Land Tenure Security and Internal Migration in Tanzania

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MOTIVATION

▶ In developing countries: one characterization of rural land ownership ⇒ weakly defined property rights

▶ Rights: through continuous and productive use, not through possession of formal land titles de Janvry et al. (2015)

> Physical presence of the occupant of the land is mandatory

> Leaving the land uncultivated for an extended period of time ⇒ risk of losing the land

▶ Similar situation in Tanzania: Customary tenure system and informal ownership

> The process of land registration and titling: costly and complicated ⇒ majority of rural land remain untitled

- ▶ Problem: Inefficient allocation of resources, mainly labor

- ▶ Different channels are identified in the literature - from tenure in/security to resource allocation.

- ▶ Tenure insecurity $\Rightarrow$

  - $>$ Fear of expropriation $\Rightarrow$ under investment in agri. plots

  - $>$ Not possible to use land as collateral in credit market$\Rightarrow$ Restricts access to credit

  - $>$ Limits market exchange or transferability of land $\Rightarrow$ distortion in allocation of labor

- ▶ The focus of most of the literature that studies the empirical link b/n tenure security & resource allocation

- ▶ This paper broadly speaks to the above literature

MOTIVATION . . . CONTD

- ▶ However, our focus is on another important but scarcely explored aspect of tenure in/security over agricultural land

    - > Impact of tenure security on households' decision to have a migrant member

    - > Limited evidence and emerging only in recent years (See de la Rupelle et al. (2009), Mullan et al. (2011), de Brauw and Mueller (2012), Valsecchi (2014), Chernina et al. (2014), de Janvry et al. (2015)).

    - > The evidence in the context of Africa in general and Tanzania in particular is scant

    - > Only de Brauw and Mueller (2012) examine the empirical link between land transferability and migration in Ethiopia

MOTIVATION: **MAIN QUESTION**

- ▶ Does tenure security have an impact on internal migration in rural Tanzania?

- ▶ Is there heterogeniety by age, gender and reasons of migration?

- ▶ Theoretically, effect of tenure security on migration can go in either direction

    - > Tenure insecurity $\Rightarrow$ Risk of expropriation $\Rightarrow$ Less Migration. OR,
      $\uparrow$ **Tenure security** $\rightarrow$ $\uparrow$ **Migration**

    - > Tenure insecurity $\Rightarrow$ Fear of wasting labor the next period if the land is taken away $\Rightarrow$ More Migration
      $\uparrow$ **Tenure security** $\rightarrow$ $\downarrow$ **Migration**

- ▶ Difficult to a priori determine the sign

DATA

- ▶ Rely on the three waves of Tanzanian National Panel Survey (NPS): 2008/2009, 2010/2011 & 2012/2013

- ▶ A total sample of 3043 households

- ▶ Household members who are ≥ 15 years old are tracked

- ▶ Define two measures of migration

  - > Binary Indicator=1 if HH has at least 1 migrant member
  - > Continuous : share of migrant members in total HH size

- ▶ Tenure Security: based on households' perception

  - > Binary indicator=1: At least one secured plot
  - > Continuous: Share of secured plots

- ▶ Outcome is measured at period t, household and plot level controls are measured at period $t-2$

MODEL AND ESTIMATION ISSUES

► Baseline model:

$$y_{ivt} = \alpha + \beta_1 TenSec_{ivt-2} + x_{ivt-2}\beta_2' + \gamma_v + \eta_t + \varepsilon_{ivt} \qquad (1)$$

where

  > y_{ivt} is an indicator for migration

  > $TenSec_{ivt-2}$ is perceived tenure security over agricultural land at period at $t-2$

  > x_{ivt-2} is a vector of household level controls which include both plot level and household level characteristics observed at $t-2$

  > γ_v and η_t respectively capture village and year fixed effects

  > ε_{ivt} is error term

► Identification is achieved using variation within a village across households and time

Two estimation concerns:

> does not control for time varying village specific factors

> Might also omit household specific time invariant factors that can potentially bias the result

Augmented Model: We thus re-specify the model as follows

$$y_{ivt} = \alpha + \beta_1 TenSecu_{ivt-2} + x_{ivt-2}\beta_2^{'} + \gamma_v + \eta_t + \theta_{vt} + \lambda_{iv} + \varepsilon_{ivt} \quad (2)$$

where θ_{vt} and λ_{iv} respectively capture time varying village specific and time invariant household specific factors.

