Age schedules of intra-provincial migration in Kenya

Victor Awuor, George Odipo & Alfred Agwanda

Population Studies and Research Institute,

University of Nairobi, Kenya

Email: ataotieno@uonbi.ac.ke

Abstract

Background: Migration today is a complex process determined by inter-related historical, geographical, economic, sociological and political factors. There are linkages between life-course transitions and patterns of movement necessitating estimation of migration propensities by age, sex and other characteristics. However, analysis of age specific migration propensities has been limited in developing countries.

Data source and methods: Data was derived from the 2009 Kenya population and housing Census via the IPUMS data Series. The standard 7-parameter age migration schedule due to Rogers and Castro (1981) was fitted using Microsoft excel workbook using solver.

Results: Large volumes of movements occur between ages 17 and 24.The peak ages at migration are similar to those observed in Asian migration patterns. The age pattern for all the regions had two peaks contrary to the standard with four.

Conclusion: The results suggest that the main contributory factors behind migration schedules are schooling, labour force and associational moves.

Keywords: Age Schedules Migration Provincial Kenya

Introduction

Migration is part of the process of transformation of social structures and institutions (King 2012) and is not only affected by broad dynamics of national and global social change, but it is part and parcel of that change (Castles, 2010; Faist, 2010; Portes, 2010). Migration embraces all dimensions of human experience (Castles 2010: 1596) and therefore migration needs to be understood within the wider phenomena of social change and social transformation (Castles, 2010; Faist, 2010; Portes, 2010). Early research on economic development and migration nexus concluded that economic development can be associated with changes in the distribution of income which in turn affects migration (Myrdal, 1957; Williamson 1965; Kanbur and Venables, 2005). The act of migration constitutes today an increasingly complex process, determined by often inter-related historical, geographical, economic, sociological and political factors. Therefore internal migration trends are strongly influenced by factors related to a country's economic and structural context (Oucho, 1998; Black et al, 2005; de Haas, 2010). However, migration patterns vary substantially across regions and countries and migration flows have changed considerably over time enhanced by accelerated development of communication, transport, trade and information networks (Ginsburg et al 2016).

Determinants of internal migration

The typological and terminological complexity of migration makes studies in this field challenging for the social sciences (King, 2012). However, the selective nature of migration cuts across different analytical traditions on why people participate in migration (De Haan, and Rogaly 2002; Ginsburg et al 2016). The human capital migration theory (Taylor 1999) argues that individual characteristics play a bigger role in determining the likelihood to migrate or not, and the returns expected in the destination areas. Migrant self-selection is driven by factors such as; education levels, skills, age, risk taking capacity, capacity to face new situations, entrepreneurship and ethnicity.

A key regularity in the selective nature of internal migration is the age-selective process, with young adults being the most mobile group. Migration varies along the life course and there are linkages between life-course transitions and patterns of movement (Bernard et. al., 2014a). The age profiles and movement behaviour are largely consistent across different populations (Courgeau 1985; Rogers 1988).

Educational attainment which represents individual's human capital, acts as an enabler of migration by improving employment opportunities and the likelihood of securing work. In economic literature, educational attainment is considered as a primary determinant of internal migration, particularly in the rural-to-urban direction (World Bank 2009). But educational aspirations may themselves drive movement and influence migration intentions as well as migration behaviour (De Jong and Fawcett 1981; De Jong 2000). This implies that human capital acquisition may be both a driver and a consequence of movement. Despite these observations, studies of migration and education linkages have produced results that are divergent and inconsistent (Williams 2009).

Labour migration theories anchored in rational choice framework tradition suggests that individuals with better education, skills and labour market experience are more likely to migrate because of their greater ability to capture its rewards (Gould 1995; Ginsburg et al 2016). These theories assume that the poorest are selected out of migration because they cannot afford it, and because their lower human capital implies lower expected rewards (Ginsburg et al 2016). The new economics of migration also suggests that the poorest do not have access to migration opportunities because of their lower capacity for risk-taking while literature on kinship networks in migration suggests that the poorest lack social capital that facilitates migration (Ginsburg et al 2016). Nevertheless, Ginsburg et al (2016) note that empirical evidence suggests that the poorest and richest have lower migration propensities.

The classic push and pull forces theory indicates that people from poor regions migrate to richer rural and urban locations and may even be accentuated with rising population pressure and deteriorating land and water availability(Deshingkar and Grimm, 2004). However, new patterns have also emerged such as; rising urbanization and manufacturing, increased occupational diversification and mobility in response to macro-economic reforms. A more recent push factor appears to be the observed fall in agricultural commodity prices brought about by macroeconomic reforms linked with liberalization and globalization policies. However, de Haas (2010) in reformulation of Zelinky's 1971 hypothesis asserts that local development context may affect migration propensities in two different ways. First, the extent to which local opportunities allow people to lead the lives they aspire to is likely to affect their migration aspirations and secondly, economic growth and other improvement in living standards are likely to increase people's capability to migrate by increasing their ability to bear the costs and risks of migration.

A number of factors such as marriage, family structure, and cultural norms may influence migration but studies suggest that predominance of the key factors may be context dependent. In many sub-Saharan African countries, many households consider migration as a strategy to improve their livelihood, minimize their risks and diversify their income sources (Deshingkar and Grimm 2004; De Haan 1999; Mercandalli and Losch, 2017).

Deshingkar and Grimm (2004) contend that in many poor countries rural-rural migration still dominates with labourers from poorer regions travelling to the agriculturally prosperous, often irrigated, areas which have more work(Oucho, 1981). Rural-rural migration is typically undertaken by poorer groups with little education and other assets because it requires lower investments. On the other hand, rural-urban migration is rapidly gaining in importance especially in the urbanizing economies since rural-urban wage differentials grow and the returns from migration increase. Urban-rural movement can occur when people retire back to their villages with retrenchment under structural adjustment programmes especially in the case of some sub Saharan countries (Tacoli 2001). A crucial factor in migration appears to be access to land in both the city and rural areas in sub Saharan Africa, poorer people move shorter distances because of their limited resources, skills, networks and market intelligence while temporary migration from smallholder farming areas has been an important means of supplementing incomes and raising the productivity of subsistence agriculture through investments in capital, seeds and irrigation (Bigsten, 1996; Deshingkar and Grimm 2004)..

Contextual factors influencing internal migration in Kenya

The initial insights into internal migration in Kenya focused mainly on migration flows and migration typologies (Ominde, 1968; Rempell 1977; Oucho 1981; Oucho 1988). Two main typologies were identified to be prominent at that time: rural to rural migration; and rural to urban migration (Ominde, 1968; Oucho, 1988; Knowles and Anker 1977). Economic disparities between geographical areas, and the search for employment and resettlement, especially in the former "White Highlands" (Oucho, 1981; Oucho and Odipo, 2000) stimulated migration patterns. The attraction to Kenyan urban centres – especially Nairobi – has been mainly due to its dominance in the national economy, including its formal and informal sectors, as well as its services sectors (Agwanda et al, 2004).

In the first decade of post-independence period the structure of the economy did not change significantly while conditions that contribute to rural-urban migration intensified (Rempel, 1981; Oucho 1988). Population growth was rapid, educational opportunities expanded considerably in the rural areas and the well-educated had increased access to those high-wage jobs previously held by Europeans and Asians (Rempel, 1981). Given limited ability to absorb the urban in-migrants in productive employment at that time, the government found it necessary to resort to various indirect means of controlling the extent of rural-urban migration (Rempel, 1981). The post-independence censuses between 1969 and 1989 indicate that the migration patterns in Kenya could be summarized into six broad areas (Oucho and Odipo 2000), namely: (a) migration to resettlement areas, (b) migration to cash crop growing areas, (c) seasonal migration within nomadic areas, (d) cross border migration in cross border regions, (e) migration from Western and Eastern regions of Kenya to other parts of country, and (f) migration from rural to urban areas.

Studies on contemporary Kenyan migration to urban centres heavily influenced by Harris – Todaro's 1970 hypothesis asserts that the search for employment opportunities, alongside the anticipated access to better educational, health, administrative, commercial and social amenities, and the 'glamour of the city 'continue to determine migration flows between rural and urban centres. Conversely, migration from urban centres to other urban and rural areas is explained by retirement, old age, and transfers in employment (Oucho 1988; Agwanda et al, 2004).

