AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Recurrent shocks, poverty traps and the degradation of pastoralists' social capital in southern Ethiopia

WASSIE BERHANU*

School of Economics, Addis Ababa University, Ethiopia

This paper examines the long-term effects of shocks experienced by a traditional pastoral community, with the aim of testing the micro-level poverty trap hypothesis. It uses the instrumental probit technique to examine empirically the way that shocks, poverty traps, and the social capital base of the pastoral livelihood system are connected. The results strongly confirm that the likelihood of falling into permanent destitution is significantly associated with recurrent exposure to covariate shocks. The detrimental effects of shocks are transmitted through poverty traps that undermine the efficacy of the indigenous welfare system. Shock-induced poverty has significantly eroded trust and confidence in the traditional social support system and appears to have increased the dependence on aid agencies. These findings emphasize the importance of focusing on innovative risk management initiatives and substantial resource commitment to socioeconomic transformation in pastoral areas rather than unduly emphasizing conventional emergency response operations.

Keywords: shocks; poverty trap; pastoralism; social capital

JEL classification: O12; Q12; Z1

Cet article examine les effets à long terme des chocs que subit une communauté pastorale traditionnelle, afin de tester l'hypothèse d'un piège de pauvreté au niveau micro-économique. On utilise ici la technique probit pour examiner de manière empirique la manière dont les chocs, les pièges de pauvreté et le capital social de base du système de la subsistance pastorale sont reliés. Les résultats confirment avec fermeté que la probabilité de se trouver dans l'indigence permanente est liée de manière significative à l'exposition récurrente aux chocs covariables. Les effets néfastes des chocs se transmettent par les pièges de pauvreté qui affaiblissent l'efficacité du système social autochtone. La pauvreté qu'entraînent les chocs a fortement sapé la confiance en un système social de soutien traditionnel et semble avoir renforcé la dépendance par rapport aux agences d'aide. Ces résultats mettent l'accent sur l'importance de cibler les initiatives novatrices en matière de gestion du risque et l'engagement substantiel en matière de ressources dans la transformation socioéconomique des zones pastorales, plutôt que d'insister lourdement sur les opérations conventionnelles mises en œuvre en cas d'urgence.

Mots-clés : *chocs ; piège de pauvreté ; pastoralisme ; capital social*

Catégories JEL : *O12 ; Q12 ; Z1*

*Correspondence: wbpresearch@yahoo.co.uk

1. Introduction

The vast dryland areas of sub-Saharan Africa are inhabited by traditional pastoralists who raise domestic livestock on extensive communal rangelands in arid and semi-arid ecosystems. Pastoralism is a livelihood system in which the largest proportion of household total income is obtained from mobile livestock raising on communal natural pastures. Livestock production is the main source of household income in these dryland environments where abnormal climatic conditions cannot offer sufficient support for crop-based livelihoods. This is different from the mixed agro-pastoral system in which income from crop production constitutes more than 50% of gross household earnings (Swift, 1988; Rass, 2006).

Traditional pastoralism is a system of production that exploits the meager resources of dryland ecosystems productively for human use (Sandford, 1983; Pratt et al., 1997; Morton & Meadows, 2000). However, pastoral people are one of the most vulnerable segments of the world's rural poor. Phrases referring to the future of pastoralism are not hard to find in the titles and contents of the literature (for example, Swift, 1982; Hogg, 1992; Webb & Coppock, 1997; Leneman & Reid, 2001; UN OCHA-PCI, 2006), indicating researchers' concern about the increasing vulnerability of pastoral livelihoods to internal and external pressures in recent decades. Despite its crucial contribution as a source of livelihood for an ever-increasing human population, African pastoralism in particular has remained a low priority concern in the development policy agendas of most governments because of the tendency to view it as a transitory mode of life with little prospect of success (Rass, 2006).

African pastoral systems in the last several decades have become extremely vulnerable to recurrent livelihood shocks and negative trends that have caused a substantial and long-lasting decline in the welfare of the pastoral sector. The sustainability of the pastoral mode of production has been significantly undermined by exposure to the exogenous pressure of natural and man-made shocks, especially recurrent droughts, violent conflicts, inappropriate interventions and bad governance (Devereux, 2006; Rass, 2006; W/Giorgis, 2008). Shocks, especially those due to 'decapitalization' (World Bank, 2008), can force pastoralists into permanent destitution. Recurrent shocks have a natural tendency to severely limit the system's asset accumulation potential. One result of this trend is the prevailing institutional inadequacy of the system to cushion those who could slide into a state of persistent failure to improve their welfare. This effect implies the existence of a poverty trap from which it is impossible for the poor to escape by their own means (Barrett, 2003; Dercon et al., 2004). Recent studies hypothesize that shock victims may get caught up in a low level equilibrium poverty trap. Attempts have been made to design novel empirical strategies to find the minimum asset threshold estimates for this hypothesized low level equilibrium in order to inform policy decisions (Barrett, 2003; Lybbert et al., 2004; Barrett et al., 2006).

