Fertility and Household Economic Outcomes among Poor Urban Households in Nairobi informal Settlements, Kenya

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Abstract

We use longitudinal data on 6,324 households from the Nairobi Urban Health and Demographic Surveillance System and a multidimensional poverty index to investigate the effects of birth of additional children on household poverty transitions between 2006 and 2009. Overall we find more households falling into than moving out of poverty, while more households remained in chronic poverty than those who stayed out of poverty over the study period. Having a birth in a household is a significant net predictor of a household falling into poverty and lessens their prospects of moving out of poverty over the observation period. Following the inevitable expenditures associated with infants' total care, our findings provide compelling quantitative support for anti-poverty interventions that include the promotion of voluntary family planning programs and smaller family size norms as part of the strategies to address persistent poverty among the urban poor.

Résumé

Nous utilisons des données longitudinales de 6, 324 ménages du système de suivi démographique et de santé en milieu urbain à Nairobi et un indice de pauvreté multidimensionnel pour analyser les effets d'une naissance supplémentaire sur les transitions de pauvreté des ménages entre 2006 et 2009. Les résultats indiquent que plus de ménages tombent dans la pauvreté qu'il n'en sort; beaucoup de ménages sont restés dans la pauvreté chronique que ceux qui sont sortis de la pauvreté au cours de cette période. Une naissance supplémentaire dans un ménage est un prédicteur net et significatif, après avoir controlé par d'autres variables, qu'un ménage tombe dans la pauvreté; il diminue aussi ses chances de sortir de la pauvreté durant cette période. Étant donné les dépenses inévitables associées à la prise en charge globale des nourrissons, nos résultats fournissent un soutien quantitatif convaincant aux interventions anti-pauvreté qui intègre la promotion volontaire des programmes de plannification familiale et les normes de familles de taille plus réduite comme stratégies pour lutter contre la pauvreté persitante chez les pauvres en milieu urbain.

Introduction

Although fertility has started to decline in most parts of sub-Saharan Africa (SSA), the estimated level of fertility remain high at about 5.1 children per woman (PRB, 2012). This average masks huge variations across regions and countries, with an increasing number of countries experiencing near replacement level fertility, while some remain at pre-transition levels (Population Reference Bureau, 2007; Ezeh et al. 2009). At the same time, poverty remains widespread in the region despite the fact that many countries have registered steady economic growth since mid-1990 (DFID, 2007).

The relationships between fertility levels and household economic welfare have long been a population theme in the demographic and development literature, as recently emphasized by the Millennium Development Goals (MDGs) (Melesse, 2006; UNDP, 2003; Potts & Fotso, 2007). More recent investigations in developing countries have indicated that rapid childbearing inhibits economic prosperity and that these effects tend to persist over the life course (Bloom and Canning, 2007; Aassve et al. 2005). By contrast, fertility reduction is posited to lead potentially to better economic outcomes, as women with fewer children engage more in income-generating activities and such households invest more in the education of their children (Mason & Lee, 2004).

In sub-Saharan African countries, despite documented commitment to implementing poverty reduction strategies, with support from international financial institutions, the contribution of reproductive

health (RH) to economic outcomes and mechanisms through which RH may influence economic indicators are not well understood (Merrick, 2001; 2002; Mason & Lee, 2004). In particular, the household context, time dynamics and short- and long-term consequences of high fertility are poorly understood in the region and there is little empirical evidence on the effects of population and reproductive health on economic outcomes at the household level (The World Bank, 2010). The lack of research in this area has mostly been precipitated by the paucity of appropriate data and methodologies (Greene and Merrick, 2005). In addition, attempts to demonstrate what interventions have the greatest promise to alleviate poverty in Africa have been hampered by lack of appropriate data and capacity to evaluate and monitor how various social phenomena affect wellbeing at household or community levels (Schultz, 2003; 2005). Besides, analysis of the linkage between fertility and poverty is complicated by the fact that routinely-available demographic data are often cross-sectional and do not include sufficiently detailed economic measures of welfare (Kenya National Bureau of Statistics and ICF Macro, 2010). Consequently, the longitudinal data from the Nairobi Urban and Health Demographic Surveillance System (NUHDSS) containing both time-varying economic and demographic information provides us with a unique opportunity to examine the household context and the economic consequences of fertility among poor urban households over a time period.

