

Assets, Activity Choice, and Policy Implications for Social Protection Systems

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Abstract

Research Originality: People in countries like Zimbabwe face ongoing economic challenges, underscoring the importance of improving social protection systems that help households build and own assets. However, there is still a limited understanding of how owning assets affects household economic activities. Without this knowledge, programs may be poorly designed, leading to little improvement in people's lives and inefficient use of public funds.

Research Objectives: This study examines how various livelihood assets affect the participation of urban and rural households in paid employment, non-farm business, and farm business activities in Zimbabwe.

Research Method: This paper applies a modified multinomial logistic regression specification on a representative sample of 51,114 observations from the 2012 and 2017 Poverty, Income, Expenditure, and Consumption Survey (PICES) pooled cross-sectional data.

Empirical Results: We found a strong association between assets owned and economic activity choices, but with rural-urban differentials. The findings confirm that natural assets such as land and cattle are central to rural livelihoods, and farm business remains the dominant livelihood activity. Secondly, it reveals a critical social or public policy aspect: that education is central to livelihoods in both rural and urban areas, as higher levels of education increase participation in paid employment and non-farm businesses, even across gender.

Implications: Zimbabwe would benefit more by boosting social support to cover more secondary and tertiary students, rather than focusing mainly on primary education social grants.

Keywords:

Livelihoods; assets; economic activities; paid employment; non-farm business; farm business

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INTRODUCTION

Over the past few decades, livelihood perspectives have been crucial in both rural and urban development programming (Scoones, 2015; Bhatasara et al., 2018). At the core is the sustainable livelihoods approach (SLA), which suggests that people can pursue a mix of strategies to make a living and survive (Scoones, 2015; Kassie et al., 2017; Serrat, 2017; Nasrudin, 2019; Hanri, 2018; Bhatasara et al., 2018; Fierros-González et al., 2020; Peng et al., 2022; Mawa et al., 2022; Kabonga, 2024). It follows that households can deploy available assets to construct and pursue livelihood activities. Therefore, choices on livelihood strategies may trigger natural asset-based activities such as farming as well as physical, human, financial, and social asset-based off-farm activities such as paid employment and small businesses (Rahman & Akter, 2014; Nagler & Naudé, 2017; Davis et al. 2017; Davis et al. 2017; Kassie et al., 2017; Loison 2019; Cramer et al., 2020; Moeis et al., 2020; Fierros-González et al., 2020; Danso-Abbeam et al. 2020; Pratikto et al., 2020; Huang et al., 2022; Liu et al., 2023). However, it is argued that, under the livelihoods approach, institutional factors can also affect choice (Kassie et al., 2017; Moeis et al., 2020; Berhanu et al., 2022).

Recent downward trends in economic growth, against a backdrop of persistent inequalities, poverty, unemployment, and social exclusion, have sparked debate over the appropriate welfare policy to support livelihoods (Todaro & Smith, 2015). Since asset-based welfare policies focus on building assets and capabilities, they are argued to foster the sustainability of development compared to traditional welfare policies that often emphasize short-term consumption. On the one hand, households can capture benefits by accumulating assets useful for their daily lives, now and in the future (Kumaraswamy et al., 2020; Berhanu et al., 2022). On the other hand, a potential criticism is that asset-based interventions, to a greater extent, cannot address the immediate livelihood needs of the poor and are costly to implement (Kumaraswamy et al., 2020).

Meanwhile, asset ownership has sparked interest in its impact on development and on livelihood outcomes, such as poverty. Recent empirical evidence indicates a positive association between asset ownership and development at the household and individual levels (Johnson et al., 2016; Moeis et al., 2020). Unsurprisingly, across Africa and Asia, land redistribution that reduces inequality has been promoted to support development (Todaro & Smith, 2015; Davis et al., 2017). Researchers have also consistently found that asset ownership reduces poverty and improves well-being (Pratikto et al., 2020; Chipunza, 2023). In effect, households with a higher asset base are more capable of engaging in productive and diversified activities (Dey & Haloi, 2019; Kassie et al., 2017; Davis et al., 2017; Loison, 2019; Fierros-González et al., 2020; Huang et al., 2022; Liu et al., 2023). By contrast, asset-poor households are often confined to low-return work and poverty traps (Moeis et al., 2020). Besides, activity choice can also be influenced by other factors such as family size, gender, and geographic location (Nagler & Naudé, 2017; Rahman & Akter, 2014; Baffoe & Matsuda, 2017; Kassie et al., 2017; Dey & Haloi, 2019; Loison, 2019; Stacey et al. 2019; Danso-Abbeam et al., 2020; Mundowa et al., 2020; Abera et al., 2021).

This study investigates the association between livelihood assets owned and three livelihood activity choices, namely, paid employment, non-farm business, and farm business in Zimbabwe. We situate this study within the household economics scholarship. We argue that there is a positive association between assets and economic activity choice, but in a particular context. Zimbabwe is used as a case study and is the best choice for three reasons: First, it is a Sub-Saharan African country with a large rural population (61.4 percent) dominated by agriculture (Zimstat, 2022) and high poverty rates in both urban and rural areas (World Bank, 2022). Second, evidence indicates that there was a reasonable improvement in ownership of some household assets between 2012 and 2017. This led the researchers to suspect that asset ownership could also be influencing activity choice. Third, since 2016, when the National Social Protection Policy was inaugurated, key interventions to improve access to basic services, education, and health have been undertaken (Ministry of Public Service, Labor and Social Welfare, 2016; Government of Zimbabwe, 2020).