Nevertheless, the role of indigenous welfare and social insurance schemes has not been adequately explored in connection with the micro-level poverty trap hypothesis. These schemes are indigenous institutions designed for shock recovery or household survival in times of adverse livelihood pressures. But pastoral societies are often exposed to covariate risks of shock-induced community-wide deprivation. When recurrent widespread livelihood difficulties are common due to repeated shocks and endemic stresses, organized indigenous social insurance schemes gradually fail to serve the purpose for which they were originally established. Shocks will bring about widespread impoverishment and can have the long-term consequence of impaired local capacity for recovery and resilience. This paper empirically examines these problems by establishing the integrated connections of shocks, poverty traps and the social capital base of pastoralism. Using the instrumental variable (IV) probit model,

the adverse effect of shocks is assessed by extending the argument to include the social capital component of the pastoral livelihood system.

The rest of the paper is structured as follows. Section 2 reviews the literature on the relationship between shocks and poverty traps and looks at the hypothesized effects of these on the social capital base of pastoralism. Section 3 introduces the study area and gives a general account of the origins and chronology of major shocks in the region. Section 4 describes the data and econometric model specification. The results of the empirical model are discussed in Section 5, and Section 6 concludes.

2. Shocks and poverty traps

Persistent poverty is conceptualized in the micro-level application of the poverty trap hypothesis as a low level equilibrium status that is considered to represent an extreme form of deprivation where recovery has become impossible and there is no chance of improving one's livelihood. A practical example of such a deprived position is given by Carter et al. (2007) along with their conceptual presentation of the long-term adverse effects of shocks on economic well-being. A strand of theoretical thought in the poverty trap literature is that there is a critical minimum asset endowment level below which a system may reach an unstable dynamic equilibrium threshold where the prospect for wealth accumulation and welfare improvement disappears (Barrett, 2003; Carter & Barrett, 2006; Barnett et al., 2008). Chronic poverty is therefore dynamically associated with asset endowment, as can be seen if we look at the asset status of households that persistently fail to achieve a minimum level of welfare (Carter & May, 2001). An attractive feature of this analytical framework is that it makes it clear that the effects of shocks in such a system can be catastrophic because asset loss can throw victims into a state of permanent destitution. Carter et al. (2007) invoke the idea of bifurcated wealth dynamics in order to demonstrate that shocks may have lasting adverse effects in the presence of poverty traps. They postulate that, in the presence of an unstable minimum equilibrium threshold level, the prospect for recovery and long-term prosperity will remain grim for those who experience asset shocks that drive them permanently below the critical minimum.

A number of recent studies describe how shocks can have persistent effects on livelihood growth and rural welfare (Dercon, 2004; Davies, 2010) and can perpetuate poverty in various ways (Carter & Barrett, 2006; Barnett et al., 2008). A notable proposition is that 'poverty begets poverty', since shock-induced deprivation means that livelihood growth and the propensity to save are severely curtailed because the poor tend to remain in low return pursuits. In the case of crop growers, risk-averse defensive behavior may take the form of choosing a portfolio of low-yield crops. Recurrent exposure to shocks may gradually shape households' risk preference, causing them to resort to 'safety first' disaster avoidance strategies (Ellis, 1993). Poor households that would like to switch to high return activities find themselves thwarted by their inability to obtain credit, or obliged to make extraordinary sacrifices of consumption in order to make the minimum productive investment required to break out of the poverty trap (Carter & Barrett, 2006). In pastoral systems, shocks devastate livestock assets, and recurrent droughts coupled with increasing human population pressure on fragile rangelands degrade the grazing resource base in arid and semi-arid areas. This usually implies a reduced potential capacity to accumulate wealth in the system.

A point often stressed in the literature is the failure of financial markets, which for the poor often means inability to obtain credit to insure against shocks or to help with post-shock recovery efforts. Barnett et al. (2008) explain that, in poor agrarian settings, formal insurance markets profoundly fail to support capital accumulation, mainly because of strong covariate risk exposure, asymmetric information and high transactions costs. The serious lack of formal financial market assistance has logically implied that the poor must resort to locally designed coping strategies and traditional social insurance schemes. However, the widespread immiserizing effects of recurrent shocks may deeply erode the efficacy of these traditional societal schemes, with a consequent growing dependence on external support structures and social protection programs. A key proposition here is that indigenous welfare schemes can profoundly fail to achieve their aims and may crumble in the face of the mass poverty that sets in after recurrent shocks.

Degradation of the social capital base of pastoralism

'Social capital' is conceptualized in various ways and there are disagreements across disciplines about its nature (Streeten, 2002). Apart from disciplinary issues, the difficulty of reaching common ground in the definition of 'social capital' appears to be due to differing perceptions of the forms it takes in different societies. Some definitions stress localized reciprocity such as personal and family networks and ties; others stress social groups associated for some common interest and goals, as in the case of credit and saving associations (Ellis, 2000). However, networks and memberships in groups dominate the commonly adopted perception of social capital in the development literature.

Social capital is a key asset of the peripheral poor such as the pastoral peoples. The vulnerability of the pastoral livelihood system means they must fall back on indigenous mechanisms and social insurance schemes in times of severe stresses and shocks. The Borana *busa gonofa* indigenous welfare schemes (discussed below) are a good example of such robust local schemes which neither local reciprocity nor membership in an association seem to exhaustively explain.