In this paper, we specifically examine the effects of the birth of additional children on the dynamics of household poverty with a focus on patterns of transition into and out of poverty between 2006 and 2009. We seek answers to the following specific questions:

I. What are the poverty profiles and fertility experiences of households living in the two urban informal settlements under observation between 2006 and 2009?

II. Is household poverty dynamics related to fertility outcomes within households, and if so, what are the net effects?

III. What are the other net predictors of households' poverty outcomes over the period?

In order to answer to these questions, we build on the premise that household economic status is not static over time. Several factors such as household-level shocks, lifecycle changes, seasons and climate variability and public policies could lead to large variations in household economic status even over a relatively short period. These variations in household economic status may also depend on the measures used to define that status. We use longitudinal data on 6,324 households collected between 2006 and 2009 from the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) and a multidimensional poverty index computed from a series of indicators, including household assets, expenditures, monetary income, and housing characteristics, weighted using the Principal Component Analysis (PCA) to assess the linkages between fertility and household poverty outcomes.

Fertility and Economic Outcomes: A review of empirical and theoretical literature

Kenya is one of the countries where declining fertility levels have been found to stall in recent years. Fertility in the country declined from 8 children per woman in 1970 to 4.7 children by the year 2000. However, between 2000 and 2007 the total fertility rate (TFR) increased to 4.9 and then declined to 4.6 by 2009 (Kenya National Bureau of Statistics & ICF Macro, 2010). If the current level of decline reaches 4.0 by 2015, the 2008 UN population projection revision puts Kenya's population at 85 million by 2050. This represents an additional 67 per cent growth burden or an absolute increase of 34 million persons—which is about six million shy of the country's 2015 population size of 40 million people. Such rapid growth in Kenya's population has huge implications for the attainment of the country's Vision 2030 development goals[1], including its aspirations for food security, universal primary education, increased access to health services, increased employment opportunities and overall economic development goals (Ezeh et al. 2009). For Nairobi, the nation's capital city, available evidence found higher fertility rates among the urban poor in Nairobi's informal settlements than the rest of the city. The TFR for Nairobi slums was 4.0 and 3.5 children per woman of reproductive age in 2000 and 2012 respectively while the corresponding figures for the rest of the city were 2.6 and 2.8 children (APHRC, 2002; KNBS and ICF Macro, 2010; APHRC, 2014).

There is no theoretical and empirical consensus on how fertility affects household economic outcomes. In many developing countries, fertility declines have been observed to often come along with reductions in poverty. Indonesia is perhaps the most striking example of this pattern. Over the last four decades, Indonesia has experienced unprecedented economic growth together with a dramatic decline in fertility. Empirical evidence shows that Indonesia experienced unprecedented economic

[1] Vision 2030 is Kenya's National Development Agenda, which aims to create a globally competitive and prosperous country with a high quality of life by transforming Kenya from a third world country into an industrialized, middle income country by 2030.

growth and a dramatic decline in fertility between 1970 and 1995. Over the period TFR fell by around 50% and real Gross Domestic Product (GPD) per person increased by more than three times (World Bank, 2004). Similarly, data for Botswana and Zambia show that despite similar geographical, historical, political and socio-economic characteristics and HIV/AIDS challenges, Botswana has been successfully transforming itself from one of the poorest countries in the world to a middle-income country with a per capita GDP of $6,982 in 2008, while poverty remains a major problem in Zambia (World Bank, 2010). Many factors such as political governance and corruption have been advanced for the divergent economic paths of the two countries although demographic factors, particularly their divergent fertility transitions, have also played a role (The World Bank, 2010). Both countries started in 1960 with a high pre-transition fertility level of about 7 children per woman. Whereas Botswana experienced rapid fertility decline from the 1980s with fertility reaching less than 3 children per woman in 2008, Zambia's fertility remained at pre-transition levels of about 6 children per woman by 2008. Consequently, Zambia's population was projected to reach 29 million by 2050 (nearly 10 times its 1960 population of 3 million people) and that of Botswana was projected to reach 2.76 million over the same period (barely 5 times its 1960 population) (The World Bank, 2010). Consistent with fertility patterns and population growth rates, the dependency ratio started to decline in Botswana from the 1970s while that of Zambia continued to increase and by 2008, youth dependency ratio had dropped to 54% in Botswana but exceeded 90% in Zambia (The World Bank, 2010). With many mouths to feed and more people in need of services, Zambia has not progressed as well as it could have compared to Botswana.

