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Intra-urban residential mobility and tenants' workplace choices in Kinondoni municipality

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ABSTRACT

In Tanzania like many developing countries, the private rental housing caters for the housing needs of the majority of low-income households where residential choices of tenants are associated with both risks and opportunities. One of the opportunities is proximity to workplaces which provide a means to save in terms of lower commuting costs and the ease with which domestic obligations can be attended. However, it is not clear whether workplaces are of prime consideration in residential mobility decision of tenants. This paper uses discriminant function analyses to predict tenants' preferences for workplace-residential proximity based on tenants' own attributes, housing and neighbourhood characteristics based on data which were collected in Kinondoni municipality in Dar es Salaam Tanzania in 2014. The results suggest that tenant mobility tend to relocate tenants away from their workplaces. The majority of tenants who are residentially detached from their workplaces tend to relocate towards wards which are located in-between the outskirt and the CBD, while those relocating to peripheral wards end-up working within their ward of residency. This pattern is explained by at least two factors; the first is the incremental nature of housing construction, which pushes tenants closer to areas of their intended housing construction (outskirt wards) and the second is tenure insecurity which motivate early tenant move-out towards outskirt wards so that they can either physically protect their acquired rights or be in a good position to purchase secure plots. Workplace-residential proximity in wards that are relatively closer to the CBD for non-mover tenants is significantly associated with low-income and lower rent which reflects the relatively lower quality housing and environmental amenities in those wards.

1. Introduction

Housing comprise shelter structures, land and housing services such as water, electricity and sewerage (Tiwari & Parikh, 1997). Housing location choice among household across the developing world is shaped by a multiple of factors. Factors such as neighbourhood characteristics i.e. proximity to market (shopping centres), availability of public transport, proximity to close friends and whether there are good community facilities such as proximity to water points, roads, footpaths local market, and bus stop have been observed to be highly important when searching for a house (Limbumba, 2010; Rath & Routray, 1997; Young & Flacke, 2010). Households tend to avoid such things as flood prone areas, steep slopes, and swamps. Like in many other developing countries, housing location choices among Dar es Salaam residents is further shaped by the informal nature of both residential settlements and the house. The decision to rent a formal or informal house involves a trade-off between more flexible lease arrangements and reduced security of tenure and most likely lower quality public services (Arnott, 2008). Tenure security is of prime consideration for home ownership in developing countries where informal land transaction are highly prevalent (Kironde, 2000; Kombe, 1994). To tenants, tenure security may be of prime consideration in choosing their future housing locations in countries where housing is provided through owner-built approaches. Further, proximity to workplaces can shape residential choices of households (Erath & Axhausen, 2009; Ingram, 2008; O'Sullivan, 2012). There are however, limited evidence to substantiate the link between workplaces and residential preferences of tenants specifically in developing countries.

There are at least six categories of important determinant of residential location choices. The first category relate to "utility maximisation" which comprises factors such as income (Chang, Chen, & Yang, 1998; Jimenez & Keare, 1984) and proximity

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to workplaces which is linked to saving in commuting cost (Erath & Axhausen, 2009; Ingram, 2008; O'Sullivan, 2012). In relation to saving in commuting cost it has been observed that households in developing countries tend to work within their neighbourhoods because of the nature of activities involved rather than the need to save in commuting costs (Aluko, 2011). This means that for those living in the urban fringe, they find it convenient to shift their workplaces to those areas as well (Acheampong & Anokye, 2013). Evidence suggesting than mobility in developing countries is motivated by social factors than economic can also be found in Limbumba (2013). The second category of residential location determinants comprises "quality and cost of municipal service" factors such as public libraries, schools, health services, education, refuse collection and street cleaning, leisure services, social services and law enforcement (Reshovsky, 1979). This category also include public utilities such as water and electricity (Gulyani & Talukdar, 2008; Lee, Beamish, & Goss, 2008; Takeuchi, Cropper, & Bento, 2008), proximity to worship sites, recreation centres (Morrow-Jones & Kim, 2009; Wizor, 2014) and other public places.

A third set of determinants of residential location choices is "race and socio-economic factors". This include discriminatory practices based on income (Jimenez & Keare, 1984), gender, education, skills race and household perceived status (Chang et al., 1998; Hernandes & Garcia, 2008), demographic composition (Huston & Han, 2010; Young & Flacke, 2010), age of household head (Chang et al., 1998; Huston & Han, 2010; Jimenez & Keare, 1984; Morrow-Jones & Kim, 2009), marital status (Lee et al., 2008), potential for family growth (Jimenez & Keare, 1984) and family size (Hernandes & Garcia, 2008). Tenants in both Accra Ghana and Dar es Salaam Tanzania have been observed to move towards locations where they have relatives (Acheampong & Anokye, 2013; Limbumba, 2010) and in certain cases residential mobility is induced by the desire for home ownership and poorly regulated rental housing (Komu, 2013). The fourth set of determinants are "neighbourhood layout and population density" factors such as physical infrastructure and environmental consideration (Aluko, 2011), congestion of houses and people (Limbumba, 2010) and proximity to natural amenities or green spaces (Wizor, 2014). However, these neighbourhood factors have also been found to play a very limited role in Ghana (Acheampong & Anokye, 2013). This is probably because the informal nature of many settlements lead to low quality housing which are difficult to redevelop or improve (Navarro & Turnbull, 2010). Such settlements are often characterised by high population density and are prime target for low-income households.

The fifth set of factors affecting residential location choices are those relating to "housing affordability coupled with a desire to achieve home ownership" (Acheampong & Anokye, 2013; Aluko, 2011; Burgess, 1992; Komu, 2013). The last set of determinants of residential location falls under the heading "quality of life factors" and comprises factors such as people's preferred lifestyles, preferences for leisure and recreation, family connections, aesthetics of the surroundings and feelings of safety and security (Wizor, 2014). The category also include self congruity factors reflecting the personal characteristics and image of the owner to the public. Other factors under this category include dissatisfaction over the quality of the house (Jimenez & Keare, 1984; Lee et al., 2008) and size of the housing space. Due to serious housing shortage in cities of developing countries, tenants are however, inclined to accept housing even in highly dilapidated neighbourhoods albeit at a lower price (Rust, Adejuyigbe, & Kihato, 2011).

