What Affects Malawi's Non-Farming Labor Force Participation in 2010 and 2013?

Malawi Integrated Household Panel Survey Short-Term Panel

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February 26, 2025

Context and Relevance

Overview of Malawi's Labor Market (2010 & 2013)

- **High Employment Rate:** 79.6% in 2013, but dominated by agriculture (64% in 2013).
- **Rise of Non-Farming Employment.**
- **Informal Economy Dominance:** 89% in 2013.
- **Child Labor:** 38% of children (ages 5-17) in 2015.
- **Economic Volatility and Crisis Impact:** Between 2011-2013, Malawi faced foreign exchange shortages, declining tobacco exports, and the *Cashgate* scandal, which halted donor aid and slowed GDP growth.

Relevance

- This study examines the determinants of non-farm labor force participation in Malawi.
- **Focuses on:** Wage employment, household businesses (non-agriculture), unpaid apprenticeships, Ganyu labor, and other.

Methodology

Model Selection Process

- **Lasso Regression for Feature Selection:** Used to identify the most relevant independent variables - results adopted.
- **Variance Inflation Factor (VIF):** Checked for multicollinearity and removed high-VIF (10) variables except for quadratic/interaction terms.

Regression Models Used

- **Pooled OLS:** Baseline model.
- **Fixed Effects:** Main model, controlling for time-invariant factors.
- **Random Effects Model:** Tested.

Hausman Test Results: Showed significant differences, justifying the use of FE.

Key Variables: Fixed Effects (FE)

Variable name	Storage type	Display format	Value label	Variable label
labor12m	float	%9.0g	yesno	**Employed in the last 12 months (wage, apprentice, ganyu, other unpaid, non-agri**
age	int	%8.0g		**How old is [NAME] (years)?**
rural	byte	%8.0g	reg_lbl	**Baseline Rural/Urban Identifier**
region	float	%9.0g	reg1_lbl	**Region: North/Central/South**
relToHHH	byte	%29.0g	relToHHHlbl	**Relationship to Head**
maritalStatus	byte	%39.0g	maritallbl	**Marital Status**
readChichewa	byte	%8.0g	yesno	**Are you able to read and write in Chichewa?**
readEnglish	byte	%8.0g	yesno	**Are you able to read and write in English?**
highestEdu	byte	%16.0g	eduLbl	**What is the highest educational qualification you have acquired?**
illness2weeks	byte	%8.0g	yesno	**During the past 2 weeks have you suffered from an illness or injury?**
chronicIllness	byte	%8.0g	yesno	**Do you suffer from a chronic illness?**
borrowCredit	byte	%8.0g	r_lbl	**Over the past 12 months, did anyone in this household borrowed on Credit?**
econcrisis	float	%9.0g		**Yes if year is 2013; No if year is 2010.**

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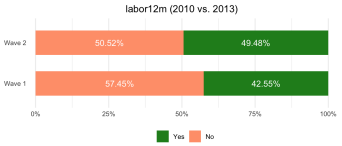
\begin{aligned}
\text{Labor}_{12m_{i,t}} = & \beta_0 + \beta_1 \text{Age}_{i,t} + \beta_2 \text{Age}^2_{i,t} + \beta_3 \text{Rural}_{i,t} + \beta_4 \text{Region (South)}_{i,t} + \beta_5 \text{Marital Status (Widowed)}_{i,t} \\
& + \beta_6 \text{Marital Status (Never Married)}_{i,t} + \beta_7 \text{Relationship to HH (Child)}_{i,t} + \beta_8 \text{Relationship to HH (Grandchild)}_{i,t} \\
& + \beta_9 \text{Relationship to HH (Other Non-Core Members)}_{i,t} + \beta_{10} \text{Highest Education (Secondary)}_{i,t} \\
& + \beta_{11} \text{Highest Education (Tertiary)}_{i,t} + \beta_{12} \text{Reads Chichewa}_{i,t} + \beta_{13} \text{Reads English}_{i,t} \\
& + \beta_{14} \text{Illness in Last 2 Weeks}_{i,t} + \beta_{15} \text{Chronic Illness}_{i,t} + \beta_{16} \text{Borrowed Credit}_{i,t} \\
& + \beta_{17} \text{Economic Crisis}_{i,t} + \beta_{18} \text{Economic Crisis} \times \text{Rural}_{i,t} \\
& + \beta_{19} \text{Economic Crisis} \times \text{Age}_{i,t} + \beta_{20} \text{Economic Crisis} \times \text{Age}^2_{i,t} \\
& + u_i + \epsilon_{i,t}
\end{aligned}
$$

