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Breaking the Net: Family Structure and Street-Connected Children in Zambia

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ABSTRACT *Drawing on original fieldwork in the slums of Ndola in Northern Zambia we isolate those features of a child's nuclear and extended family that put him most at risk of ending up on the streets. We find that older, male children and particularly orphaned children are more likely to wind up on the street. Families with a male household head who is in poor health are more likely to originate street-connected children. In contrast, households with surviving maternal grandparents or with a male head who has many sisters are significantly less likely to originate street-connected children.*

1. Introduction

The AIDS epidemic has not only reduced the population of prime age adults in many African nations but also increased the number of orphans or otherwise vulnerable children. The increase in the ranks of vulnerable children compounds the negative economic consequences of this health crisis. Vulnerable children have much lower human capital (in terms of both schooling and health) than non-orphans and even orphans cared for by members of their extended family. Thus, these children contribute to the intergenerational transmission of poverty far and above their parents' direct contribution.

Street-connected children represent a particular subcategory of orphans and vulnerable children (OVC) that typically lacks regular family support.[1] Studies conducted in 1991 and 2004 estimate that the number of street-connected children in Zambia more than doubled, from approximately 35,000 to 75,000 (Tacon and Lungwangwa, 1991; Zambian Ministry of Sport, Youth and Child Development, 2004). This represents an increase from roughly 0.9 per cent to 1.6 per cent of Zambian children living on the street.[2] While a growing body of domestic and international studies and reports describes the situation of street-connected children, evidence on the causes of this phenomenon remains scant. In this article we hypothesise that the causes lie in the families of origin. We use data from a unique sample collected through dedicated fieldwork in the slums of Northern Zambia in order to identify the factors that contribute to the breakdown of the safety net provided by the African extended family and give rise to the phenomenon of street-connected children.

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In Africa, the extended family was the traditional social security system. Extended family members were responsible for protecting the vulnerable, caring for the poor and sick and passing on traditional social values and education. Families, particularly in traditional societies, are comprised of a large network of people extending through varying degrees of relationship over multiple generations and geography and involving reciprocal obligations (Foster, 2000). However, as the number of orphans and vulnerable children increases and an ever-larger number of adults is affected by HIV/AIDS, these family networks have come under severe strain.

Against this background this article tries to identify the link between family structure and street-connected children. We present a quantitative analysis of data collected from 220 households, capturing the experience of 1455 nuclear family members and 1685 extended family members. Data collection at the household level began by first interviewing one of 43 street-connected children originating families and then, for each one of them, interviewing the first layer of neighbours using the same questionnaire. We also surveyed a sample of 102 current and former street-connected children and compared their characteristics to those of previous, larger scale, surveys. The Online Appendix contains the questionnaire templates used during the fieldwork and data collection process in Zambia.

Although our sample is small and not necessarily representative of the Zambian street children population, it provides important detail on a special subcategory of vulnerable children. Moreover, this work is, to the best of our knowledge, the first to collect information on the families of origin and their neighbours in order to evaluate the role of the nuclear and extended family in the street children phenomenon. The lack of quantitative evidence in this area stems from the difficulty of collecting micro-level data on street-connected children and, especially, on their families of origin. The data collected in this article begin to fill this gap as the fieldwork was conducted in the usually off-limit areas where street-connected children and their families live. The analysis of this unique dataset provides useful insights on the street child phenomenon and sheds some light on the direction for policies to deal with the growing population of children living on the street.

Based on these data, we find that over 10 per cent of the families in the slums have children living on the street. The health status of the male head of the household is associated with a higher likelihood a child ends up on the street. The composition of the extended family net also seems to matter: a higher number of paternal sisters and the presence of maternal grandparents is associated with a lower probability a family originates street-connected children. A younger composition of children in the household and a higher share of girls in the household are both associated with a lower probability any child ends up on the street. Likewise, the relationship of a child to the household affects the likelihood he ends up on the street: nephews, stepchildren and household heads' siblings are less likely to end up on the street compared to natural son and daughters, suggesting, as a possible interpretation, that, when an extended family accepts nephews and stepchildren, it is their intention to keep and protect them.

We urge some caution in the interpretation of our results. In our analysis, we focus on those characteristics that distinguish street-connected children or street families from families that look quite similar in that they live in exactly the same slum and face a very similar set of objective difficulties based on observable characteristics. In our regression models, we control for observable differences in families. However, we recognise that unobservable factors may contribute to the likelihood that children end up on the street. At a minimum, however, these unique data and the characteristics they point to as predictors of the street-connected children phenomenon identify important areas for future research and policy intervention.

The article is organised as follows: Section 2 reviews the existing literature and explores further the contribution of this article to the academic debate; Section 3 describes the institutional environment of Zambia and discusses the data sources and the fieldwork methodology; Section 4 describes the empirical methodology and discusses the results; Section 5 concludes.

2. Literature Review

Research on orphans and vulnerable children in Sub-Saharan Africa spans literatures in economics, psychology and socio-medicine as well as in organisational and institutional development. To our knowledge, this article is among the first to study microeconomic data on vulnerable children in urban slums in Africa – an institutional context very difficult to study. The only notable exceptions are Abraham et al. (1998) and La Ferrara (2002), which are both based on fieldwork in the informal settlements of Nairobi. These papers have a different focus, however, with La Ferrara (2002) conducting a multivariate analysis of 'self-help' groups and Abraham et al. (1998) providing a descriptive analysis of participation in different types of groups (for example, rotating savings and credit associations, burial societies, health groups, and so forth) and on the socio-economic background of respondents.