Despite considerable research on asset ownership and its impact on development and livelihood outcomes, little is known about the link between individual assets and household economic activity choices in developing countries (Davis et al., 2017), particularly in Zimbabwe (Bhatasara et al., 2018). In fact, according to Kumaraswamy et al. (2020), there is a need for further research to understand household assets better, as they are rarely covered in many livelihood studies. Another concern is that studies that focus on dichotomies between rural and urban areas are scarce. Connected to this, several studies have mainly focused on rural livelihoods (Rahman & Akter, 2014; Mundowa et al., 2020; Kabonga, 2024), leaving out the key urban constituent.

Meanwhile, the three unordered outcomes in the dependent variable led us to use multinomial regression. Other studies that used this approach include Nagler & Naudé (2017), Davis et al. (2017), and Abera et al. (2021). We relied on the assumption that including several assets, which act as controls and other covariates to control for their effects, could yield a relatively unbiased estimate of the true effect of the asset owned. On this basis, we are confident that the association between the association and the likelihood of participating in an economic activity, and the empirical patterns, are discernible.

As expected, in this study we found that rural households with natural assets, such as land and cattle, are less likely to participate in paid employment but are more inclined to engage in farm business. Secondly, education is central in both rural and urban areas, as higher education levels increase participation in paid employment and non-farm businesses across genders, thereby significantly improving well-being. Therefore, increasing social support coverage in education could be an effective policy intervention.

Our study is novel and contributes to the literature in three ways. First, to our knowledge, it is the only study to examine the relationship between key individual assets owned and economic activities in Zimbabwe. Second, it is a study that has considered rural-urban differentials in a single analysis of livelihoods. Unlike previous studies (Mundowa et al., 2020; Kabonga, 2024) that focused on single-activity outcomes

and narrow scopes, our study takes a broader view of livelihoods. Third, our study used cost-effectiveness analysis to illustrate the policy implications for social protection systems in Zimbabwe and to justify policy recommendations. Furthermore, due to a dearth of rigorous cost-effectiveness analyses of policy implications, very few studies, such as Karimah and Yudhistira (2020), have done so, albeit in transport economics.

METHODS

This paper used the multinomial logit specification based on the works of Nagler & Naudé (2017) and Abera et al. (2021), but with some modifications. Since it is not possible to directly obtain the inherent within-subject variability in the observed multinomial response, as an individual's probability cannot be empirically observed at a particular time point using cross-sectional data, we operationalized the pooled data by including time periods.

The equation for the unordered outcomes $j = (1 \text{ "paid employment" } 2 \text{ "nonfarm business" } 3 \text{ "farm business"})$ and predictors X_{it} is as follows;

$$Pr(IGA_{itj}) = (j|X_{it}, \beta_j) = \frac{e^{\beta_j X_{it}}}{\sum_{k=1}^3 e^{\beta_k X_{it}}} \quad j = (1, 2, 3) \quad (1)$$

Let, $Pr(IGA_{itj})$ be the probability of choosing any of the economic activities for the household i at time t , taking the j values (1 "paid employment" 2 "nonfarm business" 3 "farm business") for j is an integer (1, 2, 3). $X_{it} = (x_1, x_2, x_3, \dots, x_n)$ is a covariate vector of predictors for the household i at time t , for $x = (land, cattle, house, motorvehicle, tv, radio, mphone, generator, loans, dremittances, aremittances, trecieved, HHHeduc, HHhealthstatus)$ and other covariates ($HHsize, HHHsex, HHHmstatus, province$ and $area$). Then, $e^{\beta_j X_{it}}$ is the exponentiated vector of coefficients β associated with each predictor ($x_1, x_2, x_3, \dots, x_n$) at time t for income-generating activity j . The denominator becomes the sum (finite = '3' categories) of the exponentiated values of $\beta_k X_{it}$ for k is a vector of all three outcomes: paid employment, nonfarm business, and farm business. The base outcome is farm business (with the most frequency) and is normalized to zero; therefore, $\beta^{(3)}=0$. This is to ensure that the coefficient β_k represents the effects of the $X = (x_1, x_2, x_3, \dots, x_n)$ predictors, on the probability of choosing the j^{th} value, thus, the remaining coefficients for the j^{th} outcomes (paid employment ($\beta^{(1)}$) and non-farm business ($\beta^{(2)}$) relative to farm business ($\beta^{(3)}$). In fitting this model, $j - 1$ (3-1) categories are estimated, thus, (2) sets of regression coefficients (for paid employment and nonfarm business), excluding the base outcome (farm business).

$$Pr(IGA = paid_employment) = \frac{e^{\beta^{(1)}}}{1 + e^{\beta^{(1)}} + e^{\beta^{(2)}}} \quad (2)$$

Represents the probability of choosing paid employment as being the exponential e value of the coefficient $\beta^{(2)}$ of paid employment divided by the exponential values of the coefficients of the three j^{th} outcomes (paid employment, non-farm business, and farm business).