MODEL AND ESTIMATION ISSUES . . . CONTD

- ▶ Take 1st difference $\rightarrow$ control time invariant HH and village specific factors

- ▶ Only 2 time periods $\rightarrow$ differencing will also eliminate the time FE and time varying components of any village specific factors

- ▶ Reduces the model to a time invariant village fixed effect model

$$\Delta y_{iv} = \beta_0 + \beta_1 \Delta TenSecu_{iv} + \Delta x_{iv} \beta_2^{'} + \Delta \theta_v + \Delta \varepsilon_{iv} \qquad (3)$$

TABLE 1: Summary Statistics on Tenure Security

Variable	Mean	Std. Dev.	Min.	Max.	N
Any Secured	0.94	0.23	0	1	3043
Sh. of Secured LS	0.92	0.25	0	1	3043
Any Plot Titled	0.12	0.32	0	1	3043
Sh. of Titled LS	0.09	0.27	0	1	3043
Colla/Sell Any Plt	0.76	0.43	0	1	3043
Colla/Sell: Sh. of Plt Size	0.71	0.43	0	1	3043
Total Land Size	5.06	5.06	0.02	36.5	3043

► 94% of the Households feel tenure security for at least one of their plots

► Only 12% of the households have at least one plot that is titled

► 76% of the households feel that they have sell/collateral right in at least 1 plot

- ▶ shows the weak link between land title certificates and tenure security as well as the right to sell or use land as collateral

DESCRIPTIVE STATISTICS ... CONTD

TABLE 2: Correlation between the Different Measures of Tenure Security

	Any Secured	Sh. of Secured LS	Any Plot Titled	Sh. of Titled LS	Colla/Sell Any Plt	Colla/Sell: Sh. of PS	Total LS
Any Secured	1.000						
Sh. of Secured LS	0.888	1.000					
Any Plot Titled	0.050	0.045	1.000				
Sh. of Titled LS	0.043	0.047	0.925	1.000			
Colla/Sell Any Plt	0.281	0.250	0.040	0.027	1.000		
Colla/Sell: Sh. of PS	0.253	0.286	0.013	0.024	0.931	1.000	
Total LS	0.095	0.095	0.021	-0.007	0.198	0.212	1.000
Observations	3043						

► Perception of land security has some correlation (around 25%) with selling/using land as collateral

► On the other hand, households' perception of land security has very weak correlation with land title- puzzling

TABLE 3: Summary Statistics on Household and Land Characteristics

Variable	Mean	Std. Dev.	Min.	Max.	N
HH has Migrant Member	0.23	0.42	0	1	3043
No. of Migrant Members	0.44	1.14	0	19	3043
Sh of Migrant Members	0.07	0.16	0	1	3043
Household Size	5.62	2.99	1	55	3043
Male	0.77	0.42	0	1	3043
Head Age	48.92	15.64	19	105	3043
Went to School	0.71	0.46	0	1	3043
Married/Liv. Togeth.	0.78	0.41	0	1	3043
Separated/Divor/Widow	0.2	0.4	0	1	3043
Went to School	0.71	0.46	0	1	3043
Economic Shocks	0.57	0.49	0	1	3043
Water Shortage	0.3	0.46	0	1	3043

▶ On average, 23% of the households have at least 1 migrant member

▶ The average share of migrant members in the data is 7%

TABLE 4: Mean Comparison of Tenure Security Status in 2010 vs 2012

	Year 2010		Year 2012		Difference			
	Obs	Mean	Obs	Mean	Mean	SE		p-val
Any Secured	1365	0.95	1678	0.94	0.00	0.01		0.569
Sh. of Secured LS	1365	0.92	1678	0.91	0.01	0.01		0.389
Any Plot Titled	1365	0.10	1678	0.13	-0.03	0.01	**	0.014
Sh. of Titled LS	1365	0.07	1678	0.11	-0.03	0.01	***	0.001
Colla/Sell Any Plt	1365	0.72	1678	0.79	-0.08	0.02	***	0.000
Colla/Sell: Sh. of Plt Size	1365	0.67	1678	0.74	-0.07	0.02	***	0.000
Total Land Size	1365	4.93	1678	5.17	-0.23	0.18		0.201

