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Labour diversification by households 2008–2013

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7.1 Introduction

This chapter contributes to research on sustainable livelihoods by analysing the diversification of sources of household incomes and the association with household welfare using three waves of the Tanzania National Panel (household) Surveys (TNPS 2008/09, 2010/11, and 2012/13) (NBS 2010, 2011, 2013). Household welfare is measured using consumption of food (including an imputed value for consumption out of own production for farm households) and non-food items per adult equivalent, adjusted for regional and time price variation (including temporal differences associated with the fieldwork as each survey spanned over 12 months).[1] As the focus is on household welfare, and household size is included as a control in the analysis, the adult equivalent measure is more appropriate than per capita consumption.

Household income sources are separated into four labour categories that can be consistently measured at the national level within each wave and can be tracked accurately across waves given the changes in the underlying questionnaires: wage employment or self-employment and agricultural or non-agricultural employment.[2] Agricultural self-employment, or agriculture (farm) income, includes all self-employed activities in agriculture and fisheries. Non-agricultural self-employment (NAS) includes all individuals operating a business or engaged in any self-employed activity outside of agriculture. Agricultural wage (AW) employment includes all private and public agricultural employment, while non-agricultural wage (NAW) employment includes all private and public non-agricultural work. In the first wave, individuals can only list one form of wage employment for the last year while the other waves allow for up to two wage jobs. Consequently, even

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[1] Information about the surveys and construction of the consumption measures can be found in the Tanzania National Bureau of Statistics TNPS report (URT 2011). Consumption is consistent for each wave but not across waves (so year fixed effects are included in the analysis in Section 7.4); the TNPS reports suggest consumption has fallen in real terms since the first wave and poverty slightly increased.

[2] In their study of diversification in Uganda, Khan and Morrissey (2019) included remittances as a source of income. However, the recording of remittances in TNPS is inconsistent and incomplete so this source is omitted.

if an individual has work in two off-farm wage categories, we only include the one reported as the main wage job. The analysis of diversification considers changes in the number and type of labour activity by members of the household.

Diversified sources of income are an important component of household livelihood strategies in low-income countries (Asfaw et al. 2019; Van den Broeck and Kilic 2019) by increasing total income and spreading risk. Much of the literature addresses engagement of farming households in non-farm activities (e.g. Reardon et al. 2007; Davis et al. 2017). These studies do not investigate household diversification at a national level or relate diversification to a measure of household welfare. Van den Broeck and Kilic (2019) consider diversification into non-farm employment measured at the individual level for self-employment (distinguishing industry and services) or wage (agriculture, industry, and services) employment, for five sub-Saharan Africa (SSA) countries including Tanzania (with only the 2011 and 2013 survey rounds). Drivers of diversification vary across countries and by gender—for example, women are less likely to participate in any type of wage employment and when females gain any wage employment it is most likely to be casual wage work in agriculture. This chapter provides a more in-depth analysis for Tanzania.

Section 7.2 provides a brief overview of related literature on diversification. Section 7.3 discusses the data and how income diversification is measured, with some descriptive statistics of the evolution of relative household welfare over the period of study. Ideally one could identify certain activities as welfare-increasing (associated with higher earnings) and others as welfare-maintaining (low earning opportunities but allow the household to maintain consumption levels). The data are limited, but sufficient to consider the association between engaging in additional activities and household welfare (relative to the average household). Section 7.4 presents estimates of the relationship between income diversification and household welfare. Three issues are addressed: correlations between types of diversification and household welfare, distinguished by gender and rural or urban; identification of which activities are likely to be welfare-improving; and identification of household characteristics associated with types of diversification. Section 7.5 concludes by considering implications for employment policy.

7.2 Diversification of sources of income

Existing literature on income diversification tends to have a specific focus, such as increases in non-farm activities in rural areas (e.g. Reardon et al. 2007), household enterprises in urban areas (e.g. Fox and Sohnesen 2012), or on-farm crop diversification (e.g. McNamara and Weiss 2005). Davis et al. (2017) consider patterns of household engagement in agricultural wage, non-agricultural self-employment, and non-agricultural wage for twenty-two countries, focusing on SSA where richer

households are more likely to engage in non-agricultural activities (suggesting that diversification is welfare enhancing). For Tanzania, more than half of households get three-quarters of income from farming, and one-third of households are classified as diversified (Davis et al. 2017: 160). However, the analysis is restricted to the primary source of household income for rural households; household welfare is not addressed; and Tanzanian data are only for 2009.

The analysis by Van den Broeck and Kilic (2019) is closely related to our analysis as they use similar categories of off-farm employment for five SSA countries. In the case of Tanzania, they find that women are less likely than men to participate in off-farm wage employment by at least ten percentage points, and the gap is largest in urban areas; females in off-farm employment are more likely than males to be in AW and far less likely to be in NAW; and almost half of women never engage in off-farm employment, compared to about one-third of males (Van den Broeck and Kilic 2019: 85–90). The analysis is based on individual-level data over 2011–13 and does not relate diversification to a measure of household welfare. In contrast, we analyse diversification at a household level over 2008–13 and relate this to relative household consumption.