$$\Pr(IGA = non_farm_business) = \frac{e^{\beta^{(2)}}}{1 + e^{\beta^{(1)}} + e^{\beta^{(2)}}} \quad (3)$$

Denotes the probability of choosing a non-farm business as being the exponential e value of the coefficient $\beta^{(2)}$ of a non-farm business divided by the exponential values of the coefficients of the three j^{th} outcomes (paid employment, non-farm business and farm business).

$$\Pr(IGA = farm_business) = \frac{1}{1 + e^{\beta^{(1)}} + e^{\beta^{(2)}}} \quad (4)$$

The data used in this study are a pooled cross-sectional dataset developed by the authors from the 2012 and 2017 Poverty, Income, Consumption, and Expenditure (PICES) random surveys conducted by the Zimbabwe National Statistics Agency (Zimstat) every five years. PICES provides socio-economic and demographic data of rural and urban households. The 2017 survey included 32,256 households, while the 2012 survey included 31,248 households. In the two periods, data were gathered from over 60,000 people living in 10 of the country's provinces and are representative of over 95% of the country's population. The national-level domains were divided into rural and urban areas (ZimStat, 2013; ZimStat, 2018). Although the inclusion of the 2012 survey data, which is outdated, may be questioned, it is necessary given the absence of a full survey since 2017.

Table 1. Summary of variables

Variable	Variable Description	Indicator	Value Label
Dependent:			
HHEA	Household Economic Activity	nominal	1= paid employment, 2=non-farm business, 3= farm business
Independent:			
Natural Assets			
land	Land privately or communally owned	binary	1= own land, 0 otherwise
cattle	Cattle privately owned	binary	1= own cattle, 0 otherwise
Physical Assets			
house	House privately owned	binary	1= own, 0 otherwise
motor vehicle	Motor vehicles privately owned	binary	1= own, 0 otherwise
tv	Television privately owned	binary	1= own, 0 otherwise
radio	Radio privately owned	binary	1= own, 0 otherwise
mphone	Mobile phones privately owned	binary	1= own, 0 otherwise
generator	power generator privately owned	binary	1= own, 0 otherwise
Financial assets			
loans	loan received	binary	1=received, 0 otherwise
dremittances	Domestic remittances received	binary	1=received, 0 otherwise
aremittances	International remittances received	binary	1=received, 0 otherwise
treceived	Transfers received from the government	binary	1=received, 0 otherwise

Variable	Variable Description	Indicator	Value Label
Human assets			
HHHhealthstatus	household head frequent visits to the hospital	binary	1 = Yes, 0 otherwise
HHHeduc	Household head's level of education	nominal	1=preschool, 2=primary, 3=secondary, 4=tertiary
Covariates:			
Household-level			
HHsize	Household size	continuous	
HHHsex	Household head sex	binary	1=female, 0 otherwise
HHHmstatus	Household head marital status	binary	1=married, 0 otherwise
area	Household location, either rural or urban	binary	1=urban, 0 otherwise

Note: The dependent variable is household economic activity (HHEA), which is categorical (nominal). The economic activities from which these categories emanated were, as per data recorded by Zimstat as the most frequent household activity in the past month. Independent variables are assets owned and covariates, which are mostly binary except for *HHsize*, which is continuous, *HHHeduc* and *province* are both nominal.

RESULTS AND DISCUSSION

The proportional descriptive statistics presented in Table 2 show that in rural areas, farming is the main activity for 73.2 percent of households, supporting prior research on the importance of agriculture in rural economies (Davis et al. 2017; Moeis et al., 2020). Households in urban areas rely more on paid employment (44.2 percent), with non-farm businesses at 18.2 percent. The high number of non-farm household activities is consistent with (World Bank, 2017; Nagler & Naudé, 2017).

Table 2. Summary statistics

	Rural					Urban					Min.	Max.
	Obs	Freq	%	Mean	S.D.	Obs	Freq	%	Mean	S.D.		
Dependent variable												
HHEA	42,169					8,945					1	3
paid employment		8,767	20.8				3,953	44.2				
nonfarm business		2,542	6.0				1,632	18.2				
farm business		30,860	73.2				3,360	37.6				
Independent Variables												
land	42,169			0.773	0.419	8,945			0.304	0.460	0	1
cattle	42,169			0.410	0.492	8,945			0.018	0.135	0	1
house	42,169			0.849	0.358	8,945			0.282	0.450	0	1
motorvehicle	42,169			0.024	0.154	8,945			0.137	0.344	0	1
tv	42,169			0.171	0.377	8,945			0.792	0.406	0	1
radio	42,169			0.354	0.478	8,945			0.349	0.477	0	1
mphone	42,169			0.692	0.462	8,945			0.938	0.241	0	1