Most studies on the relationship between fertility and economic outcomes focus on macro level perspectives and are mainly based on empirical aggregate level data. However, observed correlations between fertility and poverty at the national level do not provide much insight into the causal links between the demographic and economic processes (Mason and Lee 2004, Birdsall et al. 2001). Moreover, earlier studies have shown that the relationship between fertility and poverty is not unidirectional but dependent on the stage of economic development (McNicoll 1997, Schoumaker and Tabutin 1999). Whereas the relationship is positive in most developing countries, a negative relationship has been reported within the very poorest countries, which is associated with lower reproduction capability and higher rates of infertility among poor households (Lipton 1998; Livi-Bacci and di Santis 1998).

The complications in the relationship between fertility and economic outcomes are exacerbated by evidence that many factors that influence fertility also determine wellbeing. These include education, health services and family planning policies. In addition to joint causation, reverse causation may also take place. Among poor households the demand for children may be high since those households rely on their children's labor supply and often the child's support for old age is a further factor that increases the demand for children. Higher fertility in turn is associated with less educational investment (i.e. demand for quantity rather than quality of children) and consequently lower earning potential for children, fostering intergenerational transmission of poverty (Moav 2005).

An important pathway to understanding the relationship between fertility and economic outcomes across developed and developing countries is examined through the relationship between fertility and female labor force participation (Angrist & Evans, 1998; Chun and Oh, 2002; Engelhardt et al. 2004; Iacovou, 2001; Kristjanson et al. 2010; Nanfosso & Zamo-Akono, 2010; Shapiro and Tambashe, 1997; Rosenzweig & Schultz, 1985). With increased opportunities for higher educational attainment and labor force participation for women in SSA (Aromolaran, 2004), childbirth and related childcare are important considerations for households, particularly if headed by women. Generally, child care is considered a major barrier to employment for most female heads of households and a major drain on earned income. In most two-parent households, child-care time and cost are shared by both parents and in an extended family system, relatives might aid child care, but in single parent households, these responsibilities rest with the single parent alone particularly those headed by women in urban areas (Gage et al. 1997). Consequently, the structure of households and the number of young children who are wholly dependent on adults for accessing care and resources significantly determine household poverty (Mberu, 2007).

Other related studies in SSA have linked the promotion of family planning in countries with high birth rates with the potential to reduce poverty and hunger, contribute substantially to women's empowerment, the achievement of universal primary schooling, and long-term environmental sustainability (Cleland, et al. 2006). Similarly, Schuler et al. (1995) reported strong positive perceptions of the benefits of contraception among women including economic benefits, such as better food for children, clothing

and education, as well as health and physical well-being, happiness and harmony in the home.

Despite these contributions, studies in SSA are constrained by data limitations, particularly as most are based on aggregate data, which leaves knowledge gap in the specificities of the urban poor. Consequently, existing national estimates do not sufficiently answer questions critical to specific livelihoods of the urban poor. Other studies that have sought to identify the causal relationship between fertility and poverty have relied on aggregate and micro level cross-sectional data (Merrick 2001), which lacks robust time-related causal information about fertility and well-being due to the fact that fertility and household income may be jointly determined. Appropriate longitudinal household surveys that include the timing of fertility and information on expenditures, income and other measures of well-being are limited especially in SSA. This paper overcomes some of the limitations of existing studies by using a unique longitudinal household dataset to examine the relationship between fertility and poverty over time.

Study Location, Data and Methods

Our study covers two of Nairobi's informal settlements- Korogocho and Viwandani. The two slums are located on the outskirts of Nairobi City about 10 km from the city centre, and about 7 kilometres from each other. These informal settlements are characterized by slum-like conditions, limited access to water and sanitation, overcrowding and poor housing conditions, limited employment opportunities, near absence of public sector services and insecurity of life and property (UN-HABITAT, 2008; 2010). The health and wellbeing implications of such patterns of urban residence have been well documented, particularly how slum residents experience limited access to health care and family planning services and how debilitating physical environment results into excess mortality and disease burdens compared to any other subgroup in Kenya (APHRC, 2002; Zulu et al. 2011).