Asfaw et al. (2019) consider both crop and income diversification for farming households in Malawi, Niger, and Zambia (data for various years between 2010 and 2015) and find that poorest households tend to benefit most from diversification. Although 'income diversification is a welfare enhancing strategy in all the three countries', crop diversification has no effect on welfare in Niger and is positive in Malawi but 'a welfare-decreasing strategy in Zambia' (Asfaw et al. 2019: 286). Thus, our expectation is that households with more sources of income will tend to have higher welfare, and we investigate this for Tanzania.

7.3 Data and measuring income diversification

The TNPS are part of the series of surveys released by the World Bank for its Living Standards Measurement Study (LSMS-ISA) project. In this chapter we use three waves of the panel. The 2008/09 wave started with an initial sample of 3,265 households. Of these, 3,168 households were re-sampled in 2010/11 alongside another 756 new or split-off households, producing a combined sample of 3,924. The 2012/13 wave re-sampled 3,786 households from the previous wave and had a total sample size of 5,010 after including new and split-off households. We exclude households that reported an income diversification (ID) value of 0 (had no farm or off-farm income), and once households with missing data are excluded we have a panel dataset of 10,141 observations taken from 3,676 households that appear in at least two waves, of which 2,789 appear in all three waves. Household income sources are separated into four labour categories that can be consistently measured at the national level within each wave and can be tracked accurately across

waves given the changes in the underlying questionnaires. The labour activities are wage employment or self-employment and agricultural or non-agricultural employment.

Agricultural self-employment, or agriculture (farm) income, includes all self-employed activities in agriculture and fisheries. Although the surveys contain an agriculture module, to keep the analysis consistent between farming and non-farming households we do not consider the type of farming (cash crops or food crops) or crop diversification as part of our measure, unlike many of the studies focusing on rural household diversification. Non-agricultural self-employment includes all earnings activities for which the individual is not listed as an employee (such as being an own account worker, helping in a household enterprise, or being an employer) that is done outside of agriculture. Agricultural wage employment includes all private and public agricultural employment, while non-agricultural wage employment includes all private and public non-agricultural work.

Income diversification can be measured in various ways. If only concerned with two sources, shares are appropriate. If it is necessary to allow for many sources, either because household adults each engage in more than one activity or because activities can be sub-divided (different types of non-farm activity or diversifying crops grown), two approaches are common. One is to construct discrete indicator variables based on numbers of sources or categories of types of income (Abdulai and CroleRees 2001). An alternative is to construct a Herfindahl index measure based on earning shares of multiple sources (Asfaw et al. 2019). This is not feasible with the TNPS: the way in which earnings from NAS and household enterprises were recorded was changed between the second and third waves; farm earnings are not measured in a manner consistent with other income sources; and earnings from wage employment were limited to the primary source of wage employment for each individual in the first wave but the primary and secondary sources in the other two waves. Furthermore, the income data from household surveys is not reliable (Carletto et al. 2022).

Creating a measure of diversification at the individual level using earning shares also proves difficult given the inconsistent way wage earnings are recorded and, more importantly, earnings from self-employment are only available at the household level (given multiple members work on the family farm or business). However, which types of employment (AW, NAS, NAW) each worker engaged in can more reliably be calculated. As such, it is possible to classify each worker in each type of employment as a different source of income. Although two workers in wage jobs are two distinct income sources, this separation is harder to justify for household activities so employment on household farm or enterprise is treated as one (family labour) income source.

We measure diversification as a simple count of how many of the four different income sources households received. The simplicity of count assures consistency across waves given the different underlying questionnaires. This does not account

for how much each activity contributes to overall incomes; for households engaged in multiple activities, those where almost all income is from one or two activities are less diversified than households with the same number of activities and shares are spread fairly evenly across all activities. However, the count is indicative and mainly used for descriptive purposes—the main analysis is for types of activities. At the national level, Khan and Morrissey (2020: Table 1) show the rise in the relative importance of off-farm work (especially NAW) and the decline in importance of farm incomes over the three surveys.[3] The most pronounced relative increases have been for the share of households with a member engaged in NAW (from 23 to 32 per cent) and AW (17 to 22 per cent);[4] NAS increased slightly from 41 to 44 per cent so most of the growth in off-farm labour was in wage employment. There was a decline from 85 to 78 per cent in the proportion of households relying on farm income.

