

Impacts of Urban Expansion on Welfare of Expropriated Peri-Urban Communities of Hossana Town, Southern Ethiopia

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Authors' contributions

This work was carried out in collaboration among all authors. Author SS designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. The author also managed the analysis of the study and the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

As demand for land increased over time, urban centers have been physically expanding their boundaries to surrounding rural and peri-urban areas by including additional land where people did base their lives in agriculture. Therefore, this study was conducted to evaluate the impacts of urban expansion on welfare of expropriated peri-urban communities of Hossana town, Hadiya Zone, Southern Ethiopia by using propensity score matching method. Household survey research design with semi-structured interview schedule for a sample of 369 households (clustered in to 148 expropriated and 221 non-expropriated) was conducted. Qualitative and quantitative data were collected from primary and secondary sources. In addition to household interview schedule; focus group discussion, key informant interview, transect walk, case story and personal observation were used as data collection tools. After propensity score matching, the per capita income of non-expropriated households is significantly greater than expropriated households. Therefore, urban

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expansion has significant impact on welfare of expropriated peri-urban local communities. Hence, it was suggested that rehabilitation programs should be developed to support the expropriated households to enable them appropriately use their cash compensation and remaining asset and prepare them for the new environment.

Keywords: *Urban expansion; peri-urban; expropriatees; non-expropriatees; impact; propensity score matching; Hossana.*

1. INTRODUCTION

The level of urbanization in Ethiopia has been very low until now, with its proportion urban population just over one fifth in 2018. Nonetheless, in the coming decades, its share of the population living in urban settlements is projected to almost double, to just under 40 per cent in 2050 [1]. In contrast, starting from a very low level of urbanization in 1950, Ethiopia has undergone relatively rapid urbanization compared both to the historical experience of the more developed regions and to other developing countries at similar levels of urbanization [2]. Like most sub-Saharan countries urban population growth and market development in Ethiopia have created mounting competition for peri-urban land located adjacent to towns and cities by people of diverse backgrounds [3].

Ethiopia's urban expansion and development strategy has been based on the acquisition of land by government from adjacent peri-urban areas. The land in the peri-urban areas is predominantly agricultural in nature. Thus, local peri-urban landholders or indigenous small farmers are largely vulnerable to loss of their land where their livelihood is based upon in the process of urbanization [4]. As demand for land increased over time, urban centers have been physically expanding their boundaries to surrounding rural and peri-urban areas by including additional land where people did base their lives in agriculture [5].

For urbanization to contribute fully to economic growth and transformation, it will have to be managed well. Ethiopia already benefits from high rates of economic growth, but among most other countries at similar levels of urbanization, it has the lowest gross national income (GNI). Moreover, growth has been driven mainly by public investment and agriculture, and rapid urbanization has not been accompanied by structural transformation of the economy [6].

Farmers who are living in the peripheral areas of big cities in the country are victims of the urban development that penetrates peri urban in

several aspects. Urban expansion into peri-urban areas (the redevelopment project in the inner city and resettlement in the urban outskirts) has displaced farmers and exposed them to critical socio-economic problems, such as intensified poverty and problems by making people landless, homeless and jobless. They lost their previous income sources and social organizations (like *iqub*, *edir*, *debo*, agricultural cooperatives, religious organizations, etc.) [7]. Moreover, as they do not have any concrete livelihood options at their disposal, the coping strategies they take upon for which they are not trained would eventually push them into vulnerability.

Researches (carried out at higher level) on the impacts of urban expansion on welfare of local communities is limited and the situations and actors interested in peri-urban land are constantly changing [4]. Moreover, those earlier studies are not comprehensive enough to give complete picture about the impact of urban expansion on expropriated and non expropriated local peri-urban communities. Therefore, the purpose of this study is to investigate the challenges imposed on peri-urban local communities as a result of the growing demand for land for urban expansion.

2. RESEARCH METHODOLOGY

2.1 Description of the Study Area

The study was carried out at Hossana town administration, the administrative center of Hadiya Zone, in Southern Ethiopia. The town is located in Lemo *woreda* of the Zone at a distance of 232 km to south of Addis Ababa and 168 km far from Hawassa the capital of the region [8].

Total area of Hossana is 40.5 square km. Mean annual temperature is 15.1-20°C, mean annual rainfall is 1001-1200 mm and the elevation ranges from 2000-2500 meters above sea level. It has a latitude and longitude of 7°30'-7°35'N, 37°48'-37°52'E [9]. The administrative division of the town was reformed in 2018/2019

and it is divided into 3 sub towns, 6 urban *kebeles*, 16 *ketenas*, 51 *sefers* and 253 *tabiyas* [10].

