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Poverty Dynamics among Kenyan Refugees During the COVID-19 Pandemic: A Heteroscedasticity Consistent Ordered Probit Approach

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Abstract: COVID-19 remains an income shock of significant economic consequence to many households across the world. The situation among refugees can be pathetic due to their inherent economic deprivations and vulnerability to income shocks. This paper analyzed the dynamics of poverty among refugees in Kenya during the COVID-19 pandemic and determined their correlates. The data were the first to fifth waves of the COVID-19 Rapid Response Phone Surveys that were conducted among refugees. The data were analysed with heteroscedasticity consistent Ordered Probit model. The results showed that with only 8.14% of the refugees never entering poverty within the survey periods, majority of the refugees were transiently (46.27%) and chronically (45.59%) poor. The error variance differed across household sizes, and heteroscedasticity was properly corrected. Movement from never being poor to chronic poverty was significantly promoted by urban residence, household size, educational levels, and camp of residence (Kakuma, Dadaab and Kalobeyei), while asset disposal income, amount of credit, remittance, and other gifts reduced it. It was concluded that efforts to reduce poverty vulnerability among refugees should among others address maternal fertility and promotion of policies to allow formally educated refugees to be gainfully engaged in the Kenyan labour markets.

Keywords: Poverty Dynamics; Vulnerability; Refugees; Heteroscedasticity; COVID-19

JEL Classifications: D60, I30; I32; I38; I39

1. Introduction

Conflict-induced human displacement remains a serious concern in Sub-Saharan Africa (SSA). Globally, between 2020 and the end of 2021, the number persons who were forcibly displaced increased by 8% to 89.3 million, while the number of refugees increased to 27.1 million (United Nations High Commission for Refugees [UNHCR], 2022). Although the number of new arrival refugees across some African

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countries may have recently declined due to some immigration restrictions imposed by the COVID-19 pandemic, the number of conflict-induced internally displaced people may not have significantly waned. Specifically, intermittent border closures and restrictions on inter-state movements were implemented by many African countries to curtail the spread of COVID-19. These have significantly affected the motivation to migrate by some potential refugees, while the pandemic has brought some migrants into a perpetual cycle of emotional and psychological traumas, vulnerability, and poverty (Mixed Migration Centre, 2021). Within the African Union (AU), the pandemic was an acid test to their commitments to the contextual contents of the Kampala Convention, which came into force on 6th December 2012, and as of 18th June 2020 had been signed by 40 out of the 55 countries, with 31 ratifications (African Union, 2021).

COVID-19 obviously presents a daunting dent on the livelihoods of many refugees, who constitute the most vulnerable group in every society. The underlying notion of welfarism as a fundamental node for humanitarian assignments has been put to significant test, given the level of economic distortions that some countries faced due to dwindling resources and economic contractions. In some instances, the high representation of the migrant populations in precariously indecent employment often limits their access to healthcare and other essential social protection services (United Nations, 2021). The onus therefore rests on policy makers to understand the magnitude of the welfare impacts and vulnerability experienced by refugees during the pandemic. This will facilitate national and international responses to covariate shocks and interventions to address growing poverty among refugees through some marginal reforms.

It should be emphasized that the Kenyan government had over the years expressed some burdensomeness over their mandatory role as the host to some refugees (UNHCR, 2021).After more than three decades, there have been speculations on the threat of closing some refugee camps by the Kenyan government and UNHCR has suggested the options of returning some of them to their home countries or other third world countries, while some of them from the East African Community (EAC) may be granted the privilege of staying back (UNHCR, 2021). However, the agitations to shed the responsibilities of hosting some refugees may have been significantly prompted by the severity of economic devastations that were suffered from COVID-19 pandemic (World Bank, 2021). Besides the public health crises that the pandemic represents, it also denotes a pathetic terminator of economic growth and sustainable livelihoods (Warah, 2022).

For an ordinary Kenyan resident, the impact of the pandemic is most reflected in consumer prices, although inflation had been on gradual increase before the pandemic (Irungu, 2020). It was estimated that since 2013, the prices of basic households' commodities increased by more than 46%, while some other statistics

revealed that since 2011, basic households' commodities' prices increased at between 16% and 53% (Warah, 2022). It had been emphasized that the prices of food and beverages increased by 8.46%, transport increased by 14.71%, healthcare services, water, fuel, hotel accommodation and housing increased by 4.25%, and personal care products increased by about 3% (Ambani, 2021).

The Kenya's economic policy responses during COVID-19 are to relief households of the pandemic's associated economic burdens. The palliative measures included zero tax on monthly income that is less than KSh 24000 per month, reduction in the maximum payable tax rate from 30% to 25%, reduction of turnover tax rate to 1% and provision of KSh 10 billion social protection cash transfer to highly vulnerable people including orphans and elderly (Delloitte, 2020). Although these policy measures are meant to cushion the general hardships that were brought about by the pandemic, the expected marginal benefits for majority of the refugees would be minimized through their generally low socio-economic status and some discriminatory legislations that aim at preventing them from functioning in the labour markets. Therefore, engagement of many refugees in informal employment, low quality housing, lack of access to basic social and sanitation services, and institutional and legal restrictions that define their work capacity, freedom of movement, and access to financial services are inherent sources of socioeconomic vulnerability (UNHCR, 2021). Also, protracted implementation of initiatives to promote employability of women is a limiting welfare factor given the high number of female-headed households among the refugees. Although reduction in overcrowding is a major remedy against domestic violence, occupational and domestic stressors, and spread of highly infectious diseases like COVID-19, the financial requirements to ensure this and persistent entrance of new refugee arrivals often undermine any development in housing quality (UNHCR, 2021).