The economics literature on vulnerable children focuses almost exclusively on HIV. Two important streams of this literature capture slightly different aspects of the relationship between family structure and childhood vulnerability.

A first growing stream studies the impact of HIV-related orphanhood on the education and health outcomes of orphans. Several longitudinal studies (for example, Case and Ardington (2006) in South Africa and Evans and Miguel (2007) in Kenya) demonstrate that, maternal death has more adverse effects on health and education than paternal death, and that outcomes are worse when the surviving parent is not taking care of the orphan. Evans (2005) demonstrates that the spillover effects of orphans on the health and education of non-orphan children is negligible once selection is taken into account. And, Ksoll (2007) finds that selection into higher-wealth caretakers mitigates the negative effects of orphanhood on education. However, studies using the general child population as a comparison find that orphans receive lower educational investments than the biological children of the household head, providing some justification for conditional transfers to households caring for orphans (Ainsworth and Filmer, 2006; Case et al. 2004).

A second stream of microeconomics literature focuses on the impact of HIV-related adult morbidity and mortality on the income and consumption of surviving household members (Naidu and Harris, 2005). This work provides evidence of a significant consumption drop in affected households within the first five years of death and shows that the impacts are larger when the decedent is a female adult (Beegle et al., 2006). Whether and how these effects are mitigated by socio-economic status is a subject of ongoing debate (for example, see Fortson 2008 and De Walque 2006) and may depend on the stage of the HIV epidemic in the country under study (Iorio and Santaeulàlia-Llopis, 2011)

The socio-medical and international development literatures pay more attention to the impact of growing disease burdens on the extended family safety net. Foster (2000) highlights how the traditional practice of orphan inheritance by uncles and aunts has declined and been replaced with care provided by grandparents or other relatives. He points to the importance of focusing on children who slip through the safety net, ending up in a variety of vulnerable situations such as on the street, working or heading households. Others have shed light on the street child phenomenon in Latin America (Rodgers, 1999) and South Asia (Conticini and Hulme, 2007).

Six main institutional studies report on vulnerable children in Zambia. Four directly study street-connected children – Tacon and Lungwangwa (1991), Lungwangwa and Macwan'gi (1996), a 2002 assessment of street-connected children in the town of Lusaka conducted by the Project Concern International Zambia and a 2006 survey conducted in 12 Zambian towns by the Ministry of Community Development and Social Services and the Ministry of Sport, Youth and Child Development.[3] All point to the dire circumstances of these children.

3. The Setting

a. Institutional Environment and Background

Official statistics on street-connected children are rare because of the difficulties of surveying this extremely mobile population. Ad hoc surveys and specific micro-data collected from field projects provide some important information. Tacon and Lungwangwa (1991), which increased awareness of the situation of street-connected children in Zambia, singled out poverty, family breakdown, lack of access to education and unemployment as the most important push-factors driving children onto the streets. The 1996 Situational Analysis and the 2004 OVC Situational Analysis support the widespread view that the number of street-connected children in Zambia has increased since 1991 and doubled over the last decade alone.

To provide a clearer picture of the Zambian street children phenomenon, we conducted two different surveys during the month of November 2008 in three highly populated slums of the city of Ndola, in the Copperbelt region of Zambia (see Figure 1). These slums, often called *peri-urban areas* or *compounds*, vary in terms of dimension, accessibility to basic services and geographical proximity to the city centre.

Living conditions are extremely poor in these slums: the great majority of the population lives below the official poverty threshold of $1 per day. The three slums in our sample are Nkwazi, Chipulukusu and Kawama. The first two are among the poorest and largest slums on the outskirts of Ndola, with more than 40,000 residents each, living without any city planning, amenities or utilities. Kawama is slightly smaller and more distant from Ndola than the other two. Basic services such as sanitation and drinking water are very poor in all of them.

b. Data Collection

Our first survey was directed at 102 street-connected children.[4] The survey of street-connected children collected information on their family background, the reasons they took to the streets, the conditions on the street, their main activities and earnings as well as their education, health, sexual behaviour and exposure to STDs. This survey was conducted both directly on the streets of Ndola where children gather as well as at the shelters where former street children attend programmes and participate in activities sponsored by our hosting non-governmental organization (NGO). Given the small size and potential non-representativeness of this sample,

Figure 1. Map of Zambia (Copperbelt region shaded)

this survey is meant to complement the main analysis by showing that our sample of street-connected children (and their families of origin) has similar characteristics to those of the overall population of street-connected children in Zambia. The second survey, which is the primary focus of our analysis, assesses the status of the extended family safety network. It was therefore collected at the household level.[5] By focusing on the family of origin of street-connected children, this work attempts to deal more effectively with the high mobility of the street-connected children population and at the same time to offer a complementary view to the one emerging from the larger-scale institutional surveys.

The sampling design for the family survey was based on a two-stage sampling procedure. At the first stage, groups or 'clusters' of households were selected; households themselves were selected at the second stage. The 'clusters' corresponded to the 18 slums surrounding the city of Ndola. In particular, three slums – Nkwazi, Chipulukusu and Kawama – were selected for the data collection because they had the highest concentration of families of origin of street-connected children traced back by the hosting NGO. Hence, though our analysis should accurately reflect conditions in those Zambian slums where street-connected children are most prevalent, it might not reflect the experience of a random sample of families living in Zambian slums.