Other studies in Kenya have focused on the resource distribution patterns and their association with migration flows (Ominde, 1968; Anker and Knowles 1977; Oucho, 2007; Oucho 2016). In particular, Rempel (1981) asserted that internal migration in Kenya may be in direct response to the development patterns. While Oucho (2007) noted that the observed sharp contrasts between the more developed central parts of Kenya (Central and Nairobi Provinces) and the least developed Northern Kenya and Western Kenya (Nyanza and Western Provinces) was an indication that there is a potential relationship between the spatial inequalities and migration patterns in Kenya.

Wakajumah, (1986) and Oucho, (1988) noted that in the immediate post-colonial period, migration may have been a response to land inequalities, so that the regions with high land inequalities had higher out migration propensities. But more recently studies showed that regions with high land inequalities still have higher out migration propensities (Oyvat and Mwangi wa Gĩthĩnji, 2017). Oyvat and Mwangi wa Gĩthĩnji (2017) further show that higher land inequality in rural areas increase propensity for migrating to other rural areas, smaller cities or towns, four largest urban areas and suburban Nairobi but not metropolitan Nairobi. However, higher living costs, uneven distribution of infrastructure and the insecure environment in Nairobi makes the framework based on distribution and expected incomes weak in explaining the migration from rural villages to Metropolitan Nairobi (Oyvat and Mwangi wa Gĩthĩnji, 2017).

Studies on the patterns and determinants of migration across Africa have been hampered by a lack of consistency in definitions, measures, timing and analysis techniques (Ginsburg et. al., 2016). For example, Bell et. al., (2015) contend that even censuses that collect migration data have widely varying practices in definitions and type of information collected. The methodological challenges that confront scholars in analysis of migration stems from the two most common forms of data: migration transitions or migration events. For many countries in sub- Saharan Africa, the only data available is the census which only produces transition data (but not event data) which cannot be utilized to study migration types such as chain migration, circular or temporary migration.

Study focus

Measuring migration and understanding its important role in spatial population dynamics have been receiving increasing attention in recent years (Bernard et. al., 2014a; Bernard et. al., 2014b). Research has been broadly concerned with the estimation of migration flows, the identification of migration propensities by age, sex and other characteristics (Rogers and Castro, 2001; Rogers et al., 2003; Rogers and Jordan, 2004). More importantly, use of indirect estimations of age-specific migration flows has been developed and extensively used in developed countries (Rogers and Castro, 2001; Rogers et al., 2003; Rogers and Jordan, 2004), but analysis of age specific migration flows has been has been limited in developing countries (Raymer and Rogers, 2006; 2008). Raymer and Rogers (2006) observation of lack of analysis of age schedules of migration in developing countries motivated this study. This study therefore applies the standard migration schedule due to Rogers and Castro, 1981 to 2009 Kenya Census data so as to establish prevailing age-sex migration patterns at sub national levels. During the 2009 Kenya census, data was collected by households and segregated by distinct administrative units, such as sub-locations, locations, divisions, districts and provinces. After the

promulgation of Kenya 2010 Constitution, regions are the equivalent of provinces, then.

Age patterns of demographic events

Empirical schedules of age-specific rates of demographic events exhibit remarkably persistent regularities in age pattern (Rogers and Watkins, 1987; Raymer and Rogers, 2006; 2008). Mortality schedules normally show a moderately high death rate immediately after birth, after which the rates drop to a minimum between ages 10 and 15, and then increase slowly until about age 50, and thereafter rise at an increasing pace until the last years of life (Rogers and Watkins. 1987). Fertility rates generally start to take on nonzero values at about age 15 and attain a maximum somewhere between ages 20 and 30. The fertility curve is uni-modal and declines to zero once again at some age close to 50 (Rogers and Watkins, 1987). Similar unimodal profiles may be found in schedules of first marriage, divorce, and remarriage (Rogers and Watkins 1987).

The most prominent regularity in age-specific schedules of migration is the high concentration of migration among young adults. Rates of migration also are high among children, starting with a peak during the first year of life, dropping to a low point at about age 16, turning sharply upward to a peak near 20 to 22, and declining regularly thereafter, except for a possible slight hump at the onset of retirement and possibly an upward slope after that hump (Rogers and Watkins. 1987). Underlying these persistent regularities in the age patterns of migration are a collection of different cause-specific age patterns (Rogers and Castro, 1981). Migrations due to marriage and education are concentrated between the ages of 10 and 30 years and are essentially uni-modal in age profile (Rogers and Castro, 1981; Rogers and Watkins, 1987; Raymer and Rogers, 2006). Migrations caused by change of employment and moving closer to the place of work have profiles that are bimodal, with local peaks during infancy and during the early years of labor-force participation (Raymer and Rogers 2006). The age profiles of migrants are similar to those of the aggregate migration schedule, exhibiting roughly the same peaks: during the early years of labor force participation and at retirement.

Migration in Sub Saharan Africa has tended to follow a uni-modal distribution on age with peaks in early adulthood and declines upon exit from the labour market (Oucho and Gould 1993; Beauchemin and Bocquier 2004; Collinson 2009). However, regularities of migration by age vary by sex. The age pattern differences by sex are typically due to differences in the timing of life-course events between the sexes (Rogers 1988). Females tend to move at younger ages in connection with marriage, while movements amongst males may be prompted by economic opportunities or employment (Agesa and Agesa 1999; Clark and Cotton 2013). Males may also be more likely to participate in return migration prompted by retirement or ill health (Collinson 2009).

Health is apparently an important cause of migration only for the elderly (Raymer and Rogers 2006). Migration age compositions have been considered to reflect particular population age compositions. Population compositions influence key aspects of migration age compositions (Little and Rogers 2007). In addition, a large proportion of total migration is composed of individuals whose moves are dependent on those of others (Ryder 1978). Migration at early ages corresponds with movement of parents or caregivers (Long 1992; Collinson 2009; Madhavan et al. 2012). The other associational moves may include: wives who migrate with their spouses; grandparents who may migrate with their children. To the extent that migration is undertaken by families as a unit, the age composition of migrants tells us something about family patterns.

More recently, researchers on internal migration have begun to focus on analysis of migration by linking change in age patterns of migration and other life course events. Using data from 18 countries, Bell and Muhidin (2009) identify marked variations between countries in three distinct features: the age at which migration peaks, the intensity at the peak, and the shape of the peak itself. These migration age profiles broadly mirror the age structure of key life-course transitions, especially among women (Bernard et. al., 2014a).

Analytical framework

Rogers et al (1978) introduced model migration schedules that have become the preeminent method used to compare age profiles of migration. In the revised model(Rogers and Castro, 1981), the standard model migration schedule is the sum of five component curves (Rogers and Watkins, 1987) in which migration intensity is composed of five components often referred to as the sum of ; childhood curve, labor force curve, retirement curve, elderly curve and a constant. Expressed algebraically, the full model migration schedule contains 13 parameters (Rogers and Watkins, 1987) and may be written as in equation 1:

$$M(x) = a1 \exp(-\alpha 1 x) + a2 \exp\{-\alpha 2 (x-\mu 2) - \exp[-\lambda 2(x-\mu 2)]\} + a3 \exp\{-\alpha 3 (x-\mu 3) - \exp[-\lambda 3(x-\mu 3)]\} + a4 \exp(\lambda 4 x) + c \quad (1)$$

The parameters of these model schedules provide summary measures of how migration varies with age,

and these have subsequently been used to compare age patterns of migration across a number of countries (Kawabe, 1990; Ishikawa, 2001; Rogers et al. 2007).

Almost all age profiles will require the childhood, labor force and constant components, but only some will include retirement and elderly curves. When retirement and elderly curves are omitted then the model reduces to seven parameters comprising; childhood curve, labour force curve, and a constant (c), algebraically expressed as in equation 2(Rogers and Castro, 1981):

$$M(x) = a1 \exp(-\alpha 1x) + a2 \exp\{-\alpha 2 (x-\mu 2) - \exp[-\lambda 2(x-\mu 2)]\} + c \quad (2)$$

Where:

a1 = the height of the childhood curve
α1 = the rate of descent of the childhood curve
a2 = the height of the labour force curve
λ2 = the rate of ascent of the labour force curve
α2 = the rate of descent of the labour force curve
μ2 = the age at peak of the labour force curve
c = a constant.

