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DETERMINANTS AND IMPACT OF URBANIZATION ON HOUSEHOLD LIVELIHOODS IN LILONGWE DISTRICT: EVIDENCE FROM INTEGRATED HOUSEHOLD SURVEY

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INTRODUCTION

Urbanization has, in recent years, become an interesting issue all over the world. The Sustainable Development Goals (SDG) number eleven on promoting sustainable cities and communities emphasizes on the need for enhancing inclusive and sustainable urbanization. According to , urbanization is an inevitable issue as statistics have shown that urban growths are increasing with 70 million new urban residents every year in developing countries. For the purpose of this study, urbanization can be defined as the rising number of people living in urban areas, (UNDP, 2016).

Malawi, as one of the developing countries has not been spared of increasing urbanization rates. Malawi's capital city, Lilongwe which is also the biggest city, still has a large proportion of rural sites that are slowly being transformed to urban sites. According to Nso (2016), urbanization rates in Malawi have been slowly rising from 15.14 percent in the year 2006 to 16.45 percent in the year 2016. Urbanization on its own has indeed effects that if not well managed can lead to a great harm to cities. Some of the effects include increased pollution which in the end affects the health and lives of urban human capital. (Larson, Findeis, & Smith, 2000).

Rural people in developing countries like Malawi move to urban areas mainly to find good quality jobs that can help improve their standards of living. Urban areas provide hope for technological progress, productive human resources and better standards of living (income). It is for this reason that the number of individuals in Malawi moving to urban areas has been slowly rising as indicated by . On the contrary, the adverse effects of urbanization are not entirely offset by these benefits of urbanization. Larson, Findeis and Smith (2000) pointed out the need for greater planning in order to offset the effects of urbanization and mitigate its impact and rising demand of consumption goods.

The effects of urbanization on the livelihood and quality of life cannot be overlooked. Researchers all over the world have researched on different effects of urbanization and their possible solutions (Larson, Findeis, & Smith, 2000; Tong, 2012; Zeng, 2012). On the contrary, information on the impact of urbanization on households' livelihoods still remains unknown as studies have emphasized on the physical environment neglecting household welfare and more importantly with the recent Integrated Household Survey data 4. Hence a study on the determinants and impact of urbanization on the livelihoods of Malawian households remains imperative. The main objective of this study therefore is to assess the determinants and impact of urbanization on livelihood indicators. Specifically, the study aims to (1) analyze the determinants of urbanization in Lilongwe; and (2) assess the impact of urbanization on food, health and education expenditures of households.

RESEARCH METHODOLOGY

Empirical Framework

The Propensity Score Matching Approach

The study employs the Propensity Score Matching Approach to Impact Evaluation as it uses cross-sectional data to study the impact of urbanization on livelihood outcome variables. With the absence of baseline data and in order to estimate a counterfactual, the study employed a PSM method and compared rural and urban households similar in observable characteristics. Hence for every unit in the urban group, a matching unit in the rural group exist based on socioeconomic and institutional characteristics.

According to Khandker, Koolwal and Samad (2010) and Harder, Stuart and Anthony (2010), the PSM approach has 6 crucial steps which must be followed. The first step is estimation of propensity scores using a binary choice model; the second step involves checking the overlap or common support; the third step is choosing a matching algorithm among different algorithms with different band widths; the fourth step is checking the matching quality to eliminate bad matches; the fifth step is effect estimation which involves estimating the Average Treatment effect of the Treated; and the last step involves sensitivity analysis in order to observe for unobserved heterogeneity.

Model Specification

Objective 1: To analyze the determinants of urbanization

According to Khandker, Koolwal and Samad (2010), the first stage of the PSM model involves estimating the probability of residing in an urban area and getting the predicted estimates as propensity scores. This stage was analyzed by the logit model. The logit model hence answered the first objective of analyzing the determinants of urbanization. Following Wooldridge (2015), the logit model can be presented as follows;

$$Y_i^* = \alpha + \beta_i X_i + \varepsilon_i \quad (1)$$

$$Y_i = 0 \text{ if } Y_i < Y^* \quad (2)$$

$$Y_i = 1 \text{ if } Y_i \geq Y^* \quad (3)$$

Where Y_i is a binary variable that takes either values of 1 if household is in urban area or 0 if in rural area, Y^* is a latent variable that indexes the decision to move to an urban area, X is a vector of observable characteristics and B is a vector of parameters to be estimated. ε is the stochastic error term.

