



## IMPROVING HOUSEHOLD WELFARE THROUGH INCOME DIVERSITY

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**ABSTRACT:** *Accepting income diversity by households is regarded as a crucial step in breaking the vicious cycle of poverty. The study aims to investigate the empirical relationship between household welfare and income diversity. We examine the effects of potential endogeneity brought on by selection bias using instrumental variable static panel model regression. The Uganda National Panel Survey waves were used in the study. The results demonstrate that having a variety of sources of income significantly improves household welfare. The findings further revealed that household welfare is significantly predicted by the household head's education while living in the eastern or northern regions has a negative effect on welfare relative to living in the central region. The methods employed in this research were unable to adequately describe the subjective nature of welfare. Future studies may consider taking a pragmatic approach. The utilization of both primary and secondary data for further research may reveal amazing results. In contrast to past research that only used expenditure as a proxy for welfare, the research study advances the literature on welfare by demonstrating the impact of income diversity on household welfare as measured by poverty status and consumption expenditure. The study extends the welfare theory by showing how diversity of income enhances household welfare using a sample of households in Uganda, a developing economy.*

**KEYWORDS:** Household Welfare, Instrumental Variables, Uganda, Income Diversity



## INTRODUCTION

Accepting income diversity by households is regarded as a crucial step in breaking the vicious poverty cycle. Other conditions being equal, income diversity adoption should offer greater revenue to the household (Amfo *et al.*, 2021). The household will spend the extra income on both consumable and non-consumable goods, reducing the prevalence of poverty and enhancing the welfare of the household. Income diversity may or may not have a significant impact on household welfare, but it is generally acknowledged that it is becoming a more effective tool for raising welfare in many emerging nations (Omotesho *et al.*, 2020).

Asmah and Avenue (2011) define household welfare as the household's control over goods and services available on the market, while Arouri *et al.* (2015) and Unnikrishnan and Imai (2020) define home welfare as the general welfare of members of the household as measured by food and non-food expenditures, and poverty status. On the contrary, income diversity refers to the process by which households generate a growing variety of sources of income by combining increasingly diverse resources and properties to meet their needs (Wan *et al.*, 2016). Additionally, according to Wan *et al.* (2016), income diversification implies changing the household's sources of income. Several types of agriculture (such as cereals, perennials, livestock, horticulture, and so on) can be engaged in such as production and value addition, together with on-farm and off-farm activities, can all be leveraged to diversify income (Johny *et al.*, 2017). Income diversity is the circumstance in which a household receives money from sources other than the primary household activity, in regard to studies by (Leng *et al.*, 2020; Wan *et al.*, 2016; Hanh & Boonstra, 2018; Porter, 2012; Minkoff & Lyons, 2017).

An estimated 8.6 percent of the world's population (656 million people) were living in poverty in 2022 (Aguilar *et al.*, 2022). This trend was expected to be more pronounced in the Middle East and North Africa. In addition, the UNICEF research predicted that 16 million people in the Middle East and North Africa experienced food insecurity in 2021 (Mostafa, 2021). Since March 2020, 68% of households in Asia, Latin America, and Africa have seen a fall in earnings, resulting in worse living conditions (Egger *et al.*, 2020). In addition, the percentage of the population living below the poverty line in Sub-Saharan Africa was projected to reach 40.0 percent by 2021 (Aguilar *et al.*, 2022). This was an increase from 420 million to 424 million in a period of one year (Aguilar *et al.*, 2022).

On the African continent, the state of affairs is considerably worse as reflected by 28 million South Africans receiving assistance as a result of the nation's growing poverty, and reports suggest that this figure has overtaken that of tax paying citizens, making the system unsustainable (Naidoo, 2022). The East African (2021) reports that 29 million people were starving in the East African region. Additionally, consumption expenditure decreased by 30% as income shocks affected 66 percent of Ugandan households as of 2020 (Kansiime *et al.*, 2021). Additionally, a study by UBOS claims that in the 2019/2020 survey, Ugandan household consumption expenditure decreased by 5.5% (UBOS, 2021).

Theoretically, people's (individuals' or households) social decisions are rooted in the importance of income diversity and welfare, such that the more the income diversity, the greater the utility and welfare of the individual and the household (Pressman & Summerfield, 2000). The theory expressly claims that raising household and individual income enhances utility and well-being (Arrow, 1999). Furthermore, every change in income diversity decisions has a considerable impact on the household's welfare. Families must make decisions on how



to diversify their incomes on a daily basis. Such decisions are unimportant for wealthy families, but they could be different for poor families as they are life and death decisions. Those who do not have enough food will perish as a result of the decision by the households to diversify, just as those who do not receive adequate medical care when they are ill will perish (Sen, 1991).