	Rural					Urban					Min.	Max.
	Obs	Freq	%	Mean	S.D.	Obs	Freq	%	Mean	S.D.		
generator	42,169			0.041	0.198	8,945			0.040	0.197	0	1
loans	42,169			0.059	0.236	8,945			0.175	0.380	0	1
dremittances	42,169			0.150	0.357	8,945			0.162	0.368	0	1
aremittances	42,169			0.029	0.167	8,945			0.060	0.238	0	1
trecieved	42,169			0.412	0.492	8,945			0.312	0.463	0	1
HHHeduc	42,169					8,945					1	4
No qualification		2,642	6.3				280	3.1				
Primary		18,386	43.6				2,490	27.8				
Secondary		18,211	43.2				4,765	53.3				
Tertiary		2,930	6.9				1,410	18.8				
HHHhealthstatus	42,169			0.202	0.402	8,945			0.171	0.377	0	1
HHHsize	42,169			2.316	2.618	8,945			1.699	2.214		
HHHsex	42,169			0.356	0.479	8,945			0.306	0.461	0	1
HHHmstatus	42,169			0.727	0.446	8,945			0.754	0.431	0	1
province	42,169										1	10
Harare		0	0				1,144	12.5				
Bulawayo		0	0				1,312	14.7				
Midlands		5,106	12.1				1,460	16.3				
Masvingo		5,447	12.9				489	5.5				
Manicaland		5,253	12.5				737	8.2				
Mashonaland West		3,828	9.1				1,487	16.6				
Mashonaland East		5,716	13.6				465	5.2				
Mashonaland Central		6,282	14.9				739	8.3				
Matabeleland South		5,242	12.4				576	6.4				
Matabeleland North		5,264	12.5				567	6.3				

Note: Obs stands for observations, % percentage points, and S.D. means standard deviation. All categorical variables are recorded as frequencies and percentages, while the binary dependent variables (0,1) and *HHsize* standing for household size, which is continuous, are reported as means and standard deviations. Min and Max show the minimum and maximum values of the variables. All data calculations are by the authors using the PICES pooled cross-section.

This is a two-step process for selecting the best estimation method for the study, and the results are presented in Table 3. The first step was to run models 1, 2, 3, and 4. Model 1 represented the baseline specification (with sex and marital status controls), Models 2, 3, and 4 (full model). The second step involved model testing using the Hausman test and Akaike's Information Criterion (AIC), the Likelihood Ratio for parameter testing.

From the results in Table 3, it can be concluded that the statistical difference in the coefficients reflects the positive effects of including the control variables (*HHsize*, *HHHsex*, *HHHmstatus*, *area*, *province* and *year*). Furthermore, the IIA was not rejected by Hausman's test, and the likelihood-ratio test yielded a very small, significant p-value. There is no multicollinearity. Consequently, model 4 was used.

Table 3. Baseline estimates of assets owned in economic activity

	Dependent variable: Economic Activity (HHEA)							
	Model 1: Baseline		Model 2: Alternative		Model 3		Model 4: Alternative	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
land	0.805*** (0.0286)	0.902** (0.0423)	0.817*** (0.0290)	0.979 (0.0470)	0.817*** (0.0292)	0.957 (0.0464)	0.832*** (0.0298)	0.987 (0.0480)
cattle	0.829*** (0.0252)	0.702*** (0.0299)	0.848*** (0.0260)	0.851*** (0.0375)	0.850*** (0.0261)	0.856*** (0.0379)	0.856*** (0.0264)	0.867*** (0.0385)
house	0.257*** (0.0102)	0.412*** (0.0217)	0.269*** (0.0109)	0.514*** (0.0276)	0.269*** (0.0109)	0.520*** (0.0282)	0.268*** (0.0108)	0.517*** (0.0279)
motorvehicle	1.282*** (0.0802)	1.855*** (0.139)	1.230*** (0.0775)	1.550*** (0.119)	1.221*** (0.0770)	1.544*** (0.119)	1.211*** (0.0764)	1.518*** (0.116)
tv	1.429*** (0.0464)	1.789*** (0.0783)	1.331*** (0.0463)	1.198*** (0.0591)	1.335*** (0.0468)	1.197*** (0.0594)	1.346*** (0.0472)	1.212*** (0.0600)
radio	0.817*** (0.0225)	0.846*** (0.0318)	0.824*** (0.0228)	0.899*** (0.0338)	0.830*** (0.0231)	0.899*** (0.0341)	0.833*** (0.0233)	0.911** (0.0346)
mphone	0.833*** (0.0263)	0.895** (0.0396)	0.822*** (0.0261)	0.805*** (0.0362)	0.814*** (0.0260)	0.795*** (0.0360)	0.799*** (0.0258)	0.766*** (0.0349)
generator	0.856** (0.0586)	0.878 (0.0763)	0.893* (0.0613)	1.059 (0.0938)	0.885* (0.0607)	1.058 (0.0939)	0.891* (0.0612)	1.072 (0.0951)
loans	1.279*** (0.0587)	0.658*** (0.0477)	1.261*** (0.0580)	0.639*** (0.0467)	1.268*** (0.0592)	0.628*** (0.0466)	1.275*** (0.0595)	0.636*** (0.0471)
dremittances	0.957 (0.0421)	1.059 (0.0617)	0.949 (0.0418)	0.969 (0.0572)	0.942 (0.0417)	0.953 (0.0566)	0.945 (0.0419)	0.957 (0.0568)
aremittances	1.045 (0.0782)	1.331*** (0.119)	1.020 (0.0771)	1.129 (0.103)	0.981 (0.0748)	1.064 (0.0989)	0.979 (0.0747)	1.060 (0.0983)
treceived	0.909*** (0.0299)	0.930 (0.0422)	0.913*** (0.0300)	0.980 (0.0450)	0.933** (0.0318)	0.994 (0.0477)	0.942* (0.0322)	1.012 (0.0487)
HHHeduc								
<i>(base outcome, 1. No qualification)</i>								
2. Primary	1.879*** (0.155)	2.059*** (0.261)	1.880*** (0.156)	2.058*** (0.262)	1.873*** (0.156)	2.061*** (0.263)	1.875*** (0.155)	2.073*** (0.264)
3.Secondary	5.209*** (0.427)	6.807*** (0.854)	5.197*** (0.427)	6.648*** (0.837)	5.187*** (0.427)	6.638*** (0.836)	5.181*** (0.425)	6.622*** (0.833)
4.Tertiary	57.25*** (5.302)	21.71*** (3.024)	56.91*** (5.272)	21.14*** (2.952)	56.84*** (5.278)	21.04*** (2.941)	56.89*** (5.273)	20.95*** (2.929)
HHHhealthstatus	0.675*** (0.0240)	0.819*** (0.0379)	0.677*** (0.0241)	0.831*** (0.0389)	0.676*** (0.0241)	0.828*** (0.0388)	0.681*** (0.0243)	0.842*** (0.0394)
<i>Prob > chi²</i>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<i>Pseudo R²</i>	0.2074	0.2074	0.2130	0.2130	0.2141	0.2141	0.2147	0.2147
<i>AIC</i>	66470.88	66470.88	66331.46	666331.46	65945.19	65945.19	65896.2	65896.2
Observations	51,114	51,114	51,114	51,114	51,114	51,114	51,114	51,114
Household Size	YES	YES	YES	YES	YES	YES	YES	YES
Sex dummy	YES	YES	YES	YES	YES	YES	YES	YES
Marital Status	YES	YES	YES	YES	YES	YES	YES	YES
Province dummy	NO	NO	YES	YES	YES	YES	YES	YES
Area dummy	NO	NO	NO	NO	YES	YES	YES	YES
Year dummy	NO	NO	NO	NO	NO	NO	YES	YES