Household size in terms of potential workers (adults) is quite stable although the average number of wage workers increased by almost half while the average number of NAS increased by 20 per cent; the fastest growth was in AW employment. Although the overall increase in ID from 1.87 to 2.06 appears small, it compares favourably with a decline from 1.72 to 1.66 in Uganda between 2005 and 2012 (Khan and Morrissey 2019). Furthermore, the increase in ID masks compositional changes where the fall in farm income has been offset by rises in off-farm, particularly wage, employment. There has been sustained growth in both male and female off-farm employment over the five-year period, more pronounced for females (whose off-farm participation increased by 41 per cent compared to 24 per cent for males, closing the participation gap. Consequently, by 2013 almost half of all households have at least one female off-farm worker compared to around one-third in 2008.

The trends in diversification for rural and urban areas separately are shown in Table 7.1. Over 90 per cent of rural households remained engaged in farming (Panel A), despite a decline of five percentage points, showing a similar pattern to eight other African countries (Davis et al. 2017). The proportion of urban households engaged in farming declined but remained over 40 per cent. Off-farm employment involves a much larger share of urban (over 90 per cent) than rural (under 70 per cent) households but has grown much faster in rural areas. Over half of urban households gain NAW income compared to about one-fifth in rural areas, although NAW has grown by about one-third in rural areas compared to 15 per cent in urban areas. Unsurprisingly, AW is very low in urban areas (but increased to 7 per cent of households) and increased by 38 per cent in rural areas to a share of 29 per cent of households, remaining the more common form of

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[3] For convenience throughout, we refer to 2008/09 as 2008, 2010/11 as 2010, and 2012/13 as 2013.
[4] Some caution in the shares is warranted as the classification of wage workers is based on whether their main wage job is NAW or AW (however, it appears that fewer than 10 per cent of wage workers had two wage jobs).

Table 7.1 Rural-urban and gender distribution of income sources, 2008–13

Panel A: Percentage of households with each income source

	Rural			Urban		
	2008/09	2010/11	2012/13	2008/09	2010/11	2012/13
Population %	74	69	68	26	31	32
N	2,063	2,629	3,219	1,202	1,295	1,791
Farm income	99	95	94	47	45	42
Off-farm work	55	66	68	87	92	92
• NAS	35	38	38	59	60	58
• Wage	34	45	47	51	60	60
• NAW	14	21	21	47	55	54
• AW	21	26	29	4	5	7

Panel B: Average number of workers per household

Off-farm work	0.79	1.03	1.09	1.27	1.40	1.46
• NAS	0.42	0.48	0.52	0.76	0.76	0.82
• Wage	0.46	0.65	0.71	0.60	0.77	0.78
• NAW	0.17	0.25	0.25	0.56	0.71	0.68
• AW	0.29	0.40	0.46	0.04	0.06	0.09
Potential workers	2.87	2.94	2.84	2.82	2.75	2.65

Panel C: Average income diversification count score

ID	1.81	1.99	2.01	2.03	2.20	2.15
ID off-farm	0.83	1.04	1.06	1.57	1.75	1.73

Panel D: Average number of male workers per household

Off-farm work	0.47	0.60	0.60	0.72	0.77	0.80
• NAS	0.22	0.24	0.24	0.36	0.34	0.37
• Wage	0.30	0.42	0.42	0.42	0.52	0.51
• NAW	0.13	0.19	0.19	0.40	0.49	0.46
• AW	0.17	0.24	0.23	0.02	0.03	0.05
Potential workers	1.38	1.42	1.37	1.30	1.26	1.22

Panel E: Average number of female workers per household

Off-farm work	0.33	0.43	0.50	0.55	0.63	0.66
• NAS	0.21	0.25	0.28	0.41	0.42	0.44
• Wage	0.16	0.23	0.29	0.18	0.25	0.27
• NAW	0.03	0.07	0.06	0.16	0.22	0.22
• AW	0.12	0.16	0.23	0.02	0.03	0.05
Potential workers	1.49	1.51	1.46	1.48	1.45	1.39

Notes: N is number of households; data population weighted using survey weights. 'Potential workers' shows the average number of working-age adults (15 years or above) per household. ID is income diversification; ID off-farm is a count of the three types of off-farm work (includes AW); 'percentage' refers to the percentage of households containing at least one member of each type; 'average' is the average number across all households. Percentages in Panel A need not add up as households can have multiple activities.
Source: Authors' calculations based on Tanzania National Panel Surveys (NBS 2010, 2011, 2013).

wage employment in such areas. The share of households with NAS changed only slightly, remaining around 60 per cent in urban areas and increasing to almost 40 per cent in rural areas. The steady increase in wage employment over the five-year period has resulted in wage employment becoming more prevalent than NAS in both urban and rural locations.

Panel B shows that the average number of wage workers has increased significantly in rural and urban households (although the AW number is very low in urban areas). The growth rates in the average number of off-farm workers in rural households have been over twice the rates for urban households (except AW, which more than doubled in urban areas but only to an average of 0.09, compared to a 58 per cent increase to 0.46 workers in rural households). The average number of NAW workers in rural households increased by almost half (and one-fifth for urban) while NAS increased by over one-fifth (less than one-tenth for urban). This suggests some dynamism in rural employment.