2. Rental housing in Tanzania

In Tanzania like many other developing countries (Arvanitis, 2013; Nohn & Bhatt, 2014), housing is provided through formal or informal means (Kironde, 1995). The formal types are of two categories which are private developer-built and public housing. Public housing units are intended for either low-income household or government employees (Beattie, Mayer, & Yildirim, 2010; Gattoni, 2009; ShoreBank International, 2011; Wakely, 2014). The second source of formal housing supply is private developers-built housing which make up a marginal share of the total housing supply in Tanzania. The main source of rental housing supply is however, the informal housing which involves individuals, private firms, local and international NGOs, CBOs, and even the government in corroboration with individuals and other organisations. Under the informal rental housing supply, residency takes place in owner-built housing which are built on either formally or informally supplied land and for which the protection of owner and rental rights is through social recognition (Kombe, 2000). Unlike many developing countries where owner-built housing is associated with slums and poor quality housing, in Tanzania the approach is also attractive to middle and higher income household who purchase larger informal plots and build high quality housing (Limbumba, 2010; Lupala, 2002). The origin of urban owner-built housing in Tanzania can be traced as far as colonialism. The colonialist neglected Africans' housing issues and applied discriminatory policies which allowed segregation of White, Asian and Africans settlements in all colonial towns (Kironde, 1995). Thus black Africans interested with urban life found themselves in informal settlements where the housing development process remains informal and incremental.

Houses developed through the owner-built approach are the main provider of private renter housing in the city of Dar es Salaam. However studies in the area of rental housing especially in relation to tenant mobility are scanty. For example in Limbumba (2013), residential location decision of owner household were observed to be shaped by proximity to workplaces (livelihood opportunities), proximity to friends and relatives and direction towards up-country home towns. In Komu (2013), it was observed that tenants mobility is shaped by the desire for home ownership. This desire was induced by the harsh living environment created by landlords leading to a complete dislike of tenancy as a form of housing tenure. Limbumba (2010) made similar observations where it is generally agreed that tenancy is assumed to be a temporary housing tenure as household move up the housing tenure radar. The dislike of tenancy tenure among tenants is not only detrimental to housing owners but also to the houses and the neighbourhoods at large. Rented owner-built houses are rarely maintained by occupiers as they believe to be in temporarily while landlords/owners have no incentive to maintain houses for which they are not living in them. As a result many houses closer to the city centre are fully occupied by tenants but are poorly maintained. All of the studies on tenant housing in Tanzania considered mobility in terms of desire for ownership but workplace as a mobility factor among tenants has never been investigated. Therefore this study wishes to bridge that gap by providing an understanding on the pattern of tenants mobility in relation to workplaces.

3. Research methodology

3.1. The setting and data

This study utilises administrative wards as alternative location choices of tenants in Kinondoni municipality. The data used for this study were collected from Kinondoni municipality between February and June 2014. Kinondoni is one of three municipalities of the city of Dar es Salaam which based on the 2012 population and

housing census has a population of 1,775,049 people in 446,504 households (National Bureau of Statistics-Tanzania, 2013). According to the 2012 household budget survey the number of house owners were estimated to be 37% for the city of Dar es Salaam (National Bureau of Statistics-Tanzania, 2014). This translates to mean that house owners in Kinondoni municipality could be around 165,206. Other forms of housing occupation other than private renting were estimated to be around 9.7% leading to a total of 43,311 households. Therefore the number of tenant households in the private rental housing could be around 237,987. The total number of tenant households surveyed for the purpose of this study were 2157 which based on the above estimates is a ward clustered sample of the 237,987 households making up about 1% of the total tenants households in the municipality. The sample is for tenant households which can have either one or more than one members. The responses are only from the household head (husband or wife for married couples). The sampling strategy adopted ensures that each ward up to Mtaa (the smallest administrative unit) level for 25 wards out of 34 are represented and an additional 2 wards were partially covered with at least one sub-ward. The sample size is substantially larger when compared to minimum sample size requirement for quantitative analysis which was estimated based on Oktay, Karaaslan, Alkan, and Çelik (2014) to be 383 households. A summary of all the data collected and used in this study is provided in Table 1.

3.2. Data analysis

3.2.1. Work-out and residential relocation risks

The analysis was carried out in two stages. In the first, the moving and work-location probabilities were estimated from cross tabulation results for both workplace/residential wards and previous/current residential wards. The probabilities were then used to compute the odds for each choice under consideration. The odd of an event is simply the ratio of the probability for the occurrence of an events against non-occurrence given as:

$$Odd_k = \ln\left(\frac{P_i}{1-P_i}\right) \tag{1}$$

where Odd_k is the odd for the kth event (relocate towards a ward or work towards or away from a ward) and P_i is the moving/workplace probability associated with tenant i. The computed odds are inputs in computing work-out, move-in and move-out risks.

Work-out risk measures ward level work-preference among tenant households computed as shown in equation (2). Working in a ward other than a ward of residency is an actual observed behaviour but when defined in terms of risk it turns out to indicate ward-level preferences. That is if many people in a ward are working in a ward that is far from their residential ward, that indicate some preference for distant workplaces among those

Table 1
Descriptive statistics for variables used in logistic regression and discriminant function analysis.

S/N	Descriptive statistics						S/N	Descriptive statistics					
	Variable name	N	Min	Max	Mean	Std. Deviation		Variable name	N	Min	Max	Mean	Std. deviation
1	Number of Bedrooms	2149	1	7	1.35	.696	16	Multi_storey Multi Family House	2157	0	1	.00	.057
2	Number of Housemates	1717	1	25	4.37	2.917	17	Low_rise Modern House	2157	0	1	.18	.388
3	Current Family Size	2136	1	15	3.18	1.666	18	Low_rise Swahili House	2157	0	1	.66	.473
4	Tenant Age at Relocation	2033	18	72	29	7.396	19	Low_rise Other House	2157	0	1	.10	.305
5	Moved_In to House with Electricity	2142	0	1	.38	.487	20	Employed Through own_Self	2143	0	1	.25	.431
6	Moved_In to Cleaner Neighbourhood	2142	0	2	.30	.460	21	Employed Through Contract	2143	0	1	.28	.448
7	Moved_In to House with Water	2142	0	1	.28	.451	22	Employed in Business	2143	0	1	.27	.442
8	Moved_In to Less Congested Neighbourhood	2142	0	1	.27	.442	23	Employed in Domestic Activities	2143	0	1	.15	.361
9	Moved_In Closer to Hospital	2142	0	1	.24	.426	24	Employed through Other Means	2143	0	1	.05	.225
10	Moved_In to a Safer Neighbourhood	2142	0	1	.36	.479	25	Neighbourhood Attractive	2157	0	1	.73	.443
11	Moved_In Closer to Public Schools	2142	0	1	.24	.426	26	Household Male	2157	0	1	.80	.397
12	Moved_In Closer to Other Services	2142	0	1	.06	.229	27	Respondent is Male	2157	0	1	.46	.498
13	Rent per Room	2119	5000	300,000	30,499	15,734.8	28	Married	2136	0	1	.65	.478
14	Total Number of Rooms	484	3	10	4	1.5	29	Rents a Living Room	2157	0	1	.35	.477
15	Total Space Rented	1981	6	203	25	22.1	30	Rent a Dining Room	2157	0	1	.05	.227
31	Tenant Year of Birth	2131	1934	1998	1982	8.4	45	Rent a Kitchen	2157	0	1	.14	.350
32	Number of Bathrooms	2105	1	5	1	.4	46	Rents a Store	2157	0	1	.08	.264
33	Average Monthly Income	1926	40,000	15,000,000	296,271	486,275.5	47	House has Backyard	2157	0	1	.44	.496
34	Rich Income Category	1926	0	1	.04	.192	48	House has Other Facilities	2157	0	1	.03	.178
35	High Income Category	1926	0	1	.08	.268	49	Supermarket in the Neighbourhood	2157	0	1	.04	.190
36	Middle Income Category	1926	0	1	.43	.495	50	Market in the Neighbourhood	2157	0	1	.18	.383
37	Low Income Category	1926	0	1	.32	.468	51	Bar in the Neighbourhood	2157	0	1	.21	.410
38	Poor Income Category	1926	0	1	.13	.336	52	Hotel in the Neighbourhood	2157	0	1	.04	.192
39	Education Category Tertially	2117	0	1	.07	.252	53	Worship Building in the Neighbourhood	2157	0	1	.39	.487
40	Education Category Vocation and Technical	2117	0	1	.06	.233	54	School in the Neighbourhood	2157	0	1	.28	.451
41	Education Category Secondary	2117	0	1	.27	.444	55	Government Building in the Neighbourhood	2157	0	1	.18	.388
42	Education Category Primary	2117	0	1	.60	.489	56	Other important features in the Neighbourhood	2157	0	1	.14	.349
43	Several Time Tenant	2124	0	1	.51	.500	57	Total Number of Additional Rooms	809	1	4	2	.962
44	Multi_storey Single Family House	2157	0	1	.01	.071	58	Year of First Residency	2150	1969	2014	2010	4.704