The second stage of the sampling selection procedure was based on a list of 43 families of origin of street-connected children residing in the three slums. These families were identified through a specific child reintegration programme run by the hosting NGO. The number of households to be interviewed per cluster was based on estimates of the proportion of families with street-connected children in each slum provided by local committees of community-based organisations. Estimates, which have been validated by other local sources (for example, local NGOs and social services' officers), put the proportion of families with street-connected children at 20–25 per cent in each slum. The number of street-connected children families and control families to be interviewed in each slum was then selected in order to reflect the suggested proportion.

Data collection began by first interviewing one of the 43 street-connected children families and then, for each one of them, interviewing the first layer of neighbours using the same questionnaire. Given the scattered disposition of houses in the slums, we drew a circle around the house of a street child's family's and interviewed neighbours living in that circle, as shown in Figure 2. Because families with street-connected children did not live close to each other, we had no cases where a neighbouring family was also a family with a child on the street, which had the benefit of simplifying the analysis. The aim of this methodology was to gather the same set of information from families that, despite facing similar living conditions, did not originate street-connected children. By comparing families with street-connected children to their immediate neighbours we aim to isolate those characteristics of the family that put children most at risk of winding up on the street.

In order to serve as a proper comparison group, a key requirement was that each neighbouring family had at least one child (for example, below the age of 18), although in all cases neighbouring families had children. Interviews were carried out through home visits to each family and addressed to the head of the household or his spouse.[6] The questionnaires were in English and a local operator from the hosting NGO assisted during each interview by providing translations in Bemba (the regional language widely used in the slums) while a second operator, who knew the geographical location of street-connected children families, served as a guide through the slums. Every family we approached agreed to participate in the survey, showing a high level of cooperation.

Based on this methodology, we interviewed a total of 220 families (43 families with street-connected children and 177 control families) and collected information on 1455 individual family members. The survey included modules on demographics, health, education, income, HIV impact and shocks (see Online Appendix for the questionnaires). Given our interest in understanding not only the characteristics of each nuclear family but also the relevance and the

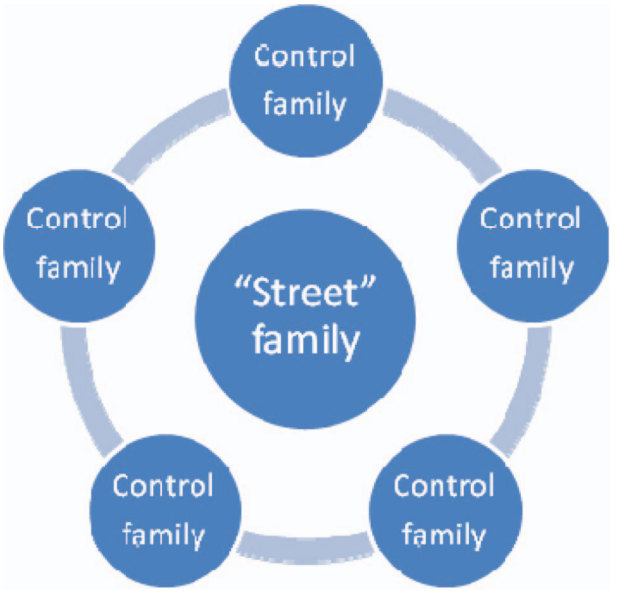

Figure 2. Household selection criterion

quality of extended family networks, we collected additional information on the geographic locations of and strengths of the relationships with 1685 extended family members. Doing so allows us to reconstruct the extended family network of each interviewed family, focusing both on *inter-generational* links with parents and adult children living in other households and on *intra-generational* links with siblings living in other households. This information was provided by each household head interviewed and was part of the same questionnaire. Overall, the questionnaire provides relevant information for a detailed assessment of the situation of nuclear families and their networks in the slums of Ndola.

Our data collection efforts distinguished between two main categories of families that we will refer to as 'street' families and 'non-street' families throughout the analysis.

4. Results

a. Descriptive Analysis

Table 1 provides basic descriptive statistics from our survey of 102 street-connected children. The age profile of street-connected children in the sample shows that most are between 15 and 18 years old, though the youngest is 12 years old. Almost two-thirds of these children are either single or double orphans and a similar share (70%) has three or more siblings. These figures suggest that street-connected children in the sample tend to come from families with multiple children and at least one missing parent.

Table 1 also sheds light on some of the reported reasons for taking to the street.[7] Over 40 per cent of street-connected children indicate that 'lack of food and money' is the main reason for leaving their homes. 'Food' is also the item most (68%) street-connected children purchase with their daily earnings from street activities, like begging or carrying luggage. The data on education and health as well as those on the sexual behaviour collected through the street-connected children's questionnaire, provide a picture of high vulnerability and high-risk exposure to sexually transmitted diseases of the sample of street-connected children. For example, over two-thirds of street-connected children report being chronically ill in the past year. Less than 15 per cent attend school while on the street and over half are sexually active.

Table 1. Descriptive statistics: street children survey

			%
Demographics	Age profile	< = 14	7.8
		15–18	62.8
		> = 19	29.4
	Orphan status	Non orphan	34.3
		Orphan (single or double)	65.7
	Nr of siblings	< = 2	30.4
		3 to 5	33.3
		> 5	36.3
Street life	Main reasons for going on the streets	Death of a parent	19.5
		Lack of food and money	41.5
		Abuse at home-escaped	24.4
		Sent by parents	4.9
		'Pulled' by friends	9.8
	Average daily earnings	less than 5000K	53.7
		from 5000K to 15000K	24.4
		more than 15000K	22.0
	Spending patterns	Food	68.3
		Clothes	4.9
		Food, clothes and bostik	24.4
		Other	2.4
Education & health	School attendance while on the street	Yes	14.7
		Sometimes	4.9
		No	80.4
	Chronically ill in the past year	Yes	67.7
		No	32.4
Sexual behavior	Sexually active	Yes	52.9
		No	47.1
	Average age at first intercourse	Mean	14.2
	Use of condom at last intercourse	Yes	33.3
		No	66.7
	Awareness of what HIV is	Yes	98.0
		No	2.0
	Self-awareness of being at risk of HIV	Yes	51.0
		No	49.0

Note: Sample size: 102 children. All children are male.