Panel C shows that both urban and rural households have on average two of the four income sources, and rural households are less diversified than their urban counterparts for off-farm jobs. The average off-farm ID for rural households rose by 28 per cent (to 1.06), although it is still well below the level for urban households (which increased by 10 per cent to 1.73). Much of the increase in diversification came during the first two waves. Panel D shows that the average number of male off-farm workers in rural households increased by 28 per cent to 0.60; more than one-third of this in 2013 is NAS (grew by 10 per cent), AW is over one-third (and increased by one-third), and NAW is less than one-third (increased by half). In urban households the increase was about 10 per cent to 0.80 (most of the increase was NAW to 0.46). The fastest growth in female off-farm employment has been in rural areas (Panel E), where the average number increased by 50 per cent to 0.50 (and AW almost doubled). In rural areas, women have come to be predominant in NAS and equal the number of men engaged in AW, but participation in NAW still remains far lower. The average number of female off-farm workers in urban households is higher than in rural but only increased by 10 per cent to 0.66 (about half the growth was NAW, which accounts for about one-third of the total, with most of the rest in NAS). Overall, although off-farm employment grew faster in rural areas it remains more widespread in urban areas, particularly non-agricultural activities.

Khan and Morrissey (2020: Figure 1) show how income sources differ by quintiles of adult equivalent consumption. Richer quintiles are more diversified, especially for off-farm ID, and diversification increased for all quintiles (specifically between 2008 and 2010). The percentage of households with a farm was stable for the poorest (with almost all engaged in farming) but declined sharply for the richest. The share with off-farm employment increased for all quintiles,

but at a faster rate for richer households. The poorest households are predominantly in farming with the lowest shares in off-farm employment and hence are least diversified. Just over half of the richest households but only a third of the poorest have a member in NAS; shares with NAW increase consistently for richer quintiles while the reverse is the case for AW.

Diversification increased over the five years: the average number AW and NAW workers in households has increased by almost half, with faster growth for females. For rural households, most of the additional female wage jobs are AW, whereas for males the additional jobs are more evenly split between AW and NAW; farming and AW predominate for the poorest households, whereas a majority of the richest households have NAW.

7.4 Empirical analysis and discussion

The relationship between income diversification and household welfare is explored using a standard reduced form model of household consumption (Glewwe 1991; Appleton 1996). Consumption (our measure of household welfare) is explained by a variety of household characteristics, to which measures of income diversification are added:

$$logCons_{it} = \alpha_i + \beta ID_{it} + \lambda X_{it} + \delta Z_{it} + \gamma_t + \varepsilon_{it} \qquad (1)$$

The dependent variable is the log of adult equivalent household consumption; ID is the count of income sources for the household; and X is a vector of dummy variables capturing the main labour activity of the household head (farm, AW, NAS, NAW, or not employed). Vector Z is a set of controls including household size, wealth index, and a number of characteristics of the household head including their age and its square, education, and marital status. The region the household is from and whether it is urban or rural are included as fixed effects. We include household fixed effects to account for unobserved time invariant factors, such as household attitudes towards risk or innate ability of members, being correlated with diversification (or more generally with selection into type of employment). The inclusion of these fixed effects may cause many of the other controls to drop out, but we include them as the panel contains households that have moved to a new location or split off. The γ_t captures time effects with a survey-year variable. In (1), i indexes households and t indexes time (survey), and estimation is for the panel of all three waves (except Table 7.5, which has estimates for each wave).

7.4.1 Diversification and welfare correlations

Estimating (1) indicates if measures of diversification (ID and off-farm ID) are correlated with household welfare. A positive coefficient indicates that diversification is greater for households with *relatively* higher consumption spending, suggesting it is welfare enhancing. A negative coefficient indicates correlation with *relatively* lower consumption spending; this does not mean welfare is reduced as the measure is relative but is consistent with welfare-maintaining activities.

Results using fixed effects are in Table 7.2 (with 1 the omitted category for ID and 0 for ID off-farm). Columns (1) and (2) show a strong positive correlation between either ID measure and household welfare, indicating that for Tanzania it is households that are involved in earnings from multiple employment categories who are better off in terms of consumption/welfare. Columns (3) and (4) split the diversification variables into separate dummies for the number of sources and show that relative welfare is significantly higher for households with two (off-farm) or more income sources, irrespective of the ID measure used. The positive association between welfare and income diversification remains, even accounting for household-level factors, but does not permit any inference regarding causality. The positive correlation indicates that diversified income sources are an attribute of higher welfare households. This is consistent with household diversification being driven more by pull factors or opportunity-led diversification where the availability of jobs allows households to increase income. Columns (5) and (6) use lagged values of the diversification measures to partially address the contemporaneous correlation between welfare and diversification. The coefficients remain positive and are larger, indicative of a positive effect of diversification on welfare, although we interpret the results with caution given the short time between the waves and likely high degree of autocorrelation for both variables.