Economic literature has conceptually viewed vulnerability from different perspectives. Therefore, vulnerability has been defined as low expected utility, absence of insurance against welfare shocks and probabilistic expectation of being poor (Calvo & Dercon, 2013; Feeny & McDonald, 2016; Gaiha & Imai, 2008; Ligon & Schechter, 2003; Ozughalu, 2016; Verme et al., 2016). Chaudhuri et al. (2002) proposed some rigorous econometric approaches to predict vulnerability to poverty from cross-sectional data. Some authors have applied this methodology to analyse vulnerability to poverty using food expenditures (Bogale, 2012; Ozughalu, 2016) and some multiple indicators of households' welfare (Feeny & McDonald, 2016; Azeem et al., 2018). This development is in tandem with the fact that poverty measurement has been conceptualized from the unidimensional and multidimensional approaches (Alkire & Santos, 2013; Azami, 2021). Whichever side we take, poverty remains a cumulative manifestation of income deprivation, and it is a very serious problem among majority of refugees.

Oucho and Odipo (2012) noted that although research on the inter-linkages between migration and poverty is multidimensional, the unidimensional approach focusing on remittances, income, expenditure, and assets had been widely used. A clearer understanding of the causes or drivers of poverty is necessary to ensure effective poverty reduction policies. Among different factors, the role of gender in the promotion of poverty among refugees had been emphasized (World Bank, 2017). Bollinger and Hagstrom (2004) found a significantly higher poverty incidence among female headed refugee households, younger households' heads, disabled households' heads, and households with large family sizes, while it declined among married couples. Chaaban et al. (2020) also found that multi-purpose cash assistances among refugees in Lebanon resulted in decline in food insecurity and better access to drinking water and healthcare services. Some other studies have explored the targeting efficiency and welfare impacts of food aid among refugees (Verme and Gigliarano, 2019; Altindag et al., 2020).

Lyons et al. (2021) found that vulnerability to poverty among Syrian refugees in Lebanon declined with access to employment income and multi-purpose cash assistance, while borrowing as the major source of income, illiteracy, primary education as the highest level of heads' education, female headed households, younger households' heads, and being single increased vulnerability. Amirthalingam and Lakshman (2012) found that among refugees from Syria, female-headed households and widows had a higher poverty incidence. Hanmer et al. (2018) also found that among Syrian refugees in Jordan, female headed households had significantly higher probability of being poor before they received the UNHCR food assistances. It was further found that possession of more than 12 years of formal education, wage income and legal entry status significantly reduced the probability of being poor irrespective of access to food assistances from the World Food Programme or UNHCR, while household size, disability and number of siblings increased it.

Oucho and Odipo (2012) emphasized that although risks, household dynamics, and intergenerational factors influencing poverty have been theoretically explored in literature, there is serious dearth of empirical studies. This paper is contributing to existing body of knowledge by being among the few to have used panel data to assess vulnerability to poverty among refugee population. The adopted econometric approach is also sound, taking adequate cognizance of inherent problem of heteroscedasticity which ordinarily may bias the estimators and affect their consistency if not properly corrected. Even at cross-sectional level, studies that address poverty measurements among refugees and asylum seekers are not so common. This paper seeks to achieve two objectives which are t determine the correlates of poverty dynamics and analyse the factors influencing intensity of poverty vulnerability. The results of the analyses can generate efficient ways to

address inherent poverty among refugees through some marginally implemented social assistances and human capital development.

2. Materials and Methods

2.1. The Data

The data used for this study were the COVID-19 Rapid Response Phone Survey, which was implemented by the Kenyan National Bureau of Statistics (KNBS) with support from the World Bank, UNHCR, and the University of California, Berkeley. The data were the first to fifth waves, which were collected between 14th of May 2020 and 29th of March 2021. The list of registered refugees in Dadaab camp, Shona camp and urban areas constituted the sampling frame. However, the sampling frame of the Socioeconomic Surveys (SES) that was recently implemented in the Kakuma and Kalobeyei camps was followed for these two camps. The list of the refugees was generated by the UNHCR. The sampling was implemented by selecting 1000 listed individuals from each of the camps, except Shona where all the registered individuals were included due to its small size, being 400 registered households. The selected individuals were sent some text messages to verify if their phone numbers were still active on the telecommunication networks. Those individuals with active phone numbers were then stratified by their age and gender (World Bank, 2022) and sampling weights were generated for each household (UNHCR, 2021a).

