THE MEDIATORY ROLE OF CAPITAL ACCESS IN URBAN LIVELIHOOD SOURCES AND THEIR CONTRIBUTION TO ACHIEVING SUSTAINABLE DEVELOPMENT GOALS IN ZIMBABWE

INSIGHTS FROM THE 2025 ZIMBABWE URBAN LIVELIHOODS ASSESSMENT

The Mediatory Role of Capital Access in Urban Livelihood Sources and Their Impact on Achieving Sustainable Development Goals in Zimbabwe

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Executive summary

The Sustainable Development Goals (SDGs) serve as a pivotal metric for evaluating the government's commitment to transitioning the country to an upper-middle-income economy by 2030. Leveraging the Zimbabwe Livelihoods Assessment Committee (ZimLAC) 2025 urban surveys which coincides with the endline of National Development Strategy 1 (NDS1) and the rollout of NDS2, progress toward SDG1 (No Poverty), SDG2 (Zero Hunger), SDG6 (Clean Water and Sanitation) and SDG7 (Affordable and Clean Energy) is assessed in the current study. This study examines the impact of urban household livelihood choices on SDG outcomes, acknowledging the heterogeneous effects of these choices across households contingent upon enabling factors (access to human, financial and social capital) and disabling factors (idiosyncratic and covariate shocks). To address potential endogeneity arising from self-selection into livelihood choices, the study employs a doubly robust inverse probability weighted regression adjustment (IPWRA) approach. The analysis yields insights into the household-level determinants of livelihood choices and their subsequent impact on SDG outcomes and heterogeneity in the impact, informing policy recommendations as follows:

Livelihood Options

	Findings	Policy implications
Labour	▪ Female-headed households exhibited a statistically significant positive relationship with salary/wage-based livelihoods at the 1% level. ▪ Older household heads were more likely to depend on salaries/wages or skilled trades/artisan work, while younger individuals were more prone to casual labor. ▪ Relative to households headed by unemployed individuals, those with any form of employment (formal or informal) exhibited a reduced likelihood of listing salaries/wages as their primary livelihood source.	1. Youth integration: Integrate youth into employment or entrepreneurship opportunities. The government's initiatives to promote youth entrepreneurship are commendable and should be expanded. 2. Support for salaried households: Implement measures to support households reliant on salaries and wages, ensuring they can maintain a decent standard of living. The government's efforts to improve conditions of service for public sector

	▪ Conversely, these households were more likely to rely on casual labor or skilled trades/artisan work. This counterintuitive finding may be attributed to the country's economic context where formal employment often entails diminished earnings prompting households to diversify their income sources through informal or casual labor arrangements.	employees are appreciated and should be sustained.
Entrepreneurial income	▪ The age of the household head positively influenced the probability of relying on own business or vending, while negatively impacting the likelihood of dependence on small-scale mining as a primary livelihood source, after controlling for observed heterogeneity. ▪ Notably, attaining O-level education or higher increased the probability of households relying on own business as a primary livelihood source, underscoring the role of education in fostering entrepreneurial skills	1. Youth integration: Integrate youth into employment or entrepreneurship opportunities. The government's initiatives to promote youth entrepreneurship are commendable and should be expanded. 2. The government's initiative to integrate entrepreneurship into the education system is commendable, as it equips students with the necessary skills to succeed in entrepreneurial endeavors. This effort has the potential to foster a culture of innovation and self-employment among the youth.
Irregular income	▪ Households headed by women or older individuals exhibited a statistically significant decrease in the probability of relying on irregular income as a major livelihood source. ▪ Education level of the household head was statistically insignificant in determining the household's reliance on irregular income. ▪ Households relying on irregular income were often headed by individuals engaged in either formal or informal employment.	1. There is a need to formalize irregular income sources from deals and improve the business environment to enhance the ease of doing business. This can help to create a more stable and conducive economic environment for businesses to thrive.
Rental income	▪ Households headed by older people were more likely to rely on rental income. ▪ Higher levels of education (A'level and above) increased the propensity to rely on rental income.	1. The government's efforts to increase access to higher education are commendable, as this can lead to improved asset accumulation and economic opportunities for individuals. By investing in education, the

		government can empower citizens with the knowledge and skills necessary to accumulate assets and achieve economic stability.
Transfer income	▪ Households headed by women, older individualsand those living apart from their spouse exhibited a statistically significant positive relationship (at the 1% level) with reliance on both intra-country and international remittances. ▪ Education, on the other hand, was positively related to reliance on remittances from abroad, due to the increased likelihood of educated household members securing better-paying jobs abroad and sending remittances back home	1. Invest in education and skills development programs that equip individuals with skills in demand globally, increasing their chances of securing better-paying jobs abroad and sending remittances back home. 2. Encourage diaspora engagement and knowledge transfer initiatives, allowing educated individuals working abroad to contribute to the home country's development.

SDG Outcomes

	Findings	Policy implications
Income (SDG1)	▪ Household age was positively related to monthly income, with a one-year increase in age corresponding to a 0.007% increase in monthly income, holding all else constant at the 1% level of significance. ▪ Higher levels of education beyond the ZJC level significantly increased household income, with returns to education exhibiting an increasing trend. Specifically, attaining a ZJC level of education increased income by 0.211%, while a graduate or postgraduate degree boosted income by 1.079%, implying a 511% increase in returns to education when transitioning from ZJC to a degree level. ▪ Employment was associated with a decline in monthly income, suggesting that income from employment may be lower than that from irregular activities.	1. Invest in education beyond the ZJC level, focusing on tertiary education and vocational training that equips individuals with skills in demand in the labor market. 2. Implement policies to promote decent work and fair compensation, addressing the issue of lower income from employment compared to irregular activities. 3. Support entrepreneurship and job creation initiatives that generate higher-income opportunities.

Dietary Diversity Score	▪ Households headed by women exhibited a statistically significant increase in HDDS by 0.245 points, ceteris paribus, at the 1% level of significance. ▪ Education level of the household head positively influenced HDDS, consistent with prior studies. ▪ Employment was negatively related to HDDS, potentially reflecting the reliance on income from employment to purchase food may not be sufficient to purchase food	1. Invest in education beyond the ZJC level, focusing on tertiary education and vocational training that equips individuals with skills in demand in the labor market
Water and Sanitation	▪ Age of the household head positively influenced access to basic sanitation services, with a statistically significant relationship at the 1% level. ▪ Education emerged as a critical factor in enhancing access to both basic water and sanitation services, after controlling for observed heterogeneity. ▪ Formal and informal employment was associated with a decline in the probability of accessing basic water and sanitation services, potentially reflecting the limited financial resources to invest in these services.	
Clean energy	▪ Older household heads exhibited a lower probability of utilizing clean cooking fuel, with a statistically significant relationship at the 5% level. This finding may reflect the inertia of older households in adopting new technologies or energy sources, potentially due to familiarity with traditional cooking fuels or limited awareness of the benefits of clean cooking fuels. ▪ Education emerged as a critical factor in increasing the probability of household access to clean cooking fuel ▪ Employment was associated with a lower probability of household access to clean cooking fuel.	1. Design targeted awareness campaigns and education programs to inform older household heads about the benefits of clean cooking fuels. 2. Implement incentives or subsidies to encourage older households to transition to clean cooking fuels.

Impact of livelihood sources on SDGs

Findings	Policy implications

Labour income	▪ Reliance on salary/wages and skilled trade/artisan livelihoods improved outcomes, while casual labor has negative effects. Specifically, reliance on salary/wages ceteris paribus increased income by 0.366%, dietary diversity score by 0.498 points, access to basic sanitation by 4.7%and clean fuel by 8.1%, respectively, at the 1% level of significance. ▪ Furthermore, reliance on skilled trade/artisan improved income by 0.107%, probability of access to basic water by 1.8%, sanitation by 3.9%and clean fuel by 5%, respectively, all things being constant. ▪ On the other hand, reliance on casual labor reduced income by 0.293%, dietary diversity by 0.560 points and access to basic sanitation by 3.2% and clean fuel by 8.9%, respectively.	1. Promote formal employment: Encourage policies that support formal employment, such as vocational training and job creation initiatives, to increase access to stable income sources, which can lead to a 0.366% increase in income and 0.498 points increase in dietary diversity score. 2. Invest in skills development: Invest in skills development programs that equip individuals with skills for skilled trades and artisanal work, enhancing their employability and income potential, which can lead to a 0.107% increase in income and improved access to basic services. 3. Regulate informal labor: Implement policies to regulate informal labor contracts, ensuring fair wages, social protection and better working conditions for casual laborers, to mitigate the negative effects of -0.293% on income and -0.560 points on dietary diversity. 4. Social protection: Implement social protection programs to support vulnerable households, including those relying on casual labor, to mitigate the negative effects of informal labor contracts, which can lead to a reduction in access to basic sanitation and clean fuel. 5. Economic diversification: Encourage economic diversification to create more job opportunities in formal sectors, reducing reliance on informal labor contracts, which can lead to improved outcomes in income, dietary diversityand access to basic services.
Entrepreneurial income	▪ Entrepreneurial income livelihoods exhibited a positive relationship with the attainment of Sustainable Development	1. Support own businesses: Policymakers should design targeted interventions to support entrepreneurship development,

	Goals (SDGs), with the notable exception of vending/petty trade's statistically insignificant effect on access to basic water and clean fuel. ▪ A comparative analysis of the impact of own business and vending/petty trade on SDG outcomes revealed that own business was more efficacious in enhancing these outcomes. ▪ Specifically, engagement in own business was associated with a 0.5% increase in income and a 0.823-point improvement in dietary diversity, whereas vending/petty trade corresponded to a 0.067% increase in income and a 0.2-point improvement in dietary diversity. ▪ Furthermore, participation in own business was linked to a 5.4% increase in the probability of accessing basic sanitation and a 5.3% increase in the utilization of clean fuel, both statistically significant at the 1% level. ▪ In contrast, vending/petty trade was associated with a 5.4% decrease in the probability of accessing basic sanitation, potentially attributable to the transitory nature of this livelihood strategy, which may disincentivize investment in basic services.	particularly own businesses, which can lead to a 0.5% increase in income, 0.823-point improvement in dietary diversity, 5.4% increase in access to basic sanitation and 5.3% increase in clean fuel utilization. 2. Improve vending/petty trade: Initiatives aimed at promoting livelihood diversification and enhancing the stability of vending/petty trade may help mitigate the negative effects on basic sanitation (-5.4%) and improve overall well-being, potentially leading to a 0.067% increase in income and 0.2-point improvement in dietary diversity. 3. Invest in basic services: Investments in basic services, such as sanitation infrastructure, may be necessary to support vulnerable populations engaged in informal livelihoods like vending/petty trade, which can help offset the negative impact on basic sanitation. 4. Entrepreneurship training: Entrepreneurship training programs and access to finance may be instrumental in enhancing the productivity and sustainability of their own businesses, thereby amplifying their positive impact on SDG outcomes, including income, dietary diversity, basic sanitation and clean fuel utilization.
Irregular income	▪ Engagement in deals, a form of irregular income, has a mixed impact on household welfare indicators. ▪ While it improved income (0.116%), dietary diversity (0.236 points) and access to basic water services (11%), it reduces access to basic sanitation (3.2%).	1. Regularization and formalization: Regularizing activities encapsulated in deals can potentially increase tax revenue for the government. This can be achieved through registration, licensing and taxation of these activities, which can also provide a framework for improving working conditions and access to basic services.

		2. Targeted interventions: Policymakers can design targeted interventions to support individuals engaged in deals, such as training and capacity-building programs, to enhance their productivity and income-generating potential (0.116% increase in income). 3. Access to basic services: Investments in basic sanitation infrastructure can help mitigate the negative impact of deals on access to basic sanitation (-3.2%). This can be achieved through public-private partnerships or targeted government interventions. 4. Social protection: Implementing social protection programs can help protect vulnerable households engaged in deals from income shocks and provide a safety net, enabling them to invest in basic services like sanitation. 5. Tax revenue utilization: The additional tax revenue generated from regularizing deals can be utilized to fund public services and infrastructure, including basic water and sanitation services, which can benefit households and communities.
Rental income	▪ Rental income had a mixed impact on household welfare indicators. ▪ While it improved income (0.292%), dietary diversity (0.588 points) and access to clean fuel (8%), it significantly reduces access to basic sanitation (26.2%), due to shared sanitation facilities.	1. Improve sanitation infrastructure: Invest in sanitation infrastructure that caters to households with shared facilities, such as rental properties, to mitigate the negative impact on access to basic sanitation (-26.2%). 2. Regulate rental properties: Implement regulations that require rental property owners to provide adequate sanitation facilities, ensuring a minimum standard of living for tenants. 3. Incentivize private sector investment: Provide incentives for private sector investment in sanitation infrastructure,

		particularly in rental properties, to increase access to basic sanitation services. 4. Targeted interventions: Design targeted interventions to support households relying on rental income, focusing on improving access to basic sanitation services and promoting hygiene practices. 5. Housing policy reform: Consider reforming housing policies to prioritize the provision of adequate sanitation facilities in rental properties, ensuring that households have access to basic services.
Transfer income	▪ Transfer income in the form of internal and external remittances had a positive impact on household welfare indicators, particularly income and access to basic water services. The findings suggest that external remittances were more effective than internal remittances in improving income (0.452% vs. 0.105%) and dietary diversity scores. Both internal and external remittances improved access to basic water services, with external remittances having a slightly larger impact (19% vs. 16%).	1. Diaspora engagement: Governments can implement policies to engage with the diaspora community, encouraging external remittances, which can lead to significant improvements in income (0.452%) and access to basic water services (19%). 2. Remittance facilitation: Implementing policies to reduce transaction costs and facilitate remittance transfers can increase the flow of external remittances, thereby enhancing their positive impact on household welfare. 3. Investment in basic services: Governments can invest in basic services, such as water infrastructure, to complement the positive impact of remittances on access to basic water services. 4. Maximizing development impact: Policymakers can design policies to maximize the development impact of remittances, such as encouraging investment in productive activities or human capital development

Farm-based	▪ Farm-based income had a positive impact on several household welfare indicators among urban households, including income (0.288% at the 1% level of significance), dietary diversity score (0.636 points at the 1% level of significance) and basic sanitation (3.6% at the 5% level of significance). ▪ However, it reduced access to clean cooking fuel (2.4% at the 10% level of significance) due to the reliance on wood arising from field clearing.	1. Environmental conservation: Implement environmental conservation programs that promote sustainable agricultural practices, reforestation and soil conservation, reducing the environmental degradation associated with wood collection. 2. Urban agriculture support: Provide support for urban agriculture initiatives, such as training, inputs and infrastructure, to enhance the income-generating potential of urban farmers, which can lead to a 0.288% increase in income (statistically significant at the 1% level).

The Mediatory Role of Access to Capital

	Findings	Policy implications
Financial capital	▪ Statistically significant relationship was observed between access to capital, proxied by access to loans and various Sustainable Development Goals (SDGs) outcomes. ▪ Specifically, the results indicated that access to loans was associated with a 0.193% increase in monthly income ($p < 0.01$), a 0.175-point improvement in dietary diversity score ($p < 0.05$), a 1.5% increase in access to basic water ($p < 0.05$) and a 4.2% increase in access to clean cooking fuel ($p < 0.01$).	1. Credit market development: Enhance credit market development initiatives to increase access to formal credit, thereby augmenting household income (0.193%) and improving overall welfare. 2. Targeted credit programs: Design targeted credit programs that cater to vulnerable populations, promoting access to basic services like clean water (1.5% increase) and clean cooking fuel (4.2% increase). 3. Financial inclusion: Implement policies that foster financial inclusion, increasing access to formal financial services and enabling households to leverage credit to improve their economic well-being. 4. Microfinance initiatives: Support microfinance initiatives that provide small-scale loans to low-income households, promoting entrepreneurship and income-generating activities.