tenants. It is considered to be a risk as working far from home may be associated with a certain disutility. The work-out risk is computed as:

$$\text{Work\_out Risk} = \text{OWO}_w/\text{OWI}_w \quad (2)$$

where, OWO_w is the odd of living in ward w but working in another ward, (work-out), OWI is the odd of working in ward w but living in another ward. (work-in). Wards with a higher work-out risk have relatively higher chances for its tenants to work away from their home wards, those wards with zero work-out risk have the same likelihoods for their tenants to work in other wards as the likelihood of other wards' tenants to work in that ward. The move-out and move-in risks were defined and computed in similar manner but using moving probabilities. The formula for move-out for example is given as;

$$\text{Move} - \text{out risk} = \text{OMO}_w/\text{OMI}_w \quad (3)$$

where, OMO_w is the odd of relocating away from ward w(move-out) and OMI_w is the odd of relocating into ward w. The Odds of move-out is simply the ratio of the probability that a tenant did actually move away from a certain ward as against all other decision (move-within and stay). Similarly the odds of move-in is simply the ratio of the probability that a tenant did actually move into a particular ward as against all other decision. Move-out and move-in measures ward-level residential preferences of tenants while work-out risk measures ward-level workplace preferences among tenants.

3.2.2. Discriminant function analysis

The second stage analyses establishes key determinants of the relationship observed in stage one. In this study, the focus is on different categories of tenants based on their residency/workplace choices. The residential choices of tenants is based on mobility towards a particular ward, within a ward or non-mover (first time tenants) and workplace choices are determined by residency, that is work away from one's residency ward, within a residency ward or unspecified workplace. Geographically, movement into and within but not outside Kinondoni municipality were considered. The combination of residency and workplace choices yields nine (3×3) categories of which four are of special interest in this study. These four categories are:

i) Move-in-Work-in: tenants who moved into a particular ward for residency purposes and ended-up working within that ward;
ii) Non-mover-Work-in: tenants who did not move out of their current ward of residency (moved within ward) and have their workplaces within their ward of residency;
iii) Move-in-Work-out: tenants who moved into a particular ward for residency purposes but work in other ward
iv) Non-mover-Work-out: tenants who did not move out of their current ward of residency but have their workplaces in other ward.

All tenants groups are observed groups although they are presumed to indicate some sense of ward-level residential-workplace preferences. Work-in and work-out tenants have fixed workplaces in specified wards but unspecified workplace tenants are either mobile or site workers who have no specific workplace. The identified groups and their resulting relationship is shown in Table 2.

The preceding groups of tenants are the variable of interest G which can be characterised into J unordered outcome with j = {1,2, …, J}. The interest is to provide a rule for predicting group membership for an observation n based on p measurements of predictors $x \in R^p$. A total of N observations are made which are then classified based on probable characteristics to determine the contribution of each characteristics in attaching an individual observation to a group. This can be done using discriminant function analysis. The analysis defines J-1 or G-1 whichever is smaller, discriminant functions which are uncorrelated linear combinations of a set of dependent variables. Each of the defined functions must provide a unique solution in terms of scores (Z) which facilitate the identification of differences between the groups. A linear discriminant function takes the following form:

$$Z_{jk} = \beta_0 + \beta_1 X_{1k} + \beta_2 X_{2k} + \ldots\ldots + \beta_n X_{nk} \quad (4)$$

In which;

Z_{jk} = discriminant Z scores for discriminant function j for object k;
β_0 = constant;
β_i = discriminant coefficient for independent variable i, i = 1,2,....n; n = number of observations;

X_{ik} = independent variable i for object k, k = 1,2,....., K; k = the number of discriminant function.

Table 2
The relationship between ward level residential location choices and workplaces.

		Tenants' workplace choice		
Residential location choice		Unspecified	Work-in	Work-out
	Non-mover	The tenant is indifferent across Workplaces and did not Move-out: Most Likely first time Tenants whose residential location choice is not in any way related to his/her workplace location.	The tenant works in a ward of his/her residency and did not move-out. Most likely first time Tenants whose residential location choice is positively influenced by his/her workplace location.	The tenant works away from his/her ward of residency and did not move-out. Most likely first time Tenants whose residential location choice was not related to his/her workplace choice.
	Move-within	The tenant is indifferent across workplaces and moved residencies within the ward: Most likely prefers within-ward residency and his/her relocation was not motivated by his/her Workplace choices	The tenant works within his/her ward of residency and moved residencies within the ward: Most likely the tenant has some attachment with the ward of his/her residency.	The tenant works away from his/her ward of residency and moved residencies within the ward: Most likely his/her relocation decision was not or marginally influenced by his/her workplaces choice.
	Move-out	The tenant are indifferent across workplaces and moved into his/her ward of residency from another ward: Have strong residency preferences for the current ward but such preference is not related to his/her workplace.	The tenant works within his/her ward of residency and moved into his ward of residency from another ward: Most likely his/her relocation decision was a direct result of his/her workplace choice.	The tenant works away from his/her ward of residency and moved into his ward of residency from another ward: Most likely his/her residential relocation was negatively correlated to his/her workplace choice.