We use data from the NUHDSS longitudinal platform, which involves prospective follow-up of about 70,000 individuals in 24,000 households in the two informal settlements and has been conducted since 2002. The surveillance involves visits to all households once every four months to record all demographic events, including births, deaths and migrations. Additional data on household amenities and income are collected once a year for all households residing within the surveillance areas. Following an expenditure survey implemented annually since 2006 and our focus on multi-dimensional perspective on poverty, we use data collected between 2006 and 2009 on household income and expenditure to compute a composite of household poverty that includes annual household expenditure. Due to the high levels of population mobility within the informal settlements (about 30% annually, which is mostly due to in and out-migration), our analysis utilizes household poverty indicators for 6,324 households that have lived in the settlements for the full four consecutive years between 2006 and 2009. This selection criterion ensures that all households are exposed to similar physical, social, economic and political environments over the observation period. We used simple regression analysis to examine whether households that were selected were significantly different from those that were not selected with respect to certain characteristics, which could indicate selection bias due to loss to follow-up. We found that there were no significant differences in the characteristics of households that were included in the analysis and those that were not. This led us to conclude that the 6,324 households selected for our study are typical of the households in the two informal settlements. There remains a probable source of bias related to likely selectivity of migration in and out of the slums. This remains a limitation of our data since we do not have data on non-migrants in migrants' places of origin and information on out-migrants from the slums.

The outcome variable is household poverty status (poor and non-poor), defined by a composite index computed from a series of indicators that include: ownership of household assets, expenditure on consumables, monetary income, and housing characteristics. A weighted value was computed from these wealth-related indicators using Principal Component Analysis (PCA). To identify a poor and a non-poor household, the generated weighted variable was categorized into two using a median score where all households with a score above the median were categorized as non-poor and those that had scores below the median value were defined as poor. There were no households that had the median score. Household poverty outcome is considered first in 2006 and at the end of the observation period in 2009.

The key independent variable is total number of births in a household between 2006 and 2009 measured by (0, 1, 2, 3, 4+). Following evidence that household sizes are small (about 3) and births are rare events and the rarity of two or more births in the same household over the four-year period in our study (out of the 35% of households who experienced a birth over the four year period, 83% of them had only one child), we settled for a binary

record of having at least a child (1+) versus not having a child (0) over the period.

Building on the literature and available data, the other predictor variables included in the analysis were divided into three groups: characteristics of households, characteristics of household heads and community contexts. Heads of households are chosen as reference persons following the pattern set by other studies in the region, and the assumption that the economic circumstances of the head of a household is the most single important indicator of household's economic status (McLanahan & Booth, 1989; Mberu, 2007). The characteristics of a household head include: gender (male/female), age in years, education level, marital status between 2006 and 2009 (in union, widowed/divorced/separated, never married, other patterns), religion (Catholic, Protestant, Islam, Others, No religion), ethnicity (Kikuyu, Luhya, Luo, Kamba, Others) and type of economic activity over the period (own business, formal employment, informal work, others). Other household characteristics used in the analysis include: average household size between 2006-2009 (less than 3, 3, 3+), and the total number of deaths in a household over the period (0, 1+). Community context is measured by place of residence (Viwandani and Korogocho). Previous studies in the slums of Nairobi have highlighted the heterogeneity of informal settlements in the city and the demographic differences between households in Korogocho and Viwandani slums, particularly Viwandani's strategic location near the major source of employment in the city (the industrial area), as well as being home to young low-income more educated industrial workers (Ezeh et al. 2006).

We use bivariate and multivariate statistical tools to evaluate the effect of having at least a birth or otherwise between 2006 and 2009 and the characteristics of households and their heads on household poverty trajectories. In the bivariate logistic model, we examined the relationship between having at least one child or otherwise over the observation period and household moving into or out of poverty. We use repeated multivariate logistic regression models to identify the net effects of having no child versus having at least one birth in an urban poor household between 2006 and 2009 on household poverty outcomes, accounting for confounders. In Model 1 we compare households that remained out of poverty throughout the observation period and those who were non poor in 2006 but fell into poverty by 2009. In Model 2, we compared households in chronic poverty over the four years of observation and households that were poor at the beginning of the period but transited out of poverty by the end of observation.