Since the time of its establishment, the population of Hossana town is increasing rapidly. Therefore, Hossana is one of the highly populated towns in Ethiopia with population 13,467 in 1984, 31,701 in 1994 and 69,957 in 2007 [10]. In 2017/2018 the total population of the town is 117,231 with population density 2,859 person per square km. The average family size of the town is 4.0 whereas total households are 29,308 [11]. The population of the town was projected to grow in to 126,322 in 2018/2019 [12].

The town is one of the oldest towns in Southern Nations, Nationalities and People Regional State, which was established in 1906. Since that time, the town undergoes through different administrative and economic systems: feudal, social and capitalist system. Each system put its own impact on the growth of the town. Hosanna town growth was stagnant during the regimes of Emperor Haile Selassie and *Derg*. Change on economic and administrative system brought

remarkable growth since 1990's [13]. And it is indicated that there was a growing pattern to the Eastern and North West part of the town with a small trend towards South West relative to other directions because of the landscape of the town. The trend and extent of changes in built up area are likely to continue with the rapid development of infrastructure and increasing of population [14].

2.2 Data and Sampling

Expropriation is the single formal way of trading peri-urban/rural land rights into urban rights in Ethiopia. In the formal process of urbanization, local peri-urban farmers are expected to be displaced and dispossessed of their land and the expropriated land is expected to be redistributed to private developers with the aim of facilitating urban-based economic growth [4]. The study population for interview schedule consisted of expropriated and non expropriated households in the peripheries of Hossana town. It was hypothesized that the two groups had income and expenditure differences and thus, stratified sampling technique was applied.

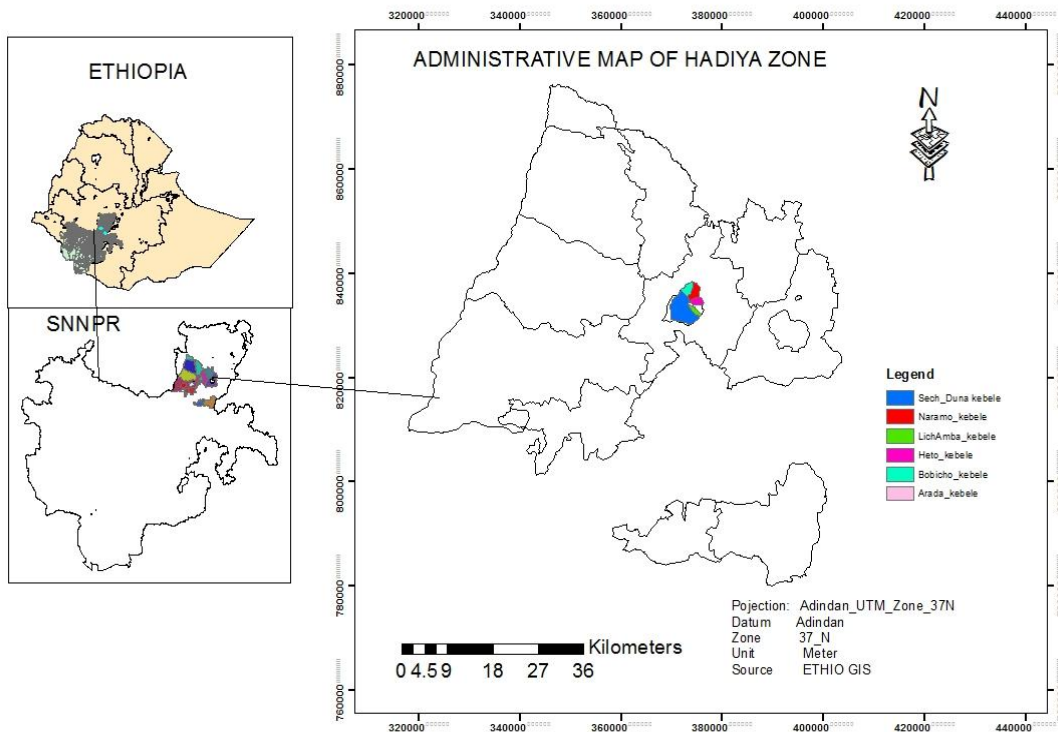


Fig. 1. Study area map
Source: GPS Map, August, 2020

Multistage sampling method was used to select the sample respondents. In the first stage, Hossana town was selected purposively. The rationale of selecting Hossana town purposively was the higher urban expansion and the research gap. Next, seven sample *kebeles* with higher urban expansion at their periphery were selected purposively from the town and seven sample rural *kebeles* at the surrounding of the town were also purposively selected. Then households were stratified into expropriated (treatment) and non-expropriated (control) groups. Finally, sample households were selected using systemic random sampling technique from the respective list of households using population proportional to sample size (PPS) to both expropriated and non-expropriated households. The sample size was obtained using Cochran (1963) formula to yield a sample for proportions [15].

$$n = \frac{Z^2 pq}{(e)^2}; \tag{1}$$

Where:

n- is desired sample size
 Z^2 -is the abscissa of the normal curve that cuts off an area α at the tails;
 e-is the desired level of precision,
 p-is the estimated proportion of an attribute that is present in the population, and
 q-is 1-p.