After modelling, a discriminant function facilitate predicting group membership across observations. To ascertain the accuracy of the predictions, hit rations are often computed. This provide a way through which one can accept or reject the discriminant function results. For most Studies a hit ratio of above 50 percent would be accepted but a one around 75 percent or more for correctly classified observations is more preferred. Apart from the hit ratios, a discriminant function provide coefficients estimates for each variable used in the model. These may be standardised discriminant weights or the unstandardised discriminant coefficients. In either case, each coefficient represents the relative contribution of the variable to the discriminant function. Independent variables with relatively larger weights are more important than the one with smaller weights. The interpretation of coefficients which is adopted in this study is the discriminant loadings or structure correlation and by comparing the absolute sizes of the significant F values and ranking them. Larger F values indicates greater discriminatory power. This technique was preferred because it allows assessing the significance of each variable just as it is the case in logistic regression (Ingram, 2008).

3.3. Limitations of the study

The initial target was to cover all wards in Kinondoni municipality with at least 30 randomly selected respondents from each Sub-ward in order to substantiate the quantitative nature of discriminant function analyses. The Subwards were considered clusters and generalisation could have been made in relation to the whole municipality as individuals in each ward were randomly selected. However, because the final data set did not cover several important wards, the municipal level generalisability could be compromised hence the findings and the recommendations are relevant with respect to each of the 26 fully surveyed wards. For the purpose of municipal/city level policies more data are required which may however, not change the findings and the policy recommendations advanced in this paper.

4. Findings

4.1. Tenants' residential-workplace choices

A summary of the relationships between workplaces and residential location choices of tenants in the municipality are presented in Table 3. The data show that 49% (1067/2157) of the surveyed tenants are non-mover, 28% (614/2157) moved to other wards (move-out) and 22% (476/2157) moved within their wards (move-within). A further examination of Table 3 show that non-mover and move-within tenants are largely work-within (61 and 49% respectively). This provides some indication that proximity to workplaces could be a stronger incentives to non-mover tenants and move-within than move-out tenants (39%). However a close examination of the data show that move-out tenants are largely work-out tenants (50%) suggesting that moving across wards are motivated by factors other than workplaces.

The characterisation of non-movers is provided in Table 4 where they are classified into 4 groups, the majority of whom originates from institutions i.e. universities, police and military barracks; are aged around 25–35 years; have stayed in the current house for a period of 2 and three years with the exception of first-time tenants from family houses the majority of whom have stayed in their current houses for 4–5 years and those who did not specify their origin who have stayed for more than five years. In terms of family size, the majority of non-mover tenants are in a family of two with the exception of those from family houses and those who did not specify their origin the majority of whom are in a family of three. The biggest family size of more than five members among non-mover tenants is observed for those who originates from their own houses. In terms of Income most non-mover tenants have between low and moderate income. This is also reflected in their education profile where basic education dominates throughout non-mover tenant types. Further it can be observed that across tenants categories, most non-mover tenants are living in low-rise Swahili houses.

The relationship between housing location of tenants can further be understood through a map portraying tenants' workplace preferences as shown in Fig. 1 and mobility pattern as shown in Fig. 2. Within inner city, only two wards (Kinondoni and Sinza) are characterised by negative Work-out, move-out and move-in risks suggesting limited mobility in wards where tenants are more likely to work within ward. Comparatively the move-out is even larger than the move-in risk providing an indication that tenants relocates away from lower work-out risk wards. Three inner wards (Mabibo, Magomeni and Mwananyamala) have positive risks for both work-out and move-in suggesting that tenants have higher possibility of relocating towards higher work-out risk wards. In Kijitonyama, there are no strong workplace preferences as tenant work-in is just the same as work-out which is also reflected in mobility as move-in and move-out are almost the same. In Makurumla ward a positive work-out risk is coupled with a positive move-out suggesting that tenants move away from higher work-out risk wards. The remaining inner wards (Hanasifu, Kigogo, Makumbusho, Mburahati and Tandale) have positive work-out risk and negative move-in and move-out risks suggesting limited mobility in wards where tenants are likely to work out of ward. Of the last five, the last two wards, move-in risk dominate suggesting that tenants relocate towards higher work-out risk wards. Move-out risk dominate in the remaining three providing evidence that tenants move away from wards where they face a higher work-out risk. Generally the inner city tenant mobility portray a strong preference for residentially detached workplaces since out of the 12 inner wards none shows that tenant relocates towards their workplace wards. Instead a weak inference on workplace-

Table 3
Tenant residential location in relation to workplace choices

			Tenant Workplace Choice			Total
			Work-Anywhere	Work-Within	Work-out	
Residential Location Choice	**Stay-in**	Count	191	526	350	1067
		% within Tenant Relocation Choice	18%	49%	33%	100%
	Move-within	Count	41	288	147	476
		% within Tenant Relocation Choice	9%	61%	31%	100%
	Move-out	Count	69	240	305	614
		% within Tenant Relocation Choice	11%	39%	50%	100%
Total		**Count**	**301**	**1054**	**802**	**2157**
		% within Tenant Relocation Choice	**14%**	**49%**	**37%**	**100%**

Table 4
Characterisation of non-mover tenants based on the origin of their tenure.

Tenants' origin	Age groups in years		Period of stay in years		Family size		Income groups		Education groups		Housing type	
First_time Tenant Family	<25	18%	1–2	7%	Single	7%	Poor	0%	Basic	57%	Low_rise Other	43%
	25 – <30	45%	2–3	36%	Family of 2	29%	Low Income	57%	Secondary	21%	Low_rise Swahili	50%
	30 – <35	9%	3–4	0%	Family of 3	43%	Moderate Income	36%	Vocation	7%	Low_rise Modern	7%
	35 – <40	9%	4–5	36%	Family of 4	7%	High Income	0%	Tertially	14%	Mult_storey Single Family	0%
	>=40	18%	> =5	21%	Family of 5	14%	Rich Income	7%			Mult_storey Multi_Family	0%
							na	0%				
	Total	**11**		**14**		**14**		**14**		**14**		**14**
First_time Tenant Institution	<25	11%	1–2	7%	Single	23%	Poor Income	13%	Basic	58%	Low_rise Other	11%
	25 – <30	34%	2–3	35%	Family of 2	28%	Low Income	28%	Secondary	26%	Low_rise Swahili	69%
	30 – <35	28%	3–4	12%	Family of 3	20%	Moderate Income	38%	Vocation	7%	Low_rise Modern	16%
	35 – <40	13%	4–5	19%	Family of 4	10%	High Income	6%	Tertially	7%	Mult_storey Single Family	0%
	>40	14%	> =5	27%	Family of 5	18%	Rich Income	2%	na	2%	Mult_storey Multi_Family	0%
							na	12%			na	4%
	Total	**544**		**590**		**586**		**594**		**594**		**594**
First_time Tenant Own House	<25	11%	1–2	15%	Single	20%	Poor Income	10%	Basic	73%	Low_rise Other	17%
	25 – <30	34%	2–3	32%	Family of 2	29%	Low Income	39%	Secondary	20%	Low_rise Swahili	46%
	30 – <35	34%	3–4	12%	Family of 3	20%	Moderate Income	34%	Vocation	2%	Low_rise Modern	29%
	35 – <40	13%	4–5	20%	Family of 4	0%	High Income	10%	Tertially	5%	Mult_storey Single Family	0%
	>40	8%	> =5	22%	Family of 5	32%	Rich Income	5%			Mult_storey Multi_Family	5%
							na	2%			na	2%
	Total	**38**		**41**		**41**		**41**		**41**		**41**
Origin Not Specified	<25	8%	1–2	13%	Single	20%	Poor Income	13%	Basic	47%	Low_rise Other	7%
	25 – <30	23%	2–3	27%	Family of 2	27%	Low Income	13%	Secondary	13%	Low_rise Swahili	33%
	30 – <35	15%	3–4	7%	Family of 3	40%	Moderate Income	20%	Vocation	0%	Low_rise Modern	13%
	35 – <40	31%	4–5	7%	Family of 4		High Income	0%	Tertially	27%	Mult_storey Single Family	13%
	>40	23%	> =5	47%	Family of 5	13%	Rich Income	0%	na	13%	na	33%
							na	53%				
	Total	**391**		**418**		**415**		**418**		**418**		**418**
Total	<25	11%	1–2	7%	Single	22%	Poor Income	11%	Basic	62%	Low_rise Other	11%
	25 – <30	33%	2–3	36%	Family of 2	29%	Low Income	29%	Secondary	24%	Low_rise Swahili	66%
	30 – <35	29%	3–4	11%	Family of 3	20%	Moderate Income	39%	Vocation and	6%	Low_rise Modern	18%
	35 – <40	13%	4–5	18%	Family of 4	9%	High Income	7%	Tertially	7%	Mult_storey Multi_Family	0%
	>40	14%	> =5	27%	Family of 5	20%	Rich Income	3%	na	2%	Mult_storey Single Family	1%
							na	11%				4%
	Total	**985**		**1063**		**1056**		**1067**		**1067**		**1067**