Computer Assisted Telephone Interview (CATI) was used to implement the surveys. The households that had been selected for interview were first loaded on the system using the information on their place of residence and phone numbers (UNHCR, 2021b). Only adult members of the households were eligible to be interviewed, and sampling was done randomly to ensure gender representativeness (UNHCR, 2021c). The first wave of the surveys was carried out between 14 May and 7 July 2020 with 1328 interviewed households. The second wave was undertaken between 16 July and 18 September 2020) with 1699 respondents. During the third wave which was implemented between 28 September and 2 December 2020, 1487 respondents were successfully interviewed. In the fourth wave, 1376 households were interviewed between 15 January and 25 March 2021. The fifth wave was implemented between 29 March and 13 June 2021 with 1562 successfully interviewed households (UNHCR, 2021b). Approval to use the dataset was granted by the UNHCR.

2.2. Heteroscedasticity Consistent Ordered Probit Model

The Ordered Probit regression model was used to analyse the determinants of poverty dynamics. This model is best used when the dependent variable is ordinal in nature (STATA, Undated). The model can be specified as:

$$\Pr(outcome = i) = \Pr(k_{i-1} < \beta_1 x_{1j} + \beta_2 x_{2j} + \beta_3 x_{3j} \ldots \ldots + \beta_k x_{kj} + u_j \leq k_i)$$

<div align="right">1</div>

$$\Pr(outcome = i) = \Phi(k_i - \beta x_j) - \Phi(k_{i-1} - \beta x_j)$$

<div align="right">2</div>

u_j is independent and identically distributed N(0,σ_v^2), and κ is a subset of the cut-points $\kappa_1, \kappa_2, \ldots \ldots \kappa_{I-1}$, where the number of possible outcomes is denoted as I. κ_0 is $-\infty$ and κ_k is $+\infty$. The estimated model lacks a constant term, which will be subsumed in the cut-point parameters. Estimation of heteroscedasticity consistent parameters in this study was implemented with *hetoprobit* command using the STATA 17 software. This command works with the variance of the error term u_j, being estimated as a multiplicative function of all the included explanatory variables (z) (Harvey, 1976). Equation 3 presents the relationship between the standard deviation and the linearly estimated explanatory variables:

$$ln\sigma_j = \pi z_j$$

<div align="right">(3)</div>

π denotes a vector of the parameters to be estimated in the variance function. Given equation 3, equation 2 can rewritten to account for heteroscedasticity and presented as equation 4:

$$\Pr(outcome = i) = \frac{\Phi(k_i - \beta x_j)}{\exp(\pi z_j)} - \frac{\Phi(k_{i-1} - \beta x_j)}{\exp(\pi z_j)}$$

<div align="right">4</div>

Accounting for heteroskedasticity is essential given the possibility of variance of error being different across some population groups, which will ultimately make the estimated parameters to be biased (Williams, 2010; Reardon et al., 2017; Alvarez and Brehm, 1995). The estimated equation is presented as:

$$Y_{it} = \alpha + \sum_{k=1}^{n} \beta_k X_i + u_i$$

<div align="right">5</div>

The dependent variable (Y_{it}) represents the poverty dynamic status of the household. In this study, the dependent variable was computed from the expenditure data of the households, with utilization of the national poverty lines which were KSh 3252 and KSh 5995 for rural and urban households respectively (World Bank, 2020). It should be noted that the data were collected in five waves, and not everyone was interviewed in all the waves because some respondents dropped out while new participants were added from time to time. To compute the indicator of poverty dynamics, only the households that participated in at least two waves of the surveys were included. Those households that were never poor in any of the waves were grouped as non-poor. Those who were non-poor in at least one of the waves, but poor in some other waves were classified as transiently poor. The households who were poor in all the waves in which they participated were classified as chronically poor. The dependent variable was coded as 1 for the non-poor, 2 for the transiently poor, and 3 for the chronically poor. Moreover, when some of the independent variables were tested for

accounting for heteroscedasticity, household size showed statistical significance ($p<0.05$). Therefore, variations in the error variance of poverty dynamics exist across the household sizes, and heteroscedasticity must be corrected.

The explanatory variables were also examined for the presence of multicollinearity, using the variance inflation factor (VIF). The included explanatory variables are household head age (years), urban resident (yes = 1, 0 otherwise), household size, household head's gender (Male = 1, 0 otherwise), improved floor materials (yes = 1, 0 otherwise), power grid connection (yes = 1, 0 otherwise), number of telephones, agricultural activities (yes = 1, 0 otherwise), pastoral activities (yes = 1, 0 otherwise), non-farm enterprises (yes = 1, 0 otherwise), amount sold assets (KSh), received food (yes = 1, 0 otherwise), amount of loans (KSh), Kakuma camp resident (yes = 1, 0 otherwise), Kalobeyei camp resident (yes = 1, 0 otherwise), Shona resident and other (yes = 1, 0 otherwise), remittance recipient (yes = 1, 0 otherwise), gift recipient (yes = 1, 0 otherwise), government help recipient (yes = 1, 0 otherwise), NGO's help recipient (yes = 1, 0 otherwise), politician's help recipient (yes = 1, 0 otherwise), primary education (yes = 1, 0 otherwise), secondary education (yes = 1, 0 otherwise), tertiary education (yes = 1, 0 otherwise), and Madrassa/Duksi trainings (yes = 1, 0 otherwise).