Our results are broadly consistent with the only national survey of street children in Zambia, which was conducted by UNICEF for a 2006 ad hoc report and with the 2002 survey of street children in the town of Lusaka. All surveys find that street-connected children are predominantly between 15 and 18 years old and that a lack of food and money are the main reasons for taking to the street. Likewise both find extremely low rates of school attendance – 30 per cent in the national sample and 20 per cent in ours. However, while our survey suggests that 'abuse at home,' is the second most common reason for going on the street, this had only marginal relevance at the national level. This difference could reflect regional variation or capture the trust established during our work, which may have made these children more comfortable expressing this reason for taking to the streets. In all surveys, money earned on the street is used predominantly for purchasing food. In contrast, whereas 45 per cent of the national sample reported giving part of the money to parents or guardians, this pattern does not emerge in our sample. One reason for this difference may be that our survey captures not only children currently living on the street but also some who previously lived there and still maintain a connection. Another important difference relates to HIV awareness: 50 per cent of the national sample indicated that they did not know about HIV and AIDS while almost all the respondents in our sample reported a general awareness. This difference could capture increasing awareness

over time. But, while our sample is consistent on many dimensions with the national sample, the children in our survey appear to have less attachment to their families and a greater awareness of at least one important health risk, namely HIV.

The information collected through the street-connected children survey provides a rich background and is a useful starting point for our analysis. We next turn our attention to the household survey. We restrict the sample from this survey to those households with at least one child between the ages of 7 and 18, which are the typical school ages in Zambia. This restriction is based on prior reports showing that street-connected children are typically within this age range (for example, see Project Concern International Zambia, 2002 and Ministry of Community Development and Social Services et al., 2006) and because our sample of street-connected children contains no one under the age of 12. This restriction allows us to better focus on the determinants of the street children phenomenon. However, our findings are not sensitive to this restriction.

The restricted sample is composed of 194 households, of which 24 are street families (that is, families having at least one child age 7–18 years old who is currently on the street) and the remaining 170 are families whose children either regularly attend school or spend their time within the slum but do not live on the street.

Descriptive statistics for the sample of nuclear families are presented in Table 2.

The table clearly shows that non-street families differ substantially from street families on many key dimensions. Non-street families have on average seven members whereas street families have eight. Non-street families are also less likely to have orphans. The difference in the proportion of families with orphans between the two types of family is large – 96 per cent of street family host orphan while only 60 per cent of non-street families do – and significant at the 1 per cent level. While the number of girls from 0 to 18 years old does not differ significantly between the two categories of families, street families have on average one more boy. The average age of male and female heads of the household is not significantly different between the two types of families but the share of children between 0 and 6 years old is systematically higher and the share between 14 and 18 years old is systematically lower in non-street families. In other words, families with older children in the household are more likely to have street-connected children.

The health status of the head of household also differs systematically across family types. Just over 80 per cent of male heads of household in street families reported poor health in the past year compared with 38 per cent in non-street families. Although less stark, differential health status is also seen for female heads of households and for children in the household.

Interestingly, employment status, as measured by the share of household heads (by gender) who are regularly employed, self-employed or unemployed does not differ across the two family type. The share of street families living above the poverty line is extremely low in general and significantly lower in street (4%) compared non-street (20%) families. These families are also subject to many financial shocks, such as business failures, job loss, drought or floods.[8] The share of household affected by shocks, in the past year and in particular by non-death related shocks is significantly higher in street families than in non-street families. Likewise, the share of households affected by HIV-deaths in the past 10 years is significantly higher in street families. The share of households absorbing HIV orphans or subject to a financial loss due to HIV-related deaths is similar for both categories of families.

Although the number of meals per day is comparable in both street and non-street families, the former reports a significantly higher number of days without enough food in a week. Only 4 per cent of street families reported having a sufficient caloric intake (namely by eating meat, chicken or fish) in the past week compared to 25 per cent of non-street families.

Finally, to capture the importance of the extended family, Table 2 shows statistics on the number of existing links with close relatives, that usually help each other in times of need, both at the intragenerational level (that is, brothers and sisters of the head of household and of his/her spouse) and at the intergenerational level (that is parents of both spouses). Non-street families look significantly different from street families also on these dimensions, with a higher number of existing links to extended family members than we observe for street families.