The social capital component of the pastoral livelihood system is sensitive to trends in its natural and financial capital foundations. This proposition can be empirically examined by referring to trends in the levels of trust and confidence in the system's indigenous social welfare mechanisms in the face of mounting livelihood pressures. Pastoral poverty is supposed to breed an increasing dependence on external institutions and structures, with a corresponding loss of confidence in the indigenous social insurance schemes. The level of trust and confidence in own support structures is then inversely related to that of external agents.

As indicated above, membership in an association or group is the measure frequently used in the empirical approach to the analysis of social capital. This is quite problematic in the context of societies that have long-established indigenous institutions such as the Borana *busa gonofa*, where membership is by birth rather than by choice. This study empirically compares the levels of trust and confidence in indigenous support institutions with those in the external structures, following the testable propositions mentioned above.

3. Shocks and the Borana pastoral crisis

3.1 The setting

Boranaland is a vast pastoralist territory comprising nearly 10% of Ethiopia's land mass. It is made up of arid and semi-arid ecological zones with a bimodal pattern of rainfall (March–May and September–October). The average annual rainfall is less than 500 mm, but with a pattern of spatial differences depending on altitude (Coppock, 1994). The Borana are traditional pastoralists of mainly milk dependent subsistence orientation (see Pratt et al., 1997, for details of pastoral typologies). The region is ecologically better suited to livestock production based on a flexible system of mobile pastoralism than to cereal cultivation (see Berhanu & Colman, 2007).

The general pattern of the pastoral cyclical movement is between dry and wet season grazing territories. The dry season main area of concentration is in the territories where there are permanent traditional wells. The grazing areas around these are, however, normally protected for regeneration during the rainy seasons. The wet season grazing lands are used during rainy periods when surface water is in abundance (Oba, 1998). Capital intensive large-scale government pond construction projects have been designed and implemented in the Borana rangelands to extend the duration of use of these vast wet season grazing territories, albeit with serious environmental repercussions.

The Borana are one of the well-known pastoral groups of East Africa. They raise mainly cattle, though they have recently diversified their herds in favor of goats and camels in response to the changing climatic and ecological conditions of their habitat (Coppock, 1994; Desta & Coppock, 2004). The Borana society is distinctive for its unique traditional institutions of self-rule (the *gada* system) and the accompanying indigenous social insurance schemes. These democratic traditional institutions have been shaped by external factors of change and the Borana's growing integration into the wider exchange system.

3.2 The origins and chronology of major shocks

During the last four decades, the Borana pastoral system has been repeatedly hit by major external shocks of often catastrophic proportions. The crisis has been compounded by inappropriate external interventions and the system's own internal processes of change. A host of factors may be responsible, but the crisis can largely be ascribed to unprecedentedly high population growth rates, recurrent droughts, shrinking grazing area, violent conflicts, external interference and bad governance.

The spectacular growth in human population on a shrinking natural resource base in the Borana rangelands has been a matter for serious concern in recent years. The annual rate of growth jumped from around 1.3% in the 1960s to above 2.5% in the late 1980s (see Helland, 1980; Lindtjort et al., 1993). Statistical evidence suggests that the Borana pastoral population is growing fast, with an underlying high momentum for further expansion. This dramatic change is often strongly attributed to, among other causes, the crumbling of the traditional population control mechanisms of the Borana *gada* system (Lindtjort et al., 1993; Coppock, 1994).

The devastating Borana pastoral crisis seems to have been caused mostly by recurrent droughts and incessant violent conflicts, partly associated with bad governance. The Borana pastoral production system experienced some sporadic heavy shocks of both natural and

manmade origin in the 18th and 19th centuries (see Tache, 1996; Taye, 2002). One known Borana famine disaster was in the early 1890s, resulting from animal disease epidemics that wiped out pastoral livestock, with consequent disastrous effect on humans.[1] This was one of the 1890s East African pastoral shocks often mentioned in the anthropological literature (Baxter, 1993). Prolonged severe drought (*oola*) was less frequent in the past (discussion with Borana elders, Dire region, 2003). Coping with the sporadic delays and deficits in the rainfall was, perhaps, not beyond the mitigating power of the system. But drought as a catastrophic recurrent phenomenon has a recent history of only four decades in Boranaland. Sources indicate only a few known 20th century prolonged droughts of significant scale in the pre-1973 period (see Hogg, 1980).

A summary of major shocks in the past decades is shown in Table 1. For the Borana pastoralists, every decade since the 1960s has been characterized by droughts and conflicts. In the 1960s, the Borana lost much of their assets in a conflict with the neighboring Somali invaders. This was followed in the next decade by the devastating 1973/74 drought, which resulted in the advent of food aid relief for the first time in Boranaland. The Borana pastoralists were caught up in the war between Ethiopia and Somalia later in the same decade and this crisis was followed by the 1984/85 major drought that ravaged the entire region. The 1990s began with the 1990/91 severe drought, conflict and dislocation following the regime change in Ethiopia. The early 1990s saw the pastoralists' acrimonious relationship with the new Ethiopian regime and heightened conflicts with the neighboring ethnic groups, followed by the catastrophic 1999/2000 drought and later the 2006 drought.