According to Harder et al. (2010), the predicted propensity scores can be presented as follows;

$$P(X) = \Pr(Z = 1 | x) = F(\beta_i X_i) \quad (4)$$

The estimated scores are hence strictly between the [0, 1] interval and follows a probabilistic distribution based on the socioeconomic and institutional characteristics (X_i).

Objective 2: Impact of urbanization on livelihood indicators of health, food and education

In order to achieve the second objective, Average Treatment effect of the Treated (ATT) was estimated to analyze the impact of urbanization on household livelihoods. The outcome variable (livelihood) was observed through households' health, food and education expenditures. Following Caliendo and Kopeing (2008), the Average Treatment Effect of the Treated can be presented as follows;

$$ATT_{PSM} = E_{P(X)} \{E(Y_1 | Z=1, P(X)) - E(Y_0 | Z=0, P(X))\} \quad (5)$$

Where $E_{P(X)}$ is the expected probability with respect to the distribution of the propensity scores estimated, Y_1 and Y_0 are the outcome variables in the urban and rural households respectively, Z is the decision variable taking the values 1 for urban residents and 0 for rural residents. The ATT shows the difference between the urban and rural residents based on the estimated propensity scores.

Sources of Data

The study used the Integrated Household Survey data 4 collected by the National Statistics Office in the year 2016 and published in 2018. The national data collected agricultural, fisheries, household and community data on 12, 447 households across Malawi. This study however focused on the household specific data and Lilongwe to analyze the determinants and impacts of urbanization on livelihood indicators.

Results and Discussion

Descriptive Statistics

This section presents the descriptive analysis of the pre-treatment statistics of the urban and rural households according to their socioeconomic, institutional and demographic characteristics. Chi-square and student t-test were used to obtain the statistics. Table 3-1 below shows the socioeconomic, institutional and demographic characteristics of the sampled households by comparing rural residents to urban residents. From the table below, age of the household head was a continuous variable measuring the age of the household head in years. The mean age for urban residents was 40.85 years and that for rural residents was 43.74 years. The p-value of $1.000 > 0.05$ shows no significant difference between the mean age of urban and rural dwellers.

Education was another continuous variable recording the maximum number of years spent in school. On average, urban residents recorded 11 school years while rural residents recorded 7 school years. The p-value of $0.000 < 0.01$ shows a significant difference between the mean education years of the urban and rural residents at 1 percent significance level. Land size measured the acreage of land owned by a household. The average land size of urban dwellers was 0.84 acres and that of rural dwellers was 1.8 acres.

Household income measured the total income of the household in Malawian Kwacha (US\$1=MWK 735). On average, urban residents earned MWK 111, 285.2 while rural residents earned MWK 83, 018.86. Gender of the household head was a binary variable taking the values 1 if head is male and 0 if female. 84.25 percent of urban residents were male headed households while 78.95 percent of rural residents were male headed. Credit access was another binary variable recording 1 if household has access to credit and 0 if not. On average, 7.9 percent of urban dwellers had access to credit while 15 percent of rural residents had access to credit.

Access to coupons was also binary recording if household had access to subsidized farm inputs or not. On average, 4 percent of urban households had access to farm input subsidy coupons while 17 percent of rural households had access to coupons. Again, land ownership showed whether the household owned any agricultural or non-agricultural land. On average, 20.65 percent of urban residents owned land while 49.84 percent of rural residents owned land.

Land title ownership was another binary variable that recorded whether household had a title document for their land or not. Only 1 and 0.33 percent from urban and rural respectively had a title document for their land. This shows the lack of title ownership documents by Malawian households. Lastly, marital status was a categorical variable. A majority 78.75 and 78.84 percent of the urban and rural residents respectively were married. Again 9 and 11 percent of the urban and rural residents respectively were separated or divorced. 4 and 1 percent of the sampled urban and rural residents respectively were never married.