3. Results and Discussion

3.1. Distribution of Demographic Variables Across Poverty Vulnerability Classes

Table 1 shows the distribution of refugees' selected demographic variables across their poverty vulnerability statuses. It reveals that the average age of all the respondents was 36.10 years. However, the average age of those who were non-poor was 33.99 years, while that for transiently and chronically poor were 35.78 and 36.81 years respectively. The relative youthfulness of the refugees is an indication that aged people may find it difficult to migrate, given the inherent difficulty of the tasks involved. This finding is in line with some previous studies by UNHCR and the World Bank (UNHCR and World Bank, undated a, b & c). The International Labour Organization (2021) also noted that in many cases, young people tend to be mostly affected by temporary or permanent displacements.

Figure 1 further shows the distribution of poverty vulnerability within the respondents' age groups. It reveals that while only 8.14% of all the respondents were non-poor, majority were either transiently or chronically poor. The Figure further reveals that the respondents who were in the 35<55 years age groups had more than half being chronically poor. In addition, transient poverty was highest among 25<30, and 60 and above age groups with 61.47% and 55.79%, respectively. These results are in line with expectations, given the pre-COVID high level of poverty among

refugees (UNHCR and World Bank, undated a, b & c). Generally, it had been estimated that within four months of battling the COVID-19 pandemic in Kenya, about 1.7 million jobs were lost and approximately 2 million households slipped into poverty (McLean, 2021).

Table 1. Selected Refugees' Demographic Variables Across Poverty Vulnerability Statuses

|	Non-Poor	Transiently Poor	Chronically Poor	All
House head age	33.99	35.78	36.81	36.10
Urban Resident	16.77	30.77	16.58	23.16
Rural Resident	83.23	69.23	83.42	76.84
Household size	1.82	3.84	6.61	4.94
Male headed	52.10	57.85	56.36	56.70
Female headed	47.90	42.15	43.64	43.30
Improved floor	57.49	53.21	32.62	44.17
Power grid	77.25	56.38	27.06	44.71
Number of phones	1.24	1.45	1.60	1.50
Agricultural job	1.80	0.42	1.18	0.88
Pastoral job	2.40	0.42	0.75	0.73
Non-Farm business	7.78	3.16	4.39	4.10
Asset Sales (KSh)	311.03	191.02	104.48	161.34
Amount of loans	626.03	484.82	394.55	455.17
Received food aid	25.75	5.80	2.78	6.05
Remittance	22.75	6.85	3.21	6.48
Gift recipient	35.33	7.17	3.42	7.75
Government's s	10.78	3.69	4.28	4.53
NGO's help	36.53	16.97	21.28	20.53
Politician's help	1.20	0.32	0.64	0.54
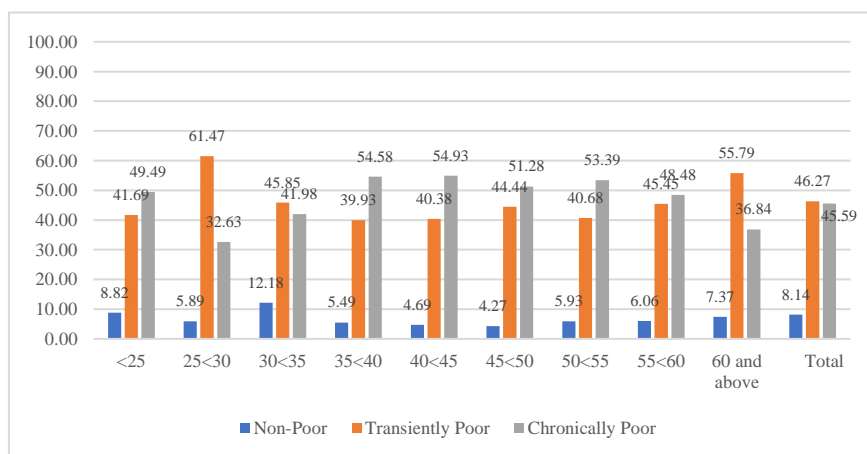
Figure 1. Distribution of Poverty Vulnerability Across Age Groups