Results

Overall, Table 1 shows that the number of households living in poverty in the period 2006-2009 rose in these communities. Among the 6, 324 households studied, 50.8 percent were poor in 2006 but the proportion rose to 55 percent by the end of 2009. This outcome is driven by 34.2 percent of households that remained poor throughout the study period and the 20.8 per cent of households, who were non poor in 2006, but fell into poverty by 2009. Conversely out of the 3,110 (49.2 per cent) households who were non-poor in 2006, only 1,794 (28.4 per cent) consistently maintained the same status by 2009, while 1,051 (16.6 per cent) households who were poor in 2006 successfully moved out of poverty by the end of 2009 .

Table 1: Poverty Transition Patterns of Urban Poor Households, 2006-2009 (N=6324)

Poverty Transition Patterns	**Year 2006**		**Year 2009**	
Poor -> Poor	50.8%	3214	34.2%	2163
Poor -> Non-Poor			20.8%	1316
Non-Poor -> Poor			16.6%	1051
Non-Poor -> Non-Poor	49.2%	3110	28.4%	1794
Total	**100**	**6324**	**100**	**6324**

Source: Authors' Analysis of NUHDSS Data, 2006-2009

In terms of number births, there were a total of 2,667 births over the four years in 6, 324 households.

The births were evenly distributed across the four years (table not shown), with the distribution varying between 24.4% and 26.7%. Further, we found that 65% of households experienced no birth over the period 2006-2009, while 29% of households experienced the birth of only one child and 6% of households had two births or more. Following the

marginal variation between households with one child and those with 2 children or more in relation to the outcome of interest-household poverty dynamics in both bivariate and multivariate analyses, we combined the birth outcome into a binary variable, (None versus 1 birth+).

In terms of the relationships between having at least a birth versus none and household poverty transitions over the period, Table 2 shows that having at least a birth, suggests on average, a disadvantage. Households that remained in chronic poverty and those that fell into poverty are mostly those that experienced at least a birth over the period. It is also noteworthy that households that remained out of poverty over the same period have the least proportion of those that experienced a birth in the four years.

Table 2: Percentage Distribution of Households that Experienced at Least 1 Birth

No. of Births	Households in chronic poverty	Households moved out of poverty	Households that fell into poverty	Households that remained out of poverty	Total (n)
0	63.9	65.3	63.2	66.9	64.8
1+	36.1	34.7	36.8	33.1	35.2
Total (n)	2163	1051	1316	1794	N=6324

To test the statistical significance of these observations at the bivariate level, we ran two separate bivariate logistic models. Our result summarized in Table 3 showed statistically significant disadvantage for households with at least a birth than otherwise in terms of falling into poverty.

Table 3: Bivariate Logit Models on Household Experiencing At Least 1 Birth versus None, 2006-2009

Number of Births	Moving Into Poverty		Moving Out Of Poverty	
	OR	95% CI	OR	95% CI
0 (ref.)				
1+	1.18*	[1.01, 1.36]	0.94	[0.81,1.10]
Observations	3110		3214	
Log lik.	-2116.56		-2031.10	

Exponentiated coefficients; 95% confidence intervals in brackets
* p<0.05 ** p<0.01 *** p<0.001

Households with at least one birth were 1.18 times more likely to fall into poverty by 2009 compared to those that had no birth, if they were non-poor in 2006. These findings were further refined using multivariate logistic regression models to identify the net effects of having at least a birth or otherwise on household poverty outcomes, accounting for confounders (see Table 4). In Model 1, households that have at least one child over the observation period have 12% higher odds of falling into poverty in 2009, if they were non-poor in 2006, although the outcome is not statistically significant. However, the odds ratio for having at least one child is significantly important for households transitioning out of poverty. Net all other effects and relative to those who did not experience a birth, having a birth over the four-year observation period in a poor household significantly diminishes the odds of moving out of poverty by 25% over the period.