Mohammed (2018) conducted a study to ascertain the impact of income diversification on staff welfare at Kaduna State University, and found a significant relationship between staff welfare and income diversification in the research area. Zhao and Barry (2014) investigated farm-level variation and its impact on rural household financial status in China. They discovered that diversity benefited low-income rural households while negatively affecting high-income rural households. Kidane and Zegeye (2019) showed that income diversity had a beneficial impact on income and reduced susceptibility to poverty in a study to evaluate the effects of income diversification on household well being. Khan and Morrissey (2019) investigated how households' sources of income changed and discovered that households with more diverse income had lower consumption welfare. For instance, by allocating a portion of their income to additional income generating activities, households can enhance their welfare and end poverty (Martinson *et al.*, 2022).

Empirical studies of income diversity and household welfare have only measured one component of welfare (consumption expenditure) (Asmah & Avenue, 2011; Arouri *et al.*, 2015; Tambo & Wünsch, 2017; Seng, 2017). Furthermore, the bulk of empirical literature (Hong *et al.*, 2018; Asfaw *et al.*, 2019; Danso-abbeam *et al.*, 2020; Zakaria *et al.*, 2019; Rahut *et al.*, 2017; Xu, 2017; Stifel, 2010) used cross-sectional methods, which do not reveal changes in welfare over time. Furthermore, previous research findings have proven contradictory. There is a substantial association between welfare and income diversity, in accordance with empirical research (Hong *et al.*, 2018; Amfo *et al.*, 2021; Stifel, 2010; Rahut *et al.*, 2017; Asfaw *et al.*, 2019; Zakaria *et al.*, 2019; Tesfaye & Tirivayi, 2020; Xu, 2017).

Diverse literature has revealed that income diversity has little to no impact on household welfare (Gautam & Andersen, 2016; Omotesho *et al.*, 2020; Khan & Morrissey, 2019; Ebenezer & Abbyssinia, 2018; Mendoza, 2018). According to Asfaw *et al.* (2019), the influence of diversity on household income differs across countries. To establish the link between income diversity and welfare, the bulk of studies have employed data from mostly developed nations (Salam *et al.*, 2019; Gautam & Andersen, 2016; Zhao & Barry, 2014; Kidane & Zegeye, 2019). This study attempts to bridge these knowledge gaps and expand the plethora of literature by using two welfare measures (consumption expenditure and poverty incidence) and nationally representative panel data from a developing country (Uganda).

The study adds to the body of knowledge on household welfare and income diversity in theoretical and practical ways. The findings of our study could provide policymakers as well as development partners with critical information about the benefits of income diversity for improving the welfare of households in Uganda. By incorporating more welfare indicators and explaining how each one relates to income diversity, the study theoretically extends the literature on welfare and income diversity. The study also offers empirical proof of how income diversity affects household welfare in a developing country like Uganda grappling with underprivileged living conditions.

The remaining portion of this paper is divided into three distinct sections. In the first section, both the theoretical background and the existing literature on the topic of income diversity and



household welfare are discussed. The second portion of the paper details the procedures and data used in the study. The study's conclusions, analyses, findings, and policy implications are covered in the last part.

## LITERATURE REVIEW

### Theory of Social Choice

Sen (1986), an Indian economist, proposed the theory to explain how individual and household actions affect their welfare. The theory specifically states that rising income for households and individuals improves their utility and well-being (Atkinson, 1999; Arrow, 1999). Sen observed that individuals actively join families, and hence their welfare is dependent on the household's collective income (Pressman & Summerfield, 2000). Therefore, the more the household income, the greater the welfare the household gains. However, the welfare of the individual household member is determined by how this income is allocated among the household members. If one member of the household has control over the bulk of the resources and/or the distribution of those resources, the outcome may not be desirable (Sen, 1990).

Household income diversity leads to greater household income, which contributes to poverty reduction and enhanced household welfare. A household's income fluctuation can be significantly decreased by having a higher level of income diversity (Kasperski & Holland, 2013). In addition to lowering susceptibility to income fluctuations, exogenous production shocks, and changes in consumption habits, income diversification strengthens economic security. Wan *et al.* (2016) also made a proposition on the growing significance of income diversity as a way for households to boost their income and safeguard themselves from risks. Increases in household well-being through loosening consumption restrictions are more likely when household income comes from a variety of sources. In other words, the welfare of a household is increased when its members come from a wide range of income sources because they can afford to spend more on things like food and other necessities, while the welfare of a household from a narrow range of income sources is reduced because of constraints on their capacity to consume food and other items.

### Household Welfare and Income Diversity

Households employ the multi-pronged strategy of income diversification to reduce their vulnerability to shocks (Zakaria *et al.*, 2019). Therefore, households try to improve their financial situation by obtaining income from a variety of sources. Kidane and Zegeye (2019) define "income diversity" as the contribution of different sources of income. As a result, the increased resources should improve both consumption and nutrition (Tesfaye & Tirivayi, 2020). Adepoju and Obayelu (2013) argue that diversifying sources of income can stabilize household finances, generate extra cash for investments, and fund the acquisition of high-tech farm equipment to boost agricultural output. Diversification occurs because families want to improve their standard of living (Gautam & Andersen, 2016; Danso-abebe *et al.*, 2020) by trying new things and adapting to new circumstances.