Table 1 further shows that majority of the refugees were from rural areas (76.84%). However, 83.23% of the non-poor households were from rural areas. Also, rural areas accounted for 83.42% of the chronically poor households. Figure 2 further shows that majority of urban residents (61.47%) were transiently poor, while majority of rural residents were chronically poor (49.49%). Understanding the role of economic sector in defining households' economic prosperity is a fundamental prerequisite for planning. In the case of Kenyan refugees, some of the camps are located in Turkana county, which is among the poorest counties in Kenya (Beltramo and Pape, 2021).
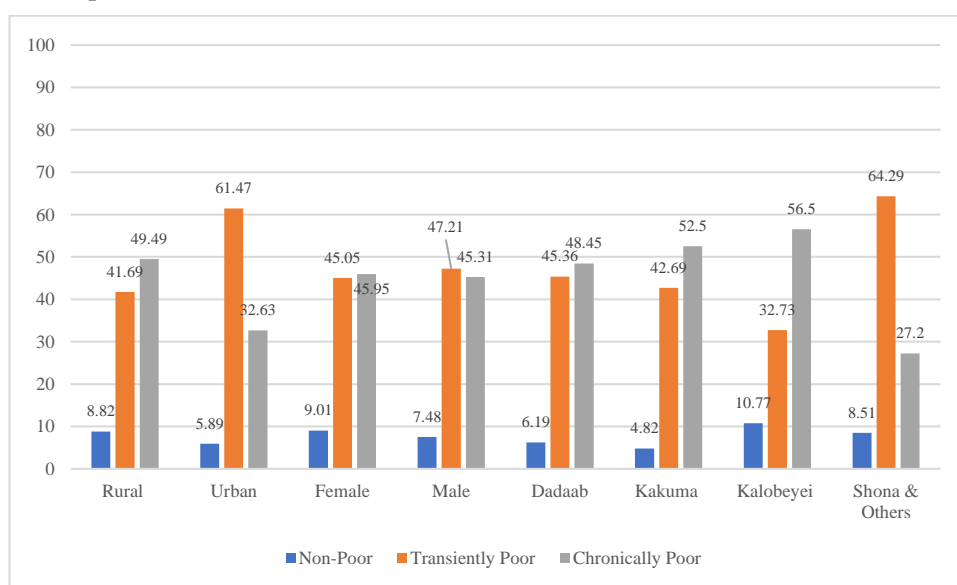

Figure 2. Distribution of Poverty Vulnerability Across Sector, Gender, and Camp of Residence

Table 1 further shows that female respondents accounted for 47.90% and 43.64% of the non-poor and chronically poor respondents, respectively. Figure 2 also shows that based on the gender of households' heads, transient poverty was slightly higher among male headed households (47.21%) than their female counterparts (45.05%). However, chronic poverty was slightly higher among female headed households with 45.95%, as against 45.31% for male headed households. Gender of the households' heads is one of the factors defining economic inequality among refugees (Jone et al., 2022). Female headed households may be worst affected by poverty due to some features defining the peculiarity of their vulnerability.

Based on the camp of residence, Figure 1 shows that respondent from Kalobeyei had the highest proportion (10.77%) being non-poor, while 64.29% of the respondents from Shona were transiently poor. It should be noted that more than half of the

respondents from Kakuma and Kalobeyei camps were chronically poor. Prevalence of chronic poverty in Kakuma and Kalobeyei reflects the depth of poverty in the western part of Turkana where they are located (UNHCR and World Bank, undated a, b, c).

Table 1 further reveals that majority of the chronically poor households did not have access to improved floor materials and electricity from the national grids. The non-poor households had an average of 1.24 telephone which is lower than 1.60 computed for those who were chronically poor. Housing characteristics are important features of income poverty (Chen & Feng, 2022). Therefore, a basic understanding of the types of housing materials and connection to basic social amenities like electricity and water can facilitate our understanding of the magnitude of economic deprivations and poverty that is being suffered by a particular household (Morrison & Shortt, 2008; Charlier et al., 2019).

Table 1 reveals that 0.88% and 0.73% of the respondents were primarily engaged in agricultural and pastoral jobs. Moreover, 4.10% were engaged in non-farm businesses. It should also be noted that 7.78% of the non-poor were into non-farm businesses. Although farming may be seen as a vocation that can be easily engaged by refugees, access to basic inputs such as fertile land and improved seeds can constitute significant challenge. The mainframe 2006 Refugee Act placed significant restrictions on the ability of refugees to explore some personal development opportunities and be gainfully engaged in the Kenya's growing formal sector (Anonymous, undated)

Although different mechanisms exist for coping against welfare shocks, their effectiveness is often differentiated by some indicators of welfare impacts. In this study, the respondents highlighted sale of assets and loan acquisition as part of the strategies to survive the pandemic. Table 1 shows that the average amount of money that was realized from sale of assets was KSh 161.34, while non-poor households had the highest average amount of money realized from sale of assets (KSh 311.03). Similarly, while the average loan received was KSh 455.17, non-poor households had the highest average loan of KSh 626.03. Although sale of assets can cushion the effects of shocks, thereby making affected households able to maintain their consumption expenditures, sale of productive assets can inhibit sustenance of livelihoods (Doss et al., 2015). It had been found that sale of livestock and land to cushion the impact of shocks can have long-term impacts on affected households, although assets like jewelleries, radio, and television which would have less long-term consequences after being disposed are often less desired to be sold due to their low market values (McPeak et al., 2012). It should also be noted that the responses displayed by households to income shocks would differ based on their types, nature and life-threatening consequences. Specifically, Wagstaff and Lindelow (2013) submitted that health shocks often require some rapid decisions. Moreover, access

to loan can enhance livelihood sustenance during pandemic (Doss et al., 2015). The sources of loan are however important because the terms and conditions by some informal lending platforms like loan sharks can be extremely demanding.