Bridging social capital	▪ Bridging social capital, in the form of government support, development partners support and church support directly to households, was ineffective in improving basic outcomes relating to SDGs 1, 2, 6and 7 in urban Zimbabwe.	
Bonding social capital	▪ Support from relatives in the locality that was in urban areas was ineffective in improving the SDGs under consideration. Moreover, support from urban relatives reduced access to basic sanitation by 11.3% at the 1% level of significance. ▪ On the contrary, support from relatives in a distant location in the form of relatives in rural areas was instrumental in improving incomes (0.465% at the 1% level of significance), dietary diversity score (0.664 points at the 1% level of significance), access to basic water (2% at the 1% level of significance) and access to clean cooking fuel (10.3% at the 1% level of significance). ▪ Furthermore, the results show that bonding social capital from sources out of the same locality was more effective than that from the same locality, probably because those in the same locality suffer the same shocks.	1. Promote rural-urban remittances: Encourage and facilitate remittances from rural relatives to urban households, as these have been shown to be effective in improving incomes (0.465%), dietary diversity (0.664 points), access to basic water (2%) and access to clean cooking fuel (10.3%). 2. Strengthen rural-urban linkages: Strengthen rural-urban linkages and networks to facilitate the flow of resources, knowledge and support between rural and urban areas, which can help improve household welfare. 3. Improve urban social services: Improve urban social services, such as sanitation, to mitigate the negative impacts of reciprocal support from urban relatives, which can lead to congestion and reduced access (11.3% reduction in access to basic sanitation).

1. INTRODUCTION

The Zimbabwe Livelihoods Assessment Committee (ZimLAC) plays a pivotal role in operationalizing Commitment Six of the Food and Nutrition Security Policy (Government of Zimbabwe, 2012), which underscores the government's commitment to establishing a national integrated food and nutrition security information system. This system provides timely and reliable data on the food and nutrition security situation, enabling evidence-based decision-making and informing program effectiveness. The 2025 Zimbabwe Urban Livelihoods Assessment coincides with the culmination of the National Development Strategy 1 (NDS1) and the rollout of the National Development Strategy 2 (NDS2), which operationalize the government's ambition to elevate Zimbabwe to upper-middle-income status by 2030. Through NDS1 and NDS2, the government is working towards achieving specific targets that align with its broader commitments to the Sustainable Development Goals (SDGs), thereby driving progress towards sustainable development and poverty reduction.

The 2025 Zimbabwe Urban Livelihoods Assessment comes against the backdrop of relative economic stability, following the introduction of the Zimbabwe Gold (ZiG) currency on April 5, 2024. The Reserve Bank of Zimbabwe (RBZ) introduced ZiG, backed by a composite basket of foreign currency and precious metals, primarily gold, to foster simplicity, certainty and predictability in monetary and financial affairs. The RBZ's monetary policy formulation and implementation since April 2024 have yielded significant results, including relative price, currency and financial stability. This stability is evidenced by month-on-month inflation stabilization, with ZWG inflation at 0.5% in February 2025 and -0.1% in March 2025, greater exchange rate stability with foreign exchange parallel market premiums below 20%, increased foreign currency inflows, improved availability of foreign currency and sustained financial sector stability and soundness (see ZimLAC, 2025, for further details). This stable economic environment provides a crucial foundation for the government's commitment to elevate Zimbabwe to upper-middle-income status, as outlined in the National Development Strategy and for the attainment of the Sustainable Development Goals (SDGs).

Household livelihood choices significantly influence their progress toward achieving the Sustainable Development Goals (SDGs). Research has shown that urban households relying on farm-based livelihoods are vulnerable to climate shocks, while agriculture-based livelihoods can be detrimental to household outcomes (Haile et al., 2020; Jaacks et al., 2021; Wossen et al., 2016). Moreover, studies have found that urban households often pursue trans-local, multi-local, or spatially diversified livelihoods across the rural-urban continuum (Andersson, 2002; Andersson Djurfeldt, 2015, 2021; Djurfeldt, 2015). The impact of livelihood choices on household outcomes and SDG progress is likely to be heterogeneous, varying by household access to financial, human and social capital. Indeed, numerous studies have demonstrated that access to capital improves household outcomes, highlighting the importance of capital endowment in shaping livelihood trajectories and SDG attainment (Abera et al., 2021; Craig et al., 2023; Kairiza et al., 2017, 2023; Nam et al., 2010; Srinivasan & Carattini, 2020).

This report utilizes the 2025 ZimLAC Urban Livelihoods Assessment to explore the intersectionality between household achievement of Sustainable Development Goals (SDGs) 1 (No Poverty), 2 (Zero Hunger), 6 (Clean Water and Sanitation) and 7 (Affordable and Clean Energy) and household livelihood choices. Specifically, it examines the mediating role of access to financial and social capital on the impact of livelihood choices on SDG attainment. However, analyzing the impact of livelihood choices is complicated by endogeneity arising from household self-selection into different livelihood options (Abera et al., 2021; Bernzen et al., 2022; Gebru et al., 2018; Harkness et al., 2023; Hashmiu et al., 2022). To address this self-selection bias, we employ the doubly robust Inverse Probability Weighted Regression Adjustment (IPWRA) procedure (Daudu et al., 2022; Msangi et al., 2024; Zheng & Ma, 2022, 2023). The IPWRA approach combines propensity score weighting with regression adjustment, providing a robust estimation of the treatment effect (livelihood choice) on the outcome variables (SDG attainment) (Chigusiwa et al., 2023).

This report is organized into several sections that provide a comprehensive analysis of the impact of livelihood choices on household outcomes. Section 2 outlines the methodology, detailing the Inverse Probability Weighted Regression Adjustment (IPWRA) procedure used to estimate the impact of livelihood choices on outcomes. Section 3 presents a descriptive analysis of background characteristics, livelihood

options, outcomes and access to capital, providing an overview of the key variables. Section 4 examines the determinants of livelihood choices and access to capital at the household level, shedding light on the household level factors that influence these outcomes. Section 5 presents the IPWRA estimates of the treatment effects of livelihood choices on outcomes, as well as the heterogeneity in these effects based on access to capital. The report begins with an Executive Summary, which synthesizes the key findings, conclusions and policy recommendations, providing a concise overview of the report's main contributions.

2. METHODS

2.1. Data generation process

The dataset utilized in this study originates from the 2025 Zimbabwe Urban Livelihoods Assessment survey (ZimLAC), which collected data from 12,046 households. The survey gathered extensive information on household background characteristics (control variables), household progress toward Sustainable Development Goals (SDGs) outcomes including income (SDG 1), dietary diversity (SDG 2), access to basic water and sanitation (SDG 6) and clean fuel (SDG 7), as well as livelihood sources (treatment variables). The data set also contains information on intervening variables that might aid (access to capital) or impede (shocks) the potency of livelihood sources, as well as intermediating variables that might amplify the impact of treatment variables on outcomes. The full details of the 2025 ZimLAC data can be found in ZimLAC (2025).

2.2. Inverse Probability Weighted Regression Adjustment (IPWRA) procedure for estimating treatment effects.

To establish the relationship between livelihood sources and progress towards SDGs indicators among urban households, the average treatment effect on the treated (ATT) is estimated. The ATT measures the average difference in outcomes (progress towards SDGs indicators) between urban households that employ the mentioned livelihood sources (treatment group) and those that do not (control group). Following (Caliendo & Kopeinig, 2008) and (Takahashi & Barrett, 2014) the ATT is defined as follows:

$$ATT = E\{Y_{i1} - Y_{i0} \mid T_i = 1\} = E(Y_{i1} \mid T_i = 1) - E(Y_{i0} \mid T_i = 1) \qquad [1]$$

where, Y_{i1} and Y_{i0} are the potential outcomes when the household employs the livelihood source and when it does not, respectively and T_i=1 if the household employs the livelihood option and, 0 otherwise. Using 'non-experimental' observational data as the 2025 ZimLAC data, one can only observe either Y_{i1} or Y_{i0} and not both. This is referred to as the counterfactual problem and has been cited by (Holland, 1986) as the fundamental problem of causal inference. Given that assignment of urban households into practicing livelihood

sources and non-practicing is not random, the groups may differ systematically as some underlying variable(s) may impact the assignment process (Abera et al., 2021; Bernzen et al., 2022; Gebru et al., 2018; Harkness et al., 2023; Hashmiu et al., 2022). This results in self-selection bias which confounds our outcomes.

To estimate an unbiased treatment effects model, varied models apply different methods to construct the unobserved counterfactuals and produce a balanced grouping of treatment and control observations with sufficient overlap between the groups. Some models rely on the correct specification of the treatment equation to produce an unbiased ATT. Such models include the Propensity Score Matching (PSM) approach (Tambo & Mockshell, 2018) and the Inverse Probability Weights (IPW) estimator (Kang & Schafer, 2007). Others rely on the correct specification of the outcome model. Such models include the Regression Adjustment (RA) model (Imbens & Wooldridge, 2009). In this study we use the Inverse Probability Weighted Regression Adjustment (IPWRA) model which combines the IPW and the RA models to produce a doubly robust model in that only the treatment equation or the outcome equation is required to be correctly specified in order to produce an unbiased ATT (Msangi et al., 2024; Zheng & Ma, 2022, 2023).

To estimate the ATT using IPWRA for the relationship between livelihood options and progress towards SDGs indicators among urban households, we begin by calculating the IPW model by weighting the observations based on the inverse probability of employing livelihood sources. The equation for the probability or propensity score of employing livelihood options following (Rosenbaum & Rubin, 1983) is specified as follows:

$$\hat{p}(X) = \Pr(T_i = 1 \mid X) = f\{h(X)\} = E(T_i \mid X) \qquad [2]$$

where, X is a vector of observed firm level variables that influence treatment and f*{} is a normal cumulative distribution function. **X** represents a vector of the households' background or control characteristics. A Probit model is used to estimate Eqn. 2 (Results are depicted in Chapter 4). The propensity score estimates obtained will be used to construct a synthetic sample from which random draws of the treatment and control groups are made such that they produce a uniform distribution based on the measured baseline covariates.

Following (Hirano & Imbens, 2001), the weights for the households employing the livelihood options (T_i=1) are set to be 1and for those that did not employ the livelihood options

(T_i=0) are set to be $\frac{\hat{p}(X_i)}{1-\hat{p}(X_i)}$, where $\hat{p}$ are the estimated propensity scores. The weights can thus be specified as:

$$w_i = T_i + (1-T_i)\frac{\hat{p}(X_i)}{1-\hat{p}(X_i)} \qquad [3]$$

The ATET for the regression adjustment model can therefore be expressed (see e.g., Wooldridge, 2010):

$$ATT_{RA} = n_1^{-1}\{\sum_{i=1}^{N} T_i[\hat{m}_1(X_i,\delta_1) - \hat{m}_0(X_i,\delta_0)]\} \qquad [4]$$

Where n_1 is the number of households that employ the livelihood option and $m_j(X_i,\delta_j)$ is the postulated regression model for the households that employed the livelihood option (j = 1) and those that did not (j = 0) based on observed covariates X and parameters $\delta_i = (\alpha_i, \beta_i)$ for all treatment units i.

By estimating regression models $m_j(X_i,\delta_j)$ in the RA (Eqn. 4) using the inverse probability weighting (IPW) in Eqn. 3 we obtain the ATT_{IPWRA} estimator. $\hat{m}_1^*(X_i,\delta_1) = \alpha_1^* + X\beta_1^*$, is the inverse probability weighted least squares for households that employed livelihood options and $\hat{m}_0^*(X_i,\delta_0) = \alpha_0^* + X\beta_0^*$ is the inverse probability weighted least squares for those that did not. Thus, the ATT for the IPWRA can be expressed as:

$$ATT_{IPWRA} = N_1^{-1}\sum_{i=1}^{N}[(\alpha_1^* + X\beta_1^*) - (\alpha_0^* + X\beta_0^*)] \qquad [5]$$

$$= (\hat{\alpha}_1^* - \hat{\alpha}_0^*) + \overline{X}_1(\hat{\beta}_1^* - \hat{\beta}_0^*)$$

where $\overline{X}_1 = N_1^{-1} \sum_{i=1}^{N} T_i X_i$ is the average over the subsample that employed livelihood options. As a result, producing the IPWRA estimates includes two stages: first, we estimate the propensity scores $\hat{p}(X, \hat{\gamma})$ and then we construct the IPW linear least squares estimates. Combining the conditional mean model and the propensity score model yields a doubly robust estimator for the ATET since only one of the two models must be correctly specified to yield asymptotically efficient results (Sloczynski et al., 2022).

3. DESCRIPTIVE ANALYSIS

3.1. Background characteristics of urban households in urban Zimbabwe: Control variables

Table 1 presents the demographic characteristics of urban households in the country, revealing that 37.5% of households are headed by women and an average household head age of 43.5 years. The marital status distribution shows that 55.9% of household heads were married and cohabiting, 8.5% were married and living apart, 1.2% were cohabiting with a partner without being married, while the remaining household heads were in mono-spousal households, with 14.4% being divorced and 13.4% widowed. In terms of educational attainment, the majority (60.1%) had at least a O'Level education, with 12.4% holding post-secondary qualifications such as certificates, diplomas, or degrees; only 1.7% lack formal education. The employment landscape was characterized by 29.3% unemployment, 22.5% formal employment and 37.3% informal employment, with smaller proportions engaging in both formal and informal employment (0.7%) or being retired (0.9%). The average household size stood at approximately 3.781 members.

These demographic and socioeconomic characteristics are likely to influence households' choices of livelihood options, leading to potential self-selection into different categories. As a result, simple comparisons of outcomes across livelihood options may be endogenous, meaning that the observed differences in outcomes may be driven by underlying differences in household characteristics rather than the livelihood options themselves necessitating the usage inverse probability weighted regression adjustment approach.