Profits from income diversification are then used to buy valuable assets and increase the overall worth of the household's holdings (Hong *et al.*, 2018; Zakaria *et al.*, 2019; Mendoza, 2018). The number of livelihood activities reduces the danger of low income production from a single



investment in poor conditions, which enhances the household's revenue from diverse income-generating activities (Amfo *et al.*, 2021; Oyimbo & Olaleye, 2016; Danso-abbeam *et al.*, 2020). Households with a varied portfolio outperform those without. As a result, diversified households are more likely than non-diversified households to spend more on consumption and asset accumulation at the end of the year or period (Oyimbo & Olaleye, 2016; Akaakohol & Aye, 2015). Furthermore, diversified income provides low-income households with a major financial advantage that is growing (Zhao & Barry, 2014).

The theory is consistent with empirical findings linking household welfare and diversified income. Financial difficulties can be overcome by a household with diversified income (Hong *et al.*, 2018). Income diversification may increase household spending by reducing economic insecurity. In other words, as income diversity increases household income, they spend more (Xu, 2017). A higher household income leads to increased savings that are then invested in durable household commodities, increasing the value of the household's holdings (Hong *et al.*, 2018). Income diversification promotes welfare by minimizing a household's dependence on just one source of income (Xu, 2017; Amfo *et al.*, 2021). Households spread their investments to reduce risk as well as increase income and eradicate poverty (Rahut *et al.*, 2017). The protection against reductions in demand and price variations comes from additional income-generating activities (Amfo *et al.*, 2021). In supposition, households will experience increased welfare if they diversify their income sources (Zakaria *et al.*, 2019). It follows that households that do so perform better than those who do not.

There have been many studies done on the effects of different incomes on household welfare. For instance, Zakaria *et al.* (2019) evaluated the effect of livelihood diversification on farm welfare in Ghana using a multiple-stage sampling strategy, a probit model, and the propensity score matching method. According to the study, farmers who were older, had access to extension services, were men, and thought that rainfall was inconsistent and temperatures were high were more likely to diversify their crops. Additionally, they discovered that households on farms with diversity outperformed those without it. Similarly, Xu (2017) discovered that income diversification increases consumption among Chinese peasants in the countryside using panel data collected at the provincial level between 1998 and 2015. The study found that while peasant consumption is less responsive to income diversification in the provinces with intermediate income, it is more responsive in the provinces' low income as well as high income subsamples respectively.

Stifel (2010) used data from Madagascar that were considered to be nationally representative in order to study the relationship between rural non-farm employment and household welfare. The research, which made use of multinomial logit models, came to the conclusion that high-return non-farm activities can provide an essential route out of poverty. Using data from the Bhutan Living Standard Survey conducted in 2012, Rahut *et al.* (2017) conducted an analysis to determine which options for rural diversification of livelihoods were most beneficial to the wellbeing of households. Propensity score matching was used to estimate the parameters. They came to the conclusion that diversification of household income into non-agriculture businesses was influenced by a variety of characteristics, including education level, amount of assets owned, accessibility of labor, and the gender of the person who headed the household. They also discovered that rural households that diversified their sources of income beyond agriculture have better incomes and lower poverty rates than those rural households that only have farms, and that doing so can help significantly cut poverty rates. Hong *et al.* (2018) investigated the relationship between having many sources of income and the welfare of



households. The survey data they used came exclusively from China. In addition, they discovered that farm households that use strategies for income diversification have higher rates of forestry, agricultural, off-farm, consumption, and savings than those that do not, in addition to a decreased risk of experiencing relative poverty. This was found in comparison to households that did not adopt such strategies.

On the other hand, Ebenezer and Abbyssinia (2018) examined the impact of livelihood diversification on welfare using South African data. They found that the households in the province were homogeneous using the Tobit regression model and a modified Multidimensional Poverty Index. Access to electricity, agricultural participation, asset score, total income and location have all been linked to household poverty. All of these factors had an impact on poverty in the Province. Furthermore, Gautam and Andersen (2016) used household survey data to create a composite household welfare score, which they used to investigate the effect of livelihood diversification on Nepalese welfare. Their findings revealed a recurring trend of diversity in the types of jobs undertaken for compensation, as well as a wide spectrum of household well-being. They also discovered that variety had no effect on happiness. It has also been shown that diversifying one's livelihood has a skewed effect, resulting in differences in income and welfare. The number of income sources accessible to rural families, as well as the impact of different income sources to total income and wellbeing, were also evaluated by Omotesho *et al.* (2020) using primary data. The study demonstrated a negative correlation between the number of income sources and the household's livelihood status, for the lower the livelihood status, the more diverse the household's income. In a panel study, Mendoza (2018) developed a two-stage pooling and fixed effects model to examine the Filipino household income diversification behavior. The study found that risk aversion and wealth accumulation were the main drivers of income diversification. The study also came to the conclusion that diversity helps wealthy families reduce future income and consumption swings, with no data suggesting that diversification has any impact on rural households, whose diversification strategy is mostly motivated by subsistence. Based on these justifications, we thus hypothesize:

H<sub>1</sub>: Income diversity has a major impact on household welfare.