The first term of the model schedule a1 exp (-α1x), is associated with migration amongst children and teenagers; a negative exponential function which starts from an initial maximum value of a1, thereafter declines at a rate of α1. The second term is a double exponential function that describes the age profile of migration of working-age people and described by four parameters which define the level, position, and shape. The standard schedule is shown in Figure 1.

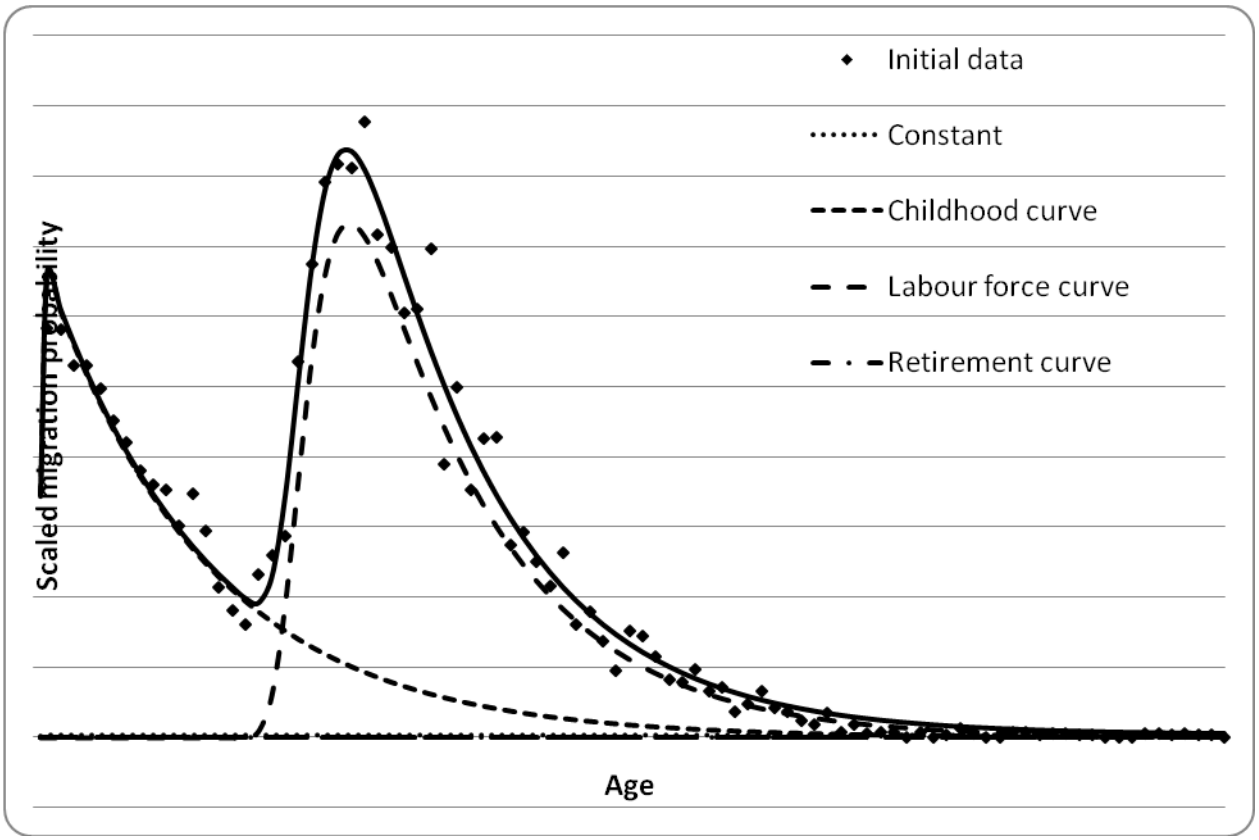


Figure 1: Standard Age Migration Schedule

The parameters a1, a2, and μ2 measure the relationship between age and migration by reference to the heights of the childhood and labour force curves and the age at which the labour force curve peaks respectively. The higher values of μ2 indicate that migration peaks at older ages and therefore schedules with centre on the 15-19 age group, are termed "young" and schedules that centre on 25-29 or 30-34 age groups are termed "old" (Raymer and Rogers 2006). Rogers and Castro (1981) further define a fifth variable as the parental shift defined as the average number of years separating the migration rates of children from those of their parents with whom they must migrate. This value is expected to be close to the average age of childbearing. The parameters α1, α2, and λ2, are exponential coefficients and their interpretation is challenging (Bernard et. al., 2014b).

Data and methods

These data were derived from the following census questions which sought to establish previous residence and duration of residence:

"Where was [person] living in August 2008?" and "When did [person] move to the current district?"

The data is transition-type data, and count of surviving migrants rather than migrations (Rees and Willekens 1985). The migration intensity used in this study was the intensity recommended for this type of data by Rees et al. (2000), or the migration probability conditional upon survival within the country (hereafter just migration probability). Migration data by sex and single years of age were obtained from the Kenya National Bureau of Statistics, 2009 Kenya Census via the Integrated Public Use Micro data Series (IPUMS) - International data extract service at the Minnesota Population Center.

To establish migration schedules for particular regions, the migration probability for each cohort was calculated as follows: Out-migration probability equals the number of people resident in the region one year before the census who were living elsewhere in Kenya on census night divided by people resident in the region one year before the census who were living anywhere in Kenya on census night. The model schedule was fitted using a Microsoft Excel 2007 workbook (Wilson, 2010). The workbook is designed to use single year interval, single year of age period-cohort migration data.

Preliminary results

1) Intra regional flows (provinces)

Table 1 shows a matrix of the enumerated population by place of birth. It gives an indicative volume of lifetime regional migration flow. The rows provide the proportion of in- migrants in each province. For example Central, Eastern and Nyanza contributed to the most in migrants in Nairobi according to the 2009 census however, compared to 1999, the pattern slightly changed with Eastern overtaking Nyanza, while Western's contribution declined. Majority of migration streams are between neighbouring regions. North eastern data did have problems during the 2009 census (KNBS, 2012).

Table1: Percent distribution of the respondents by place of birth and place of enumeration 1999 and 2009 censuses

Place of Birth 1999 census									
Place of Enumeration 1999	Nairobi	Central	Coast	Eastern	North Eastern	Nyanza	Rift Valley	Western	Outside Kenya
Nairobi	0	26.4	3.1	19.6	0.6	21	5.8	18.7	2.1
Central	14.2	0	3.3	25.9	0.7	11.8	25.5	13.4	3.5
Coast	7.8	15.5	0	31.5	2.5	22.7	4.8	14.8	3.9
Eastern	21.1	31.2	10.5	0	8.7	7	12.6	3.9	3.4
North Eastern	5.5	14.8	13.9	31.5	0	11.4	9.1	7.6	4.7
Nyanza	16.3	4.1	6.9	4.2	0.4	0	18.4	37.3	9.8
Rift Valley	3.8	33	1.0	5.8	0.4	25.8	0	27	2.1
Western	13.3	7.2	4.6	2.9	0.4	29.6	29.6	0	10.4
Place of birth 2009 census									
Place of enumeration 2009 census	Nairobi	Central	Coast	Eastern	North Eastern	Nyanza	Rift Valley	Western	Outside Kenya
Nairobi	0	24.2	2.8	23.5	2.0	18.4	8.6	15.6	4.9
Central	16.4	0	2.7	24.8	0.6	8.6	34.7	9.8	2.4
Coast	5.3	12.2	0	33.6	4.7	17.7	8.4	12.6	5.4
Eastern	15	33.5	8.6	0	6.6	9.3	17.5	7.8	1.7
North Eastern	1.1	1.9	3.2	8.4	0	1.3	6.5	3.4	74.1
Nyanza	17.7	4.5	8.1	3.7	1.4	0	20.7	35	8.9
Rift Valley	5.5	28	2.1	9.2	0.9	21.7	0	27.9	4.5
Western	9.2	5.8	12	3.1	0.7	28.9	33.3	0	7.1

Source: computed by author using 1999 and 2009 Kenya Census data

Figure 2 shows two migration indicators by the regions, namely: crude migration intensity (CMI) and migration effectiveness index (MEI). CMI represents the overall incidence, or level of internal migration within a region, indicating the propensity to move. MEI indicates the efficiency of migration as a mechanism for population redistribution by comparing net migration to migration turnover. The MEI provides insights into the role of migration in population redistribution because it measures the extent to which inter-regional flows are balanced by counter-flows. Low values of MEI are found when migration streams and counter-streams are closely balanced, while high values indicate asymmetry across the system. That is the propensity of some regions gaining population at the expense of others (Shryock et al., 1976). Eastern, Nyanza and Western, over time, are often high out migration regions (Oucho, 2007). Earlier studies indicated that migrants from Western and Nyanza moved to neighbouring regions, in search of employment in large cash crop plantations in Rift Valley, petty trade between the regions and resettlement (Wakajuma, 1986; Oucho and Odipo 2000). But recent studies suggest nature of these movements despite increased volumes of migration (Oucho, 2016).