Table 1: Chronology of major shocks in Boranaland

Leader	Gada period	Major shocks and events
Jaldessa Liban	1960–1968	Conflict with Somali invaders, locally referred to as Olki Rooboy.
		Many households lose stock due to the invasion.
Goba Bule	1969–1976	1973/74 devastating drought.
		Advent of food aid relief.
Jilo Aga	1977–1984	War between Ethiopia and Somalia, resulting in widespread destitution.
		Beginning of the 1984/85 drought.
Boru Guyo	1985–1992	1984/85 major drought.
		1990/91 drought.
		1991 regime change in Ethiopia and conflicts.
Boru Madha	1993–2000	Conflicts with neighboring ethnic group.
		Loss of grazing land and conflict with government.
		1999/2000 catastrophic drought.
Liban Jaldesa	2001– Feb 2009	2001 major clash with neighboring ethnic group.
		Period of recovery.
		2006 drought.
		Incessant conflicts.

Source: Based on discussions with the Borana oral historian Borbor Bule. Some records of the Borana catastrophic events are also found in Tache (1996) and Taye (2002). See Coppock (1994) for discussion of the effects of the two droughts of the Boru Guyo period.

[1] According to a Borana oral historian, Borbor Bule, when counting survivors the *Gumi Konye* traditional assembly of May 1892 at Arero found only 972 households for consolidated resettlement.

3.3 Indigenous social insurance schemes

Societies have traditional networks of routine social support for coping with and surviving crises. The Borana have clearly established compulsory indigenous social welfare schemes under the umbrella of the *gada* system. The immediate concern of these institutions is household survival.[2] The poor, according to the traditional Borana law (*sera*), have the right to assistance, this being a top issue on the *gumi gayo* (the Borana general assembly) agenda. The top *gada* leadership and local councilors (*hayyu*) have an obligation to look after the poor and listen to their voices. The Borana traditional social insurance schemes can be divided into three categories, as follows.

i) Compulsory restocking schemes: These are designed to meet the long-term survival needs of Borana households through binding arrangements for wealth transfer from the well-off to shock victims and needy members of the society. The obligatory schemes are implemented, though at different levels, within a vertical social organization. These schemes are of two types, *herba* and *busa gonofa*. The *herba* scheme is brought into play only sporadically, to restock those who have experienced wealth shocks in times of war or conflict. The traditional standard wealth transfer formula (rule) in the *herba* scheme is *N*-1, where *N* stands for head of cattle lost during the fight (interview with Borbor Bule, Dire region, 2003).[3] The *busa gonofa* scheme is a top issue in Borana traditional politics. This is a regular annual wealth redistribution scheme in which the rich are bound to restock the needy. The stocking process is based on prior assessments, made at annual sub-clan meetings (*kora debanu*), of the size and specific needs of poor members vis-à-vis the capacity to meet these needs. Only genuine claims are addressed. Eligibility is based on natural causes rather than abusive wealth consumption.

The spirit of *busa gonofa* is still high among the Borana, but it is an institution in crisis. A prominent manifestation is the widening gap between the demand for and supply of restocking assets as a result of high population growth and pervasive pastoralist deprivation in recent years. Priority nowadays is therefore given to genuine claimants who have fewer work hands who could seek alternative income opportunities elsewhere; those households with extra labor force, especially in accessible areas, are encouraged to supplement their income by putting some of their members into non-pastoral engagements.

ii) Temporary wealth transfers: The *dabare* (transfer) institution allows for cattle to be 'loaned' to the poor by wealthy households. The *dabare* stock is at any time subject to recall by the owner (Cossins & Upton, 1987). A *dabare*-holding poor household is a caretaker, but with the right to the entire use of the milk produced both for consumption and sale. The *dabare* holder may also keep the newly born males, or occasionally sell them, with the consent of the *dabare* stock owner. Inter-clan household *dabare* arrangements are based on free will, but the traditional law (*sera*) allows for a special right to intra-clan household requests. Thus, among people of the same lineage, appropriate responses to *dabare* claims are compulsory (Taye, 2002).

iii) Welfare support to households in immediate need: There is a universal requirement for milk provision by surplus producing families to food-deficit households in Borana residential

[2] In contrast, the oft-cited popular institution of highland Ethiopia, the *idir*, is established to meet the emergency costs of burial of the dead and related costs of the Ethiopian Coptic tradition.

[3] The tradition allows for complete restocking of cattle lost in wars or conflicts, but minus one head of cattle as a deficiency (*hanquu*), in a sense a share (with all its evils) implicitly left to the misfortune so that the restocked animals may not be reclaimed by another such disaster.

encampments and neighboring *arda* (groups of encampments in a grazing territory). The traditional institution of food sharing is established not only as a matter of strict moral obligation in several respects but is also often mandatory.

4. Data and econometric model specification

a) Data

The data used in this paper are derived from interviews with randomly selected households in the Dire region of the Borana pastoral area in southern Ethiopia. The survey was conducted, with the support of the former Borana Lowland Pastoral Development Program of the German GTZ (German Technical Cooperation), at four study sites at locations ranging from peri-urban localities to remote grazing territories selected on the basis of socioeconomic and production features of the pastoral system. The bi-weekly multi-visit household interviews were conducted from October 2002 to July 2003 in order to generate the core database of the survey.