Note: The robust seeform is in parentheses. The ***, **, * are the significance statistical indicators at 1%,5%, and 10%. They represent the probability values (p-values) associated with each coefficient. Columns 1, 3, 5, and 7 represent paid employment, and 2, 4, 6, and 8 represent non-farm business. The base outcome is a farm business. YES means the control variable is included in the model, and NO means the control variable is excluded. AIC stands for Akaike's information criterion. Calculations are based on the authors' pooled PICES, developed from Zimstat data.

Results in Table 3 indicate a strong relationship between livelihood assets possessed and household economic activities, but in a particular context. In urban areas, though land is important for farm businesses, the positive coefficient is insignificant, suggesting no meaningful association. However, in rural areas, a unit increase in land reduces the likelihood of pursuing paid employment by 3.04 percent relative to farm business (3.37 percent). This result confirms land as the main source of livelihoods in rural areas (Moeis et al., 2020). Meanwhile, cattle ownership reduces the possibility of being in a non-farm business by 6.55 percent. However, in rural areas, cattle reduce the likelihood of participating in paid employment by 1.05 percent and non-farm business (0.88 percent) relative to farm business (1.94 percent). Moreover, reduces the likelihood of participating in paid employment by 0.56 percent. This result may suggest that in rural areas, cattle provide an alternative source of income and security, supporting household subsistence needs and enabling trade or sale in times of financial need, reducing reliance on external employment opportunities and non-farm businesses. Typically, in rural areas, where agriculture is a primary source of livelihood, land and cattle ownership are central to farm business activities. This finding supports the findings of Rahman & Akter (2014), Loison (2019), Fierros-González et al. (2020), and Huang et al. (2022). However, it contradicts the findings of Kassie et al. (2017), Hoang et al. (2019), Loison (2019), and Dey and Haloi (2019), who suggest that it also increases the probability of participating in non-farm activities. Meanwhile, the coefficient of cattle, which could be similar to livestock in a study in rural Bangladesh (Rahman & Akter, 2014), is smaller on wage employment (paid employment in this study) and on non-agricultural activities (similar to non-farm business in this study), and is insignificant in this study. This could be due to differences in geographical and household characteristics.

Meanwhile, owning a house significantly reduces the likelihood of paid employment in both rural and urban areas but increases the likelihood of participation in farm business. Since the percentage-point reduction in urban areas is higher at 4.27 percent than in rural areas (1.44 percent), this could imply that owning a house provides an additional source of income, leading owners to see no reason to engage in any other activity. This supports. The significant positive impact on farm businesses in rural areas may stem from the fact that owning a house provides the necessary physical infrastructure for farm business activities. Owning a motor vehicle is significant for non-farm businesses in both urban and rural areas, but it reduces farm activities in rural areas. This finding suggests that motor vehicle ownership improves mobility and transportation for non-farm businesses and encourages diversification away from farming activities. Results also show that owning a mobile phone increases the likelihood of participating in paid employment by 3.44 percent, significant at 10% level, but is insignificant for non-farm business and farm. This is unlike in rural areas, where the chance of being in a farm business is 1.30 percent. This result suggests that mobile phones provide better access to information and communication relevant to paid employment in both urban and rural areas. The information encourages participation in farm business whilst discouraging engagement in paid employment.