NOTE: Own computation $*p < 0.1, **p < 0.05, ***p < 0.01$

▶ On average, households' perception of land security has not changed significantly between 2010 and 2012

▶ Land titling and households' perception of having the right to sell or use land as collateral has increased

RESULTS: TENURE SECURITY & INTERNAL MIGRATION

- ▶ Looked at impact on both probability of having at least 1 migrant and share of migrant in total HH size as alternative outcomes

- ▶ Tenure security in at least 1 plot and share of secured plot in total land size are used as alternative measures of tenure security

- ▶ Estimation is done based on Random Effects, Fixed effects, FE Poisson and RE-Probit Methods

- ▶ In all estimations the unit of analysis is the household and standard errors are clustered at village level

- ▶ **Main finding**: negative and statistically significant association between perceived tenure security and internal migration in Tanzania

RESULTS: BASELINE MODEL

TABLE 5: Tenure Security and Migration of Members

	Share of Migrant Members			HH Has a Migrant Member		
	RE	FE	Poisson-FE	RE	RE-Probit	FE
Any Secured	-0.039**	-0.041**	-0.644***	-0.090**	-0.085***	-0.113***
	(0.015)	(0.017)	(0.217)	(0.035)	(0.031)	(0.044)
Log Total Land Size	0.009**	0.005	0.084	0.027***	0.027***	0.012
	(0.004)	(0.004)	(0.073)	(0.009)	(0.009)	(0.011)
Household Size	0.008***	0.008***	0.112***	0.042***	0.042***	0.046***
	(0.001)	(0.001)	(0.021)	(0.004)	(0.003)	(0.004)
No. of Obs.	3043	3043	1821	3051	3051	3051
$ad\ jR^2$		.031				.093

Additional Controls include: Married/Liv. Togeth., Went to School, Dist to Maj Road, Sh. of Rented LS ,
Economic Shocks, Water Shortage . Standard errors clustered at Village Level in Parenthesis

▶ On average, HHs with at least one secured plot have 4.1
  ppts less migrant members (Col. 2)
▶ The share of migrant members, is on average, 64% lower
  for HHs with at least one secured plot (Col. 3)
▶ On average, HHs with at least one secured plot have 11.3
  ppts. less prob. of having a migrant (Col. 6)

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RESULTS: BASELINE MODEL

TABLE 6: Share of Size of Secured Plots and Migration of Members

	Share of Migrant Members			HH Has a Migrant Member		
	RE	FE	Poisson-FE	RE	RE-Probit	FE
Sh. of Secured LS	-0.026**	-0.026*	-0.446**	-0.057*	-0.055*	-0.072*
	(0.013)	(0.015)	(0.215)	(0.031)	(0.029)	(0.039)
Log Total Land Size	0.009**	0.005	0.076	0.025***	0.026***	0.011
	(0.004)	(0.004)	(0.074)	(0.009)	(0.009)	(0.011)
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- ▶ A 1 ppt. ↑ in the share of secured plots is associated with a 0.026 ppts. ↓ in the share of migrant member (Cols. 1 & 2)
- ▶ A 1 ppt ↑ in share of secured plots is → 45 % ↓ in the share of migrant members (Col. 3)
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RESULTS: BASED ON 1ST DIFFERENCE MODEL

TABLE 7: Tenure Security and Migration of Members: Using Differenced data

	Share of Migrant Members			HH Has a Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Any Secured	-0.037*	-0.039*	-0.056*	-0.080*	-0.048	-0.129*
	(0.020)	(0.021)	(0.030)	(0.048)	(0.042)	(0.069)
D_Log Total Land Size	0.001	0.003	0.014	-0.007	-0.003	-0.000
	(0.010)	(0.010)	(0.011)	(0.023)	(0.020)	(0.031)
D_Household Size	0.037***	0.037***	0.040***	0.125***	-0.026***	0.132***
	(0.006)	(0.006)	(0.007)	(0.012)	(0.010)	(0.016)
No. of Obs.	1324	1324	1324	1330	1330	1330
$ad\,jR^2$	.074		.078			.1