The study uses the component database specifically generated by structured recall interviews on the topics of shock exposure and livestock wealth accumulation trends in the previous three decades. These data were generated with the help of longitudinal questionnaires built into the cross-sectional survey. The process involved systematic interviews with household heads, in the presence of their spouses and other informed household members, about periodic changes in the size of their cattle herds as a result of their recurrent exposure to major shocks. The traditional Borana calendar was used to base interviews on key milestones so as to minimize the inherently unavoidable recall errors.

b) Econometric model specification

The effects of shocks are related to the social capital base of pastoralism through the hypothesized growing incidence of permanent poverty among pastoral households. The relationship may be specified in the form of the following linear structural equations:

$$P_{trpth} = \alpha_0 + \alpha_1 S + \alpha_2 X + \varepsilon_2$$

$$TC_{iws} = \beta_0 + \beta_1 P_{trpth} + \beta_2 X + \varepsilon_1$$

The first equation shows that the incidence of chronic asset poverty is principally determined by the level of household exposure to catastrophic shocks (*S*), and other explanatory factors gathered in vector *X*. Social capital and the poverty trap are associated in the second equation, as is shown by the relationship between trends in trust and confidence in the indigenous welfare schemes of the pastoral system (TC_{iws}) and the prevalence of poverty traps (P_{trpth}).[4]

[4] The possibility that poverty is significantly accelerated rather by the current state of indigenous welfare schemes is a potential area for further inquiries. However, here it can be reasonably assumed that the problem of simultaneity is not a serious concern because of conscious efforts at *kora debanuu* meetings that involve some minimum precautions for avoiding undue transfers that de-capacitate enterprising pastoralists.

Model estimation in this system of paired equations usually follows the 2-stage least squares procedure, but this technique is often considered to be less appropriate in the context of dichotomous outcomes with several covariates (see Rassen et al., 2008; Clarke & Windmeijer, 2009). Since this is the case with the categorical dependent variables TC_{iws} and P_{trpth} in the above relationships, the IV-probit model is adopted here as an alternative specification. Therefore, following approaches similar to those of Rassen et al. (2008) and Clarke & Windmeijer (2009), the pair of models for the IV-probit estimation is specified as:

$$P_{trpth} = I\,[\alpha_0 + \alpha_1 S + \alpha_2 X + v > 0],$$

$$TC_{iws} = I\,[\beta_0 + \beta_1\, P_{trpth} + \beta_2 X + u > 0].$$

The indicator function *I* (.) is equal to 1 when the statement in brackets is true, and 0 otherwise (Wooldridge, 2002).

The variable TC_{iws} is a binary outcome representing the level of trust and confidence in a variety of traditional networks and support structures available to the pastoral community. The poverty variable P_{trpth} is again a binary outcome of whether the respondent household is trapped below the asset poverty equilibrium threshold estimated for Borana pastoralism. Barrett (2003) and Lybbert et al. (2004) demonstrate that 12 to 15 head of cattle is the minimum wealth threshold required for successful livestock capital accumulation by Borana pastoralists. These studies demonstrate that a shock victim with a post-shock holding of below 15 will never recover to his higher pre-shock level as a result of greatly reduced capacity for effective herd accumulation through mobile pastoralism. Lybbert et al. (2004) claim that pastoralists having cattle herds below this estimated threshold level will eventually join the pool of sedentarized destitute, with an ultimate collapse of their herds to one head of cattle.

The shock variable *S* in the first equation is included to capture the effects of catastrophic cattle losses periodically experienced by respondent Borana households. It captures only the effects of covariate shocks since data on idiosyncratic risk exposures was inadequate. The variable *S* is a shock-survival index calculated as a ratio of current stock size to the highest reportedly attained pre-shock cattle holding multiplied by frequency of exposure to catastrophic shocks. The value of this shock indicator is expected to be lower for those who have lost a large quantity of their stock to recurrent shocks than for more resilient households that have gained a better chance of survival.

The variables are described in Table 2. The initial wealth status (*INITIAL*) is included in the vector of explanatory variables *X* as a significant determinant of current poverty levels. Poverty is often perceived to be a result of poor initial conditions. Persistent deprivation could be the result of inherited poverty, or weak initial status, which may keep the poor locked into low level equilibrium poverty traps.

Table 2: Definition of variables for the IV-probit estimation

Variable	Description
TC_ cwrs	Dummy for level of trust and confidence in the community wealth redistribution system, 1 if strong; 0 otherwise
TC_fr	Dummy for level of trust and confidence in friends and relatives, 1 if strong; 0 otherwise
TC_gov	Dummy for level of trust and confidence in regional government agencies, 1 if strong; 0 otherwise
TC_ngo	Dummy for level of trust and confidence in NGOs, 1 if strong; 0 otherwise
P_{trpth}	Dummy for the likelihood of falling below the suggested poverty trap threshold of 15 head of cattle, 1 if Yes; 0 otherwise
AGE	Age of household head
HHSIZE	Household size
FEMALHEAD	Gender of household head, 1 if female; 0 otherwise
INITIAL	*Initial wealth status*, as described in the text
DNTOWN	Distance from nearest town or market centre (km)
S	*Shock survival indicator*, as described in the text