Some other available coping mechanisms are remittances and gifts from people. Ability to utilize these sources may depend on the dimension of social networks already built by an individual. Table 1 shows that 6.48% and 7.75% of the refugees had access to remittances and gifts, respectively. Also, 22.75% and 35.33% of the non-poor respondents received remittances and gifts, respectively. These results can be compared to 3.21% and 3.42% of the chronically poor households who indicated to have received remittances and gifts, respectively. The results further revealed that with only 0.54% and 4.63% access, receipt of assistances from politicians and government were respectively very low. However, many NGOs seemed to have rendered some financial assistances with 20.53% access. More specifically, 36.53% of the non-poor households received assistances from NGOs.

Household size can be a positive or negative contributor to total households' income depending on the skills possessed. In line with some previous studies (UNHCR and World Bank, undated a, b, c), the results in Table 1 show that the average household size was 4.94. Moreover, average household sizes were 1.82 and 6,6 for the non-poor and chronically poor households, respectively. Figure 3 further shows that majority of the respondents with 5 household members and above were chronically poor, while the majority among households with less than 4 members were transiently poor. It should also be noted that households with more than nine members had no non-poor respondent, while those with only one member had 26.16% being non-poor. The finding is in line expectation because large families require enormous resources that are often beyond their reach due to several economic constraints.
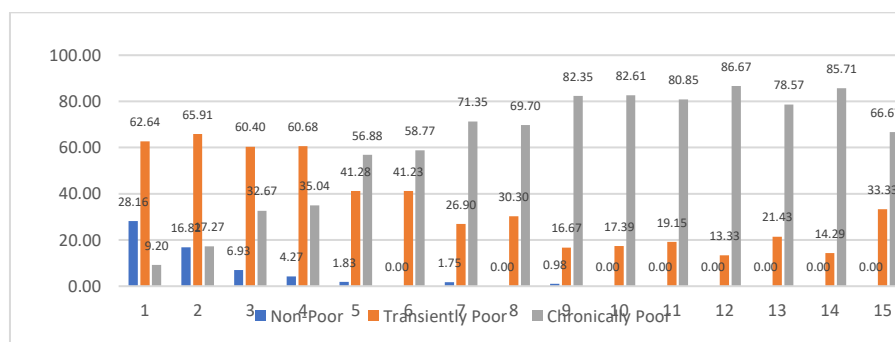

Figure 3. Distribution of poverty vulnerability across household sizes

3.2. Ordered Probit Results of the Determinants of Poverty Vulnerability

Table 2. Heteroscedasticity Consistent Ordered Probit and Marginal Parameters

| | Ordered Probit Main Model | | Marginal Parameters | | | | | |
| | | | Non-Poor | | Transiently Poor | | Chronically Poor | |
	Coeffi	z stat	dy/dx	z stat	dy/dx	z stat	dy/dx	z stat
Age of house heads	.0047559	1.53	-.000194	-1.51	-.0013761	-1.52	.0015701	1.53
Urban	.9078582	7.13	-.026271	-6.91	-.2655794	-7.65	.2938565	7.97
Household size	.3391839	10.94	-.0100541	-7.87	-.103183	-16.42	.1132371	19.05
Head gender	.0268165	0.38	-.0010974	-0.38	-.0077547	-0.38	.008852	0.38
Dadaab Camp	.2845809	2.01	-.0102346	-2.23	-.0838139	-1.99	.0940485	2.02
Kakuma Camp	.6532297	4.55	-.0219973	-4.76	-.1917171	-4.61	.2137145	4.72
Kalobeyei Resident	1.240057	7.79	-.0283391	-7.38	-.3528336	-8.82	.3811727	9.23
Improved floor	-.3294962	-3.25	.0140208	3.02	.0942667	3.35	-.1082875	-3.34
Power grid	-.6396983	-6.61	.0286236	5.39	.1795679	7.10	-.2081915	-7.12
Number of phones	-.0326894	-0.55	.0013335	0.55	.0094587	0.55	-.0107922	-0.55
Agricultural job	-.0350687	-0.09	.0014731	0.09	.0100891	0.09	-.0115622	-0.09
Pastoral job	.3419111	0.87	-.0105048	-1.20	-.1022208	-0.86	.1127256	0.89
Non-Farm job	-.0256128	-0.15	.001066	0.15	.0073825	0.15	-.0084484	-0.15
Asset Sales	-.0001293	-2.60	5.27e-06	2.56	.0000374	2.64	-.0000427	-2.65
Amount of loans	-.0000975	-3.64	3.98e-06	3.51	.0000282	3.70	-.0000322	-3.73
Received food	-.5739874	-4.16	.0359583	2.85	.1446264	5.07	-.1805847	-4.48
Remittance recipient	-.427169	-2.85	.0239364	2.14	.1129469	3.22	-.1368833	-2.98
Gift recipient	-.5837329	-4.09	.036256	2.86	.1475582	5.12	-.1838441	-4.53
Govt's help recipient	-.0003209	-0.00	.0000331	0.00	.0000928	0.00	-.0001059	-0.00
NGO's help recipient	.1125913	1.27	-.0043447	-1.32	-.0328853	-1.25	.03723	1.26
Politician's help	.0328466	0.07	-.0013035	-0.07	-.0095517	-0.07	.0108551	0.07
Primary education	.4851897	2.92	-.0137486	-4.03	-.1451541	-2.94	.1589028	3.04
Secondary education	.4873881	2.37	-.0136103	-3.44	-.1458943	-2.39	.1595046	2.47
Tertiary education	.8049949	2.83	-.0174437	-5.25	-.2372264	-3.09	.2546701	3.22
Madrassa/Duksi	-.4370972	-1.05	.025666	0.77	.1135064	1.24	-.1391724	-1.12
lnsigma								
Household size	.0376237	3.41						
/cut1	-.5151111							
/cut2	2.050606							
Number of observations	2,051							
LR chi2(25)	1000.33***							
LR test of lnsigma=0	11.10***							
VIF	1.34							