NB.
i) Education Groups: Basic, Secondary, Vocational and Technical and Tertiary.
ii) Income Groups: Poor -Income is below Tshs 100,000, Low-Income - Income range is Tshs. 100,000–199,000, Moderate-Income range is Tshs. 200,000–399,000, High-Income - Income range is Tsh. 400,000–999,000 and Rich - Income is Tshs. 1,000,000 or above.
iii) Housing Types: Mult-storey Single-family, Mult-storey Multiple-family, Low-rise Modern, Low-rise Swahili, Low-rise Others.

residential proximity preference can be made with regard to 4 out of 12 wards where tenants relocated away from higher work-out risk wards.

In three of the six middle wards (Makuburi, Kawe and Mbezi) a positive work-out risk is associated with a negative risk for both move-in and move-out suggesting limited mobility in a high work-out risk wards. However in Makuburi and Mbezi, move-out risk dominate over move-in suggesting that tenants relocates away from wards where they face a relatively higher work-out risk. In Kawe, the move-in dominates suggesting that tenants relocates towards higher work-out risk areas. Two additional middle wards (Goba and Kimara) are characterised by a positive risk for both work-out and move-in suggesting that tenants relocate towards higher work-out risk areas. The remaining ward (Ubungo) has negative risk for work-out, move-out and move-in suggesting limited mobility in low work-out risk wards. However, since move-out risk dominate tenants relocates away from a lower work-out risk ward. Similar to inner wards, there are no evidence among the middle wards to suggest any residential mobility towards tenants' workplaces.

In the outskirt, four out of eight wards (Kibamba, Kwembe, Mabwepande and Msigani) have positive work-out risk and negative risks for both move-in and move-out suggesting lower mobility in wards with higher work-out risk. However, since move-out dominate in all four, tenants relocates away from wards having a higher work-out risk. The remaining four outer wards are all different. In Wazo ward a positive work-out risk is associated with a positive move-out suggesting that tenants relocate away from higher work-out risk wards. In Bunju, neither workplace nor move-in preferences was revealed but since a negative move-out was observed, it can be urged that tenants relocates towards any ward regardless of their workplace proximities. In Kunduchi the work-out risk is positive but move-in preferences were relatively strong suggesting that tenants move towards lower work-out risk wards. In the last outer ward (Mbezi), positive work-out risk is associated with a positive move-out risk suggesting that tenants relocates towards higher work-out risk wards. Of the eight outskirt wards only one ward provide direct and strong indication that tenants relocates towards their workplaces.

4.2. Significant determinants of residential-workplace decision

The above first stage analysis provide some indication that tenants relocates away from their workplaces. To get a glimpse of the where and why questions, the discriminant function analysis results are presented. The results of the first discriminant function analysis for Move-in-Work-in tenants are presented in Part A of Table 5. It can be observed that significant predictors include two location variables of Kibamba and Kunduchi wards. This confirms previous observations where kunduchi was characterised by move-