Descriptive Figures

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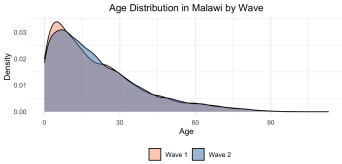
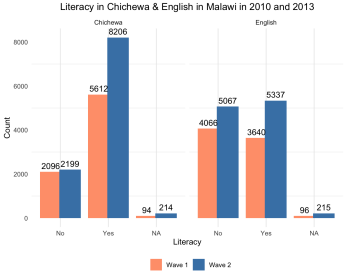
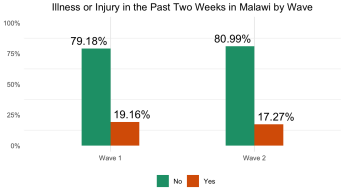
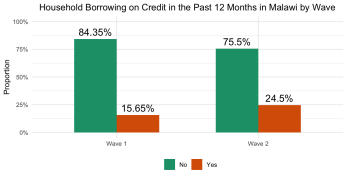
in what type of economic activity did you spend most of your time in the last 12	Freq.	Percent	Cum.
WAGE EMPLOYMENT EXCLUDING GANYU	1,291	12.30	12.30
HOUSEHOLD BUSINESS (NON-AG)	1,097	10.45	22.75
UNPAID HOUSEHOLD LABOUR (AGRIC)	6,248	59.52	82.26
UNPAID APPRENTICESHIP	22	0.21	82.47
GANYU	491	4.68	87.15
.	1,349	12.85	100.00
Total	10,498	100.00	









Model Comparison

Table 1: Comparison of OLS and FE Models: Full Sample vs Age 15-64

	(1) OLS (Full Sample)	(2) OLS (15-64)	(3) FE (Full Sample)	(4) FE (15-64)
Age	**0.0203*** **	**0.0254*** **	0.00101	0.0124
	(0.00174)	(0.00301)	(0.0103)	(0.0140)
Age Squared	**-0.000279*** **	**-0.000358*** **	0.0000658	-0.0000878
	(0.0000209)	(0.0000410)	(0.000134)	(0.000197)
Rural Area	**-0.117*** **	**-0.112*** **	-0.0384	-0.0206
	(0.0118)	(0.0126)	(0.0291)	(0.0309)
Region (South)	**0.0573*** **	**0.0479*** **	**-0.112***	**-0.102***
	(0.00703)	(0.00766)	(0.0439)	(0.0464)
Widowed	-0.0115	-0.0145	-0.0372	-0.0453
	(0.0200)	(0.0226)	(0.0471)	(0.0522)
Never Married	**-0.0529*** **	**-0.0399*** **	-0.0287	-0.0212
	(0.0156)	(0.0160)	(0.0326)	(0.0341)
Child of Head	**-0.121*** **	**-0.125*** **	**-0.0971** **	**-0.0987** **
	(0.0154)	(0.0159)	(0.0329)	(0.0340)
Grandchild of Head	**-0.134*** **	**-0.141*** **	**-0.163** **	**-0.171***
	(0.0249)	(0.0304)	(0.0576)	(0.0723)
Other Relative	**-0.0935*** **	**-0.0918*** **	**-0.123** **	**-0.112***
	(0.0176)	(0.0189)	(0.0418)	(0.0447)
Secondary Education Degree	**0.0274** **	**0.0214*** **	-0.0265	-0.0211
	(0.00995)	(0.0103)	(0.0211)	(0.0227)
Tertiary Education Degree	**0.152*** **	**0.150*** **	-0.0197	-0.0199
	(0.0157)	(0.0159)	(0.0413)	(0.0432)
Reads Chichewa	**0.0229***	**0.0273***	**0.0582** **	**0.0655** **
	(0.0107)	(0.0124)	(0.0199)	(0.0235)
Reads English	-0.00467	-0.00419	0.00488	0.00834
	(0.00868)	(0.00974)	(0.0156)	(0.0182)
Illness in Last 2 Weeks	0.00983	0.0113	0.0157	0.00980
	(0.00932)	(0.0101)	(0.0143)	(0.0156)
Chronic Illness	0.0144	0.0175	**0.0454***	0.0333
	(0.0141)	(0.0153)	(0.0217)	(0.0241)
Has Borrowed Credit	**0.110*** **	**0.103*** **	**0.0725*** **	**0.0663*** **
	(0.00806)	(0.00862)	(0.0133)	(0.0143)
Economic Crisis	**0.171*** **	**0.214*** **	**0.286*** **	**0.358*** **
	(0.0356)	(0.0578)	(0.0515)	(0.0810)
Economic Crisis x Rural	**-0.0340***	**-0.0324***	**-0.0370***	**-0.0423** **
	(0.0147)	(0.0156)	(0.0154)	(0.0163)
Economic Crisis x Age	**-0.00582** **	**-0.00901** **	**-0.00998*** **	**-0.0154*** **
	(0.00196)	(0.00344)	(0.00230)	(0.00416)
Economic Crisis x Age Squared	**0.0000712** **	**0.000123***	**0.0000889** **	**0.000176** **
	(0.0000253)	(0.0000485)	(0.0000272)	(0.0000555)
Constant	**0.344*** **	**0.267*** **	**0.510** **	0.340
	(0.0359)	(0.0542)	(0.167)	(0.225)
R^2	0.114	0.0910	0.0384	0.0350
N	19093	15821	19093	15821
df_m	20	20	19	19

Standard errors in parentheses

* p < 0.05, ** p < 0.01, *** p < 0.001

OLS vs. FE

- OLS shows larger coefficients for education and demographics.
- FE reduces bias but lowers statistical significance.

