The rise and prominence of skip-generation households in low- and middle-income countries

Objectives

There are two objectives to this study. The first is to report on trends in country-level *prevalence* of skip-generation households in lower and middle income countries (LMICs) between 1990 and 2017. Skip-generation refers to a grandparent living with a grandchild where the parents of the grandchild, or the middle generation, are absent. The second objective is to further explain the trends by assessing whether an increase or decrease in the *probability* of living in a skip-generation household between 1990 and 2017 is a function of a series of factors influencing changing household dynamics in LMICs. All analyses are conducted from the perspective of both children (aged under 15) and older persons (aged 60+) to assess whether trends and determinants are equivalent.

Background

Despite decades of criticism, demographic transition (DT) remains a continually referenced instrument for predicting global changes in household structures[1–5]. The traditional DT viewpoint predicts convergence in fertility and mortality at a point where populations stabilize at replacement level. As fertility declines, so does family size, and households move from extended to nuclear. DT also linked changes in household formation to economic growth, urbanization, and associated changes in values[6,7]. The inability of DT to accurately portray contemporary changes in family structures across the developed world led to the advancement of the 'second demographic transition' (SDT)[8,9]. Rather than a stabilization of fertility and mortality, SDT assumes fertility decline need not cease after replacement level. Thus, countries can experience population decline, which has its own implications for household living arrangements. Family forms other than marriage begin to appear, as does a disconnection between marriage and procreation and a rapid aging of society as earlier cohorts from higher fertility regimes move into elderly years followed by cohorts characterized by continually lower fertility.

It is unclear whether predictions related to household formations based on DT or SDT accurately describe the way in which households are changing for the majority of the world's population, who live in LMICs. Some studies of living arrangements for children and older people in LMICs question whether nuclearization is inevitable[10–13]. This is particularly true when considering the emergence of the 'translocal' experience, whereby individuals migrate while remaining connected to their household of origin in many ways, including economically and emotionally, bringing into question traditional DT and SDT notions about the function of household composition[14–16].

Translocality suggests that earlier studies of transformations in traditional household formations across LMICs may have systematically excluded some types of emerging household formations. A number of recent studies of global change in living arrangements do not include skip-generation households, the household type that may be most influenced by translocality[12,17]. While evidence on the change in prevalence of skip-generation households is nascent, some research by the current authors indicate that the skip-generation household may be growing in prominence[18,19].

Emergent literature suggests that a skip-generation household is, on balance, disadvantageous for both generations. There is evidence that children in these households are in worse health, have less access to quality health care, and experience socioeconomic disadvantage, while grandparents who care for grandchildren have lower wealth and worse physical and mental health[20–24]. Thus, a grandchild living with a grandparent, with no others in the household, may be a particularly vulnerable situation.

Yet, there are a number of social, economic and demographic forces that may be encouraging the formation of skip-generation households. The emergence of this type of household is at times a function of increased mortality of the middle generation, frequently a result of AIDS deaths[25,26]. One can conjecture that the formation of a skip-generation household due to the death of the middle generation is an undesirable situation. Other times, a rise in skip-generation households may be a function of more desirable situations, such as economically-motivated migration of the middle generation. As has long been imagined by economists, migration is often a household level decision[27,28]. Therefore, economic

development and the increase in employment opportunities in urban areas, which result in a rise in labor force participation, can persuade migration for the purpose of benefitting children and older people in the household of origin.

The bourgeoning appreciation of the implications of living in a skip-generation situation for both grandparents and grandchildren results in a need to clarify whether and the degree to which these types of households are a rising phenomenon in LMICs, as well as the forces that influence the chances that an individual resides in a skip-generation household. The current paper does both of these things while addressing several gaps in the literature. First, despite the notion that prevalence may be on the rise, there is little systematic research using longitudinal data to confirm this trend, its magnitude, or its consistency across countries. Second, the forces that drive an increase in the probability of living in a skip-generation household are not well established. While this type of change is antithetical to DT, since DT recognizes virtually no role for skip-generation households, it is paradoxically possible that the rise in skip-generation households is a function of factors such as economic development, urbanization, migration and changes in labor force participation, all of which are part of the explanation for the occurrence of a DT. Third, extant research on prevalence of, and probability of being in, skip-generation households has not examined this phenomenon from younger and older persons' perspectives simultaneously. For instance, literature on older persons coping with migration of their adult children is generally detached from literature on grandchildren left behind, despite that the older and younger generations are 'two sides of the same coin'. One would expect that the skip-generation trends for older persons should also reflect skip-generation trends for younger persons, and looking at both allows us to identify whether these changes are affecting the two generations similarly.