Additional Controls include: Married/Liv. Togeth., Went to School, Dist to Maj Road, Sh. of Rented LS , Economic Shocks, Water Shortage . Standard errors clustered at Village Level in Parenthesis

- ▶ Table 7 is counterpart of Table 5.
- ▶ On average, HHs with at least one secured plot have around 5.6 ppts. less migrant members (Coln. 3)
- ▶ On average, HHs with at least one secured plot have around 12.9 ppts. less prob. of having a migrant (Col. 6)

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	Share of Migrant Members			HH Has a Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Any Secured	-0.037*	-0.039*	-0.056*	-0.080*	-0.048	-0.129*
	(0.020)	(0.021)	(0.030)	(0.048)	(0.042)	(0.069)
D_Log Total Land Size	0.001	0.003	0.014	-0.007	-0.003	-0.000
	(0.010)	(0.010)	(0.011)	(0.023)	(0.020)	(0.031)
D_Household Size	0.037***	0.037***	0.040***	0.125***	-0.026***	0.132***
	(0.006)	(0.006)	(0.007)	(0.012)	(0.010)	(0.016)
No. of Obs.	1324	1324	1324	1330	1330	1330
$ad jR^2$	.074		.078			.1

Additional Controls include: Married/Liv. Togeth., Went to School, Dist to Maj Road, Sh. of Rented LS , Economic Shocks, Water Shortage . Standard errors clustered at Village Level in Parenthesis

► Table 7 is counterpart of Table 5.
► On average, HHs with at least one secured plot have around 5.6 ppts. less migrant members (Coln. 3)
► On average, HHs with at least one secured plot have around 12.9 ppts. less prob. of having a migrant (Col. 6)

RESULTS: BASED ON 1ST DIFFERENCE MODEL

TABLE 7: Tenure Security and Migration of Members: Using Differenced data

	Share of Migrant Members			HH Has a Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Any Secured	-0.037*	-0.039*	-0.056*	-0.080*	-0.048	-0.129*
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TABLE 8: Share of Size of Secured Plots and Migration of Members: Using Differenced data

	Share of Migrant Members			HH Has a Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Sh. of Secured LS	-0.024	-0.026	-0.046*	-0.041	-0.051	-0.088
	(0.018)	(0.018)	(0.027)	(0.045)	(0.039)	(0.063)
D_Log Total Land Size	0.000	0.002	0.013	-0.009	-0.003	-0.002
	(0.010)	(0.010)	(0.011)	(0.023)	(0.020)	(0.031)
D_Household Size	0.037***	0.037***	0.040***	0.125***	-0.026***	0.132***
	(0.006)	(0.006)	(0.007)	(0.012)	(0.010)	(0.016)
No. of Obs.	1324	1324	1324	1330	1330	1330
$adjR^2$	.072		.076			.099

Additional Controls include: Married/Liv. Togeth., Went to School, Dist to Maj Road, Sh. of Rented LS , Economic Shocks, Water Shortage . Standard errors clustered at Village Level in Parenthesis

► Table 8 is counterpart of Table 6 but using differenced data
► The variable of interest here is measured as a continuous variable- share of size of secured plot
► Results are qualitatively similar

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D_Household Size	0.037***	0.037***	0.040***	0.125***	-0.026***	0.132***
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RESULTS

Tenure Security and Migration of Economically Active (EA) Members: using Differenced data

	Share of EA Migrant Members			HH Has an EA Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Any Secured	-0.041**	-0.043***	-0.050**	-0.081*	-0.051	-0.123*
	(0.016)	(0.017)	(0.021)	(0.048)	(0.041)	(0.068)
D_Log Total Land Size	-0.001	0.001	0.004	-0.006	0.011	-0.001
	(0.009)	(0.009)	(0.010)	(0.022)	(0.020)	(0.030)
D_Household Size	0.020***	0.021***	0.026***	0.124***	-0.030***	0.136***
	(0.004)	(0.004)	(0.005)	(0.012)	(0.010)	(0.017)
No. of Obs.	1330	1330	1330	1330	1330	1330
$adjR^2$	.034		.056			.11

Additional Controls include: Married/Liv. Togeth., Went to School, Dist to Maj Road, Sh. of Rented LS , Economic Shocks, Water Shortage . Standard errors clustered at Village Level in Parenthesis

► The result stays similar even if we count migration of only economically active members; b/n 15 & 65 years