## DATA AND METHODS

### Data

The Uganda Bureau of Statistics (UBOS) provided secondary data that were used to generate the findings of the study which was quantitative and panel in nature. To determine the study hypothesis, we collected data from four waves of the Uganda National Panel Survey (UNPS), which was collected between 2013 and 2020. The analysis utilizes UNPS data waves from 2013/2014, 2015/2016, 2017/2018, and 2019/2020. The study includes comprehensive data on numerous socioeconomic factors, asset ownership, and indicators of poverty, among others. We chose consumption expenditure as well as poverty status for welfare measures because the focus is on how diversity of income affects household welfare.





## CONCLUSION AND DISCUSSION

### Statistics Summary

**Table 1: Summary Statistics for Consumption Expenditure**

| Wave                                      | Mean      | Minimum | Maximum | Standard dev. |
|---|-----------|---------|---------|---------------|
| <b>2013/2014</b>                          | 5,233,305 | 385,016 | 9.55e07 | 5,218,465     |
| <b>2015/2016</b>                          | 315,275   | 28,276  | 1.30e07 | 329,180       |
| <b>2017/2018</b>                          | 4,142,518 | 241,737 | 3.26e08 | 9,716,379     |
| <b>2019/2020</b>                          | 5,902,639 | 429,757 | 6.76e07 | 5,408,634     |
| <b>Overall</b>                            | 3,567,716 | 28,276  | 3.26e08 | 6,314,572     |
| <b>Total number of observations 9,493</b> |           |         |         |               |

Source: Author (2023)

Table 1's descriptive statistics on household annual consumption expenditure reveal that during the four waves, the average annual household consumption expenditure for all households was close to three million five hundred and sixty-seven thousand Ugandan Shillings. Nearly nine million Ugandan Shillings were the highest standard deviation in the mean annual consumption expenditure during the 2017–2018 wave. This demonstrates that the 2017/2018 UNPS wave demonstrated the greatest variation in annual consumption expenditure among households in comparison to the waves under consideration. The 2015/2016 UNPS wave had the lowest annual household consumption expenditure, according to the descriptive statistics in Table 1, having a mean annual consumption expenditure of the household with standard deviation of about three hundred thousand.

**Table 2: Summary Statistics of Household Poverty Status (POV)**

| Wave   | Non – Poor                      | Poor                            |
|--|---------------------------------|---------------------------------|
| <b>2013/2014</b>                               | 1789<br>(18.82%)                | 641<br>(6.75%)                  |
| <b>2015/2016</b>                               | 2,060<br>(21.70%)               | 552<br>(5.81%)                  |
| <b>2017/2018</b>                               | 1885<br>(19.86%)                | 580<br>(6.11%)                  |
| <b>2019/2020</b>                               | 2,084<br>(21.95%)               | 338<br>(3.56%)                  |
| <b>Overall</b>                                 | <b>8,146</b><br><b>(85.81%)</b> | <b>1,347</b><br><b>(14.19%)</b> |
| <b>Pearson chi-sq = 156.2482*** Pr. = .000</b> |                                 |                                 |
| <b>Total number of observations: 9493</b>      |                                 |                                 |

Source: Author (2023)

Based on the statistical data on the poverty status of households reported in Table 2, 85.81 percent of the households were classified as not living in poverty throughout the four waves that were examined. On the other hand, Table 2's descriptive data show that, over the course of the four waves under study, 1,347 households (14.19 percent of all households) were categorized as poor. As a result, Table 2's descriptive statistics show that, on average, households in the four waves under consideration had a poverty rate of roughly 14%.



**Table 3: Summary Statistics of Diversified Income**

| Wave             | Mean           | Minimum  | Maximum        | Standard Dev.    |
|------------------|----------------|----------|----------------|------------------|
| <b>2013/2014</b> | 137,655        | 0        | 1.89e07        | 1,102,452        |
| <b>2015/2016</b> | 173,352        | 0        | 1.76e07        | 857,438          |
| <b>2017/2018</b> | 289,367        | 0        | 2.33e07        | 1,234,408        |
| <b>2019/2020</b> | 1,653,871      | 0        | 1.90e07        | 2,606,021        |
| <b>Sub Total</b> | <b>282,758</b> | <b>0</b> | <b>2.33e07</b> | <b>1,187,218</b> |

Source: *Author (2023)*

According to the descriptive statistics in Table 3, the mean annual household diversified income across the four waves under investigation was about Uganda shillings two hundred and eighty-two thousand. The 2019/2020 UNPS wave had the highest mean annual household diversified income of roughly over one million while the 2013/2014 wave had the lowest mean annual household diversified income of around one hundred and thirty-seven thousand. The descriptive statistics on diversified mean annual household income demonstrate significant variations in household diversified incomes among the four UNPS waves, with an overall standard deviation of roughly Uganda shillings one million.

