



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

**ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ECONOMICS**

DOCTORAL DISSERTATION

**Essays on Development and Behavioral Economics:
Examining the Interplay Between Shocks, Social
Capital, Trust, and Prosocial Attitudes**

BY

Abraham Seyoum Gonfa

November 2025

Addis Ababa, Ethiopia



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By:

Abraham Seyoum Gonfa

Submitted to the Department of Economics, Addis Ababa University, in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Economics

Supervisors:

Main supervisor: Peter Martinsson (professor),

School of Business, Economics and Law,

University of Gothenburg, Sweden

Co-supervisor: Jonse Bane (Assistant professor),

Department of Economics,

Addis Ababa University, Ethiopia

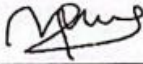
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APPROVAL SHEET

This is to certify that the dissertation prepared by Abraham Seyoum Gonfa, titled: "Essays on Development and Behavioral Economics: Examining the Interplay between Shocks, Social Capital, Trust, and Prosocial Attitudes" and submitted to the Department of Economics, College of Business and Economics, Addis Ababa University, in partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Economics complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

Board of Examiners

External Examiner: Bereket Kebede (Prof.) Signature  Date 17/01/2026

Internal Examiner: Mesele Araya (Assoc. Prof.) Signature  Date: 20/01/2026

Main Supervisor: Peter Martinsson (Prof.) Signature  Date 26/01/2026

Co-supervisor: Jonse Bane (Ass. Prof.) Signature  Date 02/02/26

Chairperson: Mengesha Yayo (Ass. Prof.) Signature  Date 02/02/26

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DEDICATION

This Dissertation is dedicated to my beloved wife, Mahlet Dawit Baysa, and our adorable kids, Sif and Kamlak.

DECLARATION

I, Abraham Seyoum Gonfa, hereby declare that this dissertation titled: “Essays on Development and Behavioral Economics: Examining the Interplay between Shocks, Social Capital, Trust, and Prosocial Attitudes” is my original work except explicitly stated otherwise in the chapter(s) to be shared with co-authors. I confirm that all the chapters in this dissertation have not been submitted (or used) for any other degree or professional qualifications.

I declare that I have undertaken the research work independently with the guidance and support of supervisors and that all the sources of materials used in this dissertation are duly acknowledged.

Table of Contents

List of Tables.....	iii
List of Figures.....	iv
Chapter One	1
Introduction.....	1
Chapter Two.....	8
Insurance Without Formal Insurance: The Buffering Role of Social Capital in Rural Ethiopia	8
2.1. Introduction.....	9
2.2. Social capital and the local informal institutions in Ethiopia: Overview	13
2.3. Data and Description.....	16
2.3.1. Data.....	16
2.3.2. Descriptive statistics	18
2.4. Empirical Strategy	20
2.5. Results and Discussion	24
2.5.1. Insurance against Idiosyncratic Shocks	24
2.5.2. Insurance against Covariate Shocks.....	26
2.5.3. Insurance against multiple shocks	28
2.5.4. Robustness Checks.....	31
2.6. Conclusions and Policy Implications.....	38
2.6.1. Conclusions.....	38
2.6.2. Policy Implications	38
2.7. References.....	40
2.8. Appendices.....	45
Chapter Three.....	48
Intergenerational Transmission of Prosocial Attitudes: Evidence from Developing Countries ...	48
3.1. Introduction.....	49
3.2. Data and Description.....	54
3.2.1. Data.....	54
3.2.2. Descriptive statistics	56
3.3. Theoretical and Empirical Strategy	59