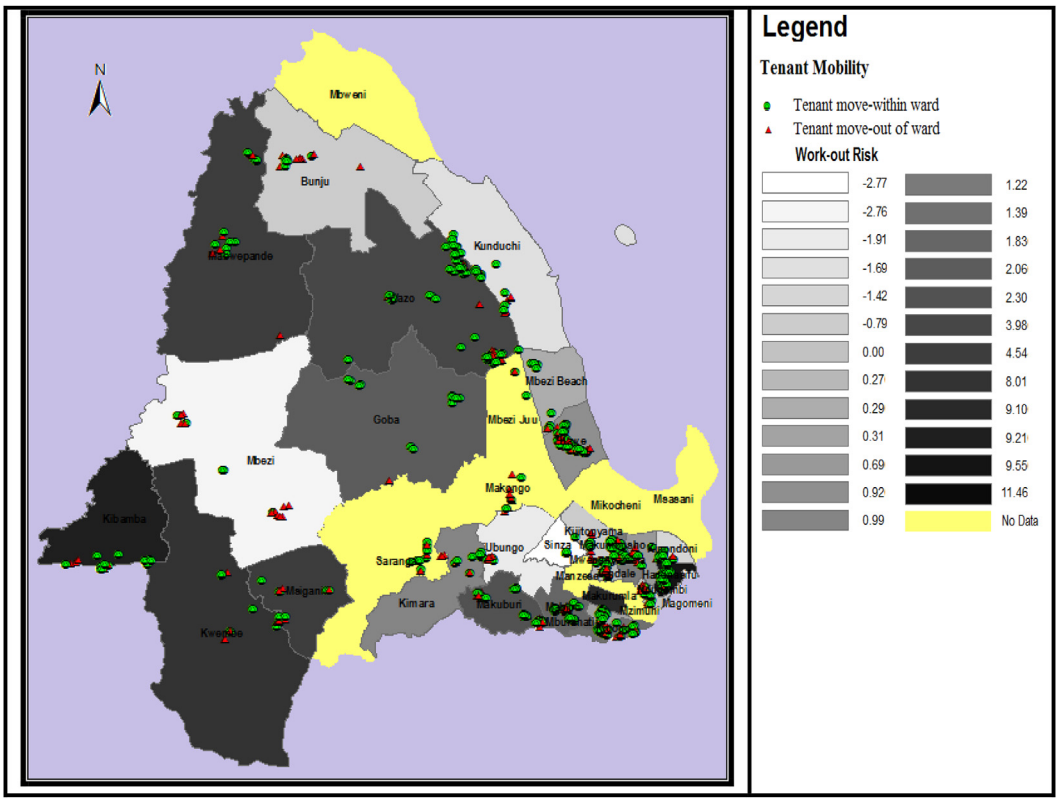
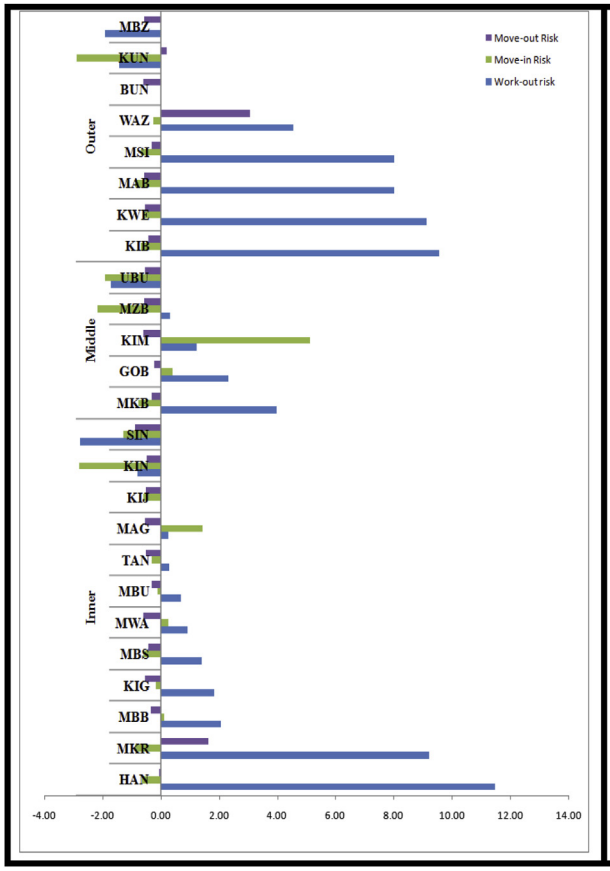


Fig. 1. Kinondoni Administrative wards showing tenant work-out risk and sample tenant locations.



S/N	Abbreviation	Name of Ward
1	BUN	Bunju
2	GOB	Goba
3	HAN	Hananasifu
4	KAW	Kawe
5	KIB	Kibamba
6	KIG	Kigogo
7	KIJ	Kijitonyama
8	KIM	Kimara
9	KIN	Kinondoni
10	KUN	Kunduchi
11	KWE	Kwembe
12	MAB	Mabwepande
13	MAG	Magomeni
14	MAK	Makongo
15	MBB	Mabibo
16	MBJ	Mbezi Juu
17	MBS	Makumbusho
18	MBU	Mburahati
19	MBW	Mbweni
20	MBZ	Mbezi
21	MIK	Mikocheni
22	MKB	Makuburi
23	MKR	Makurumla
24	MNZ	Manzese
25	MSA	Msasani
26	MSI	Msigani
27	MWA	Mwananyamala
28	MZB	Mbezi Beach
29	SAR	Saranga
30	SIN	Sinza
31	TAN	Tandale
32	UBU	Ubungo
34	WAZ	Wazo

Fig. 2. Tenants' work-out, move-out and move-in risks aggregated for each ward.

in at a relatively lower work-out risk while Kibamba was characterised by tenant move-out at a higher work-out risk. In either case tenants may be presumed to relocates towards their workplace wards though evidence for Kibamba are weak. The most important characteristics for mobile tenants relocating towards their workplace wards, include higher income, relatively larger family size and lower rent. Despite having a limited number of predictors, this model classifies most tenants correctly leading to a loading of 83.1% for original ungrouped cases being correctly classified as shown in Part D of Table 6.

The results for Non-mover-Work-in group of tenants are presented in Part B of Table 5. It can be observed that 15 variables are significant predictors. Out of the 15 variables, five were significant predictors of the YES function including two location variables which are Kawe, and Mabwepande. This suggest that many tenants in these wards are non-mover and work within their wards of residency. Both Mabwepande and Kawe are characterised by positive Work-out risk but differ in terms of tenants moving behaviour. Mabwepande has a higher move-out risk while Kawe has a higher move-in risk. Important predictors for non-mover tenants who work within their wards include having basic education, being experienced tenants and married. Tenants under this category are unlikely to reside in Wazo, Hananasifu, Mabibo and Makumbusho wards. Based on previous analyses the later three wards are characterised by high work-out risk and have higher move-out. This clearly supports the classification that such wards are unlike residencies for non-mover tenants who work within their wards. Non-mover tenants working within their ward of residency are also unlikely to be employees, to be male, to rent larger spaces, to be self employed, to live in cleaner environments and to be married. An examination of the classification results in Part D of Table 6, shows that this model correctly predicts 67.2 percent of the original cases.

The results of a third discriminant function are presented in Part C of Table 5. They show that a total of six variables are found to be significant predictors of group membership for mover-tenants who work in wards other than their ward of residency all of them being more important for the YES function. Location specific predictors identified are Wazo, Hananasifu and Makuburi wards. It should be noted that Wazo and Hananasif were observed to be unlike predictors of the previous work within ward groups of tenants hence perfectly fits under this category. All the three wards identified under this function supports the data presented in Figs. 1 and 2. That is the three wards are important destination for mover-tenants who work away from their wards of residency. Non location predictors characterising tenants under this category include being a contracted employee, living in houses with water and being a male tenant. The first and the third of these predictors were unlikely predictors of the first pair of functions hence properly fit under this category. The classification results for this function are presented in Part C of Table 6 where it can be observed that the model's prediction accuracy is closer to 81%.

The results for the last model are presented in Part D of Table 5. It can be observed that a total of eight variables were identified as significant in identifying non-mover-tenants who work outside their ward of residency. Of the eight, seven are likely predictors for group membership while one is unlikely predictor. The location specific predictors in the model include three middle wards (Goba, Makuburi and Kawe) and two central wards (Magomeni and Mburahati). These observations supports the data presented in Fig. 1 with the exception of Kawe. Fig. 2 suggest Kawe ward is a

Table 5
Discriminant function coefficients.