### Diagnostic Tests

**Table 4: Unit Root Test Results on all Model Variables**

| Variable   | Statistic         | Estimated statistic | p – value | Order of Integration |
|--|-------------------|---------------------|-----------|----------------------|
| <b>Logarithm of Consumption Expenditure (LOGCONSEXP)</b> | Inverse chi-sq.   | 321.2889            | .0000     | I(0)                 |
|  | Inverse normal    | -14.6285            | .0000     | I(0)                 |
|  | Inverse logit, t  | -32.5460            | .0000     | I(0)                 |
|  | Modified inv.     | 63.0938             | .0000     | I(0)                 |
|  | Chi-sq.           |                     |           |                      |
| <b>Logarithm of Diversified Income (LOGDIVINC)</b>       | Inverse chi – sq. | 128.2073            | .0000     | I(0)                 |
|  | Inverse normal    | -24.1328            | .0000     | I(0)                 |
|  | Inverse logit, t  | -22.0013            | .0000     | I(0)                 |
|  | Modified inv.     | 45.3006             | .0000     | I(0)                 |
|  | Chi-sq.           |                     |           |                      |
| <b>Education level of household head (hheducl)</b>       | Inverse chi-sq.   | 331.2501            | .0000     | I(0)                 |
|  | Inverse normal    | -15.5821            | .0000     | I(0)                 |
|  | Inverse logit, t  | -50.2630            | .0000     | I(0)                 |
|  | Modified inv.     | 67.1694             | .0000     | I(0)                 |
|  | Chi -sq.          |                     |           |                      |
| <b>Age of household head (Age)</b>                       | Inverse chi-sq.   | 331.2501            | .0000     | I(0)                 |
|  | Inverse normal    | -15.5821            | .0000     | I(0)                 |
|  | Inverse logit, t  | -50.2630            | .0000     | I(0)                 |
|  | Modified inv.     | 67.1694             | .0000     | I(0)                 |
|  | Chi -sq.          |                     |           |                      |



|  |                  |          |       |      |
|--|------------------|----------|-------|------|
| <b>Age squared of Household age (Agesq)</b>            | Inverse chi-sq.  | 331.2501 | .0000 | I(0) |
|  | Inverse normal   | -15.5821 | .0000 | I(0) |
|  | Inverse logit, t | -50.2630 | .0000 | I(0) |
|  | Modified inv.    | 67.1694  | .0000 | I(0) |
|  | Chi -sq.         |          |       |      |
| <b>Household size (HHsize)</b>                         | Inverse chi-sq.  | 331.2501 | .0000 | I(0) |
|  | Inverse normal   | -15.5821 | .0000 | I(0) |
|  | Inverse logit, t | -50.2630 | .0000 | I(0) |
|  | Modified inv.    | 67.1694  | .0000 | I(0) |
|  | Chi -sq.         |          |       |      |
| Categorical variables                                  |                  |          |       |      |
| <b>Poverty status of the household head (POV)</b>      | -                | -        | -     | I(0) |
| <b>Marital status of household head (marital)</b>      | -                | -        | -     | I(0) |
| <b>Residence of household head (residence)</b>         | -                | -        | -     | I(0) |
| <b>Region of household head (region)</b>               | -                | -        | -     | I(0) |
| <b>Employment sector of household head (employsec)</b> | -                | -        | -     | I(0) |

Source: Author (2023)

Table 4's unit root test findings demonstrate that every estimated Fisher-type statistic (Choi, 2001) that takes into consideration every non-categorical variable in the empirical model rejects the null hypothesis that every panel has a unit root. The level-stationarity of categorical variables is a prior known. As a result, every model variable is level-stationary and has an order zero (0) integration.