3.4.	Results and Discussions.....	64
3.4.1.	Results and discussion from cross and individual country estimations.....	64
3.4.2.	Robustness checks	67
3.4.3.	Heterogeneity analysis.....	69
3.5.	Conclusions and Implications.....	71
3.6.	References.....	73
3.7.	Appendices.....	76
	Chapter Four	81
	The Impact of Weather Shock on Political and Social Trust: Evidence from Ethiopia	81
4.1.	Introduction.....	82
4.2.	Data, Description, and Empirical strategy	86
4.2.1.	Data.....	86
4.2.2.	Descriptive statistics	90
4.2.3.	Estimation strategy.....	92
4.3.	Results and Discussion	94
4.3.1.	The impact of current weather shock on current level of trust	94
4.3.2.	Impact of past weather shocks on Trust.....	96
4.3.3.	Impact of lifetime exposure to weather shock on trust.....	97
4.3.4.	Robustness check.....	98
4.3.5.	Heterogeneity Analysis.....	102
4.4.	Conclusion and Implications.....	104
4.5.	References.....	105
4.6.	Appendices.....	109
	Chapter Five.....	112
	Summary of Conclusions and Implications of the dissertation	112
	References.....	114

List of Tables

Table 2.1: Descriptive statistics on major variables	19
Table 2.2a: Fixed effect results for insurance against health shock.....	24
Table 2.2b: Fixed effect results for insurance against economic shock.....	25
Table 2.3a: Fixed effect results for insurance against natural shock	26
Table 2.3b: Fixed effect results for insurance against market shock.....	27
Table 2.4a: Fixed effect results for insurance against multiple idiosyncratic shocks (co-occurrence of health and economic shocks).....	29
Table 2.4b: Fixed effect results for insurance against simultaneous idiosyncratic and covariate shocks (co-occurrence of health and lagged natural shocks).....	30
Table 2.4c: Fixed effect results for insurance against multiple idiosyncratic and covariate shocks (co-occurrence of health and market shocks).....	30
Table 2.5: Robustness check results using Food & Consumables Consumption	32
Table 2.5a: Fixed effect results for insurance against idiosyncratic shocks	32
Table 2.5b: Fixed effect results for insurance against covariate shocks	32
Table 2.5c: Fixed effect results for insurance against multiple shocks.....	33
Table 2.6: Robustness check results using Fixed Effect Instrumental Variable (FEIV)	35
Table 2.6a: FEIV results when social capital is measured by social network size.....	35
Table 2.6b: FEIV results when social capital is measured by network diversity	36
Table 1.6c: Results from FEIV, when social capital is measured by membership in institutions.	45
Table 3.1: Descriptive statistics of main controls.....	58
Table 3.2: Two stage Least square Instrumental variable estimation results from cross country and individual country models.....	65
Random Effect estimations.....	68
Table 3.4: Results of robustness checks using simple average indices.....	68
Table 3.5: Results of heterogeneity based on gender, rural-urban, and parent ethnicity & religion (2SLS-IV)	70
Table 3.3#: Results of robustness check using RE-IV and RE, full.....	77
Table 3.4#: Results of robustness check using simple average indices (2SLS-IV), full.....	78
Table 3.5#: Results of heterogeneity (2SLS-IV), full.....	79
Table 4.1: Descriptive statistics on major variables	91
Table 4.2: Fixed effect results (SUR) regarding impact of current weather shock on trust	94
Table 4.3: Fixed effect results (SUR) regarding the impact of seasonal weather shock on trust.....	95
Table 4.4: Fixed effect results (SUR) regarding the impact of past weather shock on trust	96
Table 4.5: Fixed effect results (SUR) on Impact of past seasonal weather shock (last 3 years).....	97
Table 4.6: Fixed effect result (SUR) regarding impact of Lifetime exposure to weather shock	98
Table 4.7: Fixed effect results (SUR) when trust is measured as mean index	99
Table 4.8: Ordered logit CRE results regarding the impact of current shock on trust.....	100
Table 4.9: Ordered logit CRE results as a robustness check, impact of past shock on trust	101
Table 4.10: Fixed effect SUR results on impact of weather shock on trust, rural and urban sub-samples.....	103
Table 4.11: Fixed effect SUR results regarding impact of seasonal weather shock on trust, for rural and urban sub-samples	103

List of Figures

Figure 2.1. Study site map.....	47
Figure 3.1: Child prosociality (average) over years, by country.....	56
Figure 3.2: Family prosociality (average) over years, by country	56
Figure 3.3. Outside family social environment (average) over years, by country	57
Figure 3.4. Young live study sites	76
Figure 4.1. Weather variability (SPEI) in Ethiopia over the years 1940 – 2009, by survey region.....	89
Figure 4.2. Young Lives Ethiopia study sites	109