5. Results of the econometric model

Table 3 presents probit regression results of the determinants of asset poverty position among the sampled Borana households. The estimated relationship strongly confirms that individual household poverty status is significantly determined by the degree of shock survival in the system. The coefficient of the exogenous variable *S* is strongly negative; that is, the higher the ability to withstand shocks in the system the lower the likelihood of falling into the state of permanent destitution. Another interesting result indicated in Table 3 is that the likelihood of currently being under the poverty trap threshold is significantly explained by the initial asset holding status of pastoral households. The respondents were asked to recall their cattle holding status at the time when they first independently established their families, and this was considered as forming their initial start-up capital. Most pastoral households with very poor initial cattle holding positions may well have faced a lasting effect of superimposed shocks that has put them at risk of being caught in the poverty trap.

Table 3: Shocks and poverty traps
(Probit regression results of the determinants of cattle holding below the defined poverty threshold)

Explanatory variables	Coefficients	P-values
AGE	-0.026	0.249
	(0.0227)	
HHSIZE	-0.302**	0.042
	(0.1486)	
FEMALHEAD	0.825	0.421
	(1.024)	
INITIAL	-0.012**	0.010
	(0.0047)	

DNTOWN	-0.021*	0.094
	(.0126)	
S	-4.499***	0.000
	(1.111)	
CONSTANT	9.00***	0.001
	(2.637)	
N = 107		
LR λ^2 (6) = 115.34		
Prob > λ^2 = 0.000		
Log likelihood = -16.456		

Numbers in parentheses are standard errors
*** Statistically significant at 1% level; ** significant at 5% level

Table 4 presents the full instrumental probit estimation results of the effects of shock-induced pastoral poverty on the indigenous welfare system. Two of the four dependent variables presented in the first row, *TC_cwrs* and TC_{fr}, are specified to capture trends in the level of trust and confidence in the indigenous social support base of the system as compared with reliance on external support structures represented by TC_{gov} and TC_{ngo}. The poverty variable P_{trpth} , defined as endogenous in the IV-probit specification, is a key variable that shows the effect of shock-induced persistent poverty on the social capital base of the pastoral livelihood system. It is strongly and negatively associated with the level of pastoral household trust and confidence in the community wealth redistribution system (*TC_cwrs*). The relationship is similarly strong and negative with respect to the more reciprocated networks of friends and relatives (denoted by TC_{fr}). These results generally testify that shock-induced widespread deprivations may well have greatly undermined the efficacy of the indigenous welfare system of Borana pastoralism. Moreover, the statistically significant negative relationship between initial wealth status (*INITIAL*) and trust and confidence in the community wealth redistribution system (*TC_cwrs*) gives the general impression that those herders who have continually lost their initial wealthier positions through ruinous exposure to recurrent shocks have perhaps had their confidence in the system's traditional support structures eroded.

Table 4: IV-Probit estimation results
(Effects on the indigenous welfare system)

Regressors	**TC_cwrs**		**TC_fr**		**TC_gov**		**TC_ngo**	
	Coefficients	**P-values**	**Coefficients**	**P-values**	**Coefficients**	**P-values**	**Coefficients**	**Coefficients**
P_{trpth}	-1.824***	0.004	-2.238***	0.000	0.191	0.798	1.015*	0.097
	(0.6337)		(0.3685)		(0.7499)		(0.6123)	
AGE	0.009	0.380	0.006	0.519	0.018*	0.059	0.004	0.664
	(0.0098)		(0.0089)		(0.0096)		(0.0091)	
HHSIZE	-0.032	0.610	-0.034	0.528	-0.107	0.126	-0.033	0.567
	(0.0633)		(0.0543)		(0.0696)		(0.0572)	
FEMALHEAD	0.407	0.330	0.874**	0.023	-0.370	0.421	-0.069	0.862
	(0.4177)		(0.3836)		(0.5498)		(0.3985)	
INITIAL	-0.004**	0.014	-0.003**	0.021	-0.002	0.288	-0.0002	0.891
	(0.0017)		(0.0012)		(0.0016)		(0.0018)	

DNTOWN	0.018***	0.004	0.011	0.244	-0.028***	0.000	-0.016**	0.012
	(0.0064)		(0.0098)		(0.0075)		(0.0064)	
CONSTANT	0.732	0.435	0.956	0.309	-0.077	0.936	-0.021	0.980
	(0.9377)		(0.9402)		(0.9633)		(0.8576)	
N	107		107		107		107	
Wald λ^2 (6)	41.31		109.52		28.0		25.67	
Prob > λ^2 =	0.000		0.000		0.000		0.000	

Numbers in parentheses are robust standard errors
*** Statistically significant at 1% level; ** significant at 5% level; * significant at 10% level

Poverty apparently increases the likelihood of reliance on government structures, though this is statistically insignificant here; and, not surprisingly, the results generally indicate that Borana households' trust in the government has decreased. A strong case that can be made is rather that the level of trust and confidence in government structures significantly declines with increasing distance from towns or nearest market centers. The positive and significant result of the relationship between poverty (P_{trpth}) and trust and confidence in NGOs (TC_ngo) is consistent with the commonly observed, though contrary to Borana tradition, tendency for Borana pastoralists' mental dependence on external aid to have increased since the turn of the century; of course, this again significantly declines with increasing distance from the center. The results shown in Table 4, especially with respect to the key variable P_{trpth} and distance, therefore very reasonably indicate that the level of trust and confidence in the community wealth redistribution system increases with wealth status and distance from the urban centers. The level of trust and confidence in external institutions, on the other hand, significantly decreases with distance. The results also suggest a general tendency for the level of trust and confidence in the own support system to be inversely related to that in external institutions, especially with respect to the key variable P_{trpth} and distance.