Table 4: Logit models predicting fertility & household poverty dynamics in Nairobi's Informal Settlements, 2006-09

Variable Categories	Moving Into Poverty		Moving Out Of Poverty	
	OR	95% CI	OR	95% CI
Household Experienced Birth				
No Births (ref.)				
At Least 1 Birth	1.12	[0.93,1.36]	0.75**	[0.63,0.91]
Household Experienced Death				
No Death (ref.)				
At Least 1 Death	1.09	[0.77,1.55]	1.07	[0.78,1.48]
Slum Residence				
Korogocho (ref.)				
Viwandani	0.24***	[0.20,0.30]	3.97***	[3.24,4.85]
Household Size				
HH Size 3 (ref.)				
HHsize <3	0.66**	[0.51,0.85]	1.27	[0.98,1.63]
HHsize 3+	1.03	[0.82,1.31]	1.17	[0.93,1.48]
Sex of Household Head				
Female (ref.)				
Male	0.33***	[0.25,0.45]	1.78***	[1.41,2.23]
Household Head Economic Activity				
Informal (ref.)				
Formal	0.70**	[0.54,0.89]	1.39*	[1.01,1.91]
Business	0.80	[0.64,1.00]	1.18	[0.96,1.45]
Unemployed	0.90	[0.71,1.15]	1.05	[0.84,1.32]
Marital Status of Household Head				
In Union (ref.)				
Separated	1.43*	[1.06,1.93]	0.61***	[0.48,0.79]
Single	1.82***	[1.36,2.42]	0.44***	[0.33,0.57]
Ethnicity				
Kikuyu (ref.)				
Luhya	0.80	[0.62,1.04]	1.59***	[1.22,2.07]
Luo	1.13	[0.87,1.46]	1.20	[0.93,1.55]
Kamba	0.75*	[0.60,0.95]	1.55***	[1.22,1.98]
Others	0.60***	[0.44,0.81]	1.65***	[1.23,2.21]
Education of Household Head				
Primary or Below (ref.)				
Secondary or Higher	0.92	[0.78,1.09]	1.12	[0.93,1.34]
Religion of Household Head				
Catholic (ref.)				
Protestants	0.96	[0.80,1.15]	0.93	[0.78,1.12]
Muslim/Other Religion	1.47*	[1.01,2.15]	0.81	[0.59,1.11]
	-		-	
Log lik. II	**1765.88**		**1793.90**	

The rest of the results in Table 4 provide further evidence supporting the multi-factor predictors of household poverty as identified in a corpus of previous studies. The individual characteristics of the head of household such as gender, religion, ethnic origin, age and marital status to varying degrees and directions significantly predict household poverty dynamics.

We observe a general weak results in relation to the role of education, with households whose heads have secondary education or higher conferring no advantage in terms of falling into poverty and moving out of poverty relative to those with lower or no education in these informal settlements.

In terms of the role of religious affiliation, we find little variations across Christian denominations and all household poverty outcomes. However, we find significant disadvantage of Muslims and those with no religion in terms of falling into poverty. Relative to Catholics, households headed by Muslims and heads

with no religion, if they were non-poor in 2006, are 47% more likely to fall into poverty in the four years of observation.

Ethnic origin of household heads is a significant predictor of household poverty transitions across all measured outcomes. Relative to the Kikuyu, Kamba-headed households if they were non-poor at the beginning of the observation in 2006, are 25% less likely to be among those that fall into poverty by the end of the observation period in 2009. Further, with the Kikuyu as the reference group, the Kamba and Luhya headed households, if they were poor in 2006, were 55%, and 59% respectively, more likely to move out of poverty by 2009.

While we find only marginally significant net effects of the shock of death on household poverty across all outcome categories, we find significant and monotonic increasing effect of household size in the propensity to fall into poverty over the observation period. Relative to the average household size of 3 members, smaller households were 34% less likely to fall into poverty by 2009, if they were non-poor in 2006.

The gender of head of household is a net predictor of household poverty dynamics. Male headed households are significantly less likely to fall into poverty in 2009 if they were non-poor in 2006. On the other hand, they are 1.78 times more likely to move out of poverty in 2009 if they were poor in 2006 compared to female headed households.