Chapter One

Introduction

Personality and attitudes are crucial determinants of individual choices and outcomes in many domains of life, while social dynamics in the forms of social capital, norms, and values play an important role in shaping individual and community responses to unfavorable events. Extreme weather events such as droughts or floods, on the other hand, can disrupt livelihoods and strain social systems, potentially eroding (or strengthening) trust between people and in government and its institutions. These relationships show that personality, attitudes, and values do not operate in isolation but interact with the broader social, cultural, and natural environments in which individuals are embedded. Understanding the interplay between them in a specific country (or society) context is, therefore, important in the research and policy arena.

The economics literature increasingly recognizes social capital, trust, and prosocial behaviors as critical determinants of various economic and non-economic outcomes. In economies where formal institutions such as credit markets and insurance systems are lacking, social capital in the form of resources embedded in local informal institutions plays a pivotal role in mitigating risks and in helping households cope with shocks (Aldrich, 2012; Aldrich and Meyer, 2015). It is, however, unclear which type of shock such resources can mitigate and whether the mere availability of the networks guarantees insurance. Prosocial attitudes, which include altruism and cooperation, are paramount for economic outcomes, as they facilitate collective action and reduce transaction costs (Bowles and Gintis, 2002). Understanding the formation of these attitudes in a setting of examining parental and external environments' influences on children is, therefore, important and provides insights that underpin cooperative economic systems. Similarly, exposure to climate risks can erode interpersonal trust and trust in institutions, leading to negative social and economic outcomes (Hsiang and Burke, 2014; Carlin et al., 2014; Frost et al., 2025). Disasters may also catalyze changes in social preferences and behaviors, bringing about solidarity within the community and with the government (Cassar et al., 2017; Sawada et al., 2023). Weather shock's effect on social and political trust in the context of weather-dependent economies is, therefore, worth exploring.

Literature regarding the insurance capacity of social capital in the face of unfavorable events, how climate extremes such as droughts and floods affect behavior and attitudes, and how cooperative and altruistic attitudes develop in children, is not yet settled, despite the increasing studies in recent times. From seminal studies by Townsend (1994) in India and Udry (1994) in Nigeria to date, informal risk-sharing arrangements based on kinship, friendship, membership in self-help institutions, or geographic proximity are considered mechanisms that allow households to smooth consumption in the face of shocks. Many show that such risk-sharing arrangements are effective in mitigating idiosyncratic shocks but are less effective against covariate shocks (Wossen et al., 2016; Kinnan and Townsend, 2012; Dercon et al., 2006; Fafchamps and Lund, 2003). Support from community networks may decline with the scale and frequency of shocks (Islam and Nguyen, 2018). Risk preferences and willingness to cooperate may also shift in ways that adversely affect informal insurance arrangements (Cassar et al., 2017). Other literature also presents the dark side of social capital, where social networks adversely affect the consumption smoothing ability of households, contrary to helping to smooth (Woldehanna et al., 2022; Di Falco and Bulte, 2011). The gap in the role of social capital not only lay in the inconclusiveness of evidence but also in its measurement. In chapter two of this dissertation, I present evidence in this regard from a setting characterized by prevalent shocks, lack of formal insurance markets, and functioning long-aged informal traditional institutions with rich social capital resources.

Cooperation among community networks in responding to shocks may imply other-regarding preferences of members of the community and/or prosocial values, norms, and institutions in the community. These attitudes determine a wide range of economic decisions and outcomes in many domains of life, including the provision of public goods, well-being, and labor market success (Frey and Meir, 2004; Heckman & Kautz, 2012; Deming, 2017; Kosse and Tincani, 2020). However, literature about how a prosocial attitude is formed, particularly in childhood and adolescence, is limited. The evidence is even exiguous in the context of developing countries. Literature shows that the formation of prosocial attitudes may take both genetic and social environment influence paths, where the latter emphasizes the role played by parents (within family socialization) and by schools and peers (outside family social environments). Parents may transmit prosocial attitudes to children both directly through interaction and indirectly through role modeling (Becker and Tomes, 1986; Kosse et al., 2020; Zumbuehl et al., 2021). Beyond family, schools represent an important arena for fostering prosociality, where interactions in learning