In this case p was the proportion of expropriated households and q was the proportion of non-expropriated households.

Therefore, the sample size was:

$$n = \frac{(1.96)^2(0.4)(0.6)}{(0.05)^2} = 369$$

And as per the proportion, sample of expropriated and non-expropriated households were 148 and 221 respectively.

Prior to conducting the interview, pre-test of the interview schedule was done out of sample *kebeles* in 18 expropriated and 18 non-expropriated households and accordingly revision was made and finalized. Primary qualitative and quantitative data were collected through the combination of household survey, personal observation, key informant interview, focus group discussion; case story and transect-

walk. Secondary data were collected using note taking, reviewing and library method from government reports and publication, books, articles, and reports of related institutions.

2.3 Data Analysis

Primary data were analyzed qualitatively and quantitatively. The quantitative data were analyzed using descriptive statistics and propensity score matching (PSM) method.

2.3.1 Descriptive statistics

Mean, standard deviation, minimum, maximum, percentage and frequency distribution are the tools used in descriptive analysis. In addition, subsample comparisons based on different explanatory variables were conducted using t- and chi-square tests.

2.3.2 Propensity score matching method

PSM has become a popular approach to estimate causal treatment effects. Once the researcher has decided to use PSM, he is confronted with a lot of questions regarding its implementation. To begin with, a first decision has to be made concerning the estimation of the propensity score. Following that one has to decide which matching algorithm to choose and determine the region of common support. Subsequently, the matching quality has to be assessed and treatment effects and their standard errors have to be estimated. Furthermore, questions like “what to do if there is choice-based sampling?” or “when to measure effects?” can be important in empirical studies. Finally, one might also want to test the sensitivity of estimated treatment effects with respect to unobserved heterogeneity or failure of the common support condition. Each implementation step involves a lot of decisions and different approaches can be thought of [16].

Step 1: Propensity score estimation

Model Choice: When estimating the propensity score, two choices have to be made. The first one concerns the model to be used for the estimation, and the second one the variables to be included in this model. In principle any discrete choice model can be used. Preference for logit or probit models (compared to linear probability models) derives from the well-known shortcomings of the linear probability model, especially the unlikeliness of the functional form when the response variable is highly skewed and

predictions that are outside the [0, 1] bounds of probabilities. For the binary treatment case, where we estimate the probability of participation vs. non-participation, logit and probit models usually yield similar results. Hence, the choice is not too critical, even though the logit distribution has more density mass in the bounds [16]. For this study a logit model was used to estimate propensity scores and matching were then performed using propensity scores of each observation. In estimating the logit model, the dependent variable is expropriation due to urban expansion, which takes the value of one if a household is expropriated and zero otherwise.

Variable choice: The matching strategy builds on the CIA (Conditional Independence Assumption), requiring that the outcome variable(s) must be independent of treatment conditional on the propensity score. Hence, implementing matching requires choosing a set of variables X that credibly satisfy this condition. Omitting important variables can seriously increase bias in resulting estimates. Only variable that influence simultaneously the participation decision and the outcome variable should be included [16].

Step 2: Choose matching algorithm

To achieve the best matching result, one should choose the best matching method out of the different matching algorithms. Thus, standardized bias, the pseudo- R^2 , sample size after matching and number of insignificant variables after matching approaches were used as criteria to decide on the best matching algorithm. One possible problem with the standardized bias approach is that we do not have a clear indication for the success of the matching procedure, even though in most empirical studies a bias reduction below 3% or 5% is seen as sufficient. The pseudo- R^2 indicates how well the regressors X explain the participation probability. After matching, there should be no systematic differences in the distribution of covariates between both groups and therefore, the pseudo- R^2 should be fairly low [16].

