards as possible. The outbreak of COVID-19 has upended countries worldwide and we are surely just at the beginning of understanding the full impact of the pandemic at both the household and national levels. In that regard, this study comes in hand as a reference for future studies within Ghana and possibly beyond. We suggest that future studies should analyze how households that lost their jobs due to COVID -19 were able to substitute to new types of work and new employers.

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Figures

Figure 1

Number of times that households had gone without enough food to eat due to COVID-19 (past two Months)

Figure 2

Number of times that households had gone without enough clean water for home use due to COVID-19 (past two Months)

Figure 3

Number of times that households had gone without medicine/medical treatments due to COVID-19 (past two Months)

Figure 4

Number of times that households had gone without enough fuel to cook food due to COVID-19 (past two Months)

Figure 5

Number of times households has gone without a cash income due to covid-19 (past two Months)

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