**Table 5: Correlation Matrix for all Model Variables**

|                   | LOGC<br>ONSE<br>XP | POV   | LOGD<br>IVINC | HHE<br>DUC<br>L | AGE   | AGE<br>SQ | GEN<br>DER | MARI<br>TAL | RESID<br>ENCE | EMPL<br>OYSE<br>C |
|-------------------|--------------------|-------|---------------|-----------------|-------|-----------|------------|-------------|---------------|-------------------|
| <b>LOGCONSEXP</b> | 1.000              |       |               |                 |       |           |            |             |               |                   |
| <b>POV</b>        | .122               | 1.000 |               |                 |       |           |            |             |               |                   |
| <b>LOGDIVINC</b>  | .102               | .122  | 1.000         |                 |       |           |            |             |               |                   |
| <b>HHEDUCL</b>    | .048               | .256  | .322          | 1.000           |       |           |            |             |               |                   |
| <b>AGE</b>        | .037               | .014  | .231          | .036            | 1.000 |           |            |             |               |                   |
| <b>AGESQ</b>      | .109               | .102  | .034          | .223            | .904  | 1.000     |            |             |               |                   |
| <b>GENDER</b>     | .011               | .004  | .002          | .012            | .214  | .204      | 1.000      |             |               |                   |
| <b>MARITAL</b>    | .102               | .053  | .025          | .104            | .224  | .240      | .541       | 1.000       |               |                   |
| <b>RESIDENCE</b>  | .142               | .211  | .203          | .021            | .411  | .220      | .042       | .211        | 1.000         |                   |
| <b>EMPLOYSEC</b>  | .222               | .053  | .073          | .117            | .109  | .107      | .117       | .007        | .110          | 1.000             |

Source: Author (2023)



In accordance with the pairwise correlation matrix in Table 5, age and age squared control variables exhibit a significant correlation ( $r = 0.9042$ ;  $p = 0.0000$ ). If both control variables are included in the model at the same time, substantial multicollinearity is expected for the correlation coefficient exceeds 0.8. Age is still included in the final model, however the study excludes age squared.

**Table 6: Normality Test for Consumption Expenditure**

| <b>Jarque-Bera Test for Normality</b>               | <b>Estimated statistic value</b> | <b>P – value</b> |
|---|----------------------------------|------------------|
| Chi – square statistic                              |                                  |                  |
| Null Hypothesis: LOGCONSEXP is normally distributed | .7619                            | .7576            |

Source: *Author (2023)*

The results of the Jarque-Bera test for normality are displayed in Table 6, and the coefficient of chi-square and associated p-value are not statistically significant. Therefore, the results of the test do not contradict the hypothesis that "LOGCONSEXP" fits a normal distribution.

### The Influence of Diverse Income on Consumption Expenditure

The endogeneity concerns of the independent variables (diversified income) due to measurement errors are addressed by employing two estimators in the panel regression with the quantitative dependent variable: the two-stage least-squares within estimator for fixed effects and the two-stage least-squares random-effects estimator for random effects. Both of these estimators are instrumental variable (IV) estimators. We estimate the models using robust standard errors to control for heteroscedasticity and within-panel serial correlation in the idiosyncratic error term. To determine household welfare, the logarithm of household consumption expenditure was utilized. Table 7 displays the summary regression estimates for models 1 and 2.

**Table 7: Regression Estimates for the 2SLS Fixed Effects IV and 2SLS Random Effects IV: Dependent Variable: LOGCONSEXP**

| <b>Independent Variable</b>            | <b>Model 1<br/>2SLS FE – IV Regression<br/>(Robust SEs in<br/>Parentheses)</b> | <b>Model 2<br/>2SLS RE – IV<br/>Regression (Robust SEs<br/>in Parentheses)</b> |
|--|--|--|
| <b>Logarithm of diversified income</b> | .0334***<br>(.0032)  | .03345***<br>(0.0041)  |
| <b>Control Variables</b>               |  |  |
| HH education level                     | .0190***<br>(0.0021)   | .0120***<br>(0.0023)   |
| HH age (years)                         | .0064***<br>(0.0009)   | .0068***<br>(0.0009)   |
| Size of household                      | .0055***<br>(0.0041)   | .0550***<br>(0.0028)   |
| HH gender (Ref=female)                 |  |  |
| Male headed HH                         | -.0780***<br>(0.0318)  | -.1004***<br>(0.0198)  |
| HH marital status (Ref=married)        |  |  |
| Married polygamously                   | -.0387***<br>(0.0211)  | -.0201***<br>(0.0215)  |



|   |   |  |
|---|---|--|
| Divorced / Separated                                    | -.2044***<br>(0.0124)   | -.1756***<br>(0.0153)                  |
| Widow / widower   | -.2171***<br>(0.0823)   | -.2532***<br>(0.1085)                  |
| Never married   | -.1616***<br>(0.0203)   | -.1803***<br>(0.0225)                  |
| HH residence <sup>(Ref=rural)</sup>                     |   |  |
| Urban   | .0717***<br>(0.0562)  | .0753***<br>(0.0517)                   |
| Region of the country <sup>(Ref=centra)</sup>           |   |  |
| Eastern   | -.3287***<br>(0.0345)   | -.3434***<br>(0.0370)                  |
| Northern  | -.1852***<br>(0.0188)   | -.2006***<br>(0.0227)                  |
| Western   | -.0854***<br>(0.0179)   | -.0058***<br>(0.0260)                  |
| HH main job sector of employment <sup>(Ref=agric)</sup> |   |  |
| Industry  | -.0760***<br>(0.0247)   | -.0745***<br>(0.0274)                  |
| Services  | -.0150***<br>(0.0179)   | .0250***<br>(0.0224)                   |
| Others  | -.0242***<br>(0.1827)   | -.0301***<br>(0.1709)                  |
|   | Wald=7040.24***<br>Wald prob>chi-sq = .0000                               | Wald=22.58<br>Wald prob>chi-sq = .0023 |
|   | Hausman chi-sq = 745.37 (p = .0000)<br>H <sub>0</sub> : RE is appropriate |  |