Step 3: Check overlap/common support

The next important step in checking the performance of the PSM estimation is checking overlap or common support condition. Average treatment effect on the treated (ATT) and average treatment effect (ATE) are only defined in the region of common support. Hence, an

important step is to check the overlap and the region of common support between treatment and comparison group [16]. Common support ensures that persons with the same X values have a positive probability of being both participants and non-participants [17]. Treatment units have to be similar to non treatment units in terms of observed characteristics unaffected by participation; thus, some non treatment units may have to be dropped to ensure comparability. However, sometimes a nonrandom subset of the treatment sample may have to be dropped if similar comparison units do not exist [18]. One of the methods to investigate overlap or common support is comparing the minima and maxima of the propensity score in both groups. The basic criterion of this approach is to delete all observations whose propensity score is smaller than the minimum and larger than the maximum in the opposite group. Observations which lie outside this region are discarded from analysis.

Step 4: Matching quality/effect estimation

Once common support condition is fulfilled, the next step is checking the balancing of propensity score and covariates. The test is fulfilled by applying the selected algorithm and the output with two-sample t-test shows the balance of the propensity score and covariates. In two-sample t-test, before matching differences are expected, but after matching the covariates should be balanced in both groups and hence no significant differences should be found. The t-test might be preferred if the evaluator is concerned with the statistical significance of the results [16].

Step 5: Sensitivity analysis

The sensitivity analysis is another important step in PSM. Estimation of treatment effects with matching estimators is based on the CIA, that is selection on observable characteristics. However, if there are unobserved variables which affect assignment into treatment and the outcome variable simultaneously, a 'hidden bias' might arise. Since it is not possible to estimate the magnitude of selection bias with non-experimental data, we address this problem with the bounding approach [16].

Average treatment effect on treated is the final step in PSM which tries to disclose whether urban expansion brought a significant effect on the welfare of households comparing between expropriated and non-expropriated households. Per capita income was used as an indicator to assess the impact of urban expansion on welfare of expropriated peri-urban community.

2.4 Definition of Variables and Hypothesis

Dependent variable: Expropriation due to urban expansion is the dependent variable for the model. It is dummy variable and which is represented in the model by one for expropriated and zero otherwise.

Outcome variable: It is the per capita income of the household in Birr during the survey year.

2.5 Explanatory Variables

Age of household head: Age is a continuous explanatory variable peculiar to the household head. If the age of the head of the household increases, there is a high probability of that household to be reluctant to expropriation since it is assumed that the older aged household head is less active to change. In light of this, age of the head of the household and expropriation due to urban expansion were expected to be negatively correlated.

Sex of household head: It is a dummy variable that takes a value of 0 for female and 1 otherwise. Female headed households are more afraid of new situation as compared to their male counterparts. Therefore, male headed households were hypothesized to be more likely to accept expropriation for urban expansion than female headed households.

Educational level of the household head: It is a continuous variable taking value of years of schooling and the better the educational level of the household head, the higher the chance to accept change. It is assumed that formal schooling is expected to enhance farmer's ability to perceive, interpret and respond to new events. Therefore, this variable was expected to have positive relationship with expropriation due to urban expansion.

Family size: It is a continuous variable that refers to the total number of persons (converted into Adult Equivalent) living within a household. Households with larger size are assumed to have more labor force and this human resource is advantageous in the job opportunity created by urban expansion. In light of this, family size and expropriation due to urban expansion were expected to have positive correlation.

Job opportunity: It is a dummy variable taking a value of 1 if the household has job opportunity, 0 otherwise. It refers the access of the household

head in general and the access of household members in particular to formal and informal job opportunity. It is assumed that urban expansion results in job opportunity. Consequently, it was hypothesized that job opportunity and expropriation due to urban expansion have positive relationship.

Perception of the household head about natural population growth: It is a dummy variable taking a value of 1 if the household head perceives that natural population growth aggravates expropriation due to urban expansion, 0 otherwise. Natural population growth is a positive natural change, when the number of live births is larger than the number of deaths during the time period considered. Therefore, it was hypothesized that household heads' perception about natural population growth and expropriation due to urban expansion are negatively correlated.

Perception of the household head about rural to urban migration: It is a dummy variable taking a value of 1 if the household head perceives that rural to urban migration aggravates expropriation due to urban expansion, 0 otherwise. Rural to urban migration refers both a socioeconomic phenomenon and a spatial process involving the movement of people from rural areas into cities, either permanently or semi-permanently. At present, it occurs mainly in developing countries as they undergo rapid urbanization. Therefore, it was hypothesized that household heads' perception about rural to urban migration and expropriation due to urban expansion have negative relationship.

Perception of the household head about rate of land bid price at the periphery: It is a dummy variable taking a value of 1 if the household head perceives that land bid price at peri-urban area is cheaper and thus increase expropriation, 0 otherwise. The rate of land bid price is cheaper in peri-urban areas than the rate of land bid price at the center of the town. Therefore, it was hypothesized that household heads' perception about rate of land bid price at the periphery and expropriation due to urban expansion are negatively correlated.