Table 2. Descriptive statistics household level

	Non-street families	Street families	
Average household size	6.84	7.83	*
Share of female headed households (%)	0.36	0.33	
Share with orphans (%)	0.60	0.96	* * *
Average number of children			
Nr. of girls	2.00	2.17	
Nr. of boys	2.11	3.12	* * *
Age structure:			
Average age of male head	43.03	47.18	
Average age of female head	39.58	40.83	
Share of children 0-6 yrs (%)	0.31	0.21	* *
Share of children 7–13 yrs (%)	0.45	0.43	
Share of children 14–18 yrs (%)	0.24	0.35	* *
Education profile:			
Average grade reached by male head	7.24	7.56	
Average grade reached by female head	5.12	3.83	*
Average grade reached by children 7–13	2.56	2.81	
Average grade reached by children 14–18	6.25	3.92	* * *
Health status			
Share male head reporting poor health in the past year	0.38	0.81	* * *
Share female head reporting poor health in the past year	0.51	0.71	*
Share of hh reporting poor health of at least 1 child in the past y	0.35	0.54	*
Employment status, male head			
Share with regular employment	0.28	0.25	
Share unemployed	0.18	0.25	
Share self-employed	0.37	0.31	
Employment status, female head			
Share with regular employment	0.04	0.00	
Share unemployed	0.53	0.56	
Share self-employed	0.35	0.35	
Income (%)			
Share of households above poverty line	0.20	0.04	*
Shocks (%)			
Share of household affected by shocks in the past year	0.62	0.79	*
Share of household affected by non death-related shocks	0.15	0.29	*
HIV impact (%)			
Share of hh affected by HIV-deaths in the past 10 years	0.44	0.63	*
Share of hh with HIV orphans	0.60	0.57	
Share of hh subject to financial loss due to HIV-death	0.77	0.93	
Nutritional status			
Nr. of meals per day	1.67	1.42	
Nr. of days without enough food in a week	1.74	2.92	* * *
Eating meat/chicken/fish in the past week (%)	0.25	0.04	* *
Extended family:			
Siblings (average number of)			
Wife's sisters	1.63	1.00	*
Wife's brothers	1.75	1.00	* *
Husband's sisters	1.09	0.21	* * *
Husband's brothers	0.92	0.29	*

(*continued*)

Table 2. (*Continued*)

	Non-street families	Street families	
Parents (average number of)			
Wife's side	0.81	0.25	* * *
Husband's side	0.51	0.17	* *
Number of households	170	24	

Notes: The last column reports statistical significance of T-test statistics for street family vs. all other families in the sample. *Significance at 10 per cent level, **Significance at 5 per cent level, ***Significance at 1 per cent level.

b. Multivariate Analysis

In order to identify the characteristics of the nuclear and extended family which, at the margin, distinguish a family that originates street-connected children from a family that is at risk of originating street children but is still able to keep them inside the family net, we run two separate sets of Ordinary Least Square (OLS) regressions: one at the household level and one at the individual child level controlling for household fixed effects. We test the robustness of the results from our OLS models with non-linear probability (PROBIT) models.

In Tables 3 (OLS) and 4 (PROBIT), we present estimates from models that use 'street families' as the dependent variable and measure the probability that a family gives rise to a street child as a function of the household's structure and the characteristics of the head of household and the extended family. This allows us to distinguish families with street-connected children from families at risk, isolating those features of family structure that, at the margin, contribute to the street children outcome. The second set of regressions in Tables 5 (OLS) and 6 (PROBIT) are estimated at the child level and use 'living on the street' as the dependent variable. These models aim to determine the characteristics of a child *within* a family that make him more likely to wind up on the street than others.

Tables 4 and 6 report average marginal effects from the PROBIT models. In all cases, we present robust standard errors. In the child-level models, we cluster the standard errors to allow for an arbitrary covariance structure at the household level.

Several patterns emerge from our analysis. As shown in Table 3, larger household size modestly increases the probability of having children on the street. The share of household members who are below age 14 decreases while the share that are boys raises the likelihood a household has a street child. More specifically, going from zero to 100 per cent of children in the 0–6 years range and in the 7–13 years range lowers the likelihood of originating street children by 30 per cent and 17 per cent, respectively, although the later estimate is not significantly different from zero in almost all specifications. Likewise going from 0 to 100 per cent of children who are boys raises the probability the family has street-connected children by almost 22 per cent. These results reflect the fact that older, male children are most likely to take to the street.

The presence of orphans in the household also appears to play an important role, implying a 12 per cent increase in the probability of generating street children. However, controlling for the extended family network (both inter-generational and intra-generational) reduces the estimated impact of orphans to a (non-significant) 6 per cent. A family's exposure to HIV-related deaths in the past 10-years further increases the probability of generating street children by 9 per cent. Thus, both HIV/AIDS history and the presence of orphans in the household seem to be important factors in understanding street-connected children.

Table 3 also shows a strong and significant impact of the male head of household's health status across all specifications. Households with a sick male head are about 10 to 15 per cent more likely to originate street children. The education of a male versus female head of household seem to have differing effects: a higher education level for the male head increases the probability of generating street children, while the opposite is true for female heads, although the latter