Table 4. Association between assets owned and economic activities by area

Independent Variable: Household Economic Activity (HHEA)						
	Average Marginal Effects					
	(1)	Urban (2)	(3)	(1)	Rural (2)	(3)
Natural Assets						
land	-0.0268** (0.0129)	0.0167 (0.0108)	0.0100 (0.0102)	-0.0304*** (0.00506)	-0.00329 (0.00354)	0.0337*** (0.00559)
cattle	0.0425 (0.0377)	-0.0655* (0.0353)	0.0230 (0.0264)	-0.0105*** (0.00386)	-0.00883*** (0.00257)	0.0194*** (0.00412)
Physical Assets						
house	-0.0427*** (0.0129)	0.0160 (0.0108)	0.0267*** (0.0102)	-0.183*** (0.00522)	-0.0144*** (0.00390)	0.198*** (0.00599)
motorvehicle	-0.0211 (0.0142)	0.0276** (0.0115)	-0.00648 (0.0123)	0.0133 (0.0106)	0.0351*** (0.00613)	-0.0484*** (0.0118)
tv	0.0284** (0.0115)	-0.0244*** (0.00939)	-0.00397 (0.00951)	0.0206*** (0.00472)	0.00907*** (0.00326)	-0.0297*** (0.00529)
radio	-0.0192* (0.00997)	0.0142* (0.00856)	0.00504 (0.00774)	-0.0126*** (0.00369)	0.00173 (0.00251)	0.0109*** (0.00403)
mphone	0.0344* (0.0194)	-0.0185 (0.0160)	-0.0159 (0.0147)	-0.0118*** (0.00394)	-0.00117 (0.00270)	0.0130*** (0.00430)
generator	-0.0157 (0.0250)	0.0142 (0.0217)	0.00149 (0.0180)	-0.0159* (0.00876)	0.00344 (0.00550)	0.0125 (0.00947)
Financial Assets						
loans	0.103*** (0.0133)	-0.108*** (0.0127)	0.00508 (0.0101)	0.0419*** (0.00665)	-0.00686 (0.00512)	-0.0351*** (0.00788)
dremittances	-0.0184 (0.0181)	0.00787 (0.0155)	0.0106 (0.0131)	-0.00313 (0.00564)	-0.00329 (0.00379)	0.00642 (0.00609)
aremittances	-0.0142 (0.0226)	0.0316* (0.0187)	-0.0175 (0.0166)	0.00133 (0.0109)	-0.00207 (0.00727)	0.000738 (0.0118)
treceived	-0.00863 (0.0159)	0.00885 (0.0139)	-0.000219 (0.0117)	-0.00871** (0.00423)	-0.00170 (0.00286)	0.0104** (0.00461)
Human Assets						
HHHeduc (base outcome, 1=No qualification)						
2=Primary	-0.00998 (0.0327)	0.0597** (0.0285)	-0.0497** (0.0232)	0.0486*** (0.00632)	0.0148*** (0.00349)	-0.0634*** (0.00693)
3=Secondary	0.0967*** (0.0324)	0.105*** (0.0280)	-0.202*** (0.0234)	0.141*** (0.00655)	0.0616*** (0.00386)	-0.202*** (0.00722)
4=Tertiary	0.439*** (0.0342)	0.0263 (0.0291)	-0.465*** (0.0246)	0.555*** (0.0109)	0.0512*** (0.00611)	-0.606*** (0.0110)
HHHhealthstatus	-0.0569*** (0.0131)	0.0268** (0.0112)	0.0301*** (0.00920)	-0.0400*** (0.00456)	-0.00369 (0.00301)	0.0437*** (0.00487)
Covariates						
Household level						
HHsize	-0.0110** (0.00455)	0.00212 (0.00273)	0.00888* (0.00512)	-0.0134*** (0.00135)	-0.00165* (0.000928)	0.0150*** (0.00144)
HHHsex	-0.172*** (0.0121)	0.0499*** (0.0101)	0.122*** (0.00915)	-0.136*** (0.00463)	-0.00885*** (0.00292)	0.145*** (0.00489)
HHHmstatus	-0.0580*** (0.0129)	-0.00308 (0.0109)	0.0611*** (0.00999)	-0.0595*** (0.00473)	-0.0154*** (0.00314)	0.0750*** (0.00514)
Observations	8,945	8,945	8,945	42,169	42,169	42,169
Province dummies	YES	YES	YES	YES	YES	YES
Area dummy	YES	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES

Note: Standard errors are reported in parentheses. The ***, **, * are the significance statistical indicators at 1%, 5%, and 10%. They represent the probability values (p-values) associated with each coefficient. Columns 1, 2, and 3 represent outcome categories: paid employment, non-farm business, and farm business. YES means that the covariate is included. Calculations are based on the authors' pooled PICES, developed from Zimstat data.

On the other hand, accessing loans increases the possibility of participating in paid employment in both urban and rural areas. This result is consistent with Pour et al. (2018) and Abera et al. (2021). However, in urban areas, it reduces the likelihood of participating in non-farm business by 1.08. However, the effects of domestic remittances are statistically insignificant, yet international remittances increase the likelihood of participating in non-farm business by 3.16 percent. Besides, transfers are insignificant in urban areas, but in rural areas slightly reduce the likelihood of being in paid employment by 0.87 relative to farm business (1.04 percent). The results also show that higher education levels (secondary and tertiary) significantly increase the likelihood of participating in paid employment and non-farm business, while decreasing the likelihood of participating in farm business in both urban and rural areas. This finding confirms earlier research showing that higher levels of education are associated with moving out of agricultural activities (Danso-Abbeam et al., 2020). However, it is inconsistent with Rahman & Akter (2014). Meanwhile, poor health status generally decreases the likelihood of participating in paid employment. However, in urban areas, it increases the likelihood of participation in non-farm businesses.