	Variable name (step[b])	A			B			C			D		
		Model 1: move-in to Work-in[a]			Model 2: stay-in to Work-in[a]			Model 3: move-in to Work-out[a]			Model 4: stay-in but work-out[a]		
		No	Yes	Wilks' Lambda	No	Yes	Wilks' Lambda	No	Yes	Wilks' Lambda	No	Yes	Wilks' Lambda
1	Kibamba	2.76	9.32	0.94									
2	Kunduchi	0.10	3.82	0.88									
4	Mabwepande				1.41	3.19	0.87						
7	Mabibo				3.12	2.30	0.84						
8	Makumbusho				1.20	0.76	0.83						
5	Wazo				0.43	(0.74)	0.86	2.13	6.80	0.85			
6	Hananasifu				2.31	1.56	0.84	0.80	2.66	0.75			
3	Kawe				2.09	2.90	0.93				1.58	1.91	0.97
9	Makuburi							1.16	3.42	0.73	1.67	2.42	0.98
10	Goba										1.00	2.62	0.99
11	Magomeni										1.58	2.43	0.98
12	Mburahati										1.60	2.40	0.97
13	Average Monthly Income	(0.02)	0.08	0.85									
14	Rent per Room[b]	8.46	4.12	0.82									
15	Current Family Size[b]	1.40	1.81	0.79									
16	Respondent is Male				1.56	1.01	0.91						
18	Employed Through own_Self				2.62	1.97	0.86						
21	Moved_In to Cleaner Neighbourhood				1.57	1.18	0.85						
22	Several Time Tenant				1.92	2.27	0.84						
25	Number of Bedrooms				2.70	2.46	0.83						
26	Married				1.82	2.10	0.83						
19	Employed Through Contract				2.20	1.18	0.96	1.71	3.50	0.91			
20	Education Category Primary				2.17	2.51	0.85				2.59	2.84	0.97
17	Rents a Living Room				0.38	(0.18)	0.89				1.81	1.48	0.99
23	Household Male							6.22	7.50	0.71			
24	Moved_In to House with Water							1.66	2.96	0.78			
27	High Income Category										1.71	2.37	0.98
	(Constant)	(4.66)	(6.87)		(6.33)	(5.67)		(3.75)	(6.96)		(2.10)	(2.42)	

[a] Fisher's linear discriminant functions.
[b] Value is Multiple of 100,000.

Table 6
Classification results.

				A			B			C			D		
		Move-in and work-in		Model 1: move-in to Work-in[a]		Stay-in and work-in	Model 2: stay-in to Work-in[b]		Move-in but work-out	Model 3: move-in but Work-out[c]		Stay-in but work-out	Model 4: stay-in but work-out[d]		
				Predicted group membership	Total respondents		Predicted group membership	Total respondents		Predicted group membership	Total respondents		Predicted group membership	Total respondents	
				No	Yes		No	Yes		No	Yes		No	Yes	
Cases Selected	Original	Count	No	1060	96	1156	No	835	440	1275	No	1120	162	1282	No	961	451	1412
			Yes	126	29	155	Yes	229	536	765	Yes	93	111	204	Yes	272	212	484
		%	No	91.7	8.3	100	No	65.5	34.5	100	No	87.4	12.6	100	No	68.1	31.9	100
			Yes	81.3	18.7	100	Yes	29.9	70.1	100	Yes	46	54	100	Yes	56.2	43.8	100
	Cross-validated[a]	Count	No	1059	97	1156	No	828	447	1275	No	1073	209	1282	No	961	451	1412
			Yes	132	23	155	Yes	238	527	765	Yes	106	98.0	204	Yes	311	173	484
		%	No	91.6	8.4	100	No	64.9	35.1	100	No	84	16	100	No	68.1	31.9	100
			Yes	85.2	14.8	100	Yes	31.1	68.9	100	Yes	52	48	100	Yes	64.3	35.7	100
Cases Not Selected	Original	Count	No	469	39	508					No	473	68	541				
			Yes	48	12	60					Yes	69	32	101				
		%	No	92.3	7.7	100					No	87.4	12.6	100				
			Yes	80.0	20.0	100					Yes	68.3	31.7	100				

[a] 83.1% of original grouped cases correctly classified; 84.7% of original unselected cases correctly classified; 82.7.
[b] 67.2% of original grouped cases correctly classified; 66.4% of cross-validated grouped cases correctly classified.
[c] 82.8% of original grouped cases correctly classified; 78.8% of original unselected cases correctly classified.
[d] 61.9% of original grouped cases correctly classified; 59.8% of cross-validated grouped cases correctly classified.

predominantly move-out ward with higher work-out risk while the observation in this last discriminant function suggest that the ward is dominated by non-mover tenants. This provide some indication that most non-mover tenants from Kawe ward work in other wards. Non location specific predictors for this category of tenants are high income and having basic education. It seems non-mover tenants who work out of wards are the one who also earn higher income though most of them only have basic education. The classification results for the Non-mover-Work-out function are presented in part D of Table 6. It can be observed that the predictive power of the model is 61.9% and 59.8% for the original grouped and validated cases respectively.

5. Discussion of the findings

5.1. Tenants' workplace and residential preferences

Based on the observations made in this study, tenants' mobility is connected to workplaces in two major perspectives. The first is that, the higher is the probability of moving into a ward the higher is the work-out risk. This translates to mean that a tenant moving towards a particular ward is more likely to be moving against his/her workplace/s. This relationship is stronger in wards that are referred to here as “inner” and “middle” city wards. The second is that work-out risk in “inner” city wards is shaped by the formality nature of each ward whereby tenants employed in the informal sectors are more likely to relocate towards informal or formerly informal wards with marginal chances of moving away from those wards. In relation to both perspectives it is argued that tenants who work closer to their residencies tend to stay far from the city centre most likely in the outskirt or closer to the outskirt in line with Acheampong and Anokye (2013) and in certain places closer to the CBD where informality is highly prevalent. However, most of the work-within ward tenants are non-movers. From the above perspectives it is clear that, tenants working away from their ward of residency are more likely to be those who have shifted into their current wards from other wards. In this regard, residential mobility for tenants in the municipality is more likely to relocate a tenant further away from his/her workplace.

The above observation can be explained in terms of the nature of residential development in the municipality. For a long time the municipality has been developing horizontally with people constructing houses privately and informally (Kironde, 1995). The housing construction process is incremental where items and materials are accumulated over time. For a poor tenant living closer to the city centre, the probability of affording a housing plot is higher in the outskirt than closer to the CBD. However given the high tenure insecurity in the outskirts (Kombe, 1994; Kironde, 2000), once a plot has been acquired it must be protected through physical presence or by immediate construction. But since poor tenants can only afford physical means to protect their acquired rights, they must move towards the wards where they intend or have acquired plots primarily for tenure security reasons. Given the nature of their employment, they are unable to find comparable activities in the outskirt and have to work away from their ward of residencies. That could be one of the main reasons for the observed mismatch between workplaces and residential mobility of tenants. The explanation is also supported by Limbumba (2010) where tenants moved into certain localities because of the availability of cheap plots in the 1970's and early 1980's making it likely for them to become home owners. This desire for home ownership has also been observed by Burgess (1992) where moving tenants were observed to increase their travel to workplaces after they had moved and in Komu (2013) where the desire for ownership was more induced by landlords'

harsh behaviour.