Table 3. Household level regressions: OLS estimates

	Dependent variable = 1 if the family has at least one child currently on the street					
	[1]	[2]	[3]	[4]	[5]	[6]
Male head age	0.001	0	−0.001	−0.001	−0.002	−0.003
	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Female head age	0	−0.002	−0.002	−0.003	−0.003	−0.003
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]
Male head education	0.019*	0.023**	0.021**	0.023**	0.023**	0.022**
	[0.010]	[0.010]	[0.010]	[0.010]	[0.009]	[0.009]
Female head education	−0.004	−0.008	−0.008	−0.01	−0.009	−0.007
	[0.007]	[0.008]	[0.008]	[0.008]	[0.007]	[0.008]
Male head poor health	0.151***	0.133**	0.126**	0.124**	0.123**	0.108**
	[0.057]	[0.056]	[0.054]	[0.055]	[0.054]	[0.054]
Female head poor health	0.046	0.073	0.06	0.065	0.055	0.064
	[0.047]	[0.048]	[0.049]	[0.049]	[0.050]	[0.049]
Missing age or educ	0.238**	0.213**	0.189*	0.167*	0.174*	0.185**
	[0.095]	[0.100]	[0.098]	[0.099]	[0.093]	[0.093]
Female headed hh		0.022	−0.016	−0.001	−0.143	−0.226
		[0.191]	[0.192]	[0.192]	[0.200]	[0.215]
Household size		0.025**	0.020*	0.020*	0.019*	0.021*
		[0.011]	[0.011]	[0.011]	[0.011]	[0.011]
Share of boys		0.213***	0.211***	0.211***	0.221***	0.218***
		[0.071]	[0.070]	[0.070]	[0.071]	[0.072]
Share of children (0–6yrs)		−0.361***	−0.327***	−0.333***	−0.314***	−0.299**
		[0.125]	[0.119]	[0.122]	[0.120]	[0.119]
Share of children (7–13yrs)		−0.186*	−0.181*	−0.179*	−0.172	−0.166
		[0.107]	[0.106]	[0.107]	[0.109]	[0.107]
share children/hh size		0.231	0.251	0.232	0.252	0.246
		[0.202]	[0.199]	[0.194]	[0.189]	[0.187]
Presence of orphans in the hh			0.118***	0.104**	0.088**	0.062
			[0.042]	[0.040]	[0.041]	[0.040]
HIV death in past 10yrs				0.073*	0.080*	0.086**
				[0.043]	[0.043]	[0.042]
No-death shocks				0.071	0.047	0.038
				[0.073]	[0.072]	[0.071]

(*continued*)

Table 3. (*Continued*)

	Dependent variable = 1 if the family has at least one child currently on the street					
	[1]	[2]	[3]	[4]	[5]	[6]
Nr. of wife's brothers					−0.002	0.008
					[0.012]	[0.013]
Nr. of wife's sisters					−0.005	−0.002
					[0.012]	[0.012]
Nr. of husband's brothers					−0.021*	−0.022*
					[0.012]	[0.012]
Nr. of husband's sisters					−0.033***	−0.031***
					[0.011]	[0.011]
Nr. of wife's parents						−0.066**
						[0.033]
Nr. of husband's parents						−0.023
						[0.035]
Constant	−0.154	−0.276	−0.292	−0.277	−0.132	−0.021
	[0.126]	[0.218]	[0.216]	[0.211]	[0.213]	[0.221]
Number of observations	194	194	194	194	194	194
R- squared	0.113	0.206	0.23	0.246	0.28	0.298

Notes: Robust standard errors in brackets. *Significance at 10 per cent level, **Significance at 5 per cent level, ***Significance at 1 per cent level.

Table 4. Household level regressions: average marginal effects based on probit estimates

	Dependent variable = 1 if the family has at least one child currently on the street					
	[1]	[2]	[3]	[4]	[5]	[6]
Male head age	−0.001	0	−0.003	−0.006	−0.015	−0.029
	[0.008]	[0.018]	[0.017]	[0.017]	[0.017]	[0.022]
Female head age	0.005	−0.017	−0.016	−0.024*	−0.023*	−0.030**
	[0.009]	[0.012]	[0.012]	[0.013]	[0.012]	[0.014]
Male head education	0.081	0.103*	0.106*	0.120**	0.113*	0.121*
	[0.051]	[0.061]	[0.061]	[0.061]	[0.064]	[0.068]
Female head educ	−0.004	−0.053	−0.042	−0.078	−0.09	−0.093
	[0.041]	[0.049]	[0.052]	[0.059]	[0.062]	[0.069]
Male head poor health	0.790***	0.975***	0.880**	0.877**	0.777*	0.687
	[0.305]	[0.347]	[0.366]	[0.374]	[0.397]	[0.476]
Female head poor health	0.25	0.409	0.452	0.461	0.492	0.668*
	[0.271]	[0.306]	[0.326]	[0.339]	[0.360]	[0.381]
Missing information	1.048**	0.872*	0.870*	0.677	0.595	0.909
	[0.419]	[0.499]	[0.514]	[0.528]	[0.599]	[0.694]
Female headed hh		0.724	0.391	0.502	−0.434	−1.383
		[1.217]	[1.189]	[1.227]	[1.143]	[1.476]
Household size		0.156***	0.128**	0.149***	0.141**	0.208***
		[0.054]	[0.055]	[0.056]	[0.056]	[0.068]
Share of boys		1.532***	1.635***	1.725***	1.605***	1.810***
		[0.457]	[0.479]	[0.500]	[0.529]	[0.605]
Share of children (0–6yrs)		−2.646***	−2.191***	−2.387***	−2.133**	−2.074**
		[0.809]	[0.789]	[0.828]	[0.882]	[0.951]
Share of children (7–13yrs)		−1.205**	−0.973	−1.243*	−1.062	−0.889
		[0.596]	[0.640]	[0.678]	[0.705]	[0.737]
share children/hh size		1.577	1.541	1.47	1.748	1.747
		[1.204]	[1.221]	[1.199]	[1.195]	[1.164]
Presence of orphans in the hh			1.118**	0.928*	0.806	0.791
			[0.548]	[0.516]	[0.539]	[0.631]
HIV death in past 10yrs				0.580**	0.658**	0.707**
				[0.282]	[0.305]	[0.357]
No-death shocks				0.579*	0.421	0.345
				[0.347]	[0.371]	[0.404]

(*continued*)

Table 4. (*Continued*)

	Dependent variable = 1 if the family has at least one child currently on the street					
	[1]	[2]	[3]	[4]	[5]	[6]
Nr. of wife's brothers					0.012	0.101
					[0.107]	[0.147]
Nr. of wife's sisters					−0.026	0.037
					[0.096]	[0.102]
Nr. of husband's brothers					−0.098	−0.13
					[0.150]	[0.177]
Nr. of husband's sisters					−0.456***	−0.381**
					[0.155]	[0.154]
Nr. of wife's parents						−0.888**
						[0.365]
Nr. of husband's parents						−0.268
						[0.427]
Constant	−2.672***	−3.819**	−4.668***	−4.395***	−3.438**	−3.194*
	[0.767]	[1.597]	[1.620]	[1.577]	[1.591]	[1.937]
Number of observations	194	194	194	194	194	194
Pseudo R-squared	0.133	0.289	0.331	0.365	0.412	0.466

Notes: Robust standard errors in brackets. *Significance at 10 per cent level, **Significance at 5 per cent level, ***Significance at 1 per cent level.