environments and exposure to civic values help shape children's orientation toward cooperation. Peer networks and broader social environments also reinforce norms of other-regarding preferences (Eisenberg et al., 2015; Agostinelli et al., 2020). The transmission and external environment influences, however, vary across societies and cultures, which may be associated with varying within-family and cultural black boxes. Chapter three of this dissertation presents cross-country and individual-country evidence about the intergenerational transmission of prosocial attitudes and the role played by the outside-family social environment in attitude formation in three developing countries.

Formed behaviors and attitudes will not remain static but change in response to changing life circumstances. Shocks are among the factors that change life circumstances. Shocks are considered belief-twisting events, where people change their beliefs by updating information encountered in their lifetime, giving more weight to recent experiences and neglecting data from too far in the past (Cogley and Sargent, 2008; Giuliano and Spilimbergo, 2025). Literature shows that weather shocks have implications for trust. It may undermine trust in government and its institutions (Carlin et al., 2014; Cassar et al., 2017; Frost et al., 2025). On the other hand, favorable responses to the shock by the government may enhance political trust by creating rally-around-the-flag conditions (Ahlerup et al., 2024; You et al., 2020). Community cooperation during (or after) natural shocks may increase interpersonal trust (Buggle & Durante, 2021; Dang & Dang, 2021; Lee, 2021). On the contrary, disasters may erode cooperative norms and reduce interpersonal cohesion (Cassar et al., 2017; Rahman et al., 2020). Understanding the relationship between natural environment and trust is, therefore, pivotal as trust determines economic outcomes such as income per capita across countries (Zak and Knack, 2001), financial development and access (Guiso et al., 2006, 2008), human capital accumulation (Dearman and Grier, 2009), firm performance (Tzafrir, 2005), and many more. Availability (or lack) of trust may result in desirable and undesirable outcomes, such as coping with crisis (Donahue et al., 2014) and support for violence and conflict (Deges, 2017).

This dissertation, by presenting the interplay between shocks, social capital, trust, and prosocial attitude formation, contributes to the existing limited body of literature and provides evidence that integrates the following relationships. Personality and attitude formation at early age of human development conditions family and outside-family social environments' influences, which may shape how individuals perceive and respond to risks in later ages of life, while social capital

conditions the collective capacity to absorb, adapt to, and recover from crises. Extreme weather events not only disrupt economic livelihoods but can also recalibrate social relationships, either by strengthening in-group solidarity or by eroding (or strengthening) general trust and confidence in governance. Understanding these dynamic interactions is critical for designing policies that build resilience by fostering both individual adaptive capacities and community-level social cohesion. In the subsequent paragraphs, I will provide a summary of each of the chapters in this dissertation, together with the type of data used, the approach followed, and key results obtained from each of the studies.

Chapter two provides evidence on what constitutes social capital and what benefits it may offer to those accessing it in rural Ethiopia—a context where shocks are prevalent, formal insurance markets are lacking, and long-aged informal traditional institutions are available. The study aims to explore the relationship between household consumption per capita during shocks and social capital. It defines social capital as the resources derived from social networks available to rural households through traditional informal institutions. The relationship is examined using longitudinal data from 1632 households spanning four years (2011-2014) and a total of over 6000 observations, covering four major regional states (Oromia, Amhara, the then Southern Nations Nationalities and Peoples (SNNP), and Tigray), sixteen districts, and ninety-six kebeles (smallest administrative unit) that together account for about 86 percent of the Ethiopian population. The kebeles in each district are selected using random sampling, while the households from each kebele are selected using systematic sampling based on a complete list of kebeles and households obtained from the respective administrations. We approach in line with the context in rural settings, based on risk-sharing models by Townsend (1994), Ravallion and Chaudhuri (1997), and Islam and Maitra (2012). That is, a household has a constant risk-aversion utility function derived from a social planner's problem of full consumption insurance and complete risk-sharing in a community. The household wants to maximize utility within a framework of insurance market failure and exposure to various shocks (health, economic, market, and natural shocks), including multiple and simultaneous shocks. Results show that social capital accessed from local informal institutions in rural Ethiopia is associated with buffering beyond idiosyncratic shocks and helps protect against multiple and simultaneous shocks. Large social networks are associated with insurance against consumption decreases in the face of idiosyncratic shocks (health and economic shocks), helping buffer even against their co-occurrence. Diversified networks provide insurance against health