\*, \*\*, \*\*\* represents 10%, 5% and 1% levels respectively

Source: *Author (2023)*

When applied to the null hypothesis that the random effects estimator is the preferred model, the computed Hausman chi-square statistic overwhelmingly rejects the null hypothesis in favor of the alternative hypothesis (Hausman chi-square = 745.37;  $p = 0.0000$ ). According to the outcomes of the Hausman test, the individual-level effects in this study are best fit by a fixed-effects model. As a result, the estimates from the fixed effects model are the focus of discussion when interpreting the results.

Estimates for income diversity in Table 7 are positive and statistically significant at the 5% level based on regression estimates from Models 1 and 2. Results demonstrate that using consumption expenditure as a proxy for household welfare, a one percent increase in the household's diversified income improves household welfare by around 3.3 percent (coef. = .0334; SE= 0.0032), assuming all other parameters remain constant.

Table 7 demonstrates that living in an urban region as opposed to a rural location (coef. = 0.0717; SE=0.0562), the head of the household's age (coef. = 0.0064; SE=0.0009), the size of the household (coef. = 0.0055; SE=0.0041), all have significant effects on the household's welfare. According to Table 7, a higher welfare is associated with a higher level of education (coef. = 0.0190; SE=0.0021), an older household head (coef. = 0.0064; SE=0.0009), a larger family (coef. = 0.0055; SE=0.0041), an urban rather than rural location (coef. = 0.0717; SE=0.0562), and employment in the service sector.



### The Effect of Income Disparity on the Prevalence of Poverty

For the panel model with a binary outcome variable, the study employs the panel probit model (see Table 8). The probit model was analyzed as an instrumental variable model to handle endogeneity in the explanatory variable. The summary regression estimates for model 3 are shown in Table 8. This model uses the household head poverty level as a surrogate for household welfare.

**Table 8: Regression Estimates for PROBIT Model (Model 3): Dependent Variable: “POV” (POV=0 if household is non – poor and 1 otherwise)**

| Independent Variable                                    | <b>Model 3</b><br>IV – Probit Regression: Coefficients are Predicted Probabilities (Robust SEs in Parentheses) |
|---|--|
| <b>Logarithm of diversified income</b>                  | -.0833***<br>(.00618)  |
| <b>Control Variables</b>                                |  |
| HH education level                                      | -.0471***<br>(0.0204)  |
| HH age (years)  | -.0024<br>(0.0055)   |
| Size of household                                       | .0331***<br>(0.0316)   |
| HH gender <sup>(Ref=female)</sup>                       |  |
| Male headed HH  | -.0066<br>(0.1881)   |
| HH marital status <sup>(Ref=married)</sup>              |  |
| Married polygamously                                    | -.1168<br>(0.1623)   |
| Divorced / Separated                                    | -.1204<br>(0.2901)   |
| Widow / widower   | .2005<br>(0.2552)  |
| Never married   | .2344<br>(0.2814)  |
| HH residence <sup>(Ref=rural)</sup>                     |  |
| Urban   | .2043***<br>(0.1547)   |
| Region of the country <sup>(Ref=centra)</sup>           |  |
| Eastern   | .1101***<br>(0.3686)   |
| Northern  | .6120***<br>(0.2564)   |
| Western   | .2047***<br>(0.01848)  |
| HH main job sector of employment <sup>(Ref=agric)</sup> |  |
| Industry  | .1334<br>(0.2225)  |
| Services  | -.1170<br>(0.1494)   |
| Others  | -.6452***<br>(0.4232)  |



|  |  |
|--|--|
|  | Wald=414.10***<br>Wald prob>chi-sq = .0000<br>Wald test for no endogeneity<br>H <sub>0</sub> : No Endogeneity<br>Prob > Chi-sq = .0000<br>Hausman test of exogeneity<br>H <sub>0</sub> : Instrumented variables are exogenous<br>Prob > chi-sq = .0005 |
|--|--|

\*, \*\*, \*\*\* represents 10%, 5% and 1% levels respectively

Source: *Author (2023)*

The Wald exogeneity test yielded a p-value for the chi-square statistic of  $\text{Prob} > \text{chi-sq.} = 0.0000$ , which is significantly smaller than the 5% significance level. At the 5% level of significance, this result rejects the null hypothesis of no endogeneity. The Wald exogeneity test validates IV-probit's lack of risk. The instrumented variables are hypothesized to be exogenous in Hausman's exogeneity test. Table 8 provides summary estimates for this test, which show that the estimated chi-square statistic has a p-value less than the 5% significance level, therefore rejecting the null hypothesis. The results of Hausman's test suggest that the instrumented variables are endogenous. Hausman's test results are consistent with Wald exogeneity test results, validating the use of instruments in probit estimation and the inclusion of endogenous regressors in the model under consideration.