Data, sample and analytical strategy

We employ 158 Demographic and Health Surveys (DHSs) spanning 1990 to 2017. Countries in the sample fit several criteria: at least two survey waves conducted since 1990; the most recent wave conducted after 2000; each survey wave contains information on whether the biological mother and/or father of children under 15 were living in the household at time of the survey. There are 49 such countries, 31 of which are in Sub-Saharan Africa. Some DHSs take place over multiple years of collection, and our data contain 244 country/years of data in total. We use the household roster from each survey, dividing the sample into two groups: (1) older people, defined as household members age 60+(N=1,100,766); (2) children under 15 (N=5,374,982).

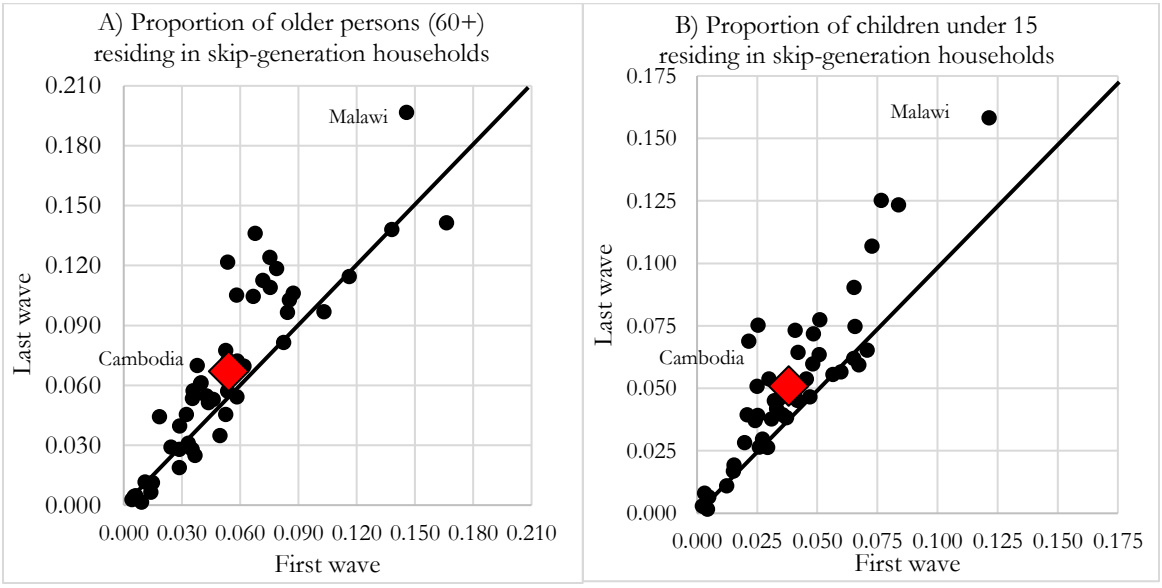
We examine two types of skip-generation households: (1) Any household that contains grandparent(s) and grandchild(ren) where the child(ren)'s parents (middle generation) are not co-resident. This household may or may not contain other members, such as siblings of the missing parent (termed ***"any skip-generation household"***). (2) Skip-generation households where there are no other household members besides the grandparent(s) and grandchild(ren) (termed ***"skip-generation only household"***). The first part of the analysis compares *prevalence* of these two types of households in the earliest versus latest round of the DHS for each of 49 countries. That is, it examines country-level trends. While data begin in 1990 and end in 2017, the longest observation span is 25 years for Tanzania, which had a DHS in 1991 and 2016, and the shortest Sierra Leone, spanning 5 years, from 2013 to 2018. In the second part of the analysis we run multilevel models to assess the individual-level *probability* of being in a skip-generation household over time. This part of the analysis then examines individual-level trends. These models include a random intercept for countries and a random slope for trend, which account for differences in the idiosyncratic tendency of being in a skip-generation household across countries and the influence of the passage of time. To assess how each year that passes changes the probability of living in a skip-generation household, we introduce a '***trend***' variable. This is constructed so that any year during the 27-year observation period is represented as a fraction equivalent to the fraction of time passed since 1990. The coefficient for this variable, which ranges from 0 to 1, is interpreted as the difference in probability of living in a skip-generation household in the last versus the first year of observation (i.e., 1990 versus 2017).

Models include age, sex, and rural/urban residence. We include education in models pertaining to older people. Importantly, five country-level variables are included to assess how the concentration of key macro factors influence the changing probability or individual-level trend of living in a skip-generation household. Data for these variables come from a variety of sources such as the UN and the International Labor Organization. These variables are: (1) cumulative crude AIDS death rate, calculated as number of AIDS deaths over a 15-year period divided by population size (***CCDR***); (2) female labor force participation rate (***FLFP***); (3) gross national income per capita (***GNI***); (4) international migration rate (***MigRate***); (5) total dependency ratio (***DepRatio***). All macro measures are standardized to a mean of 0 and standard deviation of 1 for ease of interpretation and so that their magnitude can be compared.