Perception of the household head about house sale price at the periphery: It is a dummy variable taking a value of 1 if the household head perceives that house sale price at the periphery is cheaper and thus increases expropriation, 0 otherwise. House sale price is cheaper at peri-urban area as compared to the

center of the town. Therefore, it was hypothesized that household heads' perception about house sale price at the periphery has negative correlation with expropriation due urban expansion.

Perception of the household head about urban development plan: It is a dummy variable taking a value of 1 if the household head perceives that urban development plan increases expropriation, 0 otherwise. Urban development plan is a technical and political process concerned with the development and design of land use and the built environment, including air, water, and the infrastructure passing into and out of urban areas, such as transportation, communications, and distribution networks. Therefore, it was hypothesized that household heads' perception about urban development plan and expropriation due to urban expansion have negative relationship.

Perception of the household head about economic development: It is a dummy variable taking a value of 1 if the household head perceives that economic development increases urban expansion and thus aggravates expropriation, 0 otherwise. Economic development is the growth of the standard of living of a nation's people from a low-income (poor) economy to a high-income (rich) economy. Economic growth encourages many developers for rapid construction of new houses. Therefore, it was hypothesized that household heads' perception about economic development and expropriation due to urban expansion have negative relationship.

Perception of the household head about topography of peri-urban area: It is a dummy variable taking a value of 1 if the household head perceives that topography of peri-urban area affects urban expansion, 0 otherwise. Topography is the arrangement of the natural and artificial physical features of an area. If the topography of the peri-urban area is suitable for urban expansion, it aggravates expropriation. Therefore, it was hypothesized that household heads' perception about topography of peri-urban area and expropriation due to urban expansion have negative relationship.

Perception of the household head about land speculation: It is a dummy variable taking a value of 1 if the household head perceives that land speculation aggravates expropriation, 0 otherwise. Land speculation is a financial activity that involves the purchase of land with the hope

that the price will increase over time due to factors such as scarcity. Therefore, it was hypothesized that household heads' perception about land speculation and expropriation due to urban expansion have negative relationship.

Perception of the household head about industrial expansion: This is a dummy variable taking a value of 1 if the household head perceives that industrial expansion increases expropriation, 0 otherwise. Establishment of new industries at peri-urban area requires large area. Therefore, it was hypothesized that household heads' perception about industrial expansion and expropriation due to urban expansion have negative relationship.

Perception of the household head about policy direction over access to land plots: This is a dummy variable taking a value of 1 if the household head perceives that policy direction over access to land plots increases expropriation, 0 otherwise. Urban land lease policy of the country favors people to have more urban land plots. Therefore, it was hypothesized that household heads' perception about policy direction over access to land and expropriation due to urban expansion have negative relationship.

3. RESULTS AND DISCUSSION

In this chapter, findings from descriptive statistics and econometric analysis are presented and discussed. The first section reports about the characteristics of sample households and it is followed by the econometric results.

3.1 Descriptive Analysis

This section presents descriptive statistics of demographic and institutional characteristics of the sample households and their perception on demography, national economy, policy and physical geography that are hypothesized to affect expropriation due to urban expansion and the outcome variable (per capita annual income) included in the PSM model. These variables are selected based on economic theory, previous empirical studies and information collected during the survey [19].

Table 1 compares expropriated and non-expropriated households before matching in terms of the above characteristics using t-test for continuous and X^2 -test for dummy variables. The results show that expropriated households are

similar to their non-expropriated counterparts on many variables including age, education, household heads' perception on natural population growth, household heads' perception on land bid price at peri-urban, household heads' perception on house sale price at peri-urban, household heads' perception on economic development and household heads' perception on land speculation. However, there exists considerable initial bias between sample expropriated and non-expropriated households in terms of family size, sex, job opportunity, household heads' perception on rural to urban migration, household heads' perception on urban development plan, household heads' perception on topography at peri-urban, household heads' perception on industrial development and household heads' perception on policy direction over access to land plots. For instance, expropriated households are more likely to have perception on rural to urban migration and

perception on urban development plan, but less likely to have large family size, more male headed households, job opportunity, perception on topography at peri-urban, perception on industrial development and perception on policy direction over access to land plots.

3.2 Results of the Econometric Model

3.2.1 Propensity score estimation

The dependent variable (expropriation due to urban expansion) depends on different factors. In this study, many variables are hypothesized to influence households' expropriation due to urban expansion in the study area. Binary logit model was used to identify determinants of expropriation as well as estimate propensity scores to be used for matching expropriates with non-expropriates.