The results also give some indicative evidence that the type of job matters: having a household head whose main sector of employment is NAW offers the highest returns, closely followed by NAS (although both are insignificant in the IV regressions, suggesting persistence). Having a household head engaged in AW employment (or not employed) has no significant effect on household consumption compared to having a head whose main income is from farming (the excluded category). Although 'absent head' is significantly associated with lower consumption, one should not read too much into this as there are very few observations. Note that the coefficient on household size is negative and significant; larger households have lower consumption and effects for income diversification control for household size. Consumption is higher for richer households (in terms of wealth index) but lower for female-headed households. Coefficients for year dummies (capturing the increase in nominal consumption over time)

Table 7.2 Income diversification and household consumption

	FE				IV	
	(1)	(2)	(3)	(4)	(5)	(6)
ID [ID off-farm]	0.041***	[0.042***]			0.055**	[0.059***]
	(0.008)	(0.008)			(0.022)	(0.022)
ID=2 [ID off =1]			0.015	[0.034*]		
			(0.017)	(0.018)		
ID=3 [ID off =2]			0.082***	[0.094***]		
			(0.020)	(0.022)		
ID=4 [ID off =3]			0.120***	[0.118***]		
			(0.025)	(0.025)		
Head NAS	0.069**	0.064**	0.069**	0.066**	0.051	0.044
	(0.028)	(0.028)	(0.028)	(0.028)	(0.034)	(0.035)
Head AW	0.014	0.011	0.022	0.013	−0.061	−0.066
	(0.065)	(0.065)	(0.064)	(0.064)	(0.085)	(0.085)
Head NAW	0.092***	0.084**	0.094***	0.082**	0.060	0.048
	(0.035)	(0.036)	(0.035)	(0.036)	(0.043)	(0.045)
Absent	−0.208***	−0.234***	−0.207***	−0.229***	−0.025	−0.088
	(0.040)	(0.039)	(0.042)	(0.040)	(0.536)	(0.535)
Not employed	0.051	0.048	0.051	0.048	0.015	0.010
	(0.040)	(0.040)	(0.040)	(0.040)	(0.051)	(0.051)
Wealth index	0.059***	0.058***	0.059***	0.058***	0.040***	0.040***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)
HH size	−0.064***	−0.064***	−0.065***	−0.064***	−0.069***	−0.069***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
Head age	−0.000	−0.000	−0.001	−0.000	−0.011	−0.011
	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)
Head age^2	−0.000	−0.000	−0.000	−0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female head	−0.111**	−0.112**	−0.113**	−0.111**	−0.168***	−0.169***
	(0.050)	(0.050)	(0.050)	(0.050)	(0.062)	(0.062)
Married head	−0.185***	−0.184***	−0.187***	−0.184***	−0.176***	−0.173***
	(0.035)	(0.035)	(0.035)	(0.035)	(0.043)	(0.043)
Head education	0.012**	0.012**	0.012**	0.012**	0.001	0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Observations	10,141	10,141	10,141	10,141	6,437	6,437
Households	3,676	3,676	3,676	3,676	3,648	3,648
R-squared	0.815	0.815	0.815	0.815		

Notes: Dependent variable is the log of adult equivalent consumption. Estimators are fixed effects (FE), and instrumental variable (IV). ID (ID off-farm) is the count of household sources of income, and ID=2, etc., are dummies for the given number of sources (ID = 1 is the omitted category for ID and ID off-farm = 0 is the omitted category ID off-farm). HH size refers to the number of members of the household. The IV regressions use lagged ID as an instrument. *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations based on Tanzania National Panel Surveys (NBS 2010, 2011, 2013).

and other household characteristics are all significant with the expected sign (available on request).[5]

Khan and Morrissey (2020: Table 4) present results interacting the ID measures with survey year and urban or rural location. The association between ID and welfare is positive and significant in all cases (with one exception), and the coefficients are similar in all years for urban location but increasing for rural location, which has a larger coefficient than urban in 2010 and 2013. Khan and Morrissey (2020) also show that the positive association of welfare and diversification can be found across the whole income range, and the size of the effect remains largely the same.