Table 5. Children level regressions: OLS estimates

	Dependent variable = 1 if the child is currently on the street		
	[1]	[2]	[3]
Age	0.063 ***	0.063 ***	0.065 ***
	[0.015]	[0.015]	[0.014]
Female	−0.307 ***	−0.307 ***	−0.290 ***
	[0.067]	[0.068]	[0.069]
Orphan	0.042	0.040	0.388 *
	[0.193]	[0.195]	[0.220]
Poor health		0.066 [0.129]	0.077
			[0.130]
Nephew/Niece			−0.385 **
			[0.160]
Grandchild			0.037
			[0.456]
Brother/Sister			−0.477 **
			[0.181]
Stepchild			−0.709 ***
			[0.203]
Constant	−0.383	−0.392	−0.456 *
	[0.266]	[0.267]	[0.234]
Number of observations	94	94	94
Adj. R-squared	0.29	0.28	0.29

Notes: Regressions include household fixed effects. Robust standard errors, clustered at the household level, in brackets. *Significance at 10 per cent level, **Significance at 5 per cent level, ***Significance at 1 per cent level.

estimate is not significant. The fact that higher education level of male head is associated with a higher likelihood of having a street child might be related to Fortson's (2008) findings of a positive education-HIV gradient.

Finally, extended family links prove to play an important role in reducing the probability the nuclear family originates street-connected children. Surprisingly the presence of brothers and sisters from the wife's side does not seem to have any significant impact while the presence of maternal grandparents appears to reduce the probability of generating street children by about 67 per cent. Similarly, a higher number of husband's sisters (and to a lesser extent a husband's brothers) reduces the probability of originating street children.

The results in Table 4, from household level Probit models are quite consistent with the results discussed in Table 3, albeit with a few exceptions: older female heads of household appear to reduce the probability of generating street-connected children. The impact of the male head's health status is no longer significant, when controlling for the presence of both intra- and inter-generational family links.

Similar to Tables 3 and 4, Table 5 shows OLS coefficients for the set of regressions run at the individual street child level and Table 6 reports average marginal effects based on Probit models. As mentioned above, the dependent variable in this set of regressions is a dummy variable indicating whether the child is currently on the street. These regressions include household fixed effects, to isolate those characteristics of a child in terms of age and the sex, orphan status, health status over the past year and the role in the family (for example, whether he is a son, grandson, nephew or stepchild with reference to the head of the household) that are associated with living on the street.

According to Table 5, the age and sex of the child have a strong and significant impact across all specifications. In particular, older children have a higher probability of ending up on the streets (+6%) while girls are much less likely than boys to become street-connected children (−30%).[9]

Table 6. Children level regressions: average marginal effects based on probit estimates

	Dependent variable = 1 if the child is currently on the street		
	[1]	[2]	[3]
Age	0.088 ***	0.087 ***	0.080 ***
	[0.014]	[0.015]	[0.013]
Orphan	−0.234	−0.234	0.456 *
	[0.223]	[0.225]	[0.256]
Poor health		0.002	−0.006
		[0.162]	[0.161]
Nephew/Niece			−0.472 ***
			[0.044]
Grandchild			−0.082
			[0.350]
Brother/Sister			−0.419 ***
			[0.024]
Stepchild			−0.508 ***
			[0.052]
Number of observations	57	57	57
Pseudo R-squared	0.33	0.33	0.37

Notes: Regressions include household fixed effects. Robust standard errors, clustered at the household level, in brackets. *Significance at 10 per cent level, **Significance at 5 per cent level, ***Significance at 1 per cent level.

Controlling for relationship and health status, orphan status increases the likelihood the child ends up on the street. Most interestingly, though clearly suggestive of selection issues, are the relationship variables. Relative to sons/daughters (the omitted category in these regressions), step-children, nephews/nieces and brothers/sisters are less likely to end up on the street. We interpret this finding as suggestive of the possibility that a child is unlikely to end-up living with an extended family unless this family is likely to 'keep' him. The results of the probit regression analysis shown in Table 6 confirm these results.[10]

5. Conclusions

Our analysis highlights several interesting features of the role of family structure in the street-children phenomenon.

Contrary to common belief, income is not a main determinant of the street-connected children phenomenon as most families in this setting live below the poverty line. Looking at both set of regressions (that is those at household level, assessing the probability a family originates street-connected children, and those at the individual child level, assessing the characteristics of a child within a street family that make him more likely to end up on the street) the following elements emerged: the health status of the male head of the household plays a fundamental role in determining the probability of the street outcome. Moreover the extended family net matters. A higher number of husband's sisters and the presence of maternal grandparents reduce the probability of originating street-connected children. Finally a younger composition of children in the household, a lower presence of orphans as well as a higher share of girls in the household are all associated with a lower probability of the street-connected children outcome. In addition, the role of the child within the family matters: nephews, stepchildren and household heads' siblings are less likely to end up on the street compared to natural sons and daughters, thus indicating that when an extended family accepts nephews and stepchildren, it is because there is the intention to keep and protect them.