These results clearly indicate that the social capital base of Borana pastoralism is deteriorating. Poverty and increased reliance on non-pastoral sources of income will inevitably undermine the efficacy of the essentially livestock-based traditional community welfare system as a fallback mechanism. In fact, those in peri-urban areas of relatively more intensive cropping culture may be more inclined to drop the *busa gonofa* system. With increasing proximity to the urban center, confidence in the indigenous welfare system is likely to be eroded because households that settle in peri-urban areas tend to be those with eroded asset status in search of relief provisions and non-pastoral opportunities.

6. Concluding remarks

This paper has described the Borana pastoral crisis as a situation of growing pastoralist impoverishment as a result of the devastating recurrent shocks of the past four decades. Recurrent shocks and negative trends have a natural tendency to severely limit the system's asset accumulation potential. One of the damaging impacts of such a trend is the degradation of the indigenous social support system. Since the mid-1970s, the Borana pastoralists have become more dependent on external assistance. This is strongly associated with growing pastoralist destitution and the implied critical effect of increasing loss of confidence in indigenous support institutions consequent upon the crumbling of local capacity to respond effectively to the voices of the poor.

The degraded state of the indigenous social support system of Borana pastoralism suggests the need for community-wide or individually targeted innovative program interventions. Whether there is scope for modifying the traditional rules of the game is a challenging question that warrants further inquiries. The problem with the current practice of externally motivated response mechanisms, on the other hand, is that such interventions are commonly offered ex post rather than ex ante.

The conventional post-drought emergency response is just such a demonstrable case, being fraught with complex problems of implementation and program effectiveness. There are documented cases of East African pastoralist restocking programs implemented by NGOs, as part of their disaster relief and rehabilitation efforts, that consist of providing small stock to individual households (Anderson, 1999), an effort that is completely inadequate to address the current abysmal state of shock-induced pastoralist destitution. Externally motivated resource allocators may therefore need to emphasize long-term substantial commitments to strengthening the local capacity to withstand shocks rather than relying on emergency response interventions that are hurriedly designed ex post. The complex problems of shock-induced poverty traps and the implied increasingly inadequate indigenous response capacities have prompted some yet-to-be-tested innovative risk management options, such as index-based formal livestock insurance schemes in arid areas, so as to partly manage the adverse effects of shocks. These and other externally motivated initiatives undoubtedly remain attractive, but there seems to be no obvious substitute for the long-term commitment of substantial human capital investment and economic diversification in pastoral areas.

References

Anderson, M, 1999. Rehabilitation, resettlement and restocking: Ideology and practice in pastoral development. In Anderson, D & Broch-Due, V (Eds), The Poor Are Not Us: Poverty and Pastoralism in Eastern Africa. James Currey, Oxford.

Barnett, B, Barrett, C & Skees, J, 2008. Poverty traps and index-based risk transfer products. World Development 36(10), 1766–85.

Barrett, C, 2003. Rural poverty dynamics: Development policy implications. A paper prepared for the 25th International Conference of Agricultural Economists, 16–22 August, Durban, South Africa.

Barrett, C, Marenya, PP, Mcpeak, J, Minten, B, Murithi, F, Oluoch-Kosura, W, Place, F, Randrianarisoa, JC, Rasambainarivo, J & Wangila, J, 2006. Welfare dynamics in rural Kenya and Madagascar. Journal of Development Studies 42(2), 248–77.

Baxter, P, 1993. The 'new' East African pastoralist: An overview. In Markakis, J (Ed.), Conflict and Decline of Pastoralism in the Horn of Africa. Macmillan, London.

Berhanu, W & Colman, D, 2007. Farming in the Borana rangelands of southern Ethiopia: The prospects for viable transition to agro-pastoralism. Eastern Africa Social Science Research Review 23, 79–101.

Carter, M & Barrett, C, 2006. The economics of poverty traps and persistent poverty: An asset-based approach. Journal of Development Studies 43(2), 178–99.

Carter, M & May, J, 2001. One kind of freedom: Poverty dynamics in post-apartheid South Africa. World Development 29(12), 1987–2006.

Carter, M, Little, P, Mogues, T & Negatu, W, 2007. Poverty traps and natural disasters in Ethiopia and Honduras. World Development 35(5), 835–56.

Clarke, P & Windmeijer, F, 2009. Instrumental variable estimators for binary outcome. Working Paper No. 09/209, Bristol Institute of Public Affairs, University of Bristol.

Coppock, DL, 1994. The Borana Plateau of Southern Ethiopia: Synthesis of Pastoral Research, Development and Change, 1980–91. ILCA (International Livestock Centre for Africa), Addis Ababa.