7.4.2 Types of employment and welfare

Given the limitations of the simple count measure, to assess how employment in the different income sources is associated with household welfare, ID is replaced with a set of dummies for whether the household receives farm income (*farms*), any off-farm income (*off-farm*), and NAS, NAW, or AW (Table 7.3). All regressions use the full set of controls and household fixed effects. We exclude the household head's main activity as for many households the head is the sole income earner, which causes collinearity issues. Moving into any form of off-farm employment is associated with a 6 per cent increase in household welfare while engaging in farming has no correlation with welfare (Table 7.3, column 1). Column 2 splits off-farm employment into three dummies for each of AW, NAS, and NAW. The positive association for off-farm employment seen in (1) is shown to arise because of employment in the non-agricultural sectors; AW is not significantly related to welfare whilst engagement in NAS or NAW is associated with an 8 per cent increase in welfare.

Column 3 in Table 7.3 interacts AW, NAS, and NAW with rural and urban dummies, and the associations hold in both urban and rural locations: AW is insignificant while NAS and NAW are positive and significant, although the relationship is slightly weaker in urban areas particularly for NAW. Having NAW employment in rural areas has the strongest association with household welfare (10 per cent increase), followed by rural NAS (9 per cent), and then urban NAS and NAW (6 and 5 per cent). Column 4 interacts the employment sources

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[5] The standard adult equivalence scale understates the welfare of female-headed households and households with relatively many adult females. Khan and Morrissey (2020: Appendix Table A4) calculated welfare using revised scales with higher weights on adult women (which gives lower mean real consumption). Using the revised scale has no substantive effect on the results.

Table 7.3 Off-farm employment and household consumption

	(1)	(2)	(3)	(4)		
	-	-	-	2008	2010	2012
Off-farm	0.061***					
	(0.017)					
NAS		0.083***				
		(0.016)				
Rural			0.087***	0.011	0.106***	0.135***
			(0.018)	(0.027)	(0.025)	(0.026)
Urban			0.063**	0.097***	0.031	0.070**
			(0.027)	(0.035)	(0.033)	(0.032)
AW		−0.024				
		(0.017)				
Rural			−0.025	−0.048	−0.004	−0.034
			(0.019)	(0.032)	(0.028)	(0.028)
Urban			−0.008	0.009	−0.037	0.015
			(0.046)	(0.074)	(0.065)	(0.067)
NAW		0.088***				
		(0.018)				
Rural			0.102***	0.126***	0.111***	0.066**
			(0.022)	(0.036)	(0.030)	(0.029)
Urban			0.050*	0.032	0.066**	0.067**
			(0.028)	(0.037)	(0.033)	(0.033)
Farms	−0.003	0.002	0.001		−0.000	
	(0.032)	(0.032)	(0.032)		(0.032)	
FE	Yes	Yes	Yes	Yes		
Observations	10,141	10,141	10,141	10,141		
Households	3,676	3,676	3,676	3,676		
R-squared	0.814	0.816	0.815	0.816		

Notes: As for Table 7.2, all regressions use the full sample, and estimates by rural/urban location or for different time periods are obtained by interacting with the main regression variables.
Source: Authors' calculations based on Tanzania National Panel Surveys (NBS 2010, 2011, 2013).

with time dummies as well as the rural/urban dummy (to see how the associations have changed across the three panel waves. In all locations and survey waves AW remains insignificant. In rural areas the coefficient on NAS has been increasing (to a significant 13.5 per cent effect by the third wave) while the positive association with NAW has been falling (roughly halved to 7 per cent), and in urban areas the trends are the reverse with the NAW coefficients increasing and NAS decreasing, both with about 7 per cent in 2012/13. None of the agricultural activities are significant in any of the specifications in Table 7.3, while most of the non-agricultural activities are positive and significant, and there are differing time trends in rural and urban areas even over a relatively short time period.

The lack of significance for AW in all regressions where it was included is noteworthy given the negative correlation of AW with household consumption (Khan and Morrissey 2020: Figure 1). This suggests that after accounting for factors that may 'push' households into such employment out of necessity, the negative association with welfare disappears. We extend this analysis to distinguish employment by gender in Table 7.4. The positive benefit of a male with off-farm employment is more than twice that for a female (column 1), but this male effect is only significant in rural areas whereas the effect is positive and significant for females in urban areas only (column 2). The coefficients on farms and male AW are always insignificant, but female AW is negatively associated with consumption (column 3), suggesting distress especially in rural areas as this is the only case where AW is significant (column 4). The gender differential favouring males applies to NAS, but this is driven by rural areas (female NAS is larger and significant in urban areas). The gender differential benefit is minimal for NAW