Table 1. Background characteristics of urban households

Household head is a woman	(Yes=1; No=0)	0.375 (0.484)
Household head age	Years	43.490 (14.425)
Household head marital status		
Married living together	(Yes=1; No=0)	0.559 (0.497)
Married living apart	(Yes=1; No=0)	0.085 (0.279)
Divorced/separated	(Yes=1; No=0)	0.144 (0.351)

Widow/widower	(Yes=1; No=0)	0.134 (0.341)
Cohabiting	(Yes=1; No=0)	0.012 (0.111)
Never married	(Yes=1; No=0)	0.065 (0.247)
Household head education		
None	(Yes=1; No=0)	0.017 (0.130)
Primary level	(Yes=1; No=0)	0.097 (0.297)
ZJC level	(Yes=1; No=0)	0.106 (0.308)
O' level	(Yes=1; No=0)	0.601 (0.490)
A' level	(Yes=1; o=0)	0.054 (0.226)
Diploma/Certificate after primary	(Yes=1; No=0)	0.018 (0.133)
Diploma/Certificate after secondary	(Yes=1; No=0)	0.056 (0.230)
Graduate/Post-Graduate	(Yes=1; No=0)	0.050 (0.219)
Household head employment status		
Not employed	(Yes=1; No=0)	0.293 (0.455)
Formally employed	(Yes=1; No=0)	0.225 (0.417)
Informally employed	(Yes=1; No=0)	0.373 (0.484)
Formally and informally employed	(Yes=1; No=0)	0.007 (0.082)
Retired	(Yes=1; No=0)	0.009 (0.093)
Not applicable	(Yes=1; No=0)	0.094 (0.292)
Household head living with disability	(Yes=1; No=0)	0.045 (0.208)
Household head religion		
Roman Catholic	(Yes=1; No=0)	0.096 (0.295)
Protestant	(Yes=1; No=0)	0.135 (0.342)
Pentecostal	(Yes=1; No=0)	0.265 (0.441)
Apostolic Sect	(Yes=1; No=0)	0.234 (0.424)
Zion	(Yes=1; No=0)	0.050 (0.218)
Other Christian	(Yes=1; No=0)	0.059 (0.236)
Islam	(Yes=1; No=0)	0.007 (0.081)
Traditional	(Yes=1; No=0)	0.008 (0.089)
Other religion	(Yes=1; No=0)	0.015 (0.123)
No religion	(Yes=1; No=0)	0.130 (0.336)
Household size	Natural number	3.781 (1.700)
Suburb type		
High Density	(Yes=1; No=0)	0.816 (0.388)
Medium Density	(Yes=1; No=0)	0.127 (0.333)
Informal Settlement	(Yes=1; No=0)	0.020 (0.141)
Low Density	(Yes=1; No=0)	0.037 (0.188)
Province		
Bulawayo	(Yes=1; No=0)	0.100 (0.301)
Manicaland	(Yes=1; No=0)	0.050 (0.218)
Mash Central	(Yes=1; No=0)	0.067 (0.250)
Mash East	(Yes=1; No=0)	0.100 (0.300)
Mash West	(Yes=1; No=0)	0.100 (0.300)
Mat North	(Yes=1; No=0)	0.075 (0.263)

Mat South	(Yes=1; No=0)	0.075 (0.264)
Midlands	(Yes=1; No=0)	0.125 (0.330)
Masvingo	(Yes=1; No=0)	0.075 (0.263)
Harare	(Yes=1; No=0)	0.234 (0.423)

Notes: Standard deviations in parentheses; total sample size is 12,063.

3.2. Major livelihood options for urban households in Zimbabwe: Treatment variables

Table 2 shows that the livelihoods of urban households can be broadly categorized, with only 8.4% engaging in farm-based activities including agricultural production and sales. Most households relied on non-farm livelihoods, with labor-based activities being the most prevalent. Within this category, 29.6% of households depended on salaried employment, 27.7% on casual labor and 6.4% on skilled trades or artisanal work. Entrepreneurial activities were also significant, with vending and petty trade being the most common sources of livelihood, accounting for 20.6%, followed by own business which accounts for 8.1% and small-scale mineral sales accounting for 2.5%. Notably, 10.8% of households relied on irregular income from deals, which often involve informal and, in many cases, illicit activities. Additionally, transfer income played a crucial role, with 9.9% of households relying on remittances from intra-national family contracts and 6.8% relying on remittances from transnational family contracts.

Table 2. Major livelihood option of urban households

Broad	Narrow	Livelihood option	Summary
Off-farm based	Labour income	Salary/wages	0.296 (0.457)
		Casual labour	0.277 (0.448)
		Skilled trade/artisan	0.064 (0.245)
	Entrepreneurial income	Own business	0.081 (0.272)
		Vending /petty trade	0.206 (0.405)
		Small scale mining/ mineral sales	0.025 (0.156)
	Irregular income	Deals	0.103 (0.304)
	Rental income	Rentals	0.065 (0.247)
	Transfer income	Remittances/gifts from within	0.099 (0.299)
		Remittances/gifts from outside	0.068 (0.251)
Farm based	Farm based	Produce or sell farm products	0.084 (0.278)

Notes: Standard deviations in parentheses; total sample size is 12,063.

3.3. Access to capital: Mediating variables

According to Table 3, the classification of financial and social capital revealed that only 11.4% of urban households had access to loans from both formal and informal sources. In terms of social capital, bridging capital in the form of government support was the most significant, with 6.1% of urban households benefiting, followed by support from development partners at 3.1%and churches. Conversely, an examination of bonding social capital shows that transnational bonding capital in the form of support from the diaspora accounts for 3.9%, surpassing individual forms of intra-national bonding capital, including support from urban relatives at 3.7% and rural relatives at 3.2%.

Table 3. Access to capital amongst urban households

Broad	Narrow	Capital	Summary
Financial capital	Financial capital	Access to loans (formal and informal)	0.114 (0.317)
Social capital	Bridging	Government	0.061 (0.238)
		Development partners	0.031 (0.173)
		Churches	0.021 (0.142)
	Bonding	Urban relatives	0.037 (0.188)
		Rural relatives	0.032 (0.177)
		Diaspora	0.039 (0.194)

Notes: Standard deviations in parentheses; total sample size is 12,063.

3.4. Progress towards SDGs: Outcome variables

The Sustainable Development Goals (SDGs) were tracked through various indicators that reflect progress toward achieving these targets. Specifically, income served as a key indicator for SDG 1 (No Poverty), as higher income levels enable households to afford basic necessities and improve their economic well-being. Household Dietary Diversity Score (HDDS) was a crucial metric for SDG 2 (Zero Hunger), as it measured the variety of foods consumed and reflects household food security and access to nutritious diets. Access to basic water and sanitation was a fundamental indicator for SDG 6 (Clean Water and Sanitation), highlighting the importance of safe and reliable water sources for human health

and well-being. Lastly, access to clean cooking fuel was a vital indicator for SDG 7 (Affordable and Clean Energy), as it reflects households' ability to utilize sustainable and efficient energy sources, reducing reliance on polluting fuels and mitigating environmental degradation.

In urban Zimbabwe, the summary statistics for key Sustainable Development Goal indicators revealed an average per capita income of $459.97. The mean Dietary Diversity Score, a proxy for food security, stood at 6.278 out of a possible 12. Access to basic water services was widespread, with 95.4% of urban residents having access, whereas access to basic sanitation facilities was significantly lower at 47.6%. Furthermore, the utilization of clean fuel for energy purposes was reported by 70.5% of urban households, indicating a notable share of the population still lacks access to cleaner energy sources.

Table 4. Progress towards SDGs in urban Zimbabwe

SDG #	Proxy	Definition	Summary
1. No poverty	Income	USD	459.97 (787.92)
2. Zero hunger	Dietary Diversity Score	0≤ DDS≤12	6.278 (2.275)
6. Clean Water and Sanitation	Basic water	(Yes=1; No=0)	0.954 (0.210)
	Basic sanitation	(Yes=1; No=0)	0.476 (0.499)
7. Affordable and Clean Energy	Clean fuel	(Yes=1; No=0)	0.705 (0.456)

Notes: Standard deviations in parentheses; total sample size is 12,063.

4. Determinants of livelihoods options, access to capital, and shock exposure

4.1. Livelihood options

4.1.1. Labour income livelihoods

The regression analysis in Table 5 reveals that, ceteris paribus, female-headed households exhibited a statistically significant positive relationship with salary/wage-based livelihoods at the 1% level. Conversely, these households were less likely to rely on casual labor or skilled artisan/trade as primary income sources. Furthermore, the results indicate that older household heads were more likely to depend on salaries/wages or skilled trades/artisan work, while younger individuals were more prone to casual labor. This has implications for youth livelihoods, suggesting that younger demographics may face challenges accessing stable, formal employment opportunities.

Compared to married couples living together (the reference category), monogamous households not cohabiting with spouses exhibited a statistically significant negative relationship with salary/wage-based livelihoods at the 1% level. The analysis also reveals that marital status influenced reliance on casual labor, with married individuals living apart from spouses less likely to depend on casual labor, whereas divorced or separated household heads were more likely to rely on it.

The results show that education beyond the O-level increases the probability of households relying on salaries/wages as their primary livelihood source while reducing dependence on casual labor. This finding was consistent with human capital theory, which posits that higher education levels enhance employability in formal sectors, thereby reducing reliance on informal or precarious work arrangements.

Relative to households headed by unemployed individuals, those with any form of employment (formal or informal) exhibited a reduced likelihood of listing salaries/wages as their primary livelihood source. Conversely, these households were more likely to rely on casual labor or skilled trades/artisan work. This counterintuitive finding may be attributed to the country's economic context where formal employment often entails diminished

earnings prompting households to diversify their income sources through informal or casual labor arrangements.

Compared to households residing in high-density areas, those in informal settlements were more likely to depend on casual labor as their primary livelihood source, while being less likely to engage in skilled trades/artisan work. The place of residence did not significantly influence reliance on salaries/wages. This finding may be explained by the limited access to formal employment opportunities and vocational training in informal settlements, leading residents to rely on casual labor for survival.

Table 5. Determinants of reliance on labour income as a major source of livelihood

	Salary/wages		Casual labour		Skilled trade/artisan	
VARIABLES	coef	se	coef	se	coef	se
Household head is a woman	0.042	(0.012)***	-0.070	(0.013)***	-0.043	(0.008)***
Household head age	0.001	(0.000)***	-0.001	(0.000)**	0.000	(0.000)**
Married living apart	0.037	(0.014)**	-0.056	(0.015)***	0.014	(0.010)
Divorced/separated	-0.058	(0.013)***	0.082	(0.016)***	-0.012	(0.009)
Widow/widower	-0.057	(0.015)***	-0.007	(0.017)	-0.007	(0.009)
Cohabiting	-0.067	(0.023)***	0.081	(0.039)**	-0.048	(0.016)***
Never married	0.002	(0.016)	-0.029	(0.018)	0.003	(0.010)
Primary level	0.015	(0.020)	-0.009	(0.035)	0.011	(0.012)
ZJC level	0.018	(0.021)	0.001	(0.035)	0.002	(0.012)
O' level	0.073	(0.020)***	-0.073	(0.034)**	0.019	(0.011)*
A' level	0.131	(0.025)***	-0.127	(0.037)***	-0.006	(0.014)
Diploma/Certificate after primary	0.159	(0.032)***	-0.125	(0.041)***	0.019	(0.018)
Diploma/Certificate after secondary	0.153	(0.025)***	-0.165	(0.035)***	0.037	(0.015)**
Graduate/Post-Graduate	0.181	(0.026)***	-0.181	(0.035)***	-0.009	(0.013)
Formally employed	-0.726	(0.010)***	0.244	(0.011)***	0.026	(0.006)***
Informally employed	-0.708	(0.009)***	0.219	(0.010)***	0.090	(0.007)***
Formally and informally employed	-0.337	(0.055)***	0.081	(0.042)*	0.170	(0.043)***
Retired	-0.677	(0.040)***	-0.019	(0.026)	0.015	(0.022)
Not applicable	-0.673	(0.017)***	0.066	(0.019)***	0.001	(0.010)
Household head living with disability	-0.017	(0.014)	-0.011	(0.019)	-0.003	(0.010)
Protestant	0.019	(0.013)	-0.047	(0.015)***	-0.000	(0.009)
Pentecostal	0.014	(0.012)	-0.031	(0.014)**	-0.002	(0.008)
Apostolic Sect	-0.014	(0.012)	0.025	(0.015)*	-0.007	(0.008)
Zion	-0.026	(0.017)	0.025	(0.022)	-0.011	(0.012)
Other Christian	0.006	(0.016)	0.040	(0.020)*	0.003	(0.011)
Islam	-0.057	(0.028)**	-0.061	(0.047)	-0.014	(0.023)
Traditional	-0.045	(0.030)	0.067	(0.049)	-0.000	(0.026)

Other religion	-0.023	(0.024)	-0.018	(0.036)	-0.008	(0.018)
No religion	0.002	(0.013)	-0.009	(0.017)	-0.009	(0.010)
Household size	0.002	(0.002)	0.019	(0.003)***	0.002	(0.001)
Medium Density	-0.007	(0.009)	0.025	(0.012)**	0.001	(0.007)
Informal Settlement	-0.029	(0.020)	0.163	(0.032)***	-0.055	(0.013)***
Low Density	0.027	(0.019)	0.025	(0.020)	0.010	(0.011)
Bulawayo	-0.027	(0.011)**	0.064	(0.015)***	-0.007	(0.010)
Manicaland	-0.020	(0.015)	-0.012	(0.019)	-0.040	(0.011)***
Mash Central	0.035	(0.013)***	-0.044	(0.017)***	-0.032	(0.010)***
Mash East	0.022	(0.012)*	0.043	(0.015)***	-0.021	(0.009)**
Mash West	-0.018	(0.012)	0.013	(0.015)	-0.054	(0.008)***
Mat North	0.050	(0.013)***	0.066	(0.016)***	-0.037	(0.009)***
Mat South	0.007	(0.014)	-0.076	(0.015)***	-0.039	(0.009)***
Midlands	-0.019	(0.010)*	-0.001	(0.014)	-0.051	(0.008)***
Masvingo	-0.014	(0.012)	0.086	(0.018)***	-0.029	(0.010)***
Constant	0.711	(0.031)***	0.166	(0.042)***	0.029	(0.019)
Observations	11,979		11,979		11,979	
R-squared	0.504		0.113		0.046	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.1.2. Entrepreneurial income

Table 7 presents the determinants of urban households' reliance on entrepreneurial income as a primary livelihood source. The analysis reveals that, ceteris paribus, female-headed households exhibited a statistically significant positive relationship with vending as a major livelihood source, while exhibiting a negative relationship with small-scale mining compared to male-headed households. As anticipated, the age of the household head positively influenced the probability of relying on own business or vending, while negatively impacting the likelihood of dependence on small-scale mining as a primary livelihood source, after controlling for observed heterogeneity. This finding had implications for youth, who often lack the necessary capital to initiate entrepreneurial ventures, thereby relegating them to small-scale mining, an industry characterized by inadequate regulation and hazardous working conditions. Notably, attaining O-level education or higher increased the probability of households relying on own business as a primary livelihood source, underscoring the role of education in fostering entrepreneurial skills. This supports the government's initiative to

integrate entrepreneurship into the education system, which can potentially equip students with the requisite skills to succeed in entrepreneurial endeavors.