Table 1. Descriptive statistics of continuous and dummy variables used in the PSM

Continuous variables	Household type			t-test
	Total Sample (N=369)	Expropriated (N=148)	Non-Expropriated (N=221)	
	Mean (STD)	Mean (STD)	Mean (STD)	
Age	55.61 (13.43)	56.99 (14.65)	54.69 (12.497)	-1.620
Educational level	5.04 (4.97)	5.02 (5.56)	5.05 (4.55)	0.056
Family size (AE)	4.72 (1.75)	4.11 (1.63)	5.12 (1.71)	5.670***
Dummy variables	Frequency (%)	Frequency (%)	Frequency (%)	χ^2 -test
Sex	304(82.38)	110(74.32)	194(87.78)	11.1***
Job opportunity	120(32.52)	26(17.57)	94(42.53)	25.2***
Perception on population growth	356(96.48)	145(97.97)	211(95.48)	1.63
Perception on rural to urban migration	342(92.68)	144(97.30)	198(89.59)	7.76***
Perception on land bid price at periphery	338(91.60)	138(93.24)	200(90.50)	0.87
Perception on house sale price at periphery	340(92.14)	135(91.22)	205(92.76)	0.29
Perception on urban development plan	327(88.62)	139(93.92)	188(85.07)	6.88***
Perception on economic development	333(90.24)	135(91.22)	198(89.59)	0.27
Perception on topography at periphery	317(85.91)	120(81.08)	197(89.14)	4.76**
Perception on land speculation	331(89.70)	137(92.57)	194(87.78)	2.20
Perception on industrial development	315(85.37)	113(76.35)	202(91.40)	16.1***
Perception on policy direction	331(89.70)	124(83.78)	207(93.67)	9.4***

Source: Survey data (2019). *** and ** represent significance at less than 1%, and 5% probability levels, respectively.

Table 2 summarizes the logit model result. The chi-square is significant at less than 1% probability level, which means the model is a good fit. The result also revealed a fairly low pseudo R^2 of 0.2091, i.e., expropriated households do not have much distinct characteristics and thus, good match between expropriated and not expropriated households.

The model output revealed that three variables including educational level of the household head, perception of the household head on rural to urban migration and perception of the household head on urban development plan positively and significantly affects expropriation due to urban expansion, whereas five variables including family size, job opportunity, perception of the household head on house sale price at periphery, perception of the household head on topography at the periphery and perception of the household head on industrial expansion negatively and significantly affects expropriation due to urban expansion.

The positive and significant result of educational level of the household head may be due to the fact that educated peoples look forward to improved living condition. The possible justification for negative relationship of expropriation due to urban expansion with family size might be that households with large family size fear for new environment. The justification for the negative sign of job opportunity could be households who have job opportunity may be reluctant to be expropriated. Statistically significant positive effect of perception of the household head about rural to urban migration may be due to the fact that rural to urban migration is flourishing and easily perceived by the peri-urban community and in turn initiate them to be expropriated. The demographic characteristic of the town reveals that the town is among the rapidly growing towns in the country with huge influx of rural migrants to the town [20]. Focus group discussants also confirmed that the rate of rural to urban migration is higher in the case of Hossana town. The negative association of perception of the household head about house sale price at the periphery could be explained in such a way that households who perceive the cheaper house sale price at periphery as compared to the center of the town may not prefer expropriation. According to Abraham et al. [20] and as reflected by the focus group discussants, there is lack of affordable housing in the center of Hossana town. This is perceived by peri-urban community and those who perceive are less likely to be expropriated. The positive

effect of perception of the household head about urban development plan could be justified as households who perceive the plan of urban development might prefer urban expansion in turn expropriation.

3.3 Choosing the Matching Algorithm

From the result in Table 3, kernel matching estimator with bandwidth of 0.25 was chosen based on the criteria of mean standardized bias 3-5% after matching, small pseudo- R^2 after matching, large matched sample size, and large number of insignificant variables after matching. The major advantage of kernel matching is the lower variance which is achieved because more information is used [16]. Hence, kernel matching estimator with bandwidth of 0.25 was used to estimate the average treatment effect on the treated (ATT) of urban expansion on the annual per capita income of peri-urban households.

3.4 Matching Quality

As kernel matching is chosen, the area of common support is restricted by kernel matching bandwidth 0.25 and Fig. 2 shows that distribution of propensity score and the area of common support by pair wise comparison of expropriated and non-expropriated households. It shows that some treatment sample units have been dropped as similar comparison units do not exist. The overlap in the distribution of the estimated propensity scores for the two groups indicates that the common support condition is satisfied.