Table 7.4 Off-farm employment and household consumption by gender

	(1)	(2)		(3)	(4)	
	-	Rural	Urban	-	Rural	Urban
Male off-farm	0.078***	0.088***	0.045			
	(0.017)	(0.019)	(0.035)			
Female off-farm	0.030**	0.014	0.078***			
	(0.015)	(0.017)	(0.025)			
Male NAS				0.094***	0.115***	0.021
				(0.018)	(0.020)	(0.030)
Male AW				0.013	0.018	−0.017
				(0.021)	(0.022)	(0.061)
Male NAW				0.087***	0.110***	0.021
				(0.020)	(0.024)	(0.029)
Female NAS				0.046***	0.041**	0.053**
				(0.016)	(0.020)	(0.025)
Female AW				−0.048**	−0.056**	0.004
				(0.024)	(0.025)	(0.057)
Female NAW				0.084***	0.082**	0.085**
				(0.027)	(0.038)	(0.035)
HH farms	−0.000	0.001		−0.000	−0.000	
	(0.032)	(0.032)		(0.032)	(0.032)	
FE	Yes	Yes		Yes	Yes	
Observations	10,141	10,141		10,141	10,141	
Households	3,676	3,676		3,676	3,676	
R-squared	0.815	0.815		0.816	0.816	

Notes: As for Table 7.2, all regressions use the full sample, and estimates by rural/urban location are obtained by interacting with the main regression variables.
Source: Authors' calculations based on Tanzania National Panel Surveys (NBS 2010, 2011, 2013).

overall but is greater for males in rural areas and only significant for females in urban areas.

7.4.3 Influences on diversification

The increased diversification shown in Section 7.3 appears in general to have been associated with higher welfare if into non-agricultural, especially wage, activities (although there is no clear evidence of causality). These could be considered as pull activities where individuals are attracted into higher-earning activities. In contrast, agricultural wage employment is a push activity that tends to be associated with lower relative welfare (but may be welfare maintaining). A significant number of individuals, especially females, moved into AW—17 per cent of rural households in 2010 and 2012 and even 5 per cent of urban households—although exit rates were also high. Table 7.5 shows that NAS and NAW exhibited the highest entry (and exit) rates for urban households, but AW had typically the highest entry for rural households.

Khan and Morrissey (2020: Table 8) present estimates of household entry into a new employment type, overall and separately for urban and rural areas. Few determinants are significant: poorer households are more likely to enter AW and NAS in rural areas, as are households with a less-educated head; however, in rural areas, households with an educated head are more likely to enter NAW. Table 9 in Khan and Morrissey (2020) reports results for continuing employment into each of the three types of off-farm work. Poorer and less-educated households are more likely to continue working in AW as well as those that may have experienced some distress and had to obtain a loan to meet consumption needs. In rural areas, wealthier and more-educated households continue in NAS, whilst in urban

Table 7.5 Off-farm employment entry and exit rates (%)

	Non-agricultural self				Agricultural wage				Non-agricultural wage			
	Rural		Urban		Rural		Urban		Rural		Urban	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
None	49	48	25	25	62	57	91	89	73	69	39	34
Exit	12	15	12	12	11	14	3	3	7	11	8	16
Continue	22	23	44	49	10	13	1	2	7	9	39	40
Entry	17	14	19	14	17	17	5	5	12	11	14	11

Notes: Data population weighted and show the percentage of households not engaged in each activity in the current or previous wave (none), left the activity since the previous wave (exit), engaged in the activity in both the current and previous waves (continue), or engaged in the current wave but not the previous (entry).
Source: Authors' calculations based on Tanzania National Panel Surveys (NBS 2010, 2011, 2013).

areas more-educated households are more likely to exit NAS. The rural informal sector is welfare increasing: poorer households are more likely to enter, and this increases income, so they continue in NAS. In urban and rural areas richer and more-educated households are more likely to continue in NAW.

7.5 Conclusion

The chapter investigated the role of income diversification on household welfare using three waves of Tanzanian National Panel Surveys (TNPS 2008/09, 2010/11, and 2012/13) to construct a panel with 10,141 observations from 3,676 households that appear in at least two waves. Household income sources are separated into four labour categories that can be consistently measured at the national level within each wave and can be tracked accurately across waves given the changes in the underlying questionnaires. These labour activities are agriculture (farming), non-agricultural self-employment (NAS), and agricultural (AW) and non-agricultural (NAW) wage employment. Household welfare is measured in terms of food consumption (adult equivalent expenditure). Income diversification is captured by the number and types of sources of income for household workers.

Households in Tanzania have increased diversification of sources of income even over the five-year period from 2008 to 2013, and this has been associated with higher household welfare. There has been significant growth in agricultural wage (especially for rural females) and non-agricultural wage employment, while the percentage of households with any member with income from non-agricultural self-employment increased only slightly. The average number of wage workers in households has increased by almost half (although the average number of working-age members per household has fallen), and growth has been faster for females so that gender participation gaps in wage employment are declining. For rural households, most of the additional female wage jobs are in (low-skilled) agricultural wage employment, whereas for males the additional jobs are more evenly split between agricultural and non-agricultural wage employment. Farming and agricultural wage employment predominate for the poorest households, whereas almost 60 per cent of the richest households have non-agricultural wage employment. In rural areas it is additional non-agricultural opportunities that are associated with increased welfare, consistent with rural economic diversification contributing to a reduction in rural poverty (Aikaeli et al. 2021: 1883).