Results

For the purpose of this extended abstract, we present results for the "skip-generation only households". Figure 1 looks at how prevalence of skip-generation only households, for those 60 and older (left side) and those under 15 (right side), has changed over time. Each point represents the proportion skip-generation only households in the first (X-axis) versus last (Y-axis) wave of the DHS to take place in that country. *In the full paper we also standardize time by calculating average annual percent change in prevalence and the statistical significance of that change*. The red diamonds in Figure 1 represent the average for 49 countries. The vertical line is placed so that a point on the line represents no change over time.

Clearly, the majority of countries display substantial increases in prevalence of skip-generation households. For those 60 and older, the average proportion in skip-generation households increased from 5.4% to 6.7%. For those under 15, the average increased from 3.9% to 5.1%. To provide some specific examples for countries, a couple of the points are labeled. For older adults in Malawi the proportion in skip-generation households increased from 14.6% to 19.7% (from 1992 to 2016). In Cambodia it changed from 3.8% to 7.0% (2000 to 2014). For children, the changes are 7.3% to 10.7% for Malawi and 2.2% to 6.9% in Cambodia.



Figures 1A & 1B. Country-level prevalence of skip-generation households at first and last DHS survey-years among older people (1A) and children under 15 (1B).

Table 1 shows mixed-effects model coefficients for a select model that includes the trend variable, individual-level variables, country-level variables, and trend by country-level interactions, for older people and children under 15. The Appendix provides several additional models. ***The trend variable is robust and consistently positive for both age groups***. Country-level variables ae are also

consequential. For instance, AIDS mortality, indicated by the CCDR, greatly increases the probability of living in a skip-generation situation, while female labor force participation decreases this probability. Although these findings account for interaction effects, interactions also indicate that the trend varies across country-level characteristics. For instance, trends are stronger in countries with high CCDR, and muted in countries with high female labor force participation.

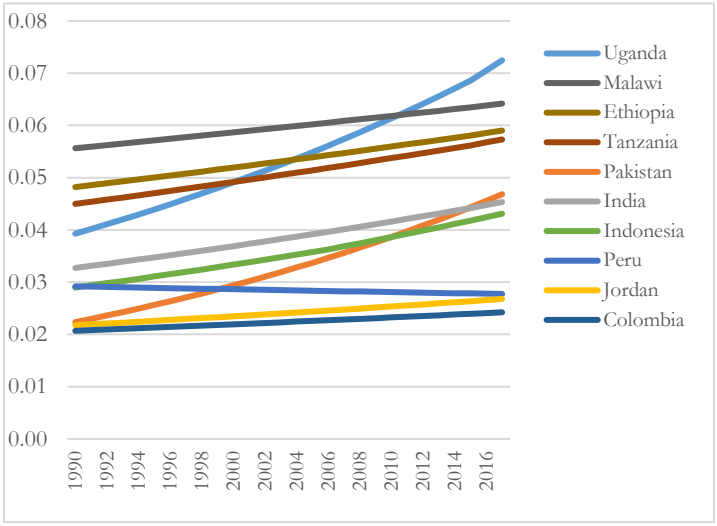
Table 1: Selected mixed-effect regression results

	Older persons	Younger persons
Trend	0.302***	0.771***
Age	0.012***	0.068***
Male (vs. female)	-0.460***	-0.051***
Rural (vs. urban)	0.387***	0.388***
1-4 years educ (vs. none)	0.015***	---
5+ years educ (vs. none)	0.178***	---
Missing (vs. none)	-0.016***	---
CCDR	0.011***	0.005***
FLFP	-0.076***	0.135***
GNI	-0.155***	-0.112***
MigRate	0.011***	0.006***
TotDepRat	0.062***	-0.059***
CCDR*trend	0.054***	0.028***
FLFP*trend	-0.063***	-0.596***
GNI*trend	-0.212***	0.057***
MigRate*trend	-0.049***	-0.033***
TotDepRatioo*trend	-0.092***	0.070***
Intercept	-3.104	-4.482
Variance (intercept)	0..217*	0.400**
Variance (trend)	0.210***	0.796***

(***p<0.001, **p<0.01, *p<0.05)

To highlight how these variables, considered simultaneously, impact patterns in skip-generation households, we present in Figure 2 estimated probabilities of living in skip-generation households by year, 1990 to 2017, for older persons in selected countries, calculated from Table 1 model. Countries chosen for this abstract make interesting examples. Some, like Uganda and Pakistan, display strong estimated increases in probability. This is likely a function of high AIDS mortality (Uganda) and low female labor force participation (Pakistan), both of which magnify the impact of time on the move to skip-generation households. In contrast, some countries, like Peru and Jordan, show little change in the probability. This reflects the impact of GNI and other country-level variables, which serve to dampen the trend.