The regions are established to having low CMI, but high MEI. In these regions the out- migration is not balanced by in-migration. Nairobi, which is Kenya's both commercial and capital city displays high values of both indicators. The high MEI indicates that in and out- migration is not balanced, due to the large volumes of in-migration relative to out-migration.

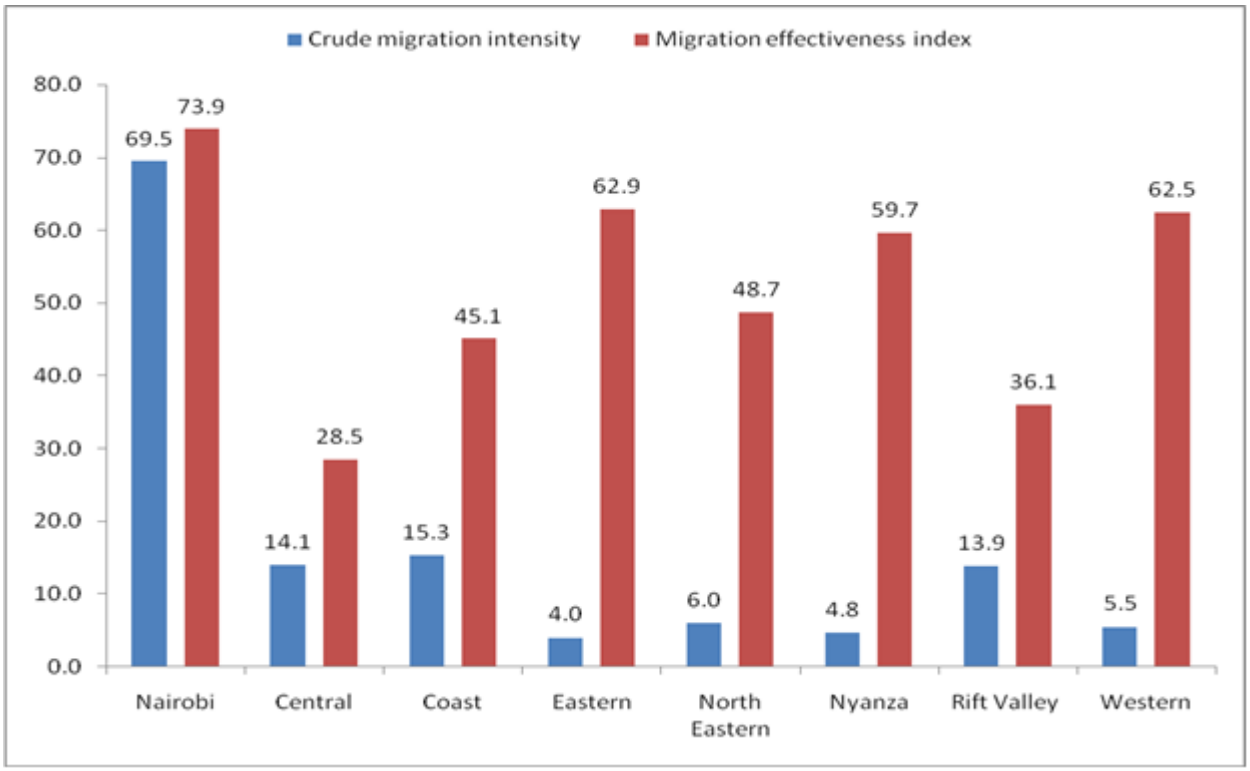


Figure 2: Indicators for level and efficiency of lifetime provincial internal migration 2009 Kenya population and housing census
Source: computed by author using 2009 Kenya Census data

Age patterns of internal out-migration

This section provides a description of the results of the migration patterns based on model migration schedules by region and their respective derived basic parameters (Model Migration Schedule Parameters). First, the model was estimated without the retirement peak and thus based on the reduced from model. For all the regions, the peak age is slightly above age group 15-19 for both men and women, with women having slightly lower values. Coast has the highest peak age for males and females respectively while Central and Nyanza have the lowest peak ages for men. Female peak ages were lowest in Nyanza and Eastern. The indicators for childhood and teenage migration vary between 0.007 and 0.017 for males and females respectively. The values for $\mu 2$ - the age at peak of the labour force curve are lowest in high outmigration regions namely, Nyanza, Western and Eastern.

Table 2: Indicators of model migration schedule by sex and province

REGIONS		a1	α1	a2	α2	λ2	c	μ2	Peak age
Nairobi	M	0.01459	0.05059	0.01006	0.01401	1.3818	0.00302	19.6317	22
	F	0.01597	0.0169	0.03203	0.33067	0.3462	0.00136	20.9935	21
Coast	M	0.00754	0.03442	0.03178	0.04012	0.5823	0.00174	19.7259	24
	F	0.00931	0.03068	0.05837	0.12677	0.5123	0.00201	19.0262	23
Nyanza	M	0.01009	0.04522	0.04342	0.06812	0.7696	0.00202	18.0779	21
	F	0.01184	0.03126	0.06411	0.14394	0.5793	0.00116	17.7191	20
North Eastern	M	0.00653	0.13809	0.05707	0.10498	0.6567	0.00265	20.4851	23
	F	0.01136	0.13374	0.04037	0.09478	0.4793	0.00171	17.5704	21
Western	M	0.01364	0.08442	0.05059	0.06706	0.5937	0.00098	18.1398	22
	F	0.01311	0.05674	0.06931	0.11480	0.5244	0.00090	17.6873	21
Central	M	0.01379	0.03961	0.04239	0.08318	0.7748	0.00115	18.2245	21
	F	0.01142	0.03664	0.07237	0.17749	0.4150	0.00155	18.5494	21
Eastern	M	0.01679	0.07555	0.04898	0.07495	0.7013	0.00119	18.3943	21
	F	0.01329	0.04208	0.06600	0.12737	0.5565	0.0005	17.6923	20
Rift Valley	M	0.00954	0.05465	0.03284	0.04270	0.6574	0.00121	18.9967	23
	F	0.00816	0.0415	0.04894	0.11459	0.4763	0.00267	18.5015	21

M- male, F – female

Source: computed by author using 2009 Kenya Census data

According to Rogers and Castro (1981), the female values for a2, α2, and λ2 in most instances were more often larger than those for males and the reverse was the case for μ2. In this study, the same applies for a2, α2, and μ2. The parameters defining the pre-labor force component, a1 generally lie within the ranges of 0.01 to 0.03 except for males in Coast, North Eastern and Rift Valley regions, respectively. This range is also the same as in the case of values obtained by Rogers and Castro for most regions except Soviet Union and Hungary that exhibited unusually high values. The values for α1 lie between 0.01 and 0.14 respectively and in some regions higher than the range observed by Roger's and Castro. The ratio of the two basic vertical parameters, a1 and a2, is a measure of the relative importance of the migration of children in a model migration schedule. According to Rogers and Castro (1981), the index of child dependency, δ12= a1/a2, tends to exhibit a mean value of about one-third with 80 percent of the values falling between one-fifth and four-fifths. Schedules with an index of one-fifth or less are said to be labor dominant; those above two-fifths are called child dependent. The index for females and males in North Eastern, Rift valley and Western males depicts labour dependency. The rest of the regions depict child dependency in the schedules. Even though the peek ages at migration occur during the youth stages, the parents are more likely to move with their children.