Table 6. Determinants of reliance on entrepreneurial income as a major source of livelihood

	Own business		Vending /petty trade		Small scale mining/ mineral sales	
VARIABLES	coef	se	coef	se	coef	se
Household head is a woman	-0.000	(0.008)	0.081	(0.011)***	-0.012	(0.005)**
Household head age	0.001	(0.000)***	0.001	(0.000)***	-0.001	(0.000)***
Married living apart	-0.013	(0.010)	-0.019	(0.014)	0.009	(0.006)
Divorced/separated	-0.018	(0.009)*	0.030	(0.014)**	-0.012	(0.005)**
Widow/widower	-0.005	(0.011)	-0.018	(0.015)	-0.006	(0.005)
Cohabiting	-0.063	(0.016)***	-0.031	(0.034)	0.002	(0.017)
Never married	-0.026	(0.011)**	-0.021	(0.015)	-0.021	(0.006)***
Primary level	-0.003	(0.016)	-0.030	(0.031)	0.002	(0.009)
ZJC level	-0.008	(0.016)	-0.021	(0.031)	-0.001	(0.009)
O' level	0.030	(0.016)*	-0.014	(0.030)	-0.003	(0.009)
A' level	0.069	(0.020)***	-0.044	(0.034)	-0.002	(0.011)
Diploma/Certificate after primary	0.081	(0.026)***	-0.055	(0.037)	-0.009	(0.011)
Diploma/Certificate after secondary	0.069	(0.019)***	-0.066	(0.033)**	-0.007	(0.010)
Graduate/Post-Graduate	0.144	(0.022)***	-0.075	(0.032)**	-0.005	(0.010)
Formally employed	0.036	(0.007)***	0.045	(0.010)***	0.020	(0.004)***
Informally employed	0.088	(0.007)***	0.159	(0.010)***	0.028	(0.003)***
Formally and informally employed	0.180	(0.045)***	0.081	(0.042)*	0.010	(0.021)
Retired	0.015	(0.026)	0.038	(0.036)	0.009	(0.010)
Not applicable	0.024	(0.013)*	-0.010	(0.018)	0.024	(0.006)***
Household head living with disability	-0.007	(0.011)	-0.036	(0.017)**	-0.003	(0.006)
Protestant	0.010	(0.011)	-0.010	(0.014)	0.001	(0.004)
Pentecostal	-0.000	(0.010)	-0.007	(0.013)	0.000	(0.004)
Apostolic Sect	-0.014	(0.010)	0.013	(0.014)	0.017	(0.004)***
Zion	-0.014	(0.013)	-0.006	(0.020)	-0.002	(0.006)
Other Christian	0.027	(0.014)*	-0.001	(0.018)	-0.012	(0.005)**
Islam	-0.053	(0.020)***	-0.013	(0.043)	0.043	(0.029)
Traditional	-0.012	(0.027)	0.007	(0.043)	0.008	(0.014)
Other religion	-0.030	(0.019)	-0.061	(0.029)**	0.005	(0.012)
No religion	-0.014	(0.011)	-0.012	(0.015)	0.026	(0.006)***
Household size	0.004	(0.002)**	0.026	(0.002)***	0.001	(0.001)
Medium Density	-0.020	(0.007)***	-0.047	(0.010)***	0.009	(0.004)**
Informal Settlement	-0.096	(0.010)***	-0.034	(0.027)	0.042	(0.016)***
Low Density	0.028	(0.015)*	-0.055	(0.016)***	-0.001	(0.008)
Bulawayo	-0.073	(0.009)***	0.059	(0.015)***	0.013	(0.003)***
Manicaland	-0.002	(0.015)	0.004	(0.018)	0.002	(0.003)

Mash Central	-0.058	(0.011)***	-0.021	(0.016)	0.081	(0.010)***
Mash East	-0.036	(0.010)***	0.014	(0.014)	-0.003	(0.003)
Mash West	-0.042	(0.010)***	-0.048	(0.013)***	0.064	(0.007)***
Mat North	-0.052	(0.010)***	-0.056	(0.013)***	0.007	(0.002)***
Mat South	-0.050	(0.011)***	0.050	(0.016)***	0.036	(0.006)***
Midlands	-0.096	(0.008)***	-0.071	(0.012)***	0.066	(0.007)***
Masvingo	-0.078	(0.010)***	0.057	(0.017)***	-0.000	(0.002)
Constant	0.014	(0.023)	-0.006	(0.038)	0.014	(0.013)
Observations	11,979		11,979		11,979	
R-squared	0.048		0.074		0.062	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.1.3. Irregular income

Table 8 presents the determinants of household reliance on irregular income as a primary livelihood source. The results indicate that, ceteris paribus, households headed by women or older individuals exhibited a statistically significant decrease in the probability of relying on irregular income as a major livelihood source, at the 1% level of significance. This finding implies that households headed by men and younger individuals were more likely to depend on irregular income, suggesting a higher propensity for precarious livelihoods among these demographic groups.

Notably, the education level of the household head was statistically insignificant in determining the household's reliance on irregular income, which may be attributed to the fact that irregular income opportunities often require limited formal education or specific skills that are not necessarily acquired through formal education. Furthermore, the analysis reveals that households relying on irregular income were often headed by individuals engaged in either formal or informal employment, which was consistent with earlier findings on the determinants of labor income as a primary livelihood source.

Table 7. Determinants of reliance on irregular income as a major source of livelihood

	Deals	
VARIABLES	coef	se
Household head is a woman	-0.045	(0.010)***
Household head age	-0.001	(0.000)***
Married living apart	-0.009	(0.012)

Divorced/separated	-0.010	(0.012)
Widow/widower	-0.012	(0.012)
Cohabiting	0.020	(0.030)
Never married	-0.002	(0.014)
Primary level	-0.007	(0.020)
ZJC level	-0.010	(0.021)
O' level	-0.003	(0.020)
A' level	-0.002	(0.023)
Diploma/Certificate after primary	-0.035	(0.024)
Diploma/Certificate after secondary	-0.006	(0.022)
Graduate/Post-Graduate	0.010	(0.023)
Formally employed	0.098	(0.008)***
Informally employed	0.087	(0.007)***
Formally and informally employed	0.056	(0.037)
Retired	0.042	(0.024)*
Not applicable	0.069	(0.012)***
Household head living with disability	-0.012	(0.012)
Protestant	-0.033	(0.011)***
Pentecostal	-0.021	(0.010)**
Apostolic Sect	-0.024	(0.011)**
Zion	-0.008	(0.015)
Other Christian	-0.029	(0.014)**
Islam	-0.037	(0.031)
Traditional	-0.010	(0.032)
Other religion	-0.014	(0.024)
No religion	-0.015	(0.012)
Household size	0.005	(0.002)***
Medium Density	0.004	(0.009)
Informal Settlement	-0.015	(0.021)
Low Density	0.002	(0.014)
Bulawayo	-0.077	(0.009)***
Manicaland	-0.073	(0.011)***
Mash Central	-0.060	(0.011)***
Mash East	0.024	(0.012)*
Mash West	-0.014	(0.011)
Mat North	-0.038	(0.011)***
Mat South	-0.052	(0.011)***
Midlands	0.056	(0.012)***
Masvingo	-0.085	(0.010)***
Constant	0.132	(0.027)***
Observations	11,979	
R-squared	0.048	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.1.4. Rental income

Table 9 presents the determinants of household reliance on rental income as a primary livelihood source among urban households. As anticipated, the age of the household head exhibits a positive and statistically significant relationship (at the 1% level) with the likelihood of relying on rental income, suggesting that older household heads had accumulated sufficient wealth and assets to invest in rental properties, thereby generating a stable source of income. This finding is consistent with the life-cycle hypothesis, which posits that individuals accumulate wealth over time (e.g., Cagetti, 2003). Furthermore, compared to households headed by married couples, households headed by single, divorced, or widowed individuals exhibited a higher propensity to rely on rental income, potentially due to the need for a more stable and predictable income stream in the absence of a dual-income household.

Notably, education beyond A-level was marginally significant and positively related to the household's reliance on rental income, suggesting that higher education may enable individuals to accumulate wealth and make informed investment decisions. Moreover, compared to unemployed household heads, those who were employed (either formally or informally) or retired exhibited a positive relationship with the propensity to rely on rental income, likely due to the financial stability and resources required to invest in rental properties.

Compared to households residing in high-density locations, those in low-density areas or informal settlements exhibited a negative relationship with the propensity to rely on rental income. Specifically, low-density areas, often characterized by higher-income households, may be negatively related (at the 10% level of significance) to rental income reliance due to either high rental rates that deter tenants or sufficient wealth that obviates the need for rental income. Conversely, informal settlements exhibited a strongly negative relationship (at the 1% level of significance) with rental income reliance, likely due to the lack of formal property rights, inadequate infrastructure and insufficient housing quality to attract paying tenants, thereby limiting the potential for rental income generation.

Table 8. Determinants of household reliance on rental income as a major source of livelihood

	Rentals	
VARIABLES	coef	se
Household head is a woman	-0.006	(0.008)
Household head age	0.002	(0.000)***
Married living apart	0.004	(0.008)
Divorced/separated	0.017	(0.009)*
Widow/widower	0.097	(0.013)***
Cohabiting	0.027	(0.019)
Never married	0.040	(0.011)***
Primary level	0.054	(0.025)**
ZJC level	0.035	(0.025)
O' level	0.035	(0.024)
A' level	0.044	(0.025)*
Diploma/Certificate after primary	0.050	(0.029)*
Diploma/Certificate after secondary	0.043	(0.026)*
Graduate/Post-Graduate	0.061	(0.026)**
Formally employed	0.034	(0.006)***
Informally employed	0.011	(0.005)**
Formally and informally employed	0.015	(0.023)
Retired	0.120	(0.039)***
Not applicable	0.109	(0.016)***
Household head living with disability	0.030	(0.015)*
Protestant	-0.000	(0.011)
Pentecostal	-0.004	(0.009)
Apostolic Sect	-0.016	(0.009)*
Zion	0.003	(0.012)
Other Christian	-0.001	(0.013)
Islam	-0.020	(0.037)
Traditional	-0.026	(0.028)
Other religion	0.005	(0.022)
No religion	-0.006	(0.010)
Household size	-0.002	(0.002)
Medium Density	-0.007	(0.006)
Informal Settlement	-0.038	(0.010)***
Low Density	-0.021	(0.011)*
Bulawayo	-0.043	(0.009)***
Manicaland	0.000	(0.012)
Mash Central	0.040	(0.012)***
Mash East	-0.026	(0.007)***
Mash West	0.024	(0.009)**

Mat North	-0.028	(0.009)***
Mat South	-0.028	(0.009)***
Midlands	-0.031	(0.007)***
Masvingo	-0.031	(0.008)***
Constant	-0.058	(0.028)**
Observations	11,979	
R-squared	0.089	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.1.5. Transfer income

Table 10 presents the determinants of household reliance on remittances as a primary livelihood source. Consistent with empirical evidence from diverse contexts (e.g., Holst et al., 2012; Lopez-Ekra et al., 2011; Park et al., 2017), households headed by women, older individuals and those living apart from their spouse exhibited a statistically significant positive relationship (at the 1% level) with reliance on both in-country and international remittances. This finding suggests that these households may have leveraged on social networks and familial ties to mitigate income volatility and ensure consumption smoothing. Vulnerability characteristics, such as being widowed or living with a disability, also positively predict reliance on remittances, indicating that remittances serve as a vital coping mechanism for households facing adverse shocks.

Employment status was positively related to intra-country remittances, potentially reflecting the role of internal migration and labor market opportunities in facilitating remittance flows. Education, on the other hand, was positively related to reliance on remittances from abroad, likely due to the increased likelihood of educated household members securing better-paying jobs abroad and sending remittances back home (Adda et al., 2022; Bhardwaj & Sharma, 2023; CHEN, 2009; Djajić et al., 2019; Dustmann et al., 2011). This finding highlights the importance of human capital in accessing international labor markets and generating remittance income.

Table 9. Determinants of household reliance on transfer income as a major source of livelihood

	Remittances/gifts from within	Remittances/gifts from outside

VARIABLES	coef	se	coef	se
Household head is a woman	0.027	(0.009)***	0.029	(0.009)***
Household head age	0.001	(0.000)***	0.001	(0.000)***
Married living apart	0.031	(0.011)***	0.062	(0.012)***
Divorced/separated	0.036	(0.012)***	-0.011	(0.010)
Widow/widower	0.049	(0.014)***	0.012	(0.012)
Cohabiting	-0.026	(0.013)*	-0.020	(0.012)
Never married	0.064	(0.014)***	0.057	(0.013)***
Primary level	0.027	(0.028)	0.020	(0.021)
ZJC level	0.023	(0.028)	0.055	(0.021)***
O' level	0.009	(0.027)	0.039	(0.020)**
A' level	0.027	(0.029)	0.063	(0.022)***
Diploma/Certificate after primary	0.002	(0.032)	0.074	(0.028)***
Diploma/Certificate after secondary	-0.003	(0.029)	0.059	(0.022)***
Graduate/Post-Graduate	-0.008	(0.029)	0.075	(0.023)***
Formally employed	0.060	(0.008)***	0.041	(0.007)***
Informally employed	0.024	(0.006)***	0.001	(0.005)
Formally and informally employed	0.147	(0.042)***	0.016	(0.026)
Retired	0.066	(0.035)*	0.103	(0.036)***
Not applicable	0.112	(0.017)***	0.088	(0.015)***
Household head living with disability	0.091	(0.018)***	0.009	(0.014)
Protestant	0.010	(0.012)	-0.032	(0.011)***
Pentecostal	-0.004	(0.011)	-0.027	(0.010)***
Apostolic Sect	-0.004	(0.011)	-0.035	(0.010)***
Zion	0.003	(0.015)	-0.043	(0.013)***
Other Christian	-0.025	(0.014)*	-0.054	(0.012)***
Islam	0.044	(0.043)	0.007	(0.035)
Traditional	-0.033	(0.031)	0.034	(0.037)
Other religion	0.023	(0.027)	-0.036	(0.021)*
No religion	-0.027	(0.011)**	-0.036	(0.011)***
Household size	-0.007	(0.002)***	-0.004	(0.002)***
Medium Density	0.049	(0.009)***	-0.007	(0.007)
Informal Settlement	0.022	(0.020)	-0.010	(0.011)
Low Density	0.040	(0.016)**	0.003	(0.014)
Bulawayo	-0.020	(0.010)*	0.055	(0.010)***
Manicaland	0.020	(0.015)	0.049	(0.013)***
Mash Central	-0.005	(0.011)	-0.017	(0.007)**
Mash East	0.016	(0.011)	0.016	(0.008)*
Mash West	0.028	(0.011)**	0.025	(0.009)***
Mat North	-0.021	(0.011)**	-0.017	(0.008)**
Mat South	-0.071	(0.010)***	0.034	(0.011)***
Midlands	-0.032	(0.009)***	-0.008	(0.007)
Masvingo	-0.018	(0.011)	0.003	(0.009)
Constant	0.013	(0.033)	-0.017	(0.025)

Observations	11,979	11,979
R-squared	0.067	0.058

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.1.6. Farm based

Table 11 presents the determinants of household reliance on farm-based income as a primary livelihood source. The results indicate that, ceteris paribus, the age of the household head exhibited a positive and statistically significant relationship at the 1% level. Additionally, household size was positively related to the likelihood of relying on farm-based income, likely due to the labor-intensive nature of agricultural production, which can be mitigated by a larger household workforce, thereby increasing the household's capacity to cultivate and harvest crops. This finding highlights the importance of household labor endowments in facilitating agricultural livelihoods.

Table 10. Determinants of household reliance on farm-based income as a major source of livelihood

	Produce or sell farm products	
VARIABLES	coef	se
Household head is a woman	0.013	(0.008)
Household head age	0.002	(0.000)***
Married living apart	-0.003	(0.011)
Divorced/separated	-0.014	(0.010)
Widow/widower	-0.028	(0.012)**
Cohabiting	-0.028	(0.019)
Never married	-0.017	(0.011)
Primary level	-0.018	(0.023)
ZJC level	-0.001	(0.023)
O' level	-0.019	(0.023)
A' level	-0.011	(0.025)
Diploma/Certificate after primary	-0.007	(0.030)
Diploma/Certificate after secondary	-0.012	(0.025)
Graduate/Post-Graduate	-0.006	(0.025)
Formally employed	0.038	(0.008)***
Informally employed	0.028	(0.007)***
Formally and informally employed	-0.027	(0.019)
Retired	0.043	(0.035)
Not applicable	-0.036	(0.014)**
Household head living with disability	-0.013	(0.013)

Protestant	0.026	(0.011)**
Pentecostal	-0.004	(0.009)
Apostolic Sect	0.004	(0.010)
Zion	-0.000	(0.014)
Other Christian	0.015	(0.014)
Islam	-0.016	(0.031)
Traditional	0.043	(0.034)
Other religion	-0.010	(0.021)
No religion	-0.012	(0.010)
Household size	0.006	(0.002)***
Medium Density	-0.004	(0.008)
Informal Settlement	-0.011	(0.017)
Low Density	0.048	(0.017)***
Bulawayo	-0.005	(0.010)
Manicaland	0.033	(0.014)**
Mash Central	0.014	(0.011)
Mash East	0.042	(0.011)***
Mash West	0.006	(0.010)
Mat North	-0.009	(0.010)
Mat South	0.012	(0.011)
Midlands	-0.023	(0.008)***
Masvingo	0.038	(0.012)***
Constant	-0.048	(0.027)*
Observations	11,979	
R-squared	0.022	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.2. Access to capital

4.2.1. Financial capital

Table 12 presents the household-level determinants of access to credit from formal and informal sources in urban Zimbabwe. Consistent with Kairiza et al. (2017), the results indicate that, after controlling for observed heterogeneity, there was no statistically significant difference in access to credit between male- and female-headed households, suggesting that financial inclusion in terms of credit access was gender-neutral in urban Zimbabwe. However, other background characteristics significantly influence credit access. Specifically, households headed by older individuals exhibited a higher likelihood of accessing credit, potentially due to their accumulated wealth, assets and reputation, which can serve as collateral or signal creditworthiness to lenders. Furthermore, education was

positively related to access to both formal and informal loans, likely due to the increased financial literacy, business acumen and creditworthiness associated with higher education levels. Educated household heads may be better equipped to navigate financial markets, prepare loan applications and manage debt, thereby increasing their access to credit from both formal and informal sources (Jonker & Kosse, 2022; Nawaz, 2022; Wirajing et al., 2024).