Household size decreases the likelihood of participating in paid employment by 1.34 percent and in non-farm business by 0.17 percent, but increases the likelihood of participating in farm business by 1.50 percent. This finding suggests that larger households might rely more on farm business activities for livelihoods. This could be due to the availability and utilization of family labor, particularly women and children. This finding supports Danso-Abbeam et al. (2020) but differs from Abera et al. (2021), who found that larger households are more likely to participate in non-farm activities. Meanwhile, female household heads are less likely to participate in paid employment in both urban and rural areas. This could be attributed to the traditional patriarchal beliefs and constructed gender roles that regard women and children as labor, and they do most of the farming activities (Stacey et al., 2019; Loison, 2019). However, the findings differ slightly from Rahman & Akter (2014). As in Bangladesh, women do not participate in any of the livelihood activities. However, the coefficient in this study for non-farm business is slightly smaller. The results also suggest that married household heads are less likely to participate in paid employment but more likely to participate in farm business in both urban and rural areas.

Results shown in Appendices 5 and 6 indicate that the association between transfers received and level of education ranges from -0.92 percent to 2.51 percent, while receiving transfers increases the likelihood of good health by approximately 2.28 percent. Since transfers are positively associated with health status and primary education, it is clear that the fee waiver policy is ineffective in improving secondary and tertiary education. However, it is improving primary education and access to health care, both of which form part of human capital. The reason could be that the Basic Education Assistance Module (BEAM) has been focusing more on primary education than on secondary and tertiary education. Though increasing the subsidy would improve the literacy rate, an alternative is to increase the budget to incorporate secondary and tertiary-level students. This could increase the years of schooling and the number of household heads with secondary and tertiary education, thereby bolstering the likelihood of participating in paid employment and non-farm business.

Table 5. Cost-Effectiveness Summary of Assumptions and Parameters

	Target	Status Quo	Increase budgetary allocation by 15%
Current education and health policy interventions			
Basic Education Assistance Module (BEAM)		18.92	21.758
Tuition Grants		6.2	7.13
Public Examination Subsidies		13.43	16.215
<i>Subtotal (education subsidies)</i>		38.55	40.47
Assistance Medical Treatment Orders (AMTOs))		0.7	0.74
Total average fee waiver subsidies expenditure @ 22% of national budgets (2018-2022) in US\$ millions		39.25	45.103
Target population coverage@ 100%	1,500,000		
Program expenditure per individual per year (70% coverage) (in US\$)	1,050,000	37.38	42.96
Program expenditure per individual (85% coverage) by 2025 (in US\$)	1,275,000	37.50	35.37
Estimated maximum benefit of education subsidies			2.51%
Estimated parameter benefit of health subsidies			2.28%
Total estimated benefits on human assets through transfers			4.79%
Benefits			
Estimated fee waiver coverage benefits per individual		41.13	47.26
Costs			
Program expenditure/cost per individual (85% coverage) by 2025 (in US\$)		37.50	35.37
Benefit-Costs ratio		1.10	1.34

Note: The policy interventions are based on annual budgetary calculations, as outlined in the UNICEF (Social Protection Policy Brief: Zimbabwe. However, any further assumptions are attributed to the authors based on estimations using the PICES data by Zimstat and Zimbabwe National Development Strategy 1 (NDS1) social policy targets. The costs are calculated by dividing the mean budget expenditure by the number of individuals in each scenario. The benefits are calculated based on the estimated results of the regressions of government transfers on health status and education.

Table 6. Incremental Cost-Effectiveness Ratio (ICER)

Strategy	Incremental cost	Incremental effect	ICER (US\$)
Strategy 1 (S1)			
maintaining the status quo vs	39.25	41.13	
Increase the budgetary allocation by 15%, but retain the same number of beneficiaries (1,050,000)	37.5	47.26	
$\Delta C - \Delta B = (Cost_{s1} - Cost_{s2}) / (Benefit_{s1} - Benefit_{s2})$	1.75	-6.13	-0.2854812
Strategy 2 (S2)			
maintaining the status Quo vs	37.38	41.13	
Increase the budgetary allocation by 15%, but also increase the number of beneficiaries to 1,275,000	42.96	47.26	
$\Delta C - \Delta B = (Cost_{s1} - Cost_{s2}) / (Benefit_{s1} - Benefit_{s2})$	-5.58	-6.13	0.91027732

Note: S1 is the first option, which is compared to the status quo, and S2 is the second alternative, which is compared to the status quo. ΔC means a change in the costs from the status quo to an alternative, and ΔB refers to the change in the benefits from the status quo to an alternative.