In over 500 sets of migration rates, Rogers et al (1981; 19) showed that the parameters of age schedules for the labour were within the following ranges: 17< μ2<22; 0.10<α2<0.20 and 0.25< λ2<0.60 respectively (Rogers and Castro, 1981) highlighting the regularities in migration schedules across different countries and times. From the observations in Table 2, values for α2 for Nairobi (both males and females), Coast and Rift Valley males are far out of range for the expected. For λ2, nearly all values for males are out of range except for Coast and Western while all the female values are within the range.

Model migration schedules by region

The profiles of migration schedules for the provinces are shown in Figures 3a to 10b. Nyanza region model migration schedules exhibited relatively good fits compared to others followed by Western, Eastern and Central regions, respectively. Nairobi and North Eastern have poor fits. The regions with high out migration rates namely Nyanza, Western and Central all show high peaks with steep descents in the labour out migration. This means that males migrated less before the teenage years. The rate of ascent of the labor force curve among males was higher, indicating that the males migrated more as they approached the labor force peak ages in Nyanza. Rift Valley and Nairobi regions had high in-migration, but low out-migration. The profiles depicted gentle-gradient of low peak age, instead of sharp descents.

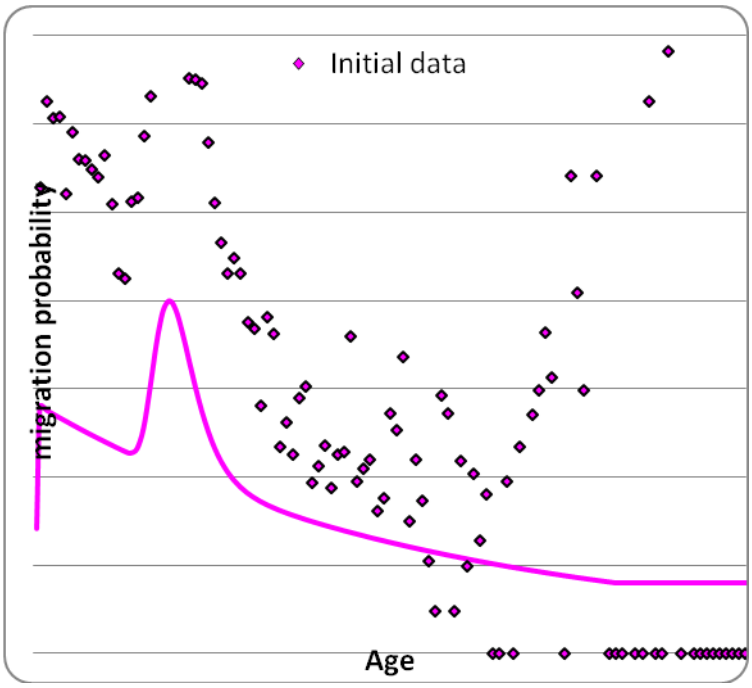


Figure 3a: Male's Age Migration Schedule, Nairobi
Source: computed by authors

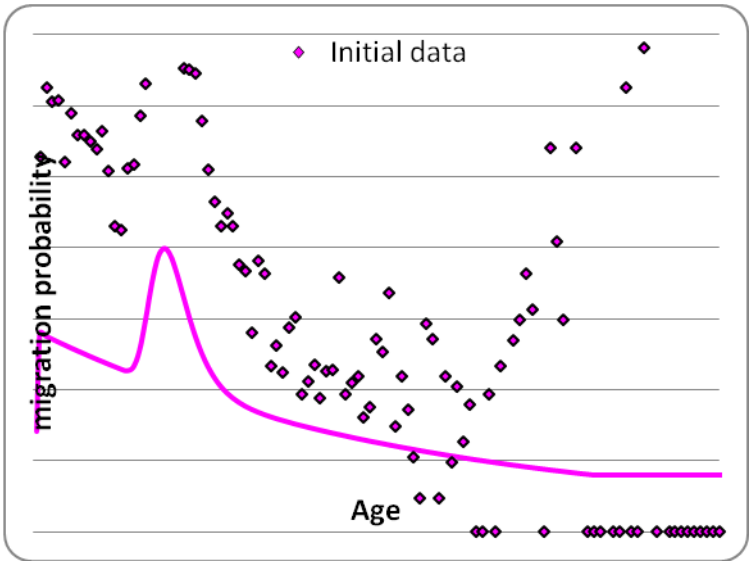


Figure 3b: Female's Age Migration Schedule, Nairobi
Source: computed by authors

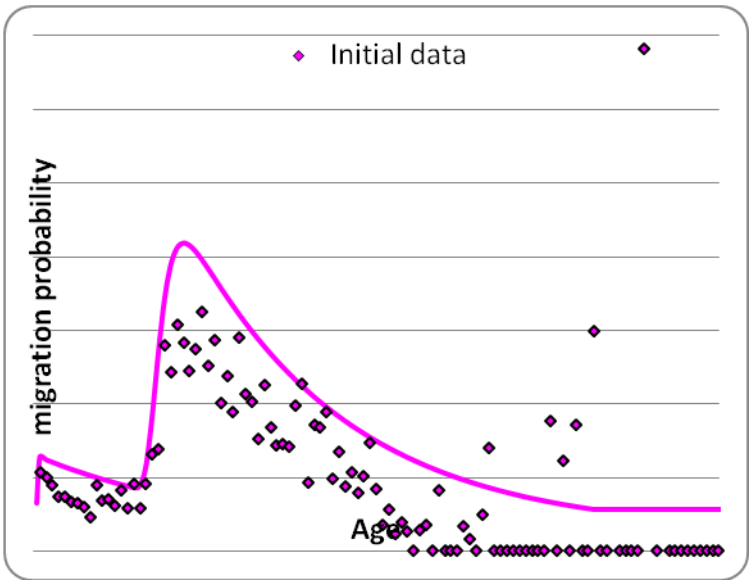


Figure 4a: Male's Age Migration Schedule, Coast
Source: computed by authors

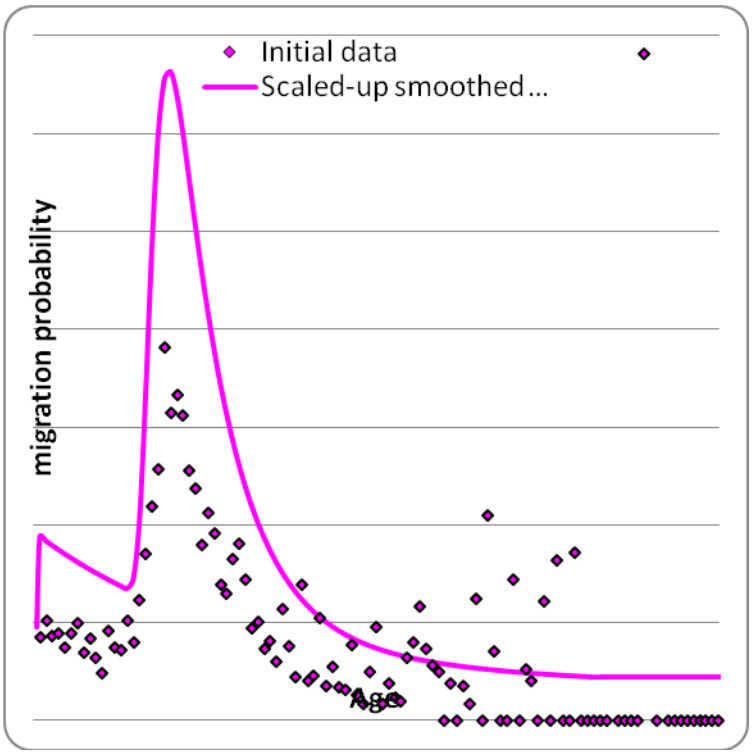


Figure 4b: Female's Age Migration Schedule, Coast
Source: computed by authors

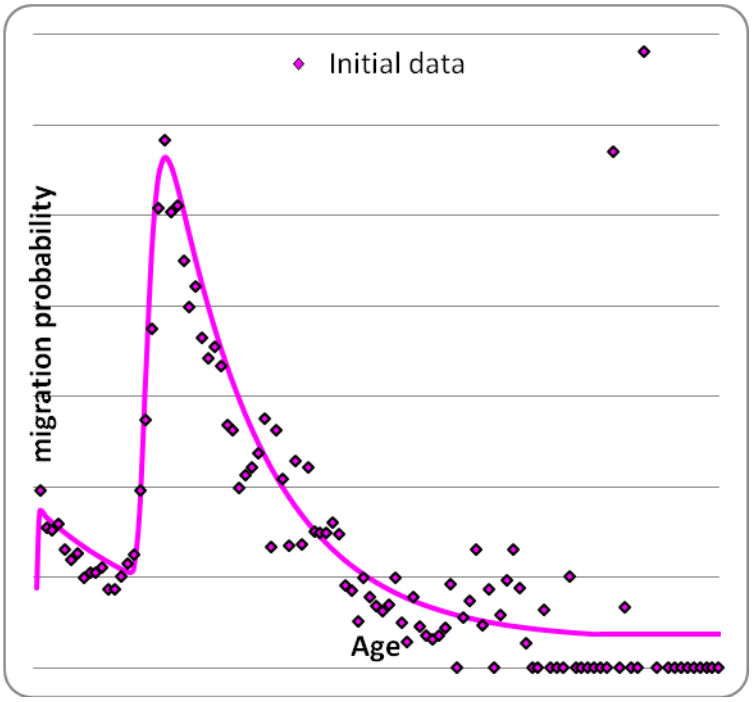


Figure 5a: Male's Age Migration Schedule, Nyanza
Source: computed by authors

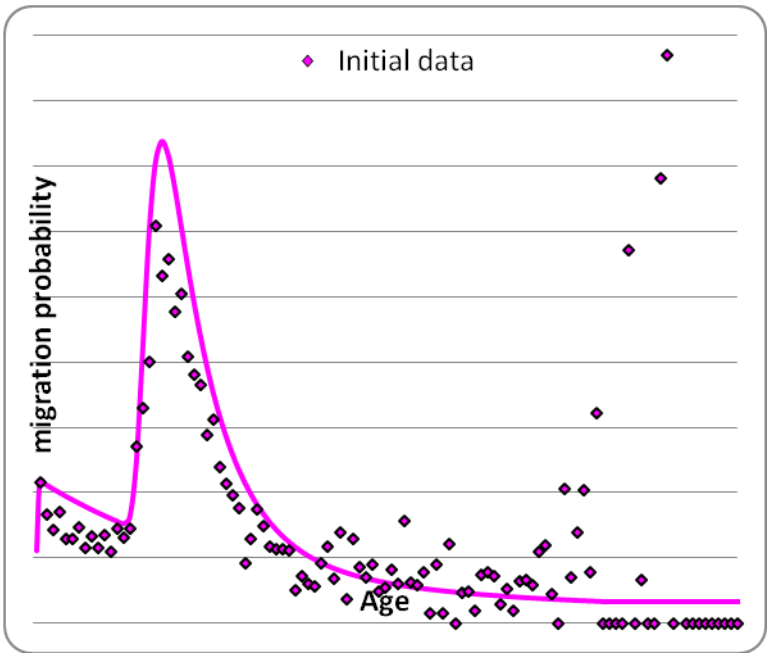


Figure 5b: Female's Age Migration Schedule, Nyanza
Source: Computed by authors

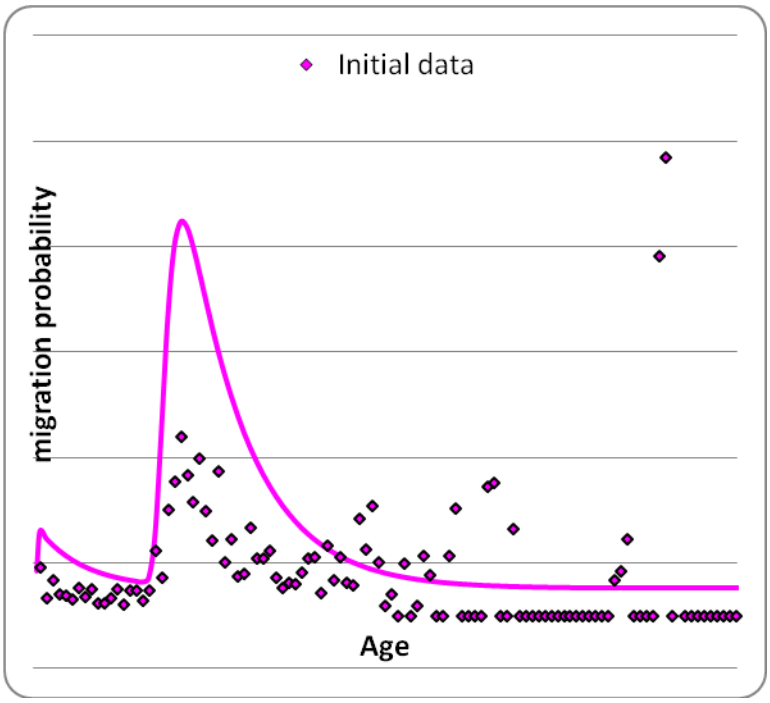


Figure 6a: Male's Age Migration Schedule, North Eastern
Source: computed by authors

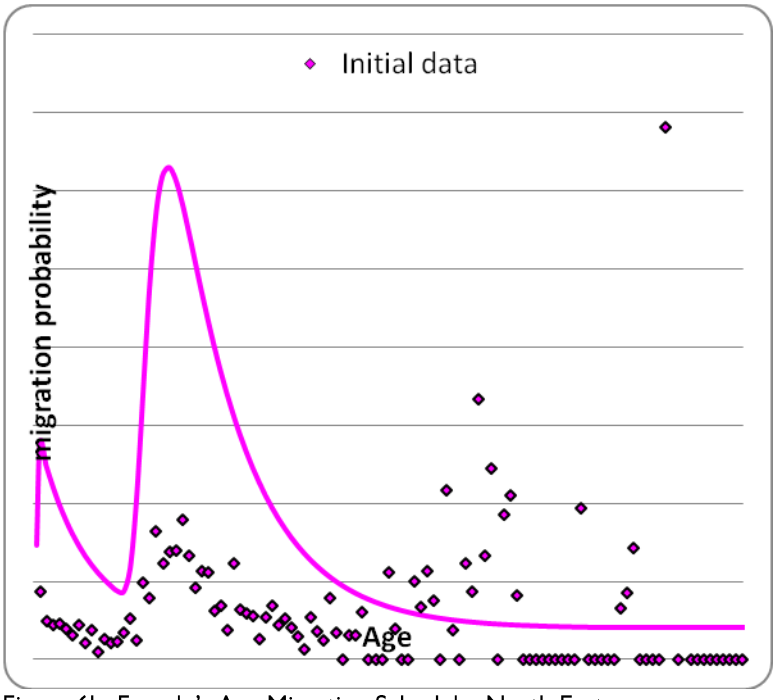
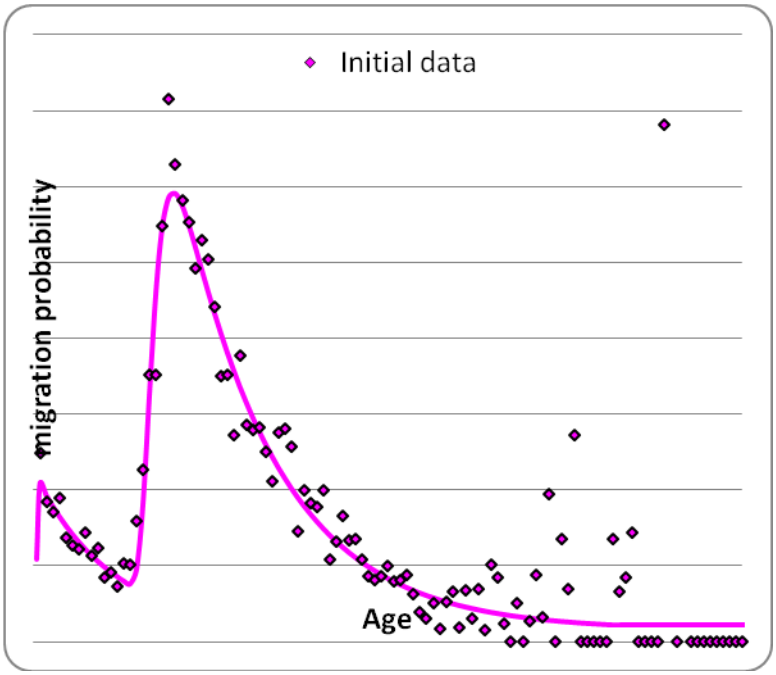