As shown in the Table 4, the estimated propensity scores vary from 0.08760862 to 0.98132028 for expropriated households and from 0.00514161 to 0.826949 non-expropriated households. Therefore, based on the rule of minima and maxima, the overlap or common support region lies between 0.08760862 and 0.826949.

Matching quality and robustness of results are summarized in Table 5. The reduction of the mean standardized bias (81.27%) from 25.1% (before matching) to 4.7% (after matching) with lower Pseudo- R^2 indicates fair matching quality. Moreover, the mean bias after matching fulfills the acceptable range of 3-5% and the cases lost to the common support restrictions is fairly low (5.69% of the total sample). Results in the Table 5 also show that if the critical level of gamma increases, the level of significance is not affected (p -value 1.7e-07 to 0.00). This indicates that for the outcome variable estimated, at various level

of critical value of gamma, the p- critical values is significant which further indicate that the study considered important covariates that affected both expropriation and household income. Thus,

it can be concluded that our impact estimates (ATT) is not sensitive to unobserved selection bias and is a pure effect of expropriation on households' per capita income.

Table 2. Logit model result

Variable	Coeff.	Std. err.	Z	P > z	Marginal effect
Age	0.016	0.011	1.46	.145	0.004
Sex	-0.408	0.358	-1.14	.253	-0.097
Education	0.065**	0.030	2.18	.029	0.015
Family size	-0.387***	0.085	-4.54	.000	-0.090
Job opportunity	-1.056***	0.292	-3.61	.000	-0.228
Perception on population growth	0.410	0.842	0.49	.626	0.089
Perception on rural to urban migration	1.878***	0.721	2.60	.009	0.306
Perception on land bid price at periphery	0.043	0.534	0.08	.936	0.010
Perception on house sale price at periphery	-0.998*	0.527	-1.89	.058	-0.244
Perception on urban development plan	1.341***	0.513	2.62	.009	0.252
Perception on economic development	0.265	0.521	0.51	.611	0.059
Perception on topography at periphery	-0.846*	0.475	-1.78	.075	-0.205
Perception on land speculation	0.838	0.520	1.61	.107	0.172
Perception on industrial development	-1.165***	0.400	-2.91	.004	-0.282
Perception on policy direction	-0.630	0.450	-1.40	.161	-0.153
Constant	-0.402	1.248	-0.32	.747	
LR chi square	103.90***				
Log likelihood	-196.553				
Pseudo R ²	0.209				
Sample size	369				

Source: Survey data (2019). ***, ** and * represent significance at less than 1%, 5% and 10% probability levels, respectively

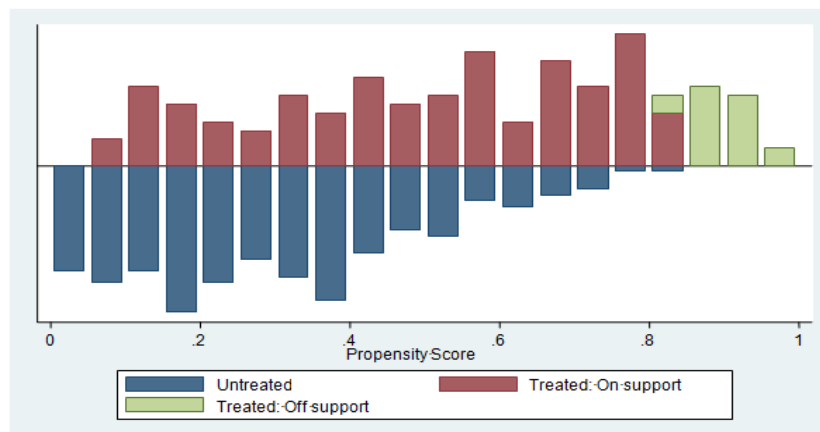


Fig. 2. Propensity score distribution and common support area after matching

Source: Survey data (2019)

Table 3. Performance of matching estimators

Matching estimators	Number of insignificant variables after matching	Pseudo-R ² after matching	Matched sample size	Mean SB
Nearest neighbor matching				
Nearest neighbor 1	7	0.063	348	10.8
Nearest neighbor 2	7	0.022	348	7.9
Nearest neighbor 3	7	0.025	348	7.3
Nearest neighbor 4	7	0.035	348	9.1
Nearest neighbor 5	7	0.031	348	7.6
Caliper matching				
Radius 0.01	7	0.048	329	9.6
Radius 0.05, 0.1, 0.5 and 1	7	0.063	348	10.8
Kernel matching				
Bandwidth 0.01	7	0.014	329	6.6
Bandwidth 0.05	7	0.027	348	7.3
Bandwidth 0.08	7	0.027	348	7.1
Bandwidth 0.1	7	0.027	348	6.9
Bandwidth 0.25	7	0.017	348	4.7
Bandwidth 0.5	7	0.057	348	9.9