RESULTS

Tenure Security and Migration of Economically Active (EA) Members: using Differenced data

	Share of EA Migrant Members			HH Has an EA Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Any Secured	-0.041**	-0.043***	-0.050**	-0.081*	-0.051	-0.123*
	(0.016)	(0.017)	(0.021)	(0.048)	(0.041)	(0.068)
D_Log Total Land Size	-0.001	0.001	0.004	-0.006	0.011	-0.001
	(0.009)	(0.009)	(0.010)	(0.022)	(0.020)	(0.030)
D_Household Size	0.020***	0.021***	0.026***	0.124***	-0.030***	0.136***
	(0.004)	(0.004)	(0.005)	(0.012)	(0.010)	(0.017)
No. of Obs.	1330	1330	1330	1330	1330	1330
$adjR^2$	.034		.056			.11

Additional Controls include: Married/Liv. Togeth., Went to School, Dist to Maj Road, Sh. of Rented LS , Economic Shocks, Water Shortage . Standard errors clustered at Village Level in Parenthesis

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	OLS	RE	FE	RE	RE-Probit	FE
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	(0.016)	(0.017)	(0.021)	(0.048)	(0.041)	(0.068)
D_Log Total Land Size	-0.001	0.001	0.004	-0.006	0.011	-0.001
	(0.009)	(0.009)	(0.010)	(0.022)	(0.020)	(0.030)
D_Household Size	0.020***	0.021***	0.026***	0.124***	-0.030***	0.136***
	(0.004)	(0.004)	(0.005)	(0.012)	(0.010)	(0.017)
No. of Obs.	1330	1330	1330	1330	1330	1330
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RESULTS

TABLE 9: Tenure Security and Migration of Economically Active (EA) Members: using Differenced data

	Share of EA Migrant Members			HH Has an EA Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Any Secured	-0.041**	-0.043***	-0.050**	-0.081*	-0.051	-0.123*
	(0.016)	(0.017)	(0.021)	(0.048)	(0.041)	(0.068)
D_Log Total Land Size	-0.001	0.001	0.004	-0.006	0.011	-0.001
	(0.009)	(0.009)	(0.010)	(0.022)	(0.020)	(0.030)
D_Household Size	0.020***	0.021***	0.026***	0.124***	-0.030***	0.136***
	(0.004)	(0.004)	(0.005)	(0.012)	(0.010)	(0.017)
No. of Obs.	1330	1330	1330	1330	1330	1330
$adjR^2$	.034		.056			.11

Additional Controls include: Married/Liv. Togeth., Went to School, Dist to Maj Road, Sh. of Rented LS , Economic Shocks, Water Shortage . Standard errors clustered at Village Level in Parenthesis

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RESULTS

Tenure Security and Migration of Economically Active (EA) Members: using Differenced data

	Share of EA Migrant Members			HH Has an EA Migrant Member		
	OLS	RE	FE	RE	RE-Probit	FE
D_Any Secured	-0.041**	-0.043***	-0.050**	-0.081*	-0.051	-0.123*
	(0.016)	(0.017)	(0.021)	(0.048)	(0.041)	(0.068)
D_Log Total Land Size	-0.001	0.001	0.004	-0.006	0.011	-0.001
	(0.009)	(0.009)	(0.010)	(0.022)	(0.020)	(0.030)
D_Household Size	0.020***	0.021***	0.026***	0.124***	-0.030***	0.136***
	(0.004)	(0.004)	(0.005)	(0.012)	(0.010)	(0.017)
No. of Obs.	1330	1330	1330	1330	1330	1330
$adjR^2$	.034		.056			.11

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▶ The result stays similar even if we count migration of only economically active members; b/n 15 & 65 years

CONCLUSION

- ▶ Examine the impact of tenure security on internal migration

- ▶ Negative association between tenure security and internal migration in Tanzania

- ▶ Results consistent across different specifications & sub-samples

- ▶ Has implication for the basic principles of structural transformation

  - ▶ structural transformation- rural to urban migration is needed

  - ▶ Increasing labor productivity in agricultural sector and provide cheap labor for service and manufacturing sectors

  - ▶ If the modern sectors could not cope up with the population pressure in urban areas, rural-urban migration may not be attractive

Thank You!