Figure 6b: Female's Age Migration Schedule, North Eastern
Source: computed by authors



7a: Male's Age Migration Schedule, Western
Source: computed by authors

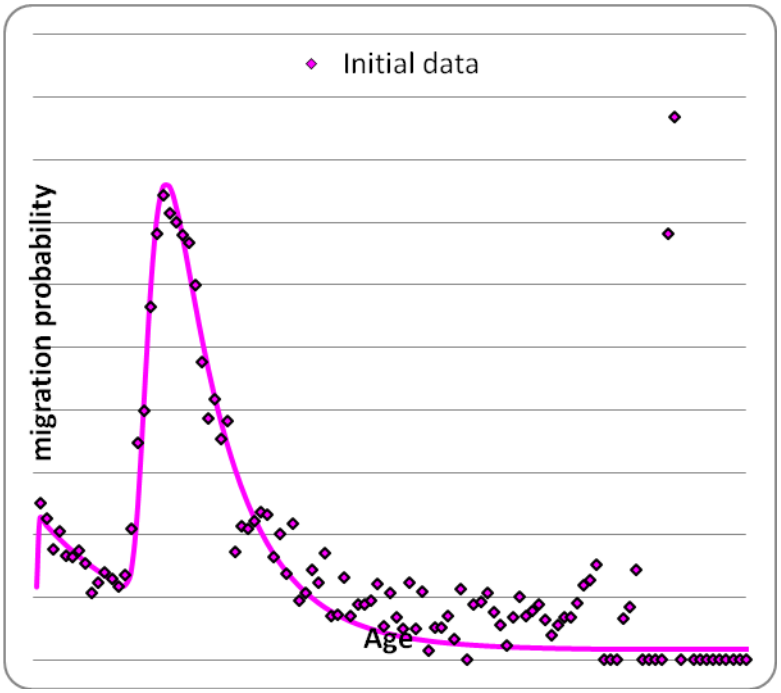


Figure 7b: Female's Age Migration Schedule, Western
Source: Computed by Authors

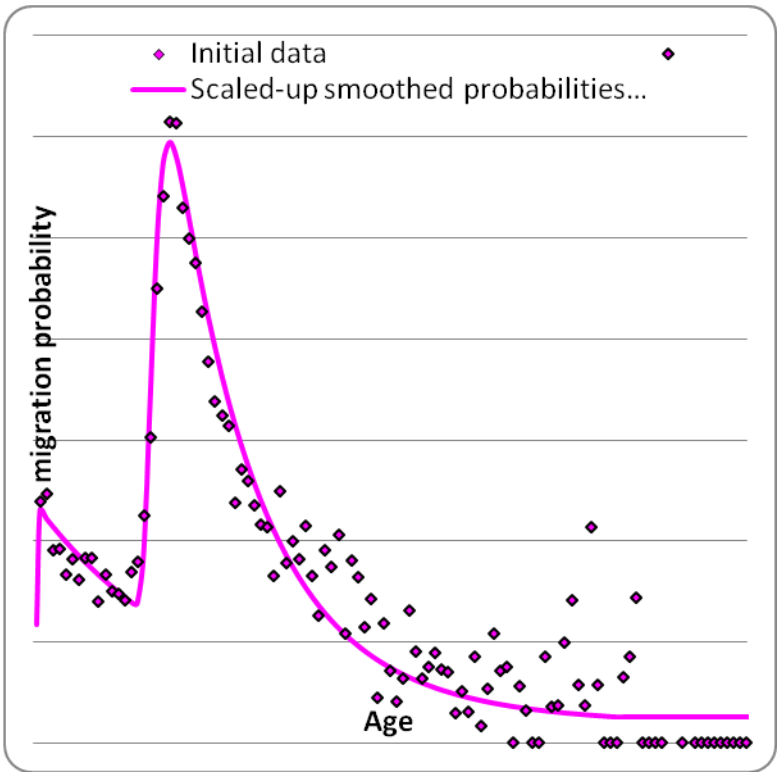


Figure 8a: Male's Age Migration Schedule, Central
Source: Computed by authors

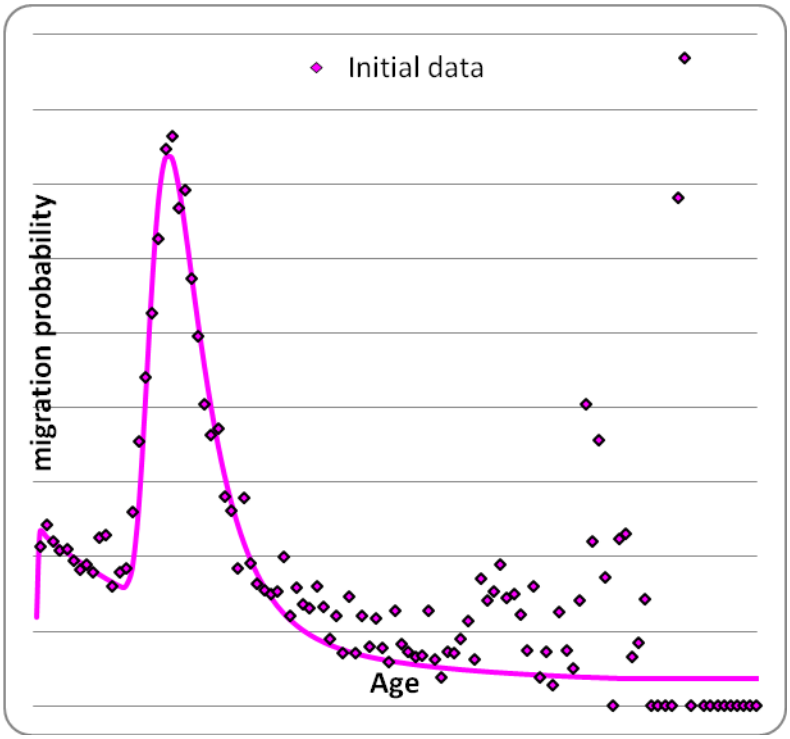


Figure 7b: Female's Age Migration Schedule, Central
Source: Computed by authors

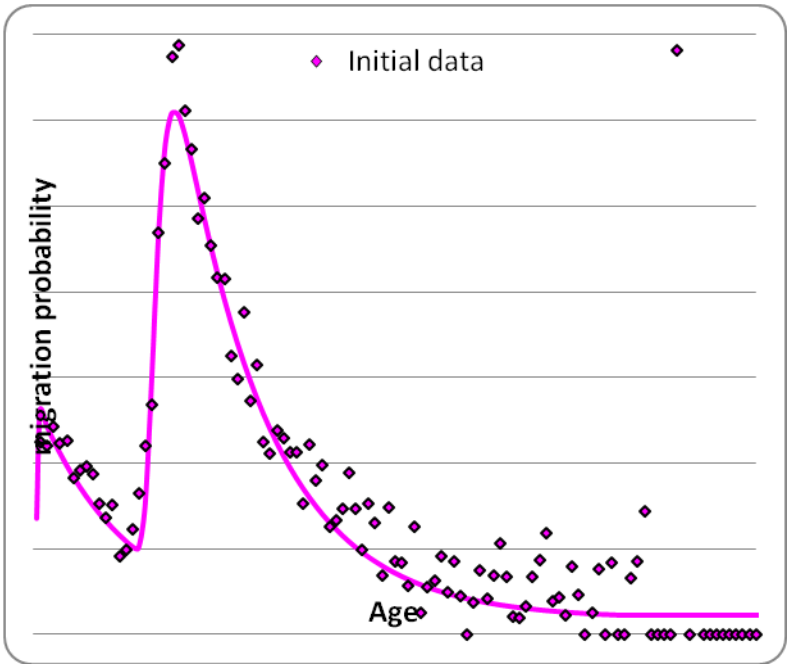


Figure 8a: The Male's Age Migration Schedule, Eastern
Source: computed by authors