Table 2 shows the results of heteroscedasticity consistent ordered Probit regression. Multicollinearity was not a major problem among the explanatory variables given the low value of the variance inflation factor (VIF). The results further show that the error variance is significantly influenced by household size and the presence of heteroscedasticity in the model can be confirmed by statistical significance of the likelihood ratio test of lnsigma ($p<0.01$). Therefore, adopting a heteroscedasticity consistent approach is justified and ignorance of this problem will make estimated parameters to be biased and inconsistent. The likelihood ratio Chi-Square statistics reveals that the model properly fitted the data, and the estimated parameters were not jointly equal to zero. The cut-point that differentiates between non-poor and transiently poor households when the values of the included predictors are zero was -0.515, while that between transiently poor and chronically poor households was 2.051.

The results in Table 2 showed that in the main model, the parameter of urban residence was positive and statistically significant ($p<0.01$). This implies that urban

respondents had a higher probability of being in the high poverty class. In addition, the marginal parameters for urban variable for the non-poor and transiently poor were statistically significant ($p < 0.01$) with negative sign while that for chronically poor model was with positive sign. These results imply that holding other variables constant, a move from rural to urban areas decreased the probability of being non-poor and being transiently poor by 2.62% and 26.56% respectively. However, the same move will increase the probability of being chronically poor by 29.19%.

The findings are clearly showing that residence in urban areas by the refugees during the pandemic promoted the likelihood of being poor. Although poverty is conventionally concentrated in rural Kenya, the peculiar channels of impacts that the pandemic had on global economy disfavoured engagement in some form of livelihood activities in urban areas, with associated and progressive job losses. More importantly, urban residents felt the impacts of lockdowns more than their counterparts in rural areas (United Nations, 2020; World Bank, 2020; Boza-Kiss et al., 2021). The finding is in line with some studies such as Mekasha and Tharp (2021), Yonzan et al. (2022) and World Bank (2020) that emphasized urban residents are more vulnerable to poverty during COVID-19. The finding is also contrary that of Barletta et al. (2022).

In line with the findings of Santamaria et al. (2021) and Boudet et al. (2021), the gender of the respondents did not significantly influence poverty dynamics. However, the results in the main model further revealed that the parameter of household size was positive and statistically significant ($p < 0.01$). This implies that in line with some previous findings, households with large family size tend to be in the high poverty class (HM Government (undated), Lacovou and Berthoud (2006), Smith and Middleton (2007), Vegeries and Perry (2003), Barnes et al., (2008). In addition, the marginal parameters were statistically significant ($p < 0.01$). These imply that if households size increases by 1 unit and holding other variables constant, the probabilities of being non-poor and transiently poor will decrease by 1.01% and 10.32%, respectively, while the probability of being chronically poor will increase by 11.32%.

Although refugees in Kenya face the same economic constraints induced by existing legislations, the location of their camps can define some difference in economic vulnerability. Specifically, the parameters of the residential camps in the main model showed statistical significance ($p < 0.01$). They indicated that the respondents in Dadaab, Kakuma, Kalobeyei camps had a higher likelihood of being in the high poverty class when compared with those from Shona camp. This may have been induced by the fact that Kakuma and Kalobeyei camps are located in one of the poorest counties in Kenya (Beltramo & Pape, 2021). The marginal parameters for all these variables across the different poverty class showed statistical significance ($p < 0.05$). Also, the parameters for the non-poor and transient poverty models had

negative sign, while those for chronic poverty had positive sign. These results indicate that holding other variables constant, a move from Shona camp to Dadaab camp will reduce the probabilities of being non-poor and transiently by 1.02% and 8.38%, respectively, while it will increase the probability of being chronically poor by 9.41%. Similarly, a move from Shona camp to Kakuma camp will reduce the probabilities of being non-poor and transiently by 2.20% and 19.17%, respectively, while it will increase the probability of being chronically poor by 21.37. Moreover, a move from Shona camp to Kalobeyei camp will reduce the probabilities of being non-poor and transiently poor by 2.83% and 35.28%, respectively, while it will increase the probability of being chronically poor by 38.12%.