Table 1.1 Socioeconomic and Institutional Characteristics of Respondents

Variable	Urban (n=673) mean	Rural (n=917)	p-value
Continuous			
Age	40.85	43.74	0.100
Education years	10.96	7	0.000
Land size (acres)	0.84	1.8	0.000
Household Income (MWK)	111285.2	83018.86	0.1282
Binary			
Gender (male=1)	0.8425	0.7895	0.008
Credit access (yes=1)	0.0788	0.1592	0.000
Coupon access (yes=1)	0.0401	0.1701	0.000
Land Ownership (yes=1)	0.2065	0.4984	0.000
Land Title document (yes=1)	0.0119	0.0033	0.401
Categorical			
Marital Status			0.000
Married	0.7875	0.7884	
Separated/Divorced	0.0921	0.1101	
Widow/Widower	0.0713	0.0905	
Never Married	0.0109	0.0490	

Results of the Econometric Model

Objective 1: Determinants of Urbanization in Lilongwe

A logit model was used to analyze the first objective which assessed the determinants of urbanization in Lilongwe. From Table 1.2 below, age of the household head, education level, access to financial credit and size of land owned affected the decision to reside in an urban area. Age positively and significantly affected the decision to reside in an urban area at 1 percent level of significance. Thus a year increase in age of the household head increased the probability of residing in an urban area by 0.38 percent. This is so as older age is highly correlated with wealth. Hence older household heads are more likely to reside in urban areas than younger household heads as they are capable of moving to urban areas.

Education was another factor that positively and significantly influenced the decision to reside in urban areas. Education was recorded as the number of years spent in school. Thus a year increase in the number of years spent in school increased the probability of residing in an urban area by 3.37 percent. This is so as education provides the skills and knowledge necessary for one to adapt in urban setting. Access to credit also significantly influenced the decision to reside in an urban area. Having access to credit increased the probability of residing in an urban area by 6.3 percent. Credit can be considered as a way of increasing a household's financial assets as it provides the opportunity of earning more income. Households with access to credit hence were more likely to reside in urban areas than households without credit access.

Lastly, land size negatively and significantly influenced the decision to reside in urban area. Land is an important determinant as it is one of the most crucial assets owned by households. An acre increase in the size of the land decreased the probability of residing in an urban area by 9.86 percent. This is so as land is one of the crucial assets owned by households and hence provides a means of livelihood.

Table 1.2 Factors Affecting the Decision to Reside in Urban Area

Variable	Marginal Effect	Standard Error
Age	0.0038***	0.0008
Gender	-0.0461	0.0538
Marital Status		
Married (R)	1	
Separated/Divorced	-0.0255	0.0556
Widowed	-0.0659	0.0570
Never Married	0.1377	0.1871
Education years	0.0337***	0.0027
Credit access	0.063**	0.0292
Coupon access	-0.0482	0.0348
Income	0.00009	0.00008
Land Ownership	0.0265	0.0254
Land size	-0.0986***	0.0109
Land title document	0.1262	0.1098

*** Significant at 1 percent, ** significant at 5 percent

Objective 2: Impact of Urbanization on Food Consumption, Health and Education Expenditures

The second objective involved estimating the impact of urbanization on food, health and education expenditures. This involved estimating the Average Treatment effect of the Treated (ATT). The ATT was estimated in a way that the effect of urbanization on livelihood indicators is attributable to urbanization alone. In order to achieve this, different steps were taken to estimate the ATT.

Choosing a Matching Algorithm

A number of matching algorithms used to match urban and rural residents were run in order to select the best algorithm. These are the kernel matching, caliper matching and the nearest neighborhood matching. According to Khandker, Koolwal and Samad (2010), the choice of the best matching algorithm depends on choosing the one with a large matched sample size, low pseudo-R square, large number of insignificant variables after matching and low standardized mean bias. Table 1.3 shows the balancing tests from the different matching algorithms. From Table 1.3, kernel matching of band width of 0.1 was the best matching algorithm as it had a low pseudo-R square, large number of insignificant covariates after matching and the smallest mean bias between the urban and rural residents after matching.

Table 1.3 Choice of a Matching Algorithm

Algorithm	Number of insignificant variables after matching	Pseudo-R square	Matched sample size	Mean bias
Kernel				
Bandwidth 0.1	9	0.02	1083	7.3
Bandwidth 0.25	7	0.026	1084	7.4
Nearest Neighbor				
At integer 1	5	0.041	1084	11.2
At integer 2	5	0.031	1084	9.7
Caliper matching				
Radius 0.1	5	0.041	1083	11.2
Radius 0.2	5	0.041	1084	11.2

Matching Quality

Another important step in PSM modelling is checking for the matching quality. This involves checking the common support to ensure that only urban and rural residents of similar traits are compared to each other. The assumption is that the probability of being an urban resident lies somewhere between 0 and 1, implying that it is never predicted perfectly. Figure 1.1 below shows the distribution of the propensity scores. From the figure below, the common support assumption is satisfied as there exist urban and rural residents of similar characteristics.