In relation to the role of marital status, we find that relative to households whose heads are in a current union, those whose heads are separated/divorced/widowed and those who are single are 43% and 82% respectively more likely to fall into poverty by the end of the observation period if they were non-poor at the beginning of observation in 2006. In terms of moving out of poverty, the outcome is reversed for both categories of households; households whose heads are separated/divorced/widowed and those who are single were 39% and 56% respectively less likely to move out of poverty by the end of the observation period in 2009, if they were poor at the beginning in 2006.

An important community variable that predicts household poverty outcomes is the slum of residence. Consistent with other studies in the slums of Nairobi, households living in Viwandani are significantly less likely than those residing in Korogocho to fall into poverty by the end of 2009, if they were non-poor in 2006. Conversely, Viwandani households are 3.97 times more likely to move out of poverty by the end of 2009 if they were poor in 2006.

Discussions and Conclusions

One key finding of our study is a general worsening of household socio-economic status over the study period, with more households falling into than moving out of poverty. We find that the occurrence of a birth in a household was a significant net predictor of poverty dynamics. In particular, households that experienced at least one birth during the period were more likely to remain in poverty compared to those that did not have a birth. Further analysis involving a cut-off of at least two births did not change the conclusions. This suggests that having even one child in the context of adverse poverty, as experienced in the slums of Nairobi, is enough to prevent households from moving out of poverty.

Consistent with a multi-factor perspective on the determinants of poverty, our results show that beyond the fertility factor, individual characteristics of the head of households (gender, age, education, religion and marital status); household composition (household size); community level factors (slum of residence) and ethnic origin are net predictors of household poverty experiences. The finding that households in Viwandani were less likely to fall into and more likely to move out of poverty compared to those in Korogocho is consistent with the slum's strategic location. Viwandani is situated near industrial area which is a major source of employment in Nairobi city and is home to young low-income educated industrial workers (Ezeh et al. 2006). The finding highlights the importance of location in determining variations in vulnerabilities across slums, particularly the primary role of economic opportunities in addressing local community poverty.

The significant disadvantage of female-headed households in staying in chronic poverty and in falling into poverty, is consistent with the primary outcomes of a growing body of research in the region, which underscores a significant degree of female disadvantage in household living conditions and associates the increasing concentration of poverty among women to the rise in the proportion of households headed or principally maintained by women (Gebremedhin, 2006; Lloyd & Gage-Brandon, 1993). This finding sheds further crucial light on the enduring female economic disadvantage in the region and provides impetus for policy interventions to address them.

Our finding on the role of marital status of the household head on poverty dynamics is consistent with a growing body of evidence which shows that in resource poor settings with limited independent opportunity structures for individuals, singlehood, separation, widowhood and divorce, exacerbates economic vulnerability by denying spouses the

advantage of pooling resources (household amenities and possessions) to provide household sustenance, and the advantages of household division of labor and complementarities in production and consumption (Becker, 1981).

Our finding regarding the role of education on changes in household poverty was counter-intuitive with households having better educated heads being worse off economically than those whose heads had no formal education. Although this calls for further inquiry especially with respect to the functionality of education received, it could be that the limited availability of formal sector jobs and high rates of unemployment in the country have weakened the role of education in helping individuals move out of poverty (Kristjanson et al. 2010). Moreover, the study setting itself (informal settlements) is ample evidence that educational attainment might not independently pull households out of poverty.

In conclusion, our study highlights the demographic dimension of household poverty outcomes in a short time span of four years. We show that experiencing even one birth is enough to increase household vulnerability to poverty and lessen their prospects of moving out of its grip. Although giving birth is culturally celebrated in terms of prolonging the lineage, our results indicate that experiencing a birth in a situation of extreme deprivation may compound household poverty. This is intuitive given the expenses associated with childbirth and care, as well as the opportunity costs in terms of forgone participation in income-generating activities during pregnancy, childbirth and postpartum period especially in the context of fringe employment opportunities available for the urban poor with little or no welfare benefits. Moreover, the findings showed that household size has implications for falling into, moving out and staying out of poverty. In the context of scarce resources and competing needs, our findings support a multi-pronged policy approach that addresses the multi-factor determinants of poverty that need to include the promotion of voluntary family planning programs and smaller family size norms. Such an approach might be an important means to not only reduce fertility but also the overall urban poverty levels, considering that the majority of those who live in sub-Saharan African cities actually reside in informal settlements.

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