Full Sample vs. Age 15-64 (FE)

- Economic crisis and its interaction effect become stronger in age-restricted model.
- Borrowing credit remains significant; chronic illness loses significance.
- Grandchild of Household Head effect weakens slightly but stays significant.

Age 15-64: FE Regression

Table 1: FE Comparison: Full Sample vs Age [15, 64]

	(1) Full Sample	(2) Age 15-64
Age	0.00101	0.0124
	(0.0103)	(0.0140)
Age Squared	0.0000658	-0.0000878
	(0.000134)	(0.000197)
Rural Area	-0.0384	-0.0206
	(0.0291)	(0.0309)
Region (South)	**-0.112***	**-0.102***
	(0.0439)	(0.0464)
Widowed	-0.0372	-0.0453
	(0.0471)	(0.0522)
Never Married	-0.0287	-0.0212
	(0.0326)	(0.0341)
Child of Head	**-0.0971****	**-0.0987****
	(0.0329)	(0.0340)
Grandchild of Head	**-0.163****	**-0.171***
	(0.0576)	(0.0723)
Other Relative	**-0.123****	**-0.112***
	(0.0418)	(0.0447)
Secondary Education Degree	-0.0265	-0.0211
	(0.0211)	(0.0227)
Tertiary Education Degree	-0.0197	-0.0199
	(0.0413)	(0.0432)
Reads Chichewa	**0.0582****	**0.0655****
	(0.0199)	(0.0235)
Reads English	0.00488	0.00634
	(0.0156)	(0.0182)
Illness in Last 2 Weeks	0.0157	0.00980
	(0.0143)	(0.0156)
Chronic Illness	**0.0454***	0.0333
	(0.0217)	(0.0241)
Has Borrowed Credit	**0.0725*****	**0.0663*****
	(0.0133)	(0.0143)
Economic Crisis	**0.286*****	**0.358*****
	(0.0515)	(0.0810)
Economic Crisis x Rural	**-0.0370***	**-0.0423****
	(0.0154)	(0.0163)
Economic Crisis x Age	**-0.00998*****	**-0.0154*****
	(0.00230)	(0.00416)
Economic Crisis x Age Squared	**0.0000889****	**0.000176****
	(0.0000272)	(0.0000555)
Constant	**0.510****	0.340
	(0.167)	(0.225)
R^2	0.0384	0.0350
N	19693	15821
df_m	19	19

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- **Economic downturns** push individuals into non-farm labor(**0.358*****).
  - **Rural workers** are less likely to shift to non-farm labor during crises, possibly due to fewer non-agricultural opportunities.
  - **Older individuals** are less responsive to economic shocks, potentially due to lower labor mobility, and the **decline slows** at higher ages.
- Individuals in **households that borrowed credit** (**0.0663*****) are more likely to engage in non-farm labor, possibly to meet financial obligations.
- **Literacy in Chichewa** (**0.0655****) reflects the importance of basic literacy for non-farm employment.
- **Being a child** (**-0.0987**), **grandchild** (**-0.171***), or **other relative** (**-0.112***) reduces non-farm labor participation compared to HH, likely due to dependency on household support.
- **Fewer** (**-0.102***) non-farm labor in the **south** compared to the north.

Policy Implications

Address Regional Inequalities

- Policies should enhance rural infrastructure, skill training, and capital access.
- The South needs region-specific investment incentives, better infrastructure, and targeted development programs.

Targeted Support for Older & Vulnerable Workers

- Policies should offer social safety nets, vocational training, and flexible work options to aid older individuals' transition.

Support Financial Inclusion & Credit Access

- Expanding credit access, especially for low-income households, can boost financial stability and non-farm labor participation.

Improve Education & Literacy Programs

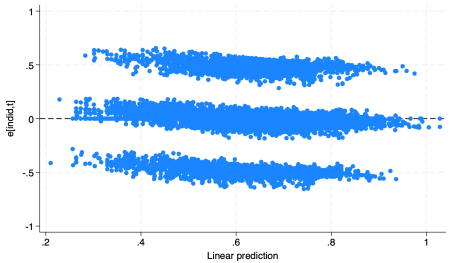
- Strengthening literacy, especially for Chichewa, can significantly increase non-farm labor participation.

Residual Analysis & Model Limitations

The model satisfies the assumptions of linearity in parameters, random distribution, no perfect collinearity, and normality of error terms.

Limitations still remain:

- **Zero Conditional Mean Concern**
  - **Three distinct bands:** unobserved heterogeneity and group-level clustering effects.
  - **Measurement Error in Y:** might fail to capture all aspects of non-farm labor employment.
- **Homoskedasticity Concerns**
  - Possible subgroup-based heteroskedasticity despite using clustered standard errors.



Residual Analysis Visualization

Future Directions & References

Next Steps for Research

- Find a better outcome variable for labor force participation.
- Figure out reasons behind three layers of residuals: extend analysis to more years, examine industry-level employment shifts during crises, recategorize highest education level, and investigate child labor by regrouping age categories.

References

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