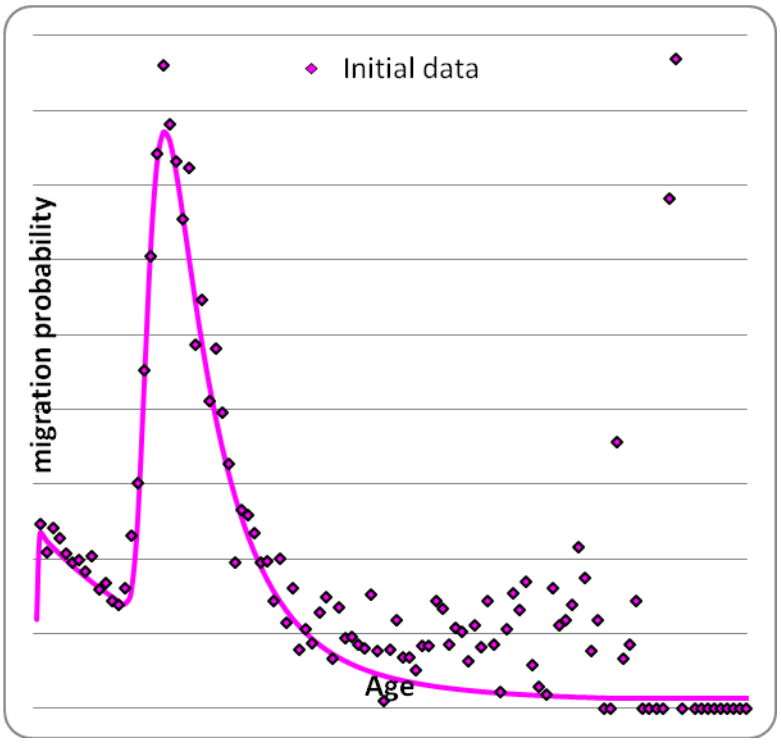


Figure 8b: Female's Age Migration Schedule, Eastern
Source: Computed by authors

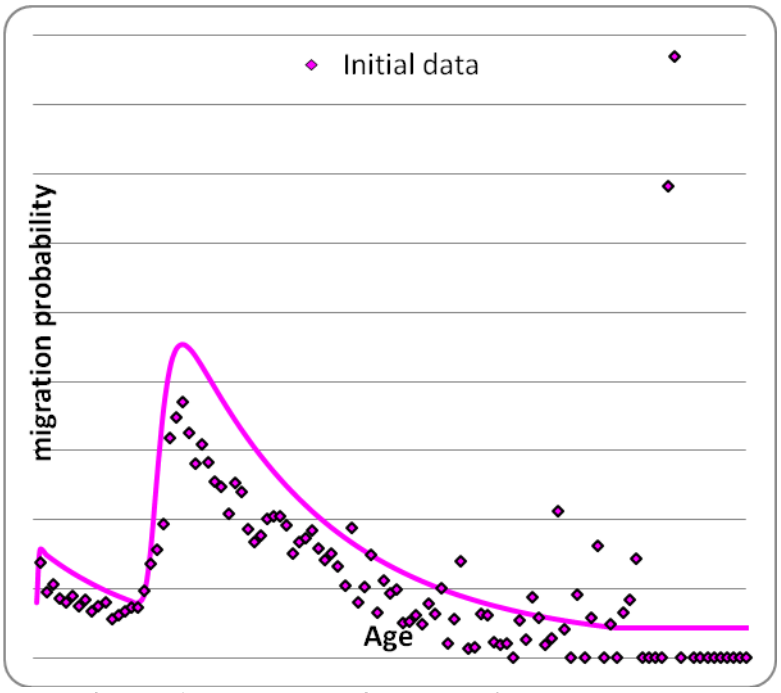


Figure 10a: Male's Age Migration Schedule, Rift Valley
Source: Computed by authors

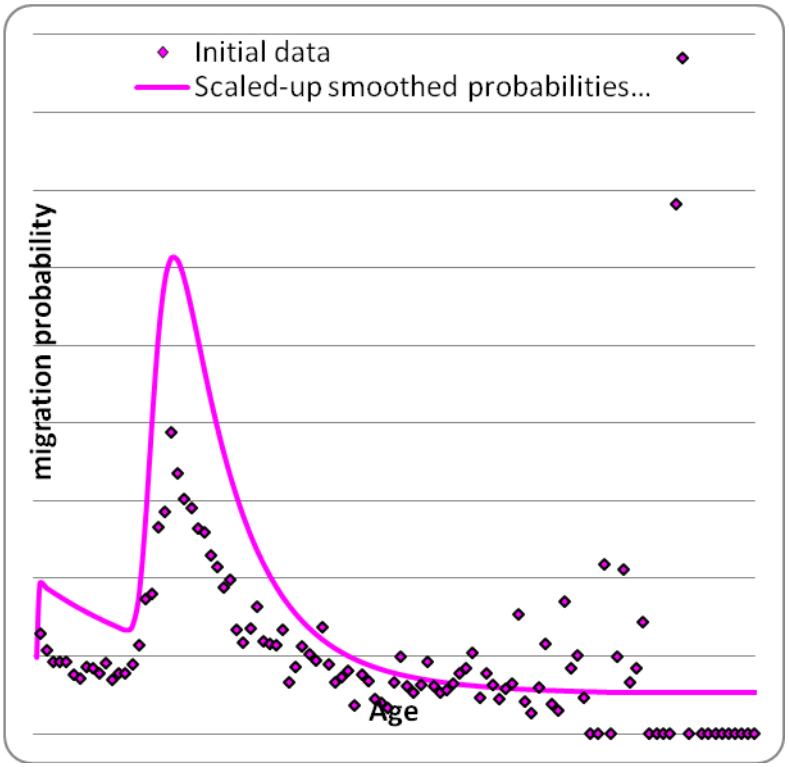


Figure 10b: Female's Age Migration Schedule, Rift Valley
Source: Computed by authors

Discussion

This study established that age migration patterns by eight regions in Kenya corroborate that of the standard age migration schedules by the Rogers-Castro Model. It conforms to age migration schedule with parameters labeled according to Rogers and Castro (1981). The age profiles of migration schedules in the regions appear remarkably similar and indicate regularity in age patterns. However, notable differences are in the height at peak age of migration; which, imply magnitudes (i.e. incidences) of mobility, as depicted by the various gradients of slope.

Two key indicators that can be derived from the schedules are the age at peak migration and the intensity at the peak (Bernard et al. (2014b). The age patterns suggest that large volumes of migratory movements within Kenya occur during schooling and labour force among youth aged between 17 and 24. This has implications for policy in the provision of

employment opportunities throughout the country. The critical challenge for youth migration is youth employment triggered by a combination of, rapid growth of educated youth, slow pace of job creation in the formal economy and underemployment in the informal sector. The patterns are expected to remain because of the increasing youth bulge in the country and policy instruments are silent on the role of internal migration in harnessing development opportunities caused by migration and mobility.

In a situation where the migration peak is high, most movement tends to be concentrated in a relatively narrow age band (Bernard et al. 2014b); as is the case depicted in Nyanza, Eastern and Western provinces, for both male's and female's mobility. These regions are also the ones with high out-migration rates. Peak ages at migration in the eight regions of Kenya, are observed to be similar to peak age observed in Asian migration patterns (Bell and Muhidin 2009). However, of note is the interpretation challenge of the parameters $\alpha 1$, $\alpha 2$, and $\lambda 2$ that are essentially exponential coefficients (Bernard et. al., 2014b), which make it difficult for analysts to make comparisons even when data is consistent.

A notable feature is that values for migration schedules in Rogers et. al., (1981) standard were mostly based on data from developed countries. Except for South Africa, few studies have used data from developing countries. The observed deviation of parameters for some regions notably, North Eastern and Rift valley may be due to quality of age data or may be representing different patterns and therefore need further data exploration. For example, the observed low peaks for pre- labour component may be indicative that large volume migration may be occurring prior to onset of child bearing and therefore lower levels of associational moves.

Conclusions

The study establishes that momentum to migrate in Kenya is a variable of age, just like fertility and mortality events. Although the application of the age migration schedule model is applicable to the Kenyan situation from the available census data are of plausible quality to test the model; the interpretation of a number of the parameters remains a challenge. Regional internal migration patterns are observed to having two peaks instead of four peaks depicted by standard age migration model. The estimated age migration schedules imply that the dominant force for out-migration in Kenya is schooling and labor force, followed by associational moves. There is need for policy measures to harness opportunities created by mobility among youth population. Methodologically, the analysis of the regions' migration age patterns recognizes the value of examining the regularities in age profiles. To achieve better results, it is important to smooth the data before fitting models.

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