For non-mover tenants working within their wards of residency, it has been observed that they are significantly linked to domestic activities, being females and have meagre income. These attributes may prevent them from accessing larger and high quality housing. The observation that non-mover tenants working within their ward of residency are likely to rent smaller space compared to other tenant groups suggest that they will concentrate a lot of activities in smaller spaces leading to deterioration of environmental qualities which is a typical characteristics of their residency wards. It is important to note that the informal history of some of these wards might have created a "legacy effect" which inhibits housing improvement by owners (Navarro & Turnbull, 2010). Further, tenants in these wards may be trapped in terms of residential options because many are experienced tenants who have locked themselves within the local limits of their wards. Experienced tenants are likely to exhaust opportunities that exist within their local submarket but fail to capture opportunities in other submarkets.

Among the significant determinant of mobility for tenants working far from their residential wards is gender being male. This suggests that females household heads are more likely to work at home because, although family responsibilities and marital status inhibit tenants mobility, it has very limited effects on males. That is male tenant household head who moved-in from other wards tend to work out of the wards while non-mover tenants are less likely to be male i.e. mostly females. This could be a result of the traditional nature of activities done by females who tend to dominate domestic activities. Although this signals that males who are mobile are likely to be single, the fact that single females do not appear on the mobile side suggest that they might be in the non-mover category. However evidence to support this from this study is very marginal as the predictor "occupation category domestic" did not appear to be significant in all the discriminant functions analysed.

While many tenants seem to be less concerned with housing services, mobile tenants moving towards wards other than their workplaces are significantly associated with houses that have water supply. They are also more likely to be employed through contracts and to be males. This provide further evidence that male tenants are far less likely to work in their wards of residencies. The observation that many of the tenants who work away from their residential wards are contracted employee suggest that they have full control of their employment hence being far from workplaces does not threaten their work attendance. Living in houses that have water provides an indication that tenants experiencing the commuting disutility are compensated through housing quality. Non-mover tenants working away from their residential wards tend to rent smaller spaces meaning that they are likely to face similar problems as non-mover tenants working within their wards. However, unlike non-mover tenants who work in their ward of residency, non-mover tenants who work away from their ward of residency, have higher income something which facilitate commuting. This suggest that residential location decision could be more a matter of affordability rather than workplace preferences (Acheampong & Anokye, 2013; Aluko, 2011).

5.2. Policy implications

A tenant balanced residential ward entails replacement for each move-out with a move-in, otherwise a mismatch between move-in and move-out creates either upward pressures on rental housing which is not good for tenants within and outside the ward or a higher vacancy rate which is not good for owners. A continued higher move-out without the corresponding move-in can lead to higher vacancy rates, discourage construction activities, reduce job prospects and increase the work-out risk among tenants' households. If the welfare of tenants is the only issue for policy consideration, it can be argued that the nature of their occupations will determine workplace choices during higher vacancy rate. The higher vacancy rate in owner-built housing is manifest through highly dilapidated housing, smaller rooms and the lower rents charged. That is instead of laying their houses/rooms vacant as a result of move-out, owners will make them "cheaper" but at the expense of housing size and neighbourhood quality. Therefore the relatively higher move-out compared to move-in can create 'vacant housing' but the associated vacancy cost is somehow internalised by owners through some informal activities that reduces rent per room but at the expense of both housing size and neighbourhood quality. As rooms becomes smaller and cheaper, in-house tenants are not only the prime customers of the created space but also employee in the informal construction activities. Over time these landlords' initiatives have increased housing congestion thus worsening both housing and neighbourhood quality.

The policy option available is to use work-out risk to improve the environmental and housing qualities by defining and publishing land uses in informal settlements which will increase the work-out risk. There could be some concern over the risks associated with separating workplaces from residential areas. The first is related to the issue of commuting cost. The reality is that in Dar es Salaam tenants are commuting from periphery residential towards closer to CBD workplace wards. Road congestion is very high and commuting expenditure per household is very high too. However these costs are borne at neither improvement in housing nor environmental quality. A policy induced (government-led) increase in work-out risk has the power of improving both neighbourhood and housing quality. When the Government declare an informal area as a residential neighbourhood for example, owners realise an improved tenure status for their houses while commercial property owners seek for alternatives as the market value of commercial properties in a legally recognised residential area deteriorates. As a result housing owners will improve housing while the government will feel obliged through its expenditure programme to provide services in the area. Similarly, individuals can apply for certain services such as water and electricity leading to improved housing quality. Therefore though the commuting cost concern is relevant for mover-tenants, It is inescapable. The enforcement of land use plans will not hurt anyone any further, at least among poor tenants but it has the potential of attracting public and private initiatives to improving the housing and neighbourhood qualities.

The second concern is for low-income tenants who always work closer to their homes. Enforcing a land use plan mean forcing them to work far away from their home something which will not only increase commuting cost but also disable them from attending domestic and child caring duties. From the observations made in this study, increasing the ward level work-out risk is not associated with any significant disutility among self employed lower-income households. Similarly, at the community level, a higher work-out risk can help in the identification of employed household who have strong preferences for workplaces. This is because the separation of residential areas from commercial or industrial areas makes it difficult for employed tenants to find jobs within their residential proximities. As a result such a strategy will trigger housing searches in wards having relatively lower workout risk by employed tenants. If increasing ward level work-out risk (defining land uses) is carried out sub-ward-after-sub-ward it will help identify tenants households who are in dare need for housing. This study suggest that household in dare need of housing are self employed tenants moving towards higher work-out risk areas.

6. Conclusion

Tenants' mobility in Kinondoni municipality tend to relocate them away from their workplaces specifically to outskirt wards where they presumably plan to buy plots and construct their own houses. Being closer to where one has a plot mean lower construction cost because of the lower supervision and labour cost especially for low-income tenants who have relatively lower opportunity cost of own labour. Even if these tenants have not started building their own houses, higher tenure insecurity in the outskirt wards require physical presence as a means of protecting one's rights necessitating early moves into those outskirt wards. Similarly proximity to where plots are potentially available mean more tenure certainty at purchase. In wards closer to the city centre, informality tends to attract more low-income tenants to settle-in than move-out thus curtailing the move-in-move-out equilibrium. The results are highly dilapidated neighbourhoods with an overwhelming number of tenants. The observation that relatively lower income tenants are living in many highly dilapidated wards some of which being closer to the CBD while those with relatively higher income live in outer wards, suggest that the proper enforcement of a land use plan has the potentials of improving both housing and neighbourhood quality. This is because government-led enforcement of land use plans can motivate move-out among employed tenants in search for housing closer to their workplaces creating vacant housing which motivates stay and move-in among self employed tenants. This strategy will not only equalise move-in and move-out but also motivate private initiatives to improve housing quality and force public authorities to provide the necessary public infrastructure.

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