Table 11. Determinants of household access to credit

	Access to credit from formal and informal sources	
VARIABLES	coef	se
Household head is a woman	0.012	(0.010)
Household head age	0.001	(0.000)***
Married living apart	0.023	(0.013)*
Divorced/separated	-0.008	(0.011)
Widow/widower	-0.012	(0.012)
Cohabiting	-0.031	(0.021)
Never married	-0.010	(0.013)
Primary level	0.019	(0.018)
ZJC level	0.035	(0.019)*
O' level	0.030	(0.018)*
A' level	0.045	(0.022)**
Diploma/Certificate after primary	0.033	(0.030)
Diploma/Certificate after secondary	0.151	(0.024)***
Graduate/Post-Graduate	0.133	(0.025)***
Formally employed	-0.097	(0.009)***
Informally employed	-0.064	(0.009)***
Formally and informally employed	-0.034	(0.041)
Retired	0.025	(0.042)
Not applicable	-0.119	(0.016)***
Household head living with disability	0.032	(0.015)**
Protestant	-0.026	(0.013)**
Pentecostal	-0.015	(0.012)
Apostolic Sect	-0.028	(0.012)**
Zion	-0.023	(0.016)
Other Christian	-0.015	(0.016)
Islam	-0.004	(0.037)
Traditional	0.013	(0.035)
Other religion	-0.090	(0.020)***
No religion	-0.019	(0.013)
Household size	0.002	(0.002)
Medium Density	-0.011	(0.009)

Informal Settlement	0.024	(0.021)
Low Density	-0.005	(0.017)
Bulawayo	-0.028	(0.009)***
Manicaland	0.126	(0.018)***
Mash Central	0.028	(0.013)**
Mash East	-0.005	(0.010)
Mash West	0.092	(0.012)***
Mat North	0.112	(0.015)***
Mat South	0.009	(0.012)
Midlands	-0.022	(0.009)**
Masvingo	0.013	(0.012)
Constant	0.078	(0.026)***
Observations	11,978	
R-squared	0.066	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.2.2. Support from institutional sources

Table 13 presents the determinants of household access to support from the government and development partners. The results indicate that household head age was positively related to access to support at the 1% level of significance, consistent with targeting strategies employed by governments and NGOs that prioritize the elderly as a vulnerable group more susceptible to poverty and in need of social protection. Conversely, the education level of the household head was negatively related to access to government and development partner support, suggesting that better-educated households were less likely to be targeted for assistance, as they were perceived to have greater capacity for self-sufficiency. Additionally, households living with at least a member with disability exhibited a higher likelihood of accessing support, consistent with the targeting of vulnerable populations. Notably, households headed by women were marginally less likely (at the 10% level of significance) to receive social support from churches, potentially indicating gender disparities in access to certain types of social support.

Table 12. Determinants of household access to support from institutional sources

	Government		Development partners		Churches	
VARIABLES	coef	se	coef	se	coef	se
Household head is a woman	0.001	(0.007)	0.004	(0.005)	-0.007	(0.004)*

Household head age	0.001	(0.000)***	0.001	(0.000)***	0.000	(0.000)
Married living apart	0.005	(0.009)	-0.003	(0.006)	0.008	(0.005)
Divorced/separated	0.004	(0.009)	0.007	(0.006)	0.018	(0.006)***
Widow/widower	0.000	(0.010)	0.013	(0.008)*	0.027	(0.007)***
Cohabiting	-0.041	(0.011)***	0.018	(0.016)	0.002	(0.010)
Never married	0.011	(0.009)	0.012	(0.007)*	0.011	(0.006)*
Primary level	-0.019	(0.025)	-0.031	(0.020)	0.004	(0.015)
ZJC level	-0.046	(0.025)*	-0.036	(0.019)*	0.010	(0.015)
O' level	-0.072	(0.024)***	-0.044	(0.019)**	-0.004	(0.014)
A' level	-0.088	(0.025)***	-0.052	(0.019)***	-0.002	(0.015)
Diploma/Certificate after primary	-0.069	(0.029)**	-0.050	(0.021)**	-0.013	(0.016)
Diploma/Certificate after secondary	-0.084	(0.025)***	-0.054	(0.019)***	-0.004	(0.015)
Graduate/Post-Graduate	-0.081	(0.026)***	-0.045	(0.020)**	-0.005	(0.015)
Formally employed	0.016	(0.006)**	0.010	(0.005)**	-0.000	(0.004)
Informally employed	0.000	(0.005)	0.012	(0.004)***	-0.000	(0.003)
Formally and informally employed	0.051	(0.028)*	0.002	(0.013)	0.013	(0.018)
Retired	0.034	(0.031)	-0.017	(0.014)	-0.001	(0.017)
Not applicable	-0.020	(0.013)	-0.017	(0.009)*	0.002	(0.008)
Household head living with disability	0.046	(0.014)***	-0.004	(0.008)	0.042	(0.011)***
Protestant	-0.008	(0.009)	-0.005	(0.006)	-0.001	(0.006)
Pentecostal	-0.002	(0.008)	-0.007	(0.006)	0.006	(0.005)
Apostolic Sect	-0.002	(0.008)	0.000	(0.006)	-0.003	(0.005)
Zion	-0.008	(0.011)	0.006	(0.009)	-0.004	(0.007)
Other Christian	0.007	(0.012)	0.015	(0.009)	-0.001	(0.007)
Islam	-0.022	(0.032)	-0.000	(0.023)	0.112	(0.039)***
Traditional	0.001	(0.025)	-0.016	(0.015)	-0.005	(0.016)
Other religion	-0.022	(0.016)	-0.020	(0.011)*	-0.014	(0.007)**
No religion	-0.002	(0.009)	0.015	(0.007)**	-0.005	(0.005)
Household size	0.006	(0.001)***	0.009	(0.001)***	0.003	(0.001)***
Medium Density	0.003	(0.007)	-0.005	(0.004)	-0.001	(0.004)
Informal Settlement	0.037	(0.019)**	0.014	(0.013)	0.008	(0.010)
Low Density	0.010	(0.013)	-0.011	(0.006)**	-0.004	(0.006)
Bulawayo	0.001	(0.007)	0.027	(0.007)***	0.008	(0.006)
Manicaland	0.037	(0.011)***	0.005	(0.007)	0.009	(0.007)
Mash Central	0.101	(0.012)***	-0.017	(0.004)***	0.007	(0.006)
Mash East	0.105	(0.011)***	-0.008	(0.004)*	0.010	(0.005)**
Mash West	0.000	(0.007)	0.009	(0.006)	-0.005	(0.004)
Mat North	0.033	(0.009)***	0.006	(0.006)	0.000	(0.005)
Mat South	0.019	(0.008)**	0.005	(0.006)	0.010	(0.006)
Midlands	-0.014	(0.005)**	-0.011	(0.004)***	0.000	(0.004)
Masvingo	0.027	(0.009)***	0.098	(0.011)***	0.006	(0.005)
Constant	0.016	(0.027)	-0.013	(0.021)	-0.009	(0.018)
Observations	11,979		11,979		11,979	
R-squared	0.048		0.047		0.021	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.2.3. Bonding social capital

Table 14 presents the household determinants of access to remittances. Consistent with prior research (Holst et al., 2012; Park et al., 2017), the results indicate that informal transnational family contracts underlying international remittances exhibited gender sensitivity. Specifically, households headed by women were more likely to receive remittances from the diaspora at the 1% level of significance, after controlling for observed heterogeneity. This finding suggests that women may be more likely to be recipients of remittances, potentially due to their roles as caregivers and household managers (Acosta et al., 2006; Lopez-Ekra et al., 2011; Pickbourn, 2016). Furthermore, households headed by individuals who are married but living apart from their spouse were more likely to receive remittances from urban, rural and diaspora relatives, likely reflecting the fact that the absent spouse, often the husband, is sending remittances to support the household, with the wife being the primary recipient. This pattern is consistent with the notion that remittances often serve as a means of fulfilling familial obligations and providing financial support to household members left behind.

Table 13. Determinants of household access to bonding social capital

	Urban relatives		Rural relatives		Diaspora relatives	
VARIABLES	coef	se	coef	se	coef	se
Household head is a woman	-0.000	(0.006)	0.008	(0.005)	0.019	(0.007)***
Household head age	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)*
Married living apart	0.018	(0.007)***	0.015	(0.008)**	0.021	(0.008)**
Divorced/separated	0.035	(0.008)***	0.022	(0.007)***	0.008	(0.008)
Widow/widower	0.029	(0.008)***	0.009	(0.007)	0.001	(0.009)
Cohabiting	-0.000	(0.012)	0.014	(0.015)	0.016	(0.015)
Never married	0.021	(0.008)**	0.019	(0.008)**	0.028	(0.010)***
Primary level	0.019	(0.016)	-0.001	(0.014)	0.008	(0.018)
ZJC level	0.026	(0.016)	0.013	(0.015)	0.016	(0.018)
O' level	0.012	(0.015)	0.005	(0.014)	0.015	(0.017)
A' level	0.008	(0.016)	0.013	(0.016)	0.030	(0.018)
Diploma/Certificate after primary	-0.005	(0.017)	-0.001	(0.018)	0.040	(0.023)*
Diploma/Certificate after secondary	-0.002	(0.016)	0.002	(0.015)	0.031	(0.019)*
Graduate/Post-Graduate	-0.003	(0.016)	0.001	(0.015)	0.047	(0.019)**

Formally employed	0.003	(0.005)	-0.003	(0.005)	0.005	(0.005)
Informally employed	0.009	(0.004)**	0.003	(0.005)	-0.001	(0.005)
Formally and informally employed	0.007	(0.018)	-0.022	(0.004)***	0.007	(0.021)
Retired	0.004	(0.019)	0.000	(0.018)	0.080	(0.032)**
Not applicable	0.017	(0.010)*	0.006	(0.009)	0.063	(0.012)***
Household head living with disability	0.039	(0.012)***	0.015	(0.009)	0.028	(0.012)**
Protestant	0.016	(0.007)**	-0.004	(0.007)	-0.012	(0.009)
Pentecostal	0.010	(0.006)	-0.004	(0.006)	-0.013	(0.008)*
Apostolic Sect	0.006	(0.007)	0.002	(0.007)	-0.011	(0.008)
Zion	0.012	(0.010)	0.003	(0.009)	-0.011	(0.010)
Other Christian	-0.005	(0.008)	-0.013	(0.008)*	-0.006	(0.010)
Islam	0.014	(0.024)	0.007	(0.022)	0.003	(0.028)
Traditional	-0.007	(0.019)	-0.012	(0.015)	-0.016	(0.021)
Other religion	0.007	(0.015)	0.008	(0.016)	-0.023	(0.014)
No religion	0.005	(0.007)	0.002	(0.007)	-0.008	(0.008)
Household size	0.003	(0.001)**	0.003	(0.001)***	0.001	(0.001)
Medium Density	-0.000	(0.005)	0.005	(0.006)	-0.010	(0.005)*
Informal Settlement	-0.007	(0.012)	-0.010	(0.010)	-0.009	(0.010)
Low Density	-0.002	(0.008)	-0.006	(0.008)	-0.001	(0.010)
Bulawayo	-0.021	(0.007)***	-0.021	(0.006)***	-0.010	(0.008)
Manicaland	-0.003	(0.010)	0.023	(0.011)**	0.012	(0.010)
Mash Central	-0.019	(0.007)***	-0.019	(0.006)***	-0.011	(0.007)
Mash East	-0.014	(0.007)**	-0.009	(0.006)	-0.004	(0.007)
Mash West	-0.016	(0.007)**	-0.017	(0.006)***	-0.006	(0.007)
Mat North	-0.017	(0.007)**	-0.005	(0.007)	-0.003	(0.008)
Mat South	-0.024	(0.007)***	-0.015	(0.007)**	-0.019	(0.007)***
Midlands	-0.019	(0.006)***	-0.012	(0.006)**	-0.028	(0.005)***
Masvingo	-0.002	(0.008)	0.017	(0.009)*	-0.011	(0.007)
Constant	-0.009	(0.019)	0.007	(0.018)	0.001	(0.021)
Observations	11,979		11,979		11,979	
R-squared	0.017		0.011		0.026	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.3. Progress towards SDGs

The Sustainable Development Goals (SDGs) are tracked through various indicators that reflect progress toward achieving these targets. Specifically, income serves as a key indicator for SDG 1 (No Poverty), as higher income levels enable households to afford basic necessities and improve their economic well-being. Household Dietary Diversity Score (HDDS) is a crucial metric for SDG 2 (Zero Hunger), as it measures the variety of foods consumed and reflects household food security and access to nutritious diets. Access to

basic water and sanitation is a fundamental indicator for SDG 6 (Clean Water and Sanitation), highlighting the importance of safe and reliable water sources for human health and well-being. Lastly, access to clean cooking fuel is a vital indicator for SDG 7 (Affordable and Clean Energy), as it reflects households' ability to utilize sustainable and efficient energy sources, reducing reliance on polluting fuels and mitigating environmental degradation. The following subsections indicate how household level characteristics influences the achievement thereof.

4.3.1. Income

Table 1 presents the household-level determinants of income, a proxy for progress toward SDG 1 (No Poverty). The results indicate that household age was positively related to monthly income, with a one-year increase in age corresponding to a 0.007% increase in monthly income, holding all else constant at the 1% level of significance. This finding suggests that older households had accumulated human capital, experience and potentially wealth-generating assets, resulting in higher incomes. Conversely, this implies that younger households are being left behind in achieving SDG 1, potentially due to limited access to resources, education, and job opportunities. Furthermore, households headed by married individuals living apart from their spouse exhibited higher incomes compared to those living with their spouse, likely reflecting the earning power of the absent spouse. In contrast, monospousal households and those cohabiting tended to have lower incomes than married couples living together, potentially due to reduced economies of scale and shared resources.

As expected, higher levels of education beyond the ZJC level significantly increased household income, with returns to education exhibiting an increasing trend. Specifically, attaining a ZJC level of education increased income by 0.211%, while a graduate or postgraduate degree boosted income by 1.079%, implying a 511% increase in returns to education when transitioning from ZJC to a degree level. This finding highlights the importance of human capital accumulation in enhancing productivity and earning potential. The government’s efforts to promote education are commendable, as investing in education yields substantial economic returns and contributes

Consistent with previous findings, employment was associated with a decline in monthly income, suggesting that income from employment may be lower than that from irregular activities. Additionally, compared to high-density locations, residing in medium-density or informal settlements reduced household income, while living in low-density areas increases income.