Table 8 estimates household size (coef. = 0.0331; SE = 0.0316), whether a household is urban as opposed to rural (coef. = 0.2043; SE = 0.1547), whether a household is located in the Eastern area (coef. = 0.1101; SE = 0.3686), and whether a household is located in the Northern region (coef. = 0.6120; SE = 0.2564). Table 8's estimates show that variables assumed to have no effect on the estimated risk of household poverty have 5% significant coefficients only in very few cases. Such control factors include the gender of the household head, the marital status of the head of the household, the industry in which the head of the household's work is performed, and whether the household is located in the Western or Central regions.

Estimated results indicate that income diversity is a crucial factor in establishing household welfare. In addition, both the IV-fixed effects and IV-probit estimates demonstrate that households can benefit from income diversification. The financial security of a household can be enhanced by diversifying and periodically reinvesting the income stream. Income from multiple household sources, including but not limited to informal agriculture revenue and official non-farm income, are used in this study. The study showed that a positive and statistically significant (at 5% level) anticipated coefficient for the variable of diversified income was observed. Since the estimated value of the diversified income variable agreed with the a priori hypotheses of the study, it was deemed theoretically valid and statistically reliable. Consequently, the null hypothesis ( $H_0$ ) that income diversity does not affect household welfare in Uganda was incorrect. Instead, the regressions in this study showed that increasing household income diversity significantly increased household welfare.

The portfolio diversification of household incomes, as represented by the diversified household income, is more evidence of the societal paradigm shift. Indeed, empirical research (see, for instance, Dzanku 2018; Loison 2019; Maertens 2020) demonstrates that income diversity



increases income, reduces poverty, and ultimately improves welfare. Our results were generally in line with those of other studies. The results of this research are in line with those of Kakungulu *et al.* (2021), who used secondary data from Uganda National Household surveys to show that rural income portfolios in Eastern Uganda have unequal welfare repercussions. Their research showed that when household income was diversified, vulnerability and poverty decreased.

The head of the household's level of education was reported in terms of completed years of schooling. Consistent with our a priori theoretical expectations, we found that a positive and statistically significant coefficient on the education variable in the IV-fixed effects model and a negative and statistically significant coefficient on the education variable in the IV-probit model were associated with a higher level of household welfare. The likelihood that a household will enjoy better welfare standards is increased when the household head has a higher level of education. This is because individuals with a higher level of education are more likely to find gainful employment, to be able to provide for their families' basic needs, and to have access to long-term support. This may provide light on the correlation between the level of education of the household's head and its financial well-being.

According to the categorical variable "region" in the empirical model, two of the three categories included significantly impacted household welfare. Four categories were created for this variable, with "central region" serving as the reference category. The study's estimations show that households in the eastern and northern regions experienced a considerable decline in welfare compared to households in the central region. Northern and eastern Uganda have higher poverty rates, which may explain this. The rates of chronic poverty were highest in the north (15.1%), then in the east (7.1%), and lowest in the center (0.4%) (UBOS, 2021). According to UBOS (UBOS, 2021) these regional differences in poverty were discovered between the Uganda national household survey periods of 2015/16 and 2019/20. The capital of Uganda, Kampala, is also situated in the country's central area, giving household heads easier access to utilities, better employment possibilities, and opportunity to engage in profitable economic activities.

## SUMMARY AND IMPLICATIONS

Using panel data from the most recent four waves of the Uganda National Panel surveys, this article examines how household welfare affects income diversity in Uganda. The study employed consumption expenditure and poverty status as surrogates for household welfare. Three types of estimators were utilized to construct the empirical panel models: the fixed effects of the instrumental variables (IV-FE), the random effects of the instrumental variables (IV-RE), and the IV – probit model. However, the proposed IV-FE and IV-logit regressions formed the basis for the final model's predictions.

According to regression estimates, income diversity has a considerable impact on household welfare. As a result, variations in the household's diverse income can be used to account for changes in household welfare. Further research found that the degree of education of household heads as well as whether they resided in the central, eastern, or northern zones might have a significant good or negative impact on the welfare of households.



The study's findings show that greater participation at home activities can improve household welfare by broadening access to several sources of income. This suggests that households whose primary means of economic support is engaged in productive rather than passive economic activity are more likely to enjoy financial success. And it is possible that household welfare would improve if people moved away from primary economic activities like subsistence farming and toward secondary economic activities like manufacturing and services.

## STUDY LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Despite the current study's contributions, further research is still needed to fill in the gaps. The research model used was unable to adequately describe how subjective welfare is. Future studies may consider taking a pragmatic approach. This could lead to the use of both primary and secondary data for that purpose.

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