Source: Survey data (2019)

Table 4. Distribution of estimated propensity scores

Household type	Mean propensity score	STD	Minimum	Maximum
Total (369)	0.401084	0.2477047	0.00514161	0.98132028
Expropriated (148)	0.5547092	0.2467662	0.08760862	0.98132028
Non-expropriated (221)	0.2982038	0.1882479	0.00514161	0.826949
Overlap region (348)			0.08760862	0.826949

Source: Survey data (2019)

Table 5. Indicators of matching quality and robustness of results

	SB _{Before} (%)	SB _{After} (%)	% (SB) reduction	Cases lost to CS	Pseudo-R ²	Critical values of gamma (Γ)
Expropriated/Non-Expropriated	25.1	4.7	81.27	21 (5.69%)	0.017	1.7e-07 – 0

Source: Survey data (2019)

Table 6. Urban expansion impacts on welfare (ATT)

Outcome Variable	Sample	Treated	Controls	Difference	S.E	t-value
Per capita income	Unmatched	14,811.728	14,471.751	339.977	1229.300	0.28
	ATT	13,682.352	16,406.883	-2724.531	1331.185	-2.05**

Source: Survey data (2019). ** represent significance at less than 5% probability level

3.5 Average Treatment Effect on the Treated

The result presented in Table 6 shows that before matching, the per capita income of non-expropriated households (14,471.751 birr) is less than expropriated households (14,811.728 birr). But after matching, the per capita income of non-expropriated households is significantly greater

than expropriated households. This shows that the per capita income of expropriated households is decreased by 16.61% due to urban expansion. Therefore, urban expansion has significant impact on welfare of expropriated peri-urban communities in the study area.

Focus group discussants reflected that the expropriated households, especially those who

had no active daughters and sons during expropriation became disadvantaged. The main reasons along this, stressed by the discussants, are problems of compensation and the problem in their management skill of cash. The problems related to compensation are identified as: the compensation doesn't consider children below 18, at Hossana the valuation is set below the right value of the property because of budget problem of the town administration to cover the cost for compensation, the community does not participate in valuation of compensation and there are long delays on the payment of compensation. As the expropriated households were farmers, they need support to manage and adopt the new environment, but nobody gave them attention. As expropriatees lose large size of farm land, jobless people are created. There is no association and cooperation between the land management unit and Small and Medium Enterprise office to support these households. Moreover, the delayed infrastructural development like pipe water, road and electric power at peri-urban area inhibit the expropriated households to pursue different livelihood strategies and in turn affect their income portfolio.

The focus group discussants and key informants also disclosed that due to fear of lower rate of compensation, most peri-urban households sold their part of land through illegal land market before the urban land plan reach their locality. Through this market, the most actors and beneficiaries are illegal land brokers and land speculators rather than land holders. Generally, although urban expansion has positive effects on peri-urban communities, it has negative effects and negative impact on welfare of expropriated peri-urban communities in the study area.

4. CONCLUSION AND POLICY RECOMMENDATION

The finding from this study indicated that urban expansion in the study area has significant impact on welfare of expropriated peri-urban local communities. The per capita income of expropriated households is significantly less than their non-expropriated counterparts. The problems are related to valuation of compensation, the absence of rehabilitation program for expropriatees and lack of infrastructure. Children below 18 are not considered in compensation package, the community does not participate in the valuation process, the compensation is not commensurate to the property lost and there is long delay in the

compensation payment process. Illegal land market, illegal land brokers and land speculators are also found to be the aggravating factors for this problem. Illegal brokers and land speculators are more beneficiaries than land holders in illegal land transaction in the study area.

Therefore, considering children below 18 in the compensation package; commensurate valuation of compensation with property lost; participation of the community in valuation of compensation; allocating and releasing enough budget for compensation in order to avoid its delay; developing rehabilitation programs to support the expropriated households to enable them appropriately use their cash and asset and prepare them for the new environment; developing infrastructures and social facilities, which are necessary for their livelihood, at peri-urban areas; and taking legal measurement at illegal land market, illegal land brokers and illegal land speculators are suggested to the respected government body.

Given the effect of illegal land market on those households who are living at peri-urban area and sold their farm land through illegal land market, the researcher would like to remind the respective body to address and give emphasis on these victim households.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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