Table 6 presents the results from the Incremental Cost-Effectiveness Ratio (ICER) calculations. The ICER calculations are based on estimations in Table 5. The results in Table 6 show that increasing the budget by 15 percent and the beneficiary count to 1,275,000 in strategy 2 can yield greater benefits, with a US\$0.90 increase in marginal benefit. However, increasing the budget allocation by 15% while maintaining the current 1,050,000 beneficiaries yields a margin of around US\$0.29. Therefore, strategy 2 may lead to higher participation in paid employment or non-farm business, potentially transforming livelihoods.

CONCLUSION

Since assets and economic activities are central to livelihoods and to asset-based interventions, this paper provides fresh empirical evidence in household and development economics. Indeed, there are long-standing debates on the relevance of asset-based policies given the existence of consumption-based social interventions. This paper investigated the association between different livelihood assets and household economic activities, carefully considering the key aspect of context specificity. The vitality of this study also rests on the thrust of providing policy evidence on the cost-effectiveness of current social policy interventions and other alternatives, which are limited in Zimbabwe. Therefore, we provided answers to the research questions using a modified multinomial regression model.

Our study results in two main findings. First, it suggests that there is a strong association between asset ownership and economic activity choices, but significant rural-urban differentials exist. Mainly, confirming that households in rural areas that own more land and cattle are more likely to participate in farm activities. Therefore, Zimbabwe's land redistribution program and its agricultural input support schemes for rural households could be ideal interventions. Secondly, it reveals a critical social or public policy aspect: education is key to livelihoods in both rural and urban areas, as higher levels of education increase participation in paid employment and non-farm business activities, even across gender. The cost-effectiveness corroborates this claim, but Zimbabwe would benefit more by increasing budgetary support to enroll more secondary and tertiary-level students, rather than focusing primarily on primary education.

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Appendix 1. Hausman (1978) specification test

	Coef.
Chi-square test value	7.496
P-value	.995

Appendix 2. Likelihood-ratio test

Assumption: model1 nested within model4

LR chi2= 118.67

Prob > chi2 = 0.0000

Name	Command	Dependent variable	Number of parameters	Title
model1	mlogit	HHEA	63	Multinomial logistic regression
model4	mlogit	HHEA	99	Multinomial logistic regression

Note: All calculations are based on the pooled PICES data. Model 1 is the restricted model and model 4 is the full model.

Appendix 3. Akaike's information criterion (AIC)

Model	df	AIC
Model 1	40	45207.72
Model 2	42	45204.83
Model 3	60	45207.55
Model 4	62	45133.05

Appendix 4. Collinearity Diagnostics (VIF)

Variable	VIF	SQRT VIF	Tolerance	R-Squared
land	1.88	1.37	0.5307	0.4693
cattle	1.24	1.11	0.8074	0.1926
house	2.24	1.50	0.4473	0.5527
motorvehicle	1.11	1.05	0.9016	0.0984
tv	1.61	1.27	0.6204	0.3796
radio	1.09	1.05	0.9155	0.0845
mphone	1.22	1.10	0.8199	0.1801
loans	1.09	1.04	0.9189	0.0811
dremittances	1.43	1.20	0.6977	0.3023
aremittances	1.11	1.05	0.9027	0.0973
treceived	1.60	1.27	0.6234	0.3766
HHHeduc	1.13	1.06	0.8867	0.1133
HHHhealthstatus	1.04	1.02	0.9608	0.0392
HHsize	3.25	1.80	0.3075	0.6925
HHHsex	1.46	1.21	0.6827	0.3173
HHHmstatus	1.48	1.22	0.6741	0.3259
area	1.82	1.35	0.5499	0.4501
province	1.11	1.05	0.8985	0.1015
year	3.36	1.83	0.2973	0.7027
Mean VIF	1.59			

Appendix 5. Multinomial regression results for the association between assets owned and the household head's level of education

Dependent Variable: HHHeduc

	Average Marginal Effects			
	No education (1)	Primary (2)	Secondary (3)	Tertiary (4)
Transfers received	-0.00568*** (0.00212)	0.0251*** (0.00446)	-0.0102** (0.00454)	-0.00919*** (0.00264)
Observations	51,114	51,114	51,114	51,114
Controls				
Household Size	YES	YES	YES	YES
Household head marital status	YES	YES	YES	YES
Province dummies	YES	YES	YES	YES
Area dummy	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES

Note: Standard error in parentheses and the ***, **, * represent significance at 1 %, 5%, and 10 %. *HHHeduc* means household head level of education and is a categorical outcome with categories (1) no education, (2) primary, (3) secondary, and (4) Tertiary. All the variables and estimations are based on the PICES pooled cross-section.

Appendix 6. Logistic regression results for the association between transfers received and household head health status

Dependent variable: HHHhealthstatus	
	Average Marginal Effects (Y1)
treceived	0.0228*** (0.00355)
Observations	51,114
Controls	
Household head level of education	YES
Household size	YES
Household head sex dummy	YES
Household head marital status dummy	YES
Area dummy	YES
Province dummies	YES

Note: Standard error in parentheses. The ***, **, * represent significance at 1 %, 5% and 10 %. HHHhealthstatus means household head health status, which is a binary outcome variable indicating whether, in the past 30 days, the household head visited a hospital regularly. The binary codes are (1) No, (0) Yes. (Y1) is the binary 1, which has no meaning in terms of good health status since the household head did not visit the hospital regularly in the past 30 days. All the variables and estimations are based on the PICES pooled cross-section.