Table 14. Determinants of household income

	ln (monthly income)	
VARIABLES	coef	se
Household head is a woman	0.006	(0.028)
Household head age	0.007	(0.001)***
Married living apart	0.071	(0.033)**
Divorced/separated	-0.134	(0.032)***
Widow/widower	-0.071	(0.037)*
Cohabiting	-0.171	(0.069)**
Never married	-0.074	(0.041)*
Primary level	0.060	(0.063)
ZJC level	0.211	(0.063)***
O' level	0.382	(0.061)***
A' level	0.662	(0.071)***
Diploma/Certificate after primary	0.732	(0.086)***
Diploma/Certificate after secondary	0.819	(0.068)***
Graduate/Post-Graduate	1.079	(0.073)***
Formally employed	-0.416	(0.024)***
Informally employed	-0.272	(0.020)***
Formally and informally employed	0.149	(0.101)
Retired	-0.121	(0.102)
Not applicable	-0.372	(0.042)***
Household head living with disability	-0.019	(0.044)
Protestant	0.016	(0.032)
Pentecostal	-0.028	(0.028)
Apostolic Sect	-0.165	(0.029)***
Zion	-0.152	(0.043)***
Other Christian	-0.105	(0.041)***
Islam	0.008	(0.095)
Traditional	0.193	(0.111)*
Other religion	-0.190	(0.066)***
No religion	-0.131	(0.032)***
Household size	0.043	(0.005)***
Medium Density	-0.079	(0.024)***
Informal Settlement	-0.306	(0.058)***

Low Density	0.098	(0.052)*
Bulawayo	0.104	(0.028)***
Manicaland	-0.040	(0.040)
Mash Central	0.046	(0.030)
Mash East	-0.302	(0.029)***
Mash West	-0.146	(0.026)***
Mat North	-0.048	(0.034)
Mat South	-0.254	(0.040)***
Midlands	-0.248	(0.025)***
Masvingo	-0.161	(0.028)***
Constant	5.272	(0.080)***
Observations	11,979	
R-squared	0.197	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.3.2. Household dietary diversity

Table 16 presents the household-level determinants of the Household Dietary Diversity Score (HDDS), a key indicator for SDG 2 (Zero Hunger). Notably, households headed by women exhibited a statistically significant increase in HDDS by 0.245 points, ceteris paribus, at the 1% level of significance. This finding is particularly striking given prior research highlighting gender disparities in household outcomes, where female-headed households often face disadvantages (Kairiza & Kembo, 2019; Macheka et al., 2021). This finding also has implications for SDG 5 (Gender Equality), as it indicates that female-headed households are not necessarily disadvantaged in terms of food security, potentially reflecting empowerment among women in household decision-making.

As anticipated, the education level of the household head positively influenced HDDS, consistent with prior studies. Education can enhance household dietary diversity by increasing awareness of nutrition, improving food preparation skills and enabling households to make informed decisions about food purchases. Educated household heads may also have better access to information about healthy diets and be more likely to adopt diverse and nutritious eating habits, contributing to the attainment of SDG 2. Conversely, employment was negatively related to HDDS, potentially reflecting the reliance on income from employment to purchase food may not be sufficient to purchase food. Furthermore, households located in medium-density or informal settlements exhibited lower HDDS

compared to those in high-density areas, while households in low-density areas had higher HDDS, likely due to differences in access to food markets, infrastructure and socioeconomic status.

Table 15. Determinants of household dietary diversity

	HDDS	
VARIABLES	coef	se
Household head is a woman	0.245	(0.068)***
Household head age	-0.001	(0.002)
Married living apart	0.007	(0.084)
Divorced/separated	-0.091	(0.082)
Widow/widower	-0.090	(0.088)
Cohabiting	0.496	(0.190)***
Never married	-0.126	(0.098)
Primary level	0.132	(0.156)
ZJC level	0.336	(0.159)**
O' level	0.702	(0.153)***
A' level	1.223	(0.179)***
Diploma/Certificate after primary	1.516	(0.218)***
Diploma/Certificate after secondary	1.407	(0.172)***
Graduate/Post-Graduate	1.695	(0.181)***
Formally employed	-0.671	(0.063)***
Informally employed	-0.409	(0.056)***
Formally and informally employed	0.821	(0.204)***
Retired	-0.329	(0.234)
Not applicable	-0.138	(0.105)
Household head living with disability	-0.080	(0.098)
Protestant	-0.049	(0.084)
Pentecostal	-0.209	(0.076)***
Apostolic Sect	-0.444	(0.078)***
Zion	-0.386	(0.113)***
Other Christian	-0.143	(0.106)
Islam	-0.170	(0.242)
Traditional	-0.024	(0.244)
Other religion	-0.680	(0.173)***
No religion	-0.341	(0.087)***
Household size	-0.041	(0.012)***
Medium Density	-0.173	(0.062)***
Informal Settlement	-0.604	(0.145)***
Low Density	0.493	(0.115)***
Bulawayo	0.131	(0.075)*
Manicaland	0.095	(0.103)

Mash Central	0.493	(0.077)***
Mash East	-0.977	(0.078)***
Mash West	-0.764	(0.073)***
Mat North	-0.647	(0.078)***
Mat South	-1.143	(0.098)***
Midlands	-0.929	(0.068)***
Masvingo	-1.276	(0.084)***
Constant	6.769	(0.203)***
Observations	11,978	
R-squared	0.125	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.3.3. Access to basic water and sanitation

Table 17 presents the determinants of access to basic water and sanitation among urban households. The results indicate that the age of the household head positively influenced access to basic sanitation services, with a statistically significant relationship at the 1% level. Furthermore, education emerged as a critical factor in enhancing access to both basic water and sanitation services, after controlling for observed heterogeneity. The positive relationship between education and access to these services can be attributed to several factors: educated household heads were more likely to have higher incomes, enabling them to afford improved water and sanitation infrastructure; they may possess better knowledge about the importance of hygiene and sanitation, leading to increased demand for these services; and they may be more adept at navigating bureaucratic processes to access public services.

In contrast, formal and informal employment was associated with a decline in the probability of accessing basic water and sanitation services, potentially reflecting the limited financial resources to invest in these services. The analysis also reveals spatial disparities in access to basic services: compared to high-density locations, households in medium-density, low-density and informal settlements had a lower propensity to access basic water services. However, households in medium- and low-density locations exhibited a higher probability of accessing basic sanitation services than those in high-density areas.

Table 16. Determinants of household access to basic water and sanitation

	Basic water		Basic sanitation	
VARIABLES	coef	se	coef	se
Household head is a woman	0.003	(0.007)	-0.002	(0.015)
Household head age	0.000	(0.000)	0.007	(0.000)***
Married living apart	-0.008	(0.008)	0.017	(0.019)
Divorced/separated	0.001	(0.008)	-0.042	(0.018)**
Widow/widower	-0.003	(0.009)	-0.010	(0.020)
Cohabiting	-0.047	(0.025)*	-0.143	(0.038)***
Never married	0.008	(0.008)	0.017	(0.022)
Primary level	-0.001	(0.018)	-0.016	(0.036)
ZJC level	0.004	(0.018)	0.001	(0.036)
O' level	0.020	(0.017)	0.047	(0.035)
A' level	0.015	(0.019)	0.107	(0.040)***
Diploma/Certificate after primary	0.013	(0.021)	0.173	(0.047)***
Diploma/Certificate after secondary	0.036	(0.018)**	0.129	(0.040)***
Graduate/Post-Graduate	0.032	(0.019)*	0.187	(0.041)***
Formally employed	-0.019	(0.006)***	-0.014	(0.014)
Informally employed	-0.014	(0.005)***	-0.055	(0.013)***
Formally and informally employed	0.028	(0.013)**	-0.022	(0.055)
Retired	0.012	(0.015)	0.031	(0.047)
Not applicable	-0.005	(0.010)	-0.064	(0.024)***
Household head living with disability	0.010	(0.009)	-0.058	(0.022)***
Protestant	-0.011	(0.007)	-0.008	(0.019)
Pentecostal	-0.006	(0.007)	-0.037	(0.017)**
Apostolic Sect	-0.009	(0.007)	-0.057	(0.017)***
Zion	-0.007	(0.010)	-0.062	(0.024)***
Other Christian	-0.000	(0.009)	0.002	(0.023)
Islam	0.035	(0.015)**	0.051	(0.054)
Traditional	-0.012	(0.023)	-0.020	(0.052)
Other religion	-0.019	(0.020)	0.061	(0.039)
No religion	-0.006	(0.008)	-0.065	(0.019)***
Household size	-0.001	(0.001)	0.010	(0.003)***
Medium Density	-0.019	(0.007)***	0.114	(0.014)***
Informal Settlement	-0.093	(0.024)***	0.048	(0.032)
Low Density	-0.019	(0.011)*	0.113	(0.023)***
Bulawayo	0.066	(0.006)***	0.092	(0.017)***
Manicaland	0.034	(0.010)***	0.048	(0.022)**
Mash Central	0.043	(0.008)***	-0.036	(0.019)*
Mash East	0.039	(0.008)***	0.054	(0.017)***
Mash West	-0.011	(0.009)	0.042	(0.017)**
Mat North	0.050	(0.007)***	-0.090	(0.018)***
Mat South	0.044	(0.008)***	0.037	(0.019)*
Midlands	0.039	(0.007)***	0.061	(0.016)***

Masvingo	0.040	(0.008)***	-0.127	(0.018)***
Constant	0.930	(0.021)***	0.128	(0.046)***
Observations	11,979		11,979	
R-squared	0.026		0.076	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.3.4. Access to clean cooking fuel

Table 18 presents the determinants of access to clean cooking fuel, a key indicator for progress toward SDG 7 (Affordable and Clean Energy). The results indicate that older household heads exhibited a lower probability of utilizing clean cooking fuel, with a statistically significant relationship at the 5% level. This finding may reflect the inertia of older households in adopting new technologies or energy sources, potentially due to familiarity with traditional cooking fuels or limited awareness of the benefits of clean cooking fuels. In contrast, younger households may be more likely to adopt clean cooking fuels due to their greater exposure to new technologies, increased awareness of environmental and health benefits and potentially higher levels of education.

Furthermore, education emerged as a critical factor in increasing the probability of household access to clean cooking fuel. Educated household heads were more likely to be aware of the health and environmental benefits of clean cooking fuels, have higher incomes to afford these fuels and possess better knowledge about the available alternatives to traditional cooking fuels. This increased awareness and capacity to adopt clean cooking fuels can be attributed to the human capital accumulated through education, which enables households to make more informed decisions about energy use (e.g., Bakehe, 2021; Gould et al., 2020; Narasimha Rao & Reddy, 2007).

Consistent with previous findings, employment was associated with a lower probability of household access to clean cooking fuel. Additionally, households in medium-density and informal settlements exhibited a lower probability of utilizing clean cooking fuel compared to those in high-density areas, likely due to differences in access to modern energy infrastructure, income levels and awareness of clean energy options.

Table 17. Determinants of access to clean energy

	Access to clean cooking fuel	
VARIABLES	coef	se
Household head is a woman	0.004	(0.013)
Household head age	-0.001	(0.000)**
Married living apart	0.036	(0.016)**
Divorced/separated	-0.016	(0.016)
Widow/widower	0.055	(0.017)***
Cohabiting	-0.022	(0.038)
Never married	0.039	(0.017)**
Primary level	0.059	(0.035)*
ZJC level	0.104	(0.035)***
O' level	0.197	(0.034)***
A' level	0.277	(0.037)***
Diploma/Certificate after primary	0.242	(0.044)***
Diploma/Certificate after secondary	0.300	(0.037)***
Graduate/Post-Graduate	0.304	(0.037)***
Formally employed	-0.150	(0.012)***
Informally employed	-0.072	(0.010)***
Formally and informally employed	-0.080	(0.043)*
Retired	0.032	(0.038)
Not applicable	-0.019	(0.021)
Household head living with disability	-0.013	(0.019)
Protestant	0.007	(0.015)
Pentecostal	-0.016	(0.014)
Apostolic Sect	-0.089	(0.015)***
Zion	-0.097	(0.022)***
Other Christian	-0.006	(0.019)
Islam	-0.053	(0.053)
Traditional	-0.050	(0.042)
Other religion	-0.062	(0.034)*
No religion	-0.046	(0.016)***
Household size	-0.021	(0.003)***
Medium Density	-0.052	(0.012)***
Informal Settlement	-0.213	(0.030)***
Low Density	-0.025	(0.021)
Bulawayo	0.104	(0.012)***
Manicaland	-0.162	(0.020)***
Mash Central	0.054	(0.014)***
Mash East	-0.153	(0.016)***
Mash West	-0.051	(0.014)***
Mat North	-0.155	(0.017)***
Mat South	-0.154	(0.018)***
Midlands	-0.296	(0.014)***

Masvingo	-0.333	(0.018)***
Constant	0.845	(0.043)***
Observations	11,979	
R-squared	0.162	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.4. Shocks and stressors

4.4.1. Price related

Table 19 presents the determinants of household susceptibility to price-related shocks among urban households in Zimbabwe. The results indicate that an increase in the age of the household head was associated with increased susceptibility to shocks related to price increases of basic commodities, but decreased susceptibility to shocks related to rental increases, both statistically significant at the 1% level. This finding may reflect the fixed nature of older households' income sources, making them more vulnerable to commodity price shocks, while older households may be more likely to own or have long-term control over their housing, reducing their exposure to rental price shocks.

Notably, the education level of the household head did not exhibit a statistically significant relationship with susceptibility to price-related shocks. This lack of significance may be attributed to the covariate nature of price shocks (Onyango et al., 2021), which affect households across different education levels, making education a less important factor in determining vulnerability to these shocks.

Furthermore, households headed by formally and informally employed individuals exhibited increased susceptibility to all price change shocks, including commodity price changes, rental changes and charges related to mobile money transactions. This finding can be attributed to the reliance on fixed earnings from formal or informal contracts, which makes households more vulnerable to dynamic price changes. When prices increase, households with fixed incomes may struggle to adjust their expenditure, leading to increased susceptibility to price-related shocks.