There is an association between labour diversification and higher household welfare, but not all types of off-farm employment are equally beneficial, and there are significant gender differences. Non-agricultural self-employment is beneficial, irrespective of gender, but has grown relatively slowly; policies that support informal opportunities, especially in rural areas, would facilitate gender-inclusive welfare-improving diversification. As could be expected, non-agricultural wage

employment is beneficial for both genders, so the relatively high growth is a good sign (although may not have continued beyond 2013). Continuing to support increased education and wage employment opportunities is worthwhile. Although agricultural wage employment has been an important source of new employment opportunities for females, especially in rural areas, it is not a good diversification strategy insofar as disadvantaged females are pushed into low-earning employment. Increased support to improve productivity seems essential to increase potential earnings from agriculture (wage or farming) and will tend to benefit women. For the poorest rural households, employment opportunities will remain limited and public support will be required. There is evidence that public work projects are successful at targeting women and the poor with earnings probably at least comparable to agricultural wage work.[6]

A number of the findings for Tanzania in Van den Broeck and Kilic (2019) are consistent with or complementary to our analysis: women are less likely to participate in off-farm wage employment, and when they do it is most likely to be agriculture; the majority of those working report only one job; and women are significantly less likely than men to be in non-agricultural wage employment. The broad findings are consistent with evidence from the literature on the importance of off-farm employment for rural households but goes further in including urban households and distinguishing effects, in terms of welfare, of the type of employment. Non-agricultural self- and wage employment are associated with higher welfare, and growth of non-agricultural wage employment in Tanzania has helped to raise welfare for households. Agricultural wage employment has also increased, but this does not deliver a benefit in terms of higher consumption (especially for females). Income diversification does matter for household welfare, but there are differences by gender and activities where opportunities are available that have important implications for the effect of diversification.

These findings contrast with those of Khan and Morrissey (2019) for Uganda where non-agricultural wage employment grew more slowly and the general finding is that engaging in more labour activities is primarily because of push factors: lower-income households need to engage in more activities to meet their consumption needs, and these are primarily in agricultural wage employment where jobs are, especially for females, associated with lower consumption. In Uganda it appears that diversifying income sources is a sign of distress and driven by push factors or what Loison (2015) classifies as 'survival-led' as opposed to 'opportunity-led' diversification. Poorer households in Uganda diversified into

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[6] An assessment report of the TASAF Public Works Programme finds that the scheme targets the poor and has a 70 per cent female participation rate with potential to scale up (see http://ispatools.org/tools/ISPA-Country-Report-Tanzania-PWP.pdf).

low-return activities in order to ensure survival and reduce vulnerability to shocks. We do not find this to be the case in general for Tanzania over 2008–13.

At the outset of the COVID-19 pandemic in 2020, Tanzania avoided lockdown measures, sustained school closures, or bans on large public gatherings; the measures put in place have been less restrictive than those adopted by neighbouring countries. When President Samia Suluhu Hassan assumed power following the death of President Magufuli in March 2021, some measures were put in place, such as recommending the use of masks in public and a vaccination campaign, but the government avoided restrictions that would significantly disrupt economic activity (Aikaeli et al. 2021: 1886). Nevertheless, economic effects of the global pandemic, such as loss of exports and tourist earnings and disruptions in the supply of imported inputs, were associated with employment losses in the formal sector and income losses among the self-employed that may have pushed more than half a million people below the poverty line (World Bank 2021).

Given the household characteristics associated with vulnerability to poverty— low education, employment in agriculture, large households, and living in rural areas (Aikaeli et al. 2021: 1872)—inferences can be drawn on the sustainability of welfare improvements due to diversification since 2020. The indirect effects of COVID-19 appear to have been less severe in rural areas. The positive association between diversification and welfare for rural households with males in non-agricultural employment is likely to persist (although those in tourism-related activities will have suffered losses). The challenge remains how to improve the prospects of rural females, who fared less well than males. Females in poorer households (lower wealth or less-educated head and more dependents) are more likely to enter and remain in agricultural wage employment (negatively associated with household welfare), consistent with diversification motivated by push factors as this may be the only option for less-educated females to help maintain household consumption. Females in non-agricultural employment work fewer hours (as there are more dependents in the household or females are also working on the farm), although this does appear to be a welfare-increasing diversification strategy.

Females in non-agricultural self-employment have benefited compared to males in urban areas, a gender-inclusive welfare-increasing diversification strategy (as it is associated with richer and more-educated households). However, this is the sector where income losses have been most common during COVID-19, especially in urban areas, so any gains from diversification may have been lost in recent years. As the economy begins to recover, households should be able to re-establish self-employment activities. Households who experienced job losses in non-agricultural wage employment, mostly in urban areas, will be the most severely affected and may take longest to recover because firms need to start hiring workers again.

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