Figure 2. Predicted probability of living in skip-generation older persons (60+)



Preliminary conclusions

Our data provide evidence that prevalence of skip-generation households is rapidly increasing across most LMICs. This living arrangement merits further attention. Although country-level variables influence the magnitude of this trend, in some cases predicting stability over time (e.g., Peru and Jordan) the trend coefficient in our multilevel models remains strong when controlling for country-level characteristics and cross-level interactions and predict robust increases in skip-generation households for most countries (e.g., Uganda and Pakistan). There appears therefore to be some sort of underlying phenomenon encouraging skip-generation households that is unaccounted for in by the factors we considered. Perhaps this is reflecting cultural and normative changes in values across LMICs; we will conduct further analyses to examine additional possible influences on this trend. We will broaden this discussion in the full paper, also touching on how and possibly why there are differences in results across the younger and older population samples. In addition, we will undertake additional analyses: expand our regression models so they include variables indicating tendency of skip-generation households being formed by death versus migration of the middle generation; explore data from specific countries in an attempt to understand our findings through selected country case studies for both older people and children under 15.

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APPENDIX: Expanded mixed-effect regression results

Older people 60+ (N=1,100,766)			**Model 1**		**Model 2**		**Model 3**	
	Coef.	**(SE)**	**Coef.**	**(SE)**	**Coef.**	**(SE)**	**Coef.**	**(SE)**
Trend	0.377***	0.073	0.432***	0.073	0.503***	0.067	0.302***	0.130
Age (years)			0.012***	0.000	0.012***	0.000	0.012***	0.000
Male (vs. female)			-0.460***	0.000	-0.327***	0.000	-0.460***	0.000
Lives in a rural area (vs. urban)			0.327***	0.000	0.588***	0.000	0.387***	0.000
Education: 1-4 years (vs. none)			0.015***	0.000	0.015**	0.000	0.015***	0.000
Education: 5+ years (vs. none)			-0.178***	0.000	-0178***	0.001	0.178***	0.001
Education: missing (vs. none)			0.018***	0.001	0.017***	0.001	-0.016***	0.001
CCDR					0.051***	0.001	0.011***	0.001
FLFP					-0.080***	0.002	-0.076***	0.005
GNI					-0.053***	0.001	0.155***	0.003
Migration rate					-0.012***	0.000	0.011***	0.001
Total dependency ratio					-0.005***	0.000	0.062***	0.005
CCDR*trend							0.054***	0.002
FLFP*trend							-0.063***	0.008
GNI*trend							-0.212***	0.003
Migration rate*trend							-0.049***	0.001
Total dependency ratio*trend							-0.092***	0.006
Intercept	2.339	0.097	-3.261	0.089	-3.287	0.096	-3.104	0.106
Variance (intercept)	0.197*	0.095	0.155*	0.079	0.195	0.093	0..217*	0.114
Variance (trend)	0.264***	0.054	0.258***	0.053	0.216	0.044	0.210***	0.168
Children under 15 (N=5,374,982)			**Model 1**		**Model 2**		**Model 3**	
	Coef.	**SE**	**Coef.**	**SE**	**Coef.**	**SE**	**Coef.**	**(SE)**
Trend	.430***	0.135	0.469***	0.089	0.659***	0.090	0.771***	0.127
Age (years)			0.068***	0.000	0.068***	0.000	0.068***	0.000
Lives in a rural area (vs. urban)			0.388***	0.000	0.387***	0.000	0.388***	0.000
Male (vs. female)			-0.051***	0.000	-0.051***	0.000	-0.051***	0.000
CCDR					0.025***	0.000	0.005***	0.001
FLFP					-0.194***	0.001	0.135***	0.002
GNI					-0.102***	0.000	-0.112***	0.001
Migration rate					-0.009***	0.000	0.006***	0.000
Total dependency ratio					.007***	0.000	-0.059***	0.002
CCDR*trend							0.028***	0.001
FLFP*trend							-0.596***	0.001
GNI*trend							0.057***	0.001
Migration rate*trend							-0.033***	0.001
Total dependency ratio*trend							0.070***	0.003
Intercept			-4.344	0.132	-4.420	0.150	-4.482	0.128
Variance (intercept)	0.438*	0.180	0.427**	0.175	0.542**	0.224	0.400**	0.165
Variance (trend)	0.389***	0.079	0.388***	0.079	0.401***	0.082	0.796***	0.162

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