8. Determinants of household susceptibility to price related shocks

	Price changes-sharp increase of basic commodities		Price changes-sharp increase of other commodities		Increase in rentals		Being charged mo using mobile mon swipe	
LES	coef	se	coef	se	coef	se	coef	se
hold head is a woman	-0.026	(0.014)*	0.009	(0.015)	0.005	(0.015)	0.003	(0.01
hold head age	0.001	(0.000)***	0.000	(0.000)	-0.004	(0.000)***	0.000	(0.00
l living apart	-0.003	(0.017)	-0.045	(0.019)**	-0.036	(0.018)*	-0.038	(0.01
ed/separated	0.013	(0.017)	-0.030	(0.019)	0.000	(0.018)	-0.005	(0.01
/widower	0.031	(0.019)*	-0.016	(0.020)	-0.030	(0.019)	0.009	(0.02
ting	0.066	(0.036)*	-0.015	(0.042)	0.101	(0.042)**	-0.184	(0.03
married	0.017	(0.020)	-0.034	(0.022)	-0.060	(0.021)***	-0.005	(0.02
y level	-0.042	(0.034)	-0.050	(0.037)	-0.071	(0.036)**	-0.061	(0.03
el	0.025	(0.034)	-0.011	(0.038)	-0.027	(0.036)	-0.022	(0.03
	-0.007	(0.033)	-0.020	(0.036)	-0.030	(0.035)	-0.024	(0.03
	0.017	(0.038)	0.002	(0.041)	-0.050	(0.040)	-0.009	(0.04
a/Certificate after primary	-0.034	(0.046)	-0.093	(0.049)*	-0.097	(0.047)**	-0.064	(0.04
a/Certificate after ary	0.027	(0.037)	-0.022	(0.041)	-0.056	(0.039)	0.003	(0.04
te/Post-Graduate	-0.018	(0.038)	-0.069	(0.042)	-0.075	(0.041)*	-0.017	(0.04
ly employed	0.013	(0.013)	-0.024	(0.014)*	0.024	(0.014)*	-0.011	(0.01
ally employed	-0.002	(0.012)	-0.009	(0.013)	0.013	(0.013)	-0.037	(0.01
ly and informally employed	0.144	(0.044)***	0.165	(0.053)***	0.191	(0.055)***	0.105	(0.05
	0.013	(0.045)	-0.023	(0.053)	0.043	(0.049)	-0.036	(0.04
plicable	-0.016	(0.022)	-0.021	(0.024)	-0.001	(0.022)	-0.053	(0.02
hold head living with ty	0.000	(0.020)	0.022	(0.022)	0.017	(0.021)	0.009	(0.02
ant	-0.014	(0.017)	-0.025	(0.019)	-0.042	(0.018)**	-0.015	(0.01
ostal	-0.004	(0.015)	-0.004	(0.017)	-0.009	(0.017)	-0.026	(0.01
lic Sect	-0.039	(0.016)**	-0.048	(0.017)***	-0.019	(0.017)	-0.070	(0.01
	-0.052	(0.023)**	-0.051	(0.025)**	0.000	(0.024)	-0.068	(0.02
Christian	-0.099	(0.022)***	-0.056	(0.023)**	-0.085	(0.023)***	-0.102	(0.02
	0.092	(0.047)*	-0.032	(0.059)	0.005	(0.057)	-0.038	(0.05
nal	0.021	(0.047)	0.044	(0.052)	-0.008	(0.051)	-0.030	(0.05
eligion	0.016	(0.036)	-0.008	(0.039)	-0.075	(0.038)**	-0.040	(0.03
gion	-0.042	(0.018)**	-0.041	(0.020)**	0.016	(0.019)	-0.050	(0.01
hold size	0.003	(0.003)	-0.005	(0.003)*	-0.003	(0.003)	-0.002	(0.00
n Density	-0.040	(0.013)***	-0.049	(0.014)***	-0.051	(0.014)***	0.007	(0.01
al Settlement	-0.020	(0.031)	0.040	(0.033)	-0.116	(0.029)***	-0.022	(0.03
nsity	0.021	(0.023)	-0.010	(0.025)	-0.107	(0.023)***	-0.051	(0.02
yo	-0.108	(0.017)***	-0.004	(0.018)	-0.057	(0.016)***	-0.141	(0.01
land	-0.026	(0.022)	0.093	(0.022)***	-0.058	(0.021)***	-0.078	(0.02
entral	0.011	(0.018)	0.065	(0.020)***	0.016	(0.019)	0.135	(0.02
ast	-0.143	(0.017)***	0.062	(0.018)***	0.032	(0.017)*	0.021	(0.01
Vest	-0.127	(0.017)***	-0.116	(0.017)***	-0.016	(0.017)	-0.098	(0.01
rth	0.139	(0.015)***	0.140	(0.018)***	0.053	(0.019)***	0.068	(0.01
uth	0.103	(0.017)***	0.039	(0.020)**	0.044	(0.019)**	0.022	(0.01
ds	-0.015	(0.015)	0.054	(0.016)***	0.099	(0.016)***	0.008	(0.01

go	0.160	(0.015)***	0.077	(0.019)***	0.230	(0.019)***	0.131	(0.01
nt	0.665	(0.043)***	0.620	(0.047)***	0.605	(0.046)***	0.467	(0.04
ations	11,979		11,979		11,979		11,979	
red	0.050		0.021		0.051		0.036	

Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.4.2. Infrastructure

Table 20 presents the determinants of household susceptibility to infrastructure shocks, specifically power outages. The results indicate that, due to the covariate nature of power outages, susceptibility was largely homogeneous across household characteristics, with notable exceptions. Households headed by employed individuals were less likely to be susceptible to power outages shocks compared to unemployed households, reflecting government prioritization of power supply to productive sectors of the economy where employed households were more likely to reside or work.

The analysis also reveals spatial disparities in susceptibility to power outages shocks. Compared to high-density areas, households in informal settlements were 4.3% less susceptible to power outages, while those in low-density areas were 4.2% more susceptible, both statistically significant at the 1% level. The lower susceptibility in informal settlements may be attributed to the fact that these households are largely not connected to the formal grid in the first place, while the higher susceptibility in low-density areas reflect the greater demand for power in these areas, potentially due to the presence of more affluent households with higher electricity needs.

Table 19. Determinants of household susceptibility to infrastructure shocks

	Power Outages (not including faults)	
VARIABLES	coef	se
Household head is a woman	0.003	(0.007)
Household head age	0.000	(0.000)
Married living apart	0.006	(0.009)
Divorced/separated	0.013	(0.009)
Widow/widower	0.000	(0.009)
Cohabiting	-0.003	(0.019)
Never married	0.000	(0.010)
Primary level	0.005	(0.016)
ZJC level	0.000	(0.016)

O' level	0.008	(0.016)
A' level	-0.013	(0.018)
Diploma/Certificate after primary	-0.001	(0.022)
Diploma/Certificate after secondary	0.024	(0.019)
Graduate/Post-Graduate	0.011	(0.019)
Formally employed	-0.034	(0.007)***
Informally employed	-0.011	(0.007)*
Formally and informally employed	-0.054	(0.019)***
Retired	-0.042	(0.020)**
Not applicable	-0.014	(0.011)
Household head living with disability	0.003	(0.010)
Protestant	0.007	(0.009)
Pentecostal	0.002	(0.008)
Apostolic Sect	-0.006	(0.008)
Zion	0.006	(0.012)
Other Christian	0.015	(0.012)
Islam	0.020	(0.032)
Traditional	-0.004	(0.021)
Other religion	-0.041	(0.011)***
No religion	0.022	(0.009)**
Household size	-0.003	(0.001)***
Medium Density	0.000	(0.006)
Informal Settlement	-0.043	(0.008)***
Low Density	0.042	(0.015)***
Bulawayo	-0.022	(0.007)***
Manicaland	0.045	(0.013)***
Mash Central	0.095	(0.013)***
Mash East	-0.030	(0.006)***
Mash West	0.002	(0.008)
Mat North	-0.047	(0.006)***
Mat South	0.014	(0.010)
Midlands	0.031	(0.008)***
Masvingo	0.009	(0.009)
Constant	0.066	(0.022)***
Observations	11,979	
R-squared	0.029	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.4.3. Climate

Table 21 presents the determinants of household susceptibility to climate-related shocks, specifically prolonged mid-season dry spells. Consistent with previous findings, older

household heads were more likely to be susceptible to these shocks, likely due to their greater reliance on agriculture-based livelihoods, which are highly vulnerable to climate variability. The covariate nature of climate-related shocks is reflected in the largely insignificant relationships between other household characteristics and susceptibility to these shocks. However, locational differences emerged as a significant factor, with households in medium-density and informal settlements exhibiting greater susceptibility to climate-related shocks compared to those in high-density areas.

Table 20. Determinants of household susceptibility to climate related shock

	Prolonged mid-season dry spell	
VARIABLES	coef	se
Household head is a woman	0.006	(0.012)
Household head age	0.001	(0.000)***
Married living apart	0.009	(0.014)
Divorced/separated	-0.017	(0.014)
Widow/widower	-0.023	(0.015)
Cohabiting	0.017	(0.032)
Never married	0.004	(0.016)
Primary level	0.043	(0.026)*
ZJC level	0.044	(0.026)*
O' level	0.020	(0.024)
A' level	0.000	(0.028)
Diploma/Certificate after primary	-0.005	(0.034)
Diploma/Certificate after secondary	0.006	(0.028)
Graduate/Post-Graduate	0.062	(0.030)**
Formally employed	-0.002	(0.010)
Informally employed	0.011	(0.009)
Formally and informally employed	0.047	(0.044)
Retired	0.045	(0.042)
Not applicable	-0.036	(0.018)**
Household head living with disability	-0.001	(0.017)
Protestant	0.002	(0.014)
Pentecostal	-0.033	(0.012)***
Apostolic Sect	-0.002	(0.013)
Zion	0.006	(0.019)
Other Christian	0.034	(0.019)*
Islam	0.010	(0.044)
Traditional	-0.009	(0.037)
Other religion	-0.005	(0.030)
No religion	-0.011	(0.014)

Household size	-0.002	(0.002)
Medium Density	0.068	(0.012)***
Informal Settlement	0.056	(0.025)**
Low Density	0.005	(0.019)
Bulawayo	0.014	(0.012)
Manicaland	0.119	(0.019)***
Mash Central	0.065	(0.015)***
Mash East	0.102	(0.014)***
Mash West	0.045	(0.012)***
Mat North	-0.026	(0.012)**
Mat South	0.077	(0.015)***
Midlands	0.040	(0.011)***
Masvingo	0.017	(0.013)
Constant	0.042	(0.032)
Observations	11,979	
R-squared	0.025	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

4.4.4. Idiosyncratic shocks

Table 22 presents the determinants of household susceptibility to idiosyncratic shocks. The results indicate that households headed by women exhibited a 2.5% lower susceptibility to loss of employment of a key household member shock, however, these households were 2.6% and 1.7% more susceptible to health-related shocks and loss of key social services shocks, respectively, which may be attributed to the caregiving roles often assumed by women, making them more vulnerable to these types of shocks.

The analysis also reveals that higher education levels among household heads increased susceptibility to theft, burglary, or armed robbery shocks. This may have been due to the accumulation of wealth and assets among more educated households, making them more attractive targets for thieves. Furthermore, the employment status of the household head was positively (5.6% and 3.5% for formally and informally employed) related to susceptibility to loss of employment by a key household member shock. This finding can be attributed to the fact that employed household members were more likely to be affected by employment shocks, such as job loss or retrenchment.

Table 21. Determinants of household susceptibility to idiosyncratic shocks

	Loss of employment by key household member		Theft/burglary /Armed robbers		Other Health related		Loss of key social service		Death of main income earner in the household	
VARIABLES	coef	se	coef	se	coef	se	coef	se	coef	se
Household head is a woman	-0.025	(0.011)**	0.009	(0.011)	0.026	(0.009)***	0.017	(0.008)**	0.003	(0.008)
Household head age	0.000	(0.000)	0.000	(0.000)	0.002	(0.000)***	0.001	(0.000)**	-0.000	(0.000)
Married living apart	-0.022	(0.013)*	-0.022	(0.012)*	-0.019	(0.011)*	0.001	(0.010)	-0.022	(0.009)**
Divorced/separated	0.006	(0.013)	0.001	(0.013)	0.009	(0.012)	-0.002	(0.010)	0.014	(0.010)
Widow/widower	0.021	(0.015)	-0.001	(0.014)	-0.010	(0.013)	-0.011	(0.010)	0.107	(0.013)***
Cohabiting	-0.070	(0.024)***	-0.002	(0.028)	0.035	(0.027)	-0.048	(0.019)**	0.004	(0.023)
Never married	-0.005	(0.015)	0.014	(0.015)	0.025	(0.013)**	0.021	(0.012)*	0.003	(0.012)
Primary level	-0.006	(0.026)	0.039	(0.021)*	0.039	(0.024)	0.011	(0.020)	0.012	(0.024)
ZJC level	0.006	(0.027)	0.059	(0.021)***	0.046	(0.024)*	0.008	(0.020)	0.028	(0.024)
O' level	0.008	(0.026)	0.061	(0.020)***	0.026	(0.023)	0.013	(0.019)	0.007	(0.023)
A' level	-0.003	(0.029)	0.060	(0.024)**	0.033	(0.026)	-0.017	(0.021)	0.015	(0.025)
Diploma/Certificate after primary	0.025	(0.035)	0.034	(0.028)	0.043	(0.032)	0.004	(0.026)	-0.013	(0.027)
Diploma/Certificate after secondary	-0.030	(0.028)	0.092	(0.024)***	0.027	(0.026)	-0.015	(0.021)	-0.018	(0.025)
Graduate/Post-Graduate	-0.025	(0.029)	0.069	(0.025)***	0.001	(0.025)	-0.014	(0.022)	-0.002	(0.025)
Formally employed	0.056	(0.010)***	-0.017	(0.009)*	0.011	(0.008)	-0.002	(0.008)	0.005	(0.007)
Informally employed	0.035	(0.009)***	0.012	(0.009)	0.011	(0.008)	0.007	(0.007)	-0.006	(0.007)
Formally and informally employed	0.106	(0.043)**	0.030	(0.042)	-0.016	(0.025)	-0.034	(0.022)	0.010	(0.029)
Retired	-0.039	(0.026)	0.029	(0.036)	0.014	(0.034)	-0.059	(0.019)***	-0.001	(0.029)
Not applicable	0.015	(0.017)	0.008	(0.016)	-0.031	(0.016)*	-0.006	(0.013)	-0.000	(0.014)
Household head living with disability	0.024	(0.017)	0.002	(0.015)	0.100	(0.018)***	0.002	(0.012)	0.004	(0.014)
Protestant	0.034	(0.013)***	-0.009	(0.013)	-0.007	(0.012)	0.018	(0.010)*	0.003	(0.010)
Pentecostal	0.040	(0.011)***	-0.005	(0.012)	-0.004	(0.011)	0.009	(0.009)	0.006	(0.009)
Apostolic Sect	0.018	(0.011)	-0.009	(0.012)	-0.012	(0.011)	-0.001	(0.009)	0.009	(0.010)
Zion	0.033	(0.017)*	0.001	(0.017)	0.029	(0.017)*	-0.015	(0.012)	0.002	(0.013)
Other Christian	0.042	(0.016)***	0.004	(0.016)	-0.003	(0.015)	0.013	(0.013)	0.016	(0.013)
Islam	0.012	(0.038)	-0.031	(0.034)	-0.001	(0.039)	-0.011	(0.030)	-0.048	(0.023)**
Traditional	-0.001	(0.033)	0.034	(0.039)	-0.042	(0.028)	0.010	(0.029)	0.054	(0.036)
Other religion	0.061	(0.030)**	0.059	(0.031)*	-0.036	(0.021)*	0.004	(0.023)	0.070	(0.027)**
No religion	0.019	(0.013)	-0.009	(0.013)	-0.006	(0.012)	0.034	(0.011)***	0.004	(0.010)
Household size	0.002	(0.002)	-0.004	(0.002)**	0.005	(0.002)**	-0.000	(0.002)	-0.002	(0.002)
Medium Density	0.005	(0.010)	-0.010	(0.009)	-0.036	(0.008)***	0.012	(0.008)	0.014	(0.008)*
Informal Settlement	0.020	(0.024)	0.052	(0.026)**	-0.004	(0.019)	0.002	(0.019)	-0.012	(0.017)

Low Density	-0.004	(0.016)	0.006	(0.017)	-0.009	(0.015)	0.010	(0.015)	0.012	(0.014)
Bulawayo	0.007	(0.012)	-0.008	(0.013)	-0.019	(0.011)*	-0.046	(0.008)***	-0.030	(0.009)***
Manicaland	0.029	(0.017)*	-0.012	(0.016)	0.014	(0.014)	0.052	(0.015)***	-0.009	(0.013)
Mash Central	-0.019	(0.014)	-0.049	(0.013)***	0.049	(0.014)***	0.035	(0.013)***	-0.033	(0.010)***
Mash East	0.049	(0.014)***	-0.057	(0.011)***	0.051	(0.012)***	-0.039	(0.009)***	-0.009	(0.010)
Mash West	-0.062	(0.010)***	-0.024	(0.012)**	-0.021	(0.010)**	0.032	(0.011)***	0.006	(0.010)
Mat North	-0.009	(0.013)	-0.109	(0.010)***	-0.022	(0.011)**	-0.047	(0.009)***	-0.048	(0.009)***
Mat South	0.019	(0.015)	-0.033	(0.014)**	-0.010	(0.012)	0.026	(0.012)**	0.006	(0.012)
Midlands	-0.025	(0.011)**	-0.036	(0.011)***	-0.029	(0.009)***	-0.052	(0.007)***	-0.036	(0.008)***
Masvingo	0.000	(0.014)	-0.065	(0.012)***	0.075	(0.014)***	0.008	(0.011)	-0.048	(0.009)***
Constant	0.061	(0.032)*	0.102	(0.028)***	-0.057	(0.030)*	0.036	(0.025)	0.077	(0.028)***
Observations	11,979		11,979		11,979		11,979		11,979	
R-squared	0.016		0.015		0.031		0.022		0.031	

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

5. IPWRA estimates of treatment effects on SDGs

5.1. Major livelihood sources

5.1.1 Labour related livelihoods

Table 23 presents the IPWRA estimates of the treatment effects of livelihood sources on SDG indicators. The results indicate that reliance on salary/wages and skilled trade/artisan livelihoods improved outcomes, while casual labor had negative effects. Specifically, reliance on salary/wages ceteris paribus increased income by 0.366%, dietary diversity score by 0.498 points, access to basic sanitation by 4.7%and clean fuel by 8.1%, respectively, at the 1% level of significance. Furthermore, reliance on skilled trade/artisan improved income by 0.107%, probability of access to basic water by 1.8%, sanitation by 3.9%and clean fuel by 5%, respectively, all things being constant. On the other hand, reliance on casual labor reduced income by 0.293%, dietary diversity by 0.560 points and access to basic sanitation by 3.2% and clean fuel by 8.9%, respectively.