Overall these results seem to confirm the importance of the extended family safety net as well as the key role of the female presence in the household in reducing the likelihood that children end up on the street. They suggest that promoting the role of women in the household and

supporting extended family links may represent an important avenue for policies aimed at reducing the risk of street life.

Because street-connectedness could have a long lasting negative impact for the economy through the loss in human capital of prime age individuals, we consider the potential impact of one general type of policy – improving the health of the male head of household. According to our estimates (see Table 3), having the male head of household in poor health increases the probability that the household produces a street child by 12 per cent to 15 per cent. Moreover, based on our data, street-connected children tend to have 1.88 to 1.56 fewer years of schooling than children living at home. Using cross-country estimates based on the Barro and Lee data set (see Barro, 2001) showing that, all else being equal, an additional year of schooling raises the growth rate of an economy by 0.44 per cent per year,[11] times the 1.56 (or 1.88) fewer years of education of a street child, times the range of coefficients for the health of the head of household from Table 1, moving the self-reported health of the household head from poor to good would imply an increase in the growth rate of the economy by 0.08 to 0.12 of a percentage point per year. Although this calculation makes some strong assumptions (for example, a child living at home is in school), it seems to suggest that policies aimed at improving the health of the male head of household could have meaningful economic benefits not only in the short run but, more importantly, in the long run.

Despite this calculation, we urge some caution in interpreting our results too strongly. In our analysis, we focus on those characteristics that distinguish street-connected children or street families from families that, based on observable characteristics, look quite similar. But, there could be unobservable factors that are correlated with these characteristics and the drive the likelihood that children end up on the street. Nonetheless, we think these unique data and the characteristics they point to as predictors of street-connectedness identify important areas for future research. Specifically, we envisage two major research directions – one testing the robustness of our methodology and generalisability of our findings to other countries and contexts and the other pilot-testing policies designed on the basis of our findings, such as the impact of dedicated healthcare programmes for the male head of the household, on the street-connected children phenomenon.[12] More generally, this work should highlight the importance of a holistic approach to research aimed at understanding children's connections to the street in addition to their broader familial and social network.

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Notes

1. We follow the 'State of the World's Street-connected children: Research' report (Meincke, 2011) which defined street-connected children as '*children for whom the street has become a central reference point, playing a significant role in their everyday lives and identities*'. As implied by the term, our study includes both children currently living on the street and children who once lived on the street and still have strong connections to the street even if they may sleep elsewhere.
2. The percentages are calculated using CIA World Factbook estimates of the Zambian population of children ages 0 to 14 of 3.9 million and 4.8 million in 1991 and 2004, respectively.
3. The other two situational analyses, conducted in 1999 and 2004 by UNICEF, USAID and the Government of the Republic of Zambia (GRZ), tackle the issue of street children only as part of the wider problem of orphans and vulnerable children in Zambia.

4. An informed consent to the collection of personal information about the children was conducted and obtained from either the family of origin or the guardian (when available) or by the responsible member of the organisation taking care of the children.
5. Approaching children on the street and their families of origin required investing a fair amount of time to establish a relationship of mutual trust with the respondents by adapting to the unwritten rules of the slums as well as partially and temporarily sharing life conditions and cultural habits. In this sense, the relationships already established by our hosting NGO allowed us to conduct the fieldwork in areas that are normally considered off-limits to non-locals.
6. Note that household heads could be male or female. In all cases, however, based on local customs, spouses were female. In other words, females were coded as head of household only in cases where a male was not present in the home, otherwise the male is usually considered to be the head of household.
7. Results on questions related to street life (for example, reasons for taking to the street) are conditional on reporting having lived on the street for at least one week.
8. Other non-death related shocks include: loss of remittances, increases in food price, birth in the household, illness or accident to a household member, theft, house damage, crop loss, death of livestock, marriage.
9. The latter result needs to be interpreted with caution given that we only had one girl on the street. From what we could observe during the field research, boys and girls living on the street tend to stay separated and the former are more visible than the latter. This does not mean that girls are less likely to end up in the streets but rather that they end up in a different way (for example, prostitution) to the streets and therefore, being this a different phenomenon, this was not captured by the type of research approach used in the article. Moreover, there is also some stigma attached to the idea of a girl ending up on the street. Families tend to admit more easily if a son is living on the street (that can mean he engages in lots of different activities) rather than admitting that a girl lives on the street (which tends to be immediately associated with the idea of prostitution).
10. The Probit regressions in Table 6 are based on 57 observations as the only female in the sample (and the associated observations) is dropped because the outcome is perfectly predicted.
11. Barro (2001) actually provides a range of estimates, from 0.23 to 0.84 of a percentage point per year, for the effect of schooling on growth. The upper bound of this range is obtained for the sample of poor-countries. Because Barro (2001) discusses 0.44 as a benchmark estimate, we use it as the basis for our back-of-the-envelope calculation.
12. In terms of follow up actions, we plan to disseminate the results of this research to the children attending the shelter and that have been part of the individual survey. Further activities will be discussed with the hosting NGO for a deeper involvement of the children in the results of our research through specific group activities and games that can help children to reflect on and discuss their family networks. Finally, initiatives with the families of the slums will also be considered, to raise awareness on the importance of family links to avoid the risk of children ending up on the streets.

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