Cossins, N & Upton, M, 1987. The Borana pastoral system of southern Ethiopia. Agricultural Systems 25(3), 199–218.

Davies, S, 2010. Do shocks have persistent impact on consumption? The case of rural Malawi. Progress in Development Studies 10(1), 75–9.

Dercon, S, 2004. Growth and shocks: Evidence from rural Ethiopia. Journal of Development Economics 74, 309–29.

Dercon, S, Bold, T & Calvo, C, 2004. Insurance for the poor? Working Paper No. 125, QEH Working Paper Series. Queen Elizabeth House (QEH), Oxford University.

Desta, S & Coppock, DL, 2004. Pastoralism under pressure: Tracking system change in southern Ethiopia. Human Ecology 32, 465–86.

Devereux, S, 2006. Vulnerable livelihoods in Somali region, Ethiopia. Research Report No. 57, Institutive of Development Studies, University of Sussex.

Ellis, F, 1993. Peasant Economics: Farm Households and Agrarian Development. Second edition. Cambridge University Press, Cambridge.

Ellis, F, 2000. Rural Livelihoods and Diversity in Developing Countries. Oxford University Press, New York.

Helland, J, 1980. Five Essays on the Study of Pastoralists and Development of Pastoralism. Bergen University, Bergen.

Hogg, R, 1980. Pastoralism and impoverishment: The case of the Isiolo Boran of northern Kenya. Disasters 4(30), 299–310.

Hogg, R, 1992. Should pastoralism continue as a way of life? Disasters 16(2), 133–7.

Leneman, M & Reid, R, 2001. Pastoralism beyond the past. Development 44(4), 85–9.

Lindtjort, B, Alemu, T & Bjoruan, B, 1993. Population growth, fertility, mortality and migration in drought prone areas of Ethiopia. Transactions of the Royal Society of Tropical Medicine and Hygiene 97(1), 24–8.

Lybbert, T, Barrett, C, Desta, S & Coppock, L, 2004. Stochastic wealth dynamics and risk management among a poor population. Economic Journal 114(498), 750–77.

Morton, J & Meadows, N, 2000. Pastoralism and Sustainable Livelihoods: An Emerging Agenda. Policy Series 11, Natural Resource Institute, University of Greenwich.

Oba, G, 1998. Assessment of indigenous range management knowledge of the Booran pastoralists of southern Ethiopia. Unpublished report for the Borana Lowland Pastoral Development Project of the German GTZ (German Technical Cooperation).

Pratt, D, Le Gall, F & Cornelis de Haan, 1997. Investing in pastoralism: Sustainable natural resource use in arid Africa and Middle East. World Bank Technical Working Paper No. 365, World Bank, Washington, DC.

Rass, N, 2006. Policies and strategies to address the vulnerability of pastoralists in sub-Saharan Africa. Working Paper No. 37, Pro-Poor Livestock Policy Initiative, FAO (Food and Agriculture Organization), Rome.

Rassen, J, Schneeweiss, S, Glynn, R, Mittleman, M & Brookhart, A, 2008. Instrumental variable analysis for estimation of treatment effects with dichotomous outcomes. American Journal of Epidemiology 169(3), 273–84.

Sandford, S, 1983. Management of Pastoral Development in the Third World. John Wiley, Chichester.

Streeten, P, 2002. Reflections on social and antisocial capital. In Isham, J, Kelly, T & Ramaswamy, S (Eds), Social Capital and Economic Development: Well-being in Developing Countries. Edward Elgar, Cheltenham.

Swift, J, 1982. The future of African hunter-gatherer and pastoral peoples. Development and Change 13(2), 159–81.

Swift, J, 1988. Major Issues in Pastoral Development with Special Emphasis on Selected African Countries. FAO (Food and Agriculture Organization), Rome.

Tache, B, 1996. The indigenous welfare institutions as a coping mechanism to natural, social and market pressures and the implications of development interventions in Boorana, southern Ethiopia. Unpublished BA dissertation, Addis Ababa University.

Taye, G, 2002. Indigenous survival strategies in the face of famine: The case of Boorana Oromo, southern Ethiopia. Unpublished MA thesis, Addis Ababa University.

UN OCHA-PCI (United Nations Office for the Coordination of Humanitarian Affairs – Pastoralist Communication Initiative), 2006. Is pastoralism still viable in the Horn of Africa? www.pastoralists.org/pastoralist-pdf/Is-pastoralism-still-viable.pdf Accessed 7 March 2009.

Webb, P & Coppock, L, 1997. Prospects for pastoralism in semi-arid Africa. In Vosti, S & Reardon, T (Eds), Sustainability, Growth and Poverty Alleviation. Johns Hopkins University Press, Baltimore & London.

Wooldridge, J, 2002. Econometric Analysis of Cross Section and Panel Data. The MIT Press, Cambridge, MA.

World Bank, 2008. World Development Report. World Bank, Washington, DC.

W/Giorgis, T, 2008. Local conflict-poverty-governance nexus: Case studies from Ethiopian Somalis and Borana. A paper presented at the 6th International Conference on the Ethiopian Economy, 3–6 July, Addis Ababa, Ethiopia.