Figure 1.1 Matching Quality

Average Treatment Effect of the Treated (ATT)

The other important step in PSM estimation is estimating the impact of urbanization on the selected livelihood indicators. What we have done so far is to match urban and rural residents based on observable characteristics so that any difference in the outcome variable can be attributed to urbanization and urbanization alone. The outcome variables involve food, health and education expenditures. Table 1.4 below shows the impact of urbanization on the livelihood indicators.

Out of the three livelihood indicators, food consumption and health expenditure were the only two outcome variables that turned out to be significant. Education expenditure however turned out not significant despite having a positive difference. Before matching was done, the average food expenditure of urban residents was MWK14594.74 (US\$19.85) per month and that of rural residents was MWK4930.21 (US\$6.71) per month. Thus before employing the PSM model, on average urban residents had their food expenditures MWK9664.52 (US\$13.15) more than those of rural residents. After matching similar households, the difference between the average food expenditures between urban and rural residents reduced to MWK7818.57 (US\$10.64) but was still significant at 1 percent level of significance with a t-value of $9.4 > 2.58$. Taking expenditures on food as a proxy for food security, the results imply that urbanization increases the food security status of households by increasing incomes and ability to purchase and access food.

Health expenditure was another positive and significant livelihood indicator. Urbanization is mainly assumed to increase the pollution which has an impact on the health of urban dwellers. The results show that before matching, the average health expenditure of urban residents was MWK12626.86 (US\$17.18) per month and that of rural residents was MWK2995.26 (US\$4.07) per month implying that the health expenditure of urban households was MWK9631.61 (US\$13.1) more than that of rural households. After matching similar households, the difference reduced to MWK7749.05 (US\$10.54) but was still significant at 5 percent with a t-value of $2.57 > 1.96$. Thus urban dwellers make more health expenditures than rural residents.

Table 1.4 Impact of Urbanization on Livelihoods

Outcome	Sample	Urban	Rural	Difference	Std. Error	t-value
Food Expenditure	Unmatched	14594.74	4930.21	9664.52	457.94	21.1***
	ATT	14633.13	6814.55	7818.57	831.42	9.4***
Health Expenditure	Unmatched	12626.86	2995.26	9631.61	1634.9	5.89***
	ATT	12677.99	4928.94	7749.05	3010.7	2.57**
Education Expenditure	Unmatched	216229.2	44229.4	171999.8	27283	6.30***
	ATT	215624.4	188886	26738.1	49714	0.54

Robustness of the Results

The last step of PSM estimation is to check whether the results obtained are insensitive to bias. Table 1.5 shows that the standardized bias was 7.3, only one case was lost and the pseudo-R square was 2 percent. All these according to Caliendo and Kopeing (2008) imply the ATT's estimated were fit enough. After conducting sensitivity analysis using the R-bounds, the significant values of gamma for Food expenditure ranged from 1.1 to 2. Thus absence of hidden bias. The significant values of gamma for health expenditure ranged from 1.1 to 1.5. Thus the unobserved heterogeneity would have to increase the odds ratio of urbanization by 10 to 50 percent before it could negate the estimated ATT. Hence the estimated impact is valid.

Table 1.5 Robustness of Results

	SB _{After Matching}	Cases lost to CS	Pseudo-R ²	Critical values of gamma ()
Urbanization	7.3	1	0.02	1.1 – 2, 1.1-1.5

CONCLUSION AND RECOMMENDATIONS

The results show that of the factors hypothesized to influence urbanization, age, education level and access to credit positively and significantly influenced urbanization. Again, urbanization significantly affected food expenditure of households and their health expenditure. Thus urban households are more food secure than rural households. Policy makers can hence think of expanding cities or urbanizing rural areas in order to improve food security status of rural people. Policies can involve constructing markets in rural areas and promoting rural industries. Urbanization was also found to increase the health expenditure of urban households. Thus proper health policies in urban areas needs to be put in place. There is need for expanding health facilities and services to urban dwellers.

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