The policy implications stemming from the treatment effects of the labour related livelihoods include:

1. Promote formal employment: Encourage policies that support formal employment, such as vocational training and job creation initiatives, to increase access to stable income sources, which can lead to a 0.366% increase in income and 0.498 points increase in dietary diversity score.
2. Invest in skills development: Invest in skills development programs that equip individuals with skills for skilled trades and artisanal work, enhancing their employability and income potential, which can lead to a 0.107% increase in income and improved access to basic services.
3. Regulate informal labor: Implement policies to regulate informal labor contracts, ensuring fair wages, social protection and better working conditions for casual laborers, to mitigate the negative effects of -0.293% on income and -0.560 points on dietary diversity.

4. Social protection: Implement social protection programs to support vulnerable households, including those relying on casual labor, to mitigate the negative effects of informal labor contracts, which can lead to a reduction in access to basic sanitation and clean fuel.
5. Economic diversification: Encourage economic diversification to create more job opportunities in formal sectors, reducing reliance on informal labor contracts, which can lead to improved outcomes in income, dietary diversity and access to basic services.

5.1.2 Entrepreneurial income

The estimation results presented in Table 23 indicate that entrepreneurial income livelihoods exhibited a generally positive relationship with the attainment of Sustainable Development Goals (SDGs), with the notable exception of vending/petty trade's statistically insignificant effect on access to basic water and clean fuel. A comparative analysis of the impact of own business and vending/petty trade on SDG outcomes revealed that own business was more efficacious in enhancing these outcomes. Specifically, engagement in own business is associated with a 0.5% increase in income and a 0.823-point improvement in dietary diversity, whereas vending/petty trade corresponds to a 0.067% increase in income and a 0.2-point improvement in dietary diversity. Furthermore, participation in own business was linked to a 5.4% increase in the probability of accessing basic sanitation and a 5.3% increase in the utilization of clean fuel, both statistically significant at the 1% level. In contrast, vending/petty trade was associated with a 5.4% decrease in the probability of accessing basic sanitation, potentially attributable to the transitory nature of this livelihood strategy, which may disincentivize investment in basic services.

The policy implications stemming from the treatment effects of the entrepreneurial related livelihoods include:

1. Support own businesses: Policymakers should design targeted interventions to support entrepreneurship development, particularly own businesses, which can lead

to a 0.5% increase in income, 0.823-point improvement in dietary diversity, 5.4% increase in access to basic sanitation and 5.3% increase in clean fuel utilization.

2. Improve vending/petty trade: Initiatives aimed at promoting livelihood diversification and enhancing the stability of vending/petty trade may help mitigate the negative effects on basic sanitation (-5.4%) and improve overall well-being, potentially leading to a 0.067% increase in income and 0.2-point improvement in dietary diversity.
3. Invest in basic services: Investments in basic services, such as sanitation infrastructure, may be necessary to support vulnerable populations engaged in informal livelihoods like vending/petty trade, which can help offset the negative impact on basic sanitation.
4. Entrepreneurship training: Entrepreneurship training programs and access to finance may be instrumental in enhancing the productivity and sustainability of their own businesses, thereby amplifying their positive impact on SDG outcomes, including income, dietary diversity, basic sanitation and clean fuel utilization.

5.1.3 Irregular income

The findings suggest that engagement in deals, a form of irregular income, had a mixed impact on household welfare indicators. While it improves income (0.116%), dietary diversity (0.236 points) and access to basic water services (11%), it reduced access to basic sanitation (3.2%). To leverage the benefits of deals while mitigating the drawbacks, policymakers can consider the following:

1. Regularization and formalization: Regularizing activities encapsulated in deals can potentially increase tax revenue for the government. This can be achieved through registration, licensing and taxation of these activities, which can also provide a framework for improving working conditions and access to basic services.
2. Targeted interventions: Policymakers can design targeted interventions to support individuals engaged in deals, such as training and capacity-building programs, to enhance their productivity and income-generating potential (0.116% increase in income).

3. Access to basic services: Investments in basic sanitation infrastructure can help mitigate the negative impact of deals on access to basic sanitation (-3.2%). This can be achieved through public-private partnerships or targeted government interventions.
4. Social protection: Implementing social protection programs can help protect vulnerable households engaged in deals from income shocks and provide a safety net, enabling them to invest in basic services like sanitation.
5. Tax revenue utilization: The additional tax revenue generated from regularizing deals can be utilized to fund public services and infrastructure, including basic water and sanitation services, which can benefit households and communities.

Table 22. IPWRA estimates of treatment effects of livelihood sources on SDG outcomes

		Income		Dietary Diversity Score		Basic water		Basic sanitation		Clean fuel	
	ATE	coef	se	coef	se	coef	se	coef	se	coef	se
Labour income	Salary/wages	0.366	(0.025)***	0.498	(0.065)***	0.006	(0.005)	0.047	(0.015)***	0.081	(0.012)***
	Casual labour	-0.293	(0.021)***	-0.560	(0.055)***	0.001	(0.005)	-0.032	(0.013)**	-0.089	(0.011)***
	Skilled trade/artisan	0.107	(0.036)***	0.079	(0.087)	0.018	(0.006)***	0.039	(0.023)*	0.050	(0.020)**
Entrepreneurial income	Own business	0.500	(0.033)***	0.823	(0.094)***	-0.010	(0.011)	0.054	(0.020)***	0.053	(0.016)***
	Vending /petty trade	0.067	(0.019)***	0.200	(0.054)***	0.003	(0.005)	-0.054	(0.013)***	0.007	(0.010)
Irregular income	Deals	0.116	(0.028)***	0.236	(0.078)***	0.011	(0.005)**	-0.032	(0.018)*	0.003	(0.014)
Rental income	Rental income	0.292	(0.044)***	0.588	(0.109)***	0.012	(0.009)	-0.264	(0.022)***	0.080	(0.022)***
Transfer income	Internal remittances	0.105	(0.032)***	-0.022	(0.081)	0.016	(0.005)***	0.014	(0.019)	0.014	(0.016)
	External remittances	0.452	(0.038)***	0.397	(0.109)***	0.019	(0.008)**	0.036	(0.023)	0.041	(0.021)*
Farm based	Farm based	0.288	(0.031)***	0.636	(0.075)***	-0.006	(0.007)	0.036	(0.017)**	-0.024	(0.014)*

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

5.1.4 Rental income

The findings suggest that reliance on rental income had a mixed impact on household welfare indicators. While it improved income (0.292%), dietary diversity (0.588 points) and access to clean fuel (8%), it significantly reduced access to basic sanitation (26.2%), likely due to shared sanitation facilities. To address this challenge, policymakers can consider the following:

- Improve sanitation infrastructure: Invest in sanitation infrastructure that caters to households with shared facilities, such as rental properties, to mitigate the negative impact on access to basic sanitation (-26.2%).
- Regulate rental properties: Implement regulations that require rental property owners to provide adequate sanitation facilities, ensuring a minimum standard of living for tenants.
- Incentivize private sector investment: Provide incentives for private sector investment in sanitation infrastructure, particularly in rental properties, to increase access to basic sanitation services.
- Targeted interventions: Design targeted interventions to support households relying on rental income, focusing on improving access to basic sanitation services and promoting hygiene practices.
- Housing policy reform: Consider reforming housing policies to prioritize the provision of adequate sanitation facilities in rental properties, ensuring that households have access to basic services.

5.1.5 Transfer income

The estimation results in Table 23 indicate that transfer income in the form of internal and external remittances had a positive impact on household welfare indicators, particularly income and access to basic water services. The findings suggest that external remittances were more effective than internal remittances in improving income (0.452% vs. 0.105%) and dietary diversity scores. Both internal and external remittances improved access to basic

water services, with external remittances having a slightly larger impact (19% vs. 16%). The policy implications arising out of these findings are that:

1. Diaspora engagement: Governments can implement policies to engage with the diaspora community, encouraging external remittances, which can lead to significant improvements in income (0.452%) and access to basic water services (19%).
2. Remittance facilitation: Implementing policies to reduce transaction costs and facilitate remittance transfers can increase the flow of external remittances, thereby enhancing their positive impact on household welfare.
3. Investment in basic services: Governments can invest in basic services, such as water infrastructure, to complement the positive impact of remittances on access to basic water services.
4. Maximizing development impact: Policymakers can design policies to maximize the development impact of remittances, such as encouraging investment in productive activities or human capital development.

5.1.6. Farm based

The findings suggest that farm-based income had a positive impact on several household welfare indicators among urban households, including income (0.288% at the 1% level of significance), dietary diversity score (0.636 points at the 1% level of significance) and basic sanitation (3.6% at the 5% level of significance). However, it reduced access to clean cooking fuel (2.4% at the 10% level of significance) probably due to the reliance on wood arising from field clearing. To maximize the benefits of farm-based income, policymakers can consider the following:

1. Environmental conservation: Implement environmental conservation programs that promote sustainable agricultural practices, reforestation and soil conservation, reducing the environmental degradation associated with wood collection.
2. Urban agriculture support: Provide support for urban agriculture initiatives, such as training, inputs and infrastructure, to enhance the income-generating potential of urban farmers, which can lead to a 0.288% increase in income (statistically significant at the 1% level).

Table 23.IPWRA estimates of treatment effects of capital access on SDG outcomes

		ln (monthly income)		Dietary diversity score		Basic water		Basic sanitation		Clean fuel	
	VARIABLES	coef	se	coef	se	coef	se	coef	se	coef	se
Financial	Access to loans	0.193	(0.028)***	0.175	(0.072)**	0.015	(0.007)**	-0.010	(0.016)	0.042	(0.014)***
Bridging	Government	-0.067	(0.037)*	-0.016	(0.098)	-0.006	(0.012)	-0.032	(0.022)	-0.031	(0.019)
	Development partners	-0.046	(0.058)	0.253	(0.140)*	-0.018	(0.015)	-0.056	(0.030)*	-0.072	(0.035)**
	Churches	0.121	(0.054)**	0.015	(0.145)	-0.008	(0.016)	-0.028	(0.033)	0.018	(0.030)
Bonding	Urban relatives	0.030	(0.039)	0.163	(0.104)	-0.007	(0.011)	-0.113	(0.023)***	-0.022	(0.020)
	Rural relatives	0.465	(0.045)***	0.664	(0.122)***	0.020	(0.011)*	-0.016	(0.028)	0.103	(0.021)***

Notes: Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1

5.2. Access to capital

5.2.1. Financial capital

The IPWRA estimates of treatment effects of access to capital presented in Table 24 reveals a statistically significant relationship between access to capital, proxied by access to loans and various Sustainable Development Goals (SDGs) outcomes. Specifically, the results indicated that access to loans was associated with a 0.193% increase in monthly income ($p < 0.01$), a 0.175-point improvement in dietary diversity score ($p < 0.05$), a 1.5% increase in access to basic water ($p < 0.05$) and a 4.2% increase in access to clean cooking fuel ($p < 0.01$). The following are policy implications arising out of these findings are that:

1. Credit market development: Enhance credit market development initiatives to increase access to formal credit, thereby augmenting household income (0.193%) and improving overall welfare.
2. Targeted credit programs: Design targeted credit programs that cater to vulnerable populations, promoting access to basic services like clean water (1.5% increase) and clean cooking fuel (4.2% increase).
3. Financial inclusion: Implement policies that foster financial inclusion, increasing access to formal financial services and enabling households to leverage credit to improve their economic well-being.
4. Microfinance initiatives: Support microfinance initiatives that provide small-scale loans to low-income households, promoting entrepreneurship and income-generating activities.

5.2.2. Bridging social capital

The findings suggest that bridging social capital, in the form of government support, development partners support and church support directly to households, was generally ineffective in improving basic outcomes relating to SDGs 1, 2, 6and 7 in urban Zimbabwe. This finding was supported by prior studies that find that bridging social capital is more important in improving higher-order outcomes, such as employment opportunities, rather than basic outcomes like food security (Craig et al., 2023; Kairiza et al., 2023).

5.2.3. Bonding social capital

The table shows the IPWRA estimates of the treatment effects of access to bonding social capital in the form of support from urban and rural relatives among urban households in the country. The table shows that support from relatives in the locality within urban areas was ineffective in improving the SDGs under consideration. Moreover, support from urban relatives reduced access to basic sanitation by 11.3% at the 1% level of significance. This finding may be attributed to the reciprocal nature of this support, implying the sharing of amenities, which can lead to congestion and reduced access.

On the contrary, support from relatives in a distant location in the form of relatives in rural areas was instrumental in improving incomes (0.465% at the 1% level of significance), dietary diversity score (0.664 points at the 1% level of significance), access to basic water (2% at the 1% level of significance) and access to clean cooking fuel (10.3% at the 1% level of significance). In comparison to the findings on bridging social capital, our results concurred with Craig et al. (2023) and Kairiza et al. (2023) that bonding social capital was more effective in improving basic household needs than bridging capital. Furthermore, the results showed that bonding social capital from sources out of the same locality was more effective than that from the same locality, probably because those in the same locality probably suffer the same shocks. The policy implications arising out of these findings necessitate the following:

1. Promote rural-urban remittances: Encourage and facilitate remittances from rural relatives to urban households, as these have been shown to be effective in improving incomes (0.465%), dietary diversity (0.664 points), access to basic water (2%) and access to clean cooking fuel (10.3%).
2. Strengthen rural-urban linkages: Strengthen rural-urban linkages and networks to facilitate the flow of resources, knowledge and support between rural and urban areas, which can help improve household welfare.
3. Improve urban social services: Improve urban social services, such as sanitation, to mitigate the negative impacts of reciprocal support from urban relatives, which can

lead to congestion and reduced access (11.3% reduction in access to basic sanitation).

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