The parameters of access to improved floor and national electricity grids were with negative sign and statistically significant in the main model (p<0.01). These parameters indicated that the respondents with access to improved floor materials and electricity from the national grids had a lower likelihood of being in the high poverty class, when compared with those without these facilities. Similarly, the marginal parameters for these parameters revealed that a move from not having improved floor materials to having it increased the probabilities of being non-poor and transiently poor by 1.40% and 9.43%, respectively, while it reduced the probability of being chronically poor by 21.37%. Moreover, a move from not being connected to national grids to being connected will increase the probabilities of being non-poor and transiently poor by 2.86% and 17.96%, respectively, while it will reduce the probability of being chronically poor by 20.82%. These findings are reemphasizing the positive correlation that often exists between multidimensional and income/expenditure poverty (Wang et al., 2016; Wang, 2022; Coley et al., 2013).

This study also explored the impacts of some adopted income shock coping mechanisms on vulnerability to poverty. The included variables were the amount of money realized from asset disposal and loans. In the main model, the parameters of the amounts of money that were realized from sale of assets and loans were statistically significant (p<0.01) and with negative sign. These results imply that if the money realized from sale of assets and loan increased, the probability of being in the high poverty class will reduce. In addition, the marginal parameters revealed that a unit increase in the money realized from sale of assets is associated with increase in the probabilities of being non-poor and transiently poor by 0.0005% and 0.0037%, respectively, while it reduced the probability of being chronically poor by 0.0043%. In addition, if the amount of loans that were secured by refugees increased by KSh 1.00, the probabilities of being non-poor and transiently poor will increase by 0.0040% and 0.0028%, respectively, while it reduced the probability of being chronically poor by 0.0032%. These findings are reinforcing the need for some coping strategies and their effectiveness during pandemics. They also reemphasize the fact that poverty vulnerability can be reduced with presence of some assets and access to credit. (Carter, 2007; McKay, 2009; Carter & Barrett, 2006).

In addition to loan and asset disposal, the other ways of coping with income shocks like COVID-19 are through remittances and gifts. The results in the main model showed that the parameters of access to food aid, remittance, and other gifts are statistically ($p<0.01$) with negative sign. These results are in alignment with the main finding by Saptono et al. (2022) and Arapi-Gjini et al. (2020) which indicates that access to food aid, remittance and other gifts reduced the likelihood of being in the high poverty class. Moreover, the marginal parameters of these variables were also statistically significant ($p<0.05$). The results showed that the respondents with access to food aid had the probabilities of being non-poor and transiently poor increased by 3.60% and 14.46%, respectively, while the probability of being chronically poor declined by 18.06%. The results further showed that therefugees who received remittances had their probabilities of being non-poor and transiently poor increased by 2.39% and 11.29%, respectively, while the probability of being chronically poverty declined by 13.69%. In similar manner, a move from not having access to other gifts to having access increased the probabilities of being non-poor and transiently poor by 3.62% and 14.76%, respectively, while the probability of being chronically poverty declined by 18.38%. These findings are emphasizing the role of formal and informal social programmes and financial assistances in reducing vulnerability to poverty.

Finally, although education remains a major driver of households' wealth for poverty reduction, legislations that limit the entrance of refugees into the Kenyan labour market may be a primary barrier to reaping the rewards of being formally educated. The results in Table 2 show that the parameters of primary, secondary, and tertiary education are statistically significant with positive sign ($p<0.05$). These results are contrary to expectations and showed that attainment of each of these educational qualifications increased the likelihood of being in the high poverty class. The marginal parameters for these education variables are statistically significant ($p<0.05$). The results indicated that a move from no education to primary education reduced the probability of being non-poor and transiently poor by 1.37% and 14.52%, respectively, while it increased the probability of being chronically poor by 15.89%. Similarly, a move from no education to secondary education reduced the probability of being non-poor and transiently poor by 1.36% and 14.59%, respectively, while it increased the probability of being chronically poor by 15.95%. Finally, a move from no education to tertiary education reduced the probability of being non-poor and transiently poor by 1.74% and 23.72%, respectively, while it increased the probability of being chronically poor by 25.47%.

Conclusion

Although COVID-19 affected majority of the Kenyan population, refugees are among the population groups that suffered extreme deprivations and poverty

vulnerability. The goal of a world without poverty, as highlighted in the Sustainable Development Goals (SDGs), is now being threatened by the pandemic. The findings from this study have underscored some dimensions of marginal reforms, for consistent poverty alleviation among refugees in Kenya. There is the need to evaluate households' welfare enhancement requirements of every refugee camp to clearly highlight their weaknesses and strengths. The need to intensify economic opportunities for refugees residing in urban areas had also been emphasized. Specifically, policy reforms that allow refugees with recognized educational qualifications to work in the labour markets without too stringent conditions can facilitate poverty reduction. More importantly, promotion of access to formal credits will go a long way in enhancing the livelihoods of refugees, especially those who may target expansion of their informal businesses within the camps. In addition, the role of remittances and other humanitarian supports that target the poorest among the poor refugees' households had been emphasized. Finally, there is the need to promote family planning and regulate maternal fertility among refugees.

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