shocks, whereas social capital derived from membership in local institutions helps protect against declines in consumption during market shocks and multiple idiosyncratic shocks.

Chapter three delves into prosocial attitude formation in children, which is exiguously studied, particularly in the context of developing countries. The study uses Young Lives longitudinal data from three countries in two continents: Ethiopia, India, and Vietnam—one of the richest datasets of the developing world, having information on parents and children from a survey of over twenty years. This chapter uses only old cohorts of the child surveys of the Young Lives data and focuses on the first three rounds: round 1 at age 8, round 2 at age 12, and round 3 at age 15. Information from about 1,000 children and their parents in each of the three sample countries, followed up for three rounds (over eight years), with a total of more than 7,000 observations, is used in this study. The Ethiopian sample covers four regions (Oromia, Amhara, the then Southern Nations Nationalities and People (SNNP), and Tigray) and one city administration—Addis Ababa; three to five districts from each region; at least one kebele (lower administrative unit) from each district; and about 20 sentinel sites with 50 children from each sentinel site. The India sample is from two states, Andhra Pradesh & Telangana. Four regions in Andhra Pradesh, namely Srikakulam, Prakasam, Vizayanagaram, and one urban site. About three to four districts are included from each state, and about one to five sentinel sites are covered from each district, with a total of 20 sentinel sites and 50 children from each sentinel. The Vietnam sample covers five regions, namely the Northeast region, the Red River delta region, the South-central coast region, the Mekong River delta region, and a city (Da Nang). It covers one province from each region, four sentinel sites from each selected province, and a total of 20 sentinel sites with 50 children each.

I approached the subject based on an empirical strategy by Basin and Verdier (2001) regarding cultural transmission from parents to children. Prosocial attitude formation in children is the result of interactions between vertical and oblique socializations, where parents' socialization actions influence children's prosocial attitude either as a prosocial attachment figure or as an altruistic object with power of control over the children, and imitation and learning mainly through interaction with outside-family environments, such as schools and peers, help shape children's attitudes. Results show that prosocial attitudes in children are significantly correlated with parents' attitudes and the social environments, such as schools and peers. However, results about the transmission of prosocial attitudes from parents to children are not consistent across individual

country samples. It is rather mixed, with evidence of transmission in Ethiopia sample but no significant association in India and Vietnam samples. The outside family social environment is associated with prosocial attitudes of children in the Ethiopia and India samples, but no evidence of association in the Vietnam sample. The transmission exhibits heterogeneity based on religion and ethnic similarity of parents.

Chapter four presents the impacts of exogenous weather shocks on social and political trust by using Ethiopian Young Lives Survey data, a context where livelihoods largely depend on weather-dependent agriculture. I constructed the Standardized Precipitation Evapotranspiration Index (SPEI) from gridded precipitation and temperature information attached to the Young Lives' communities of both the young and old cohort samples. Then, weather shocks are constructed considering a standard classification of one standard deviation above or below the long-term means. Since information about social and political trust is included in the household questionnaire of two rounds, we use only round 2 (2006) and round 3 (2009) data. Households/parents from both cohorts, consisting of 2,000 young and 1,000 old cohorts per survey round, totaling more than 5,000 observations, are used. The young live data used for this chapter comprises not only old cohorts but also young cohorts consisting of 100 households/children from each of the 20 sentinel sites. The analysis employs information on parents and exploits the sensibility of weather shocks' impact on adults' trust. I approach by first estimating the impact of current weather shocks on current social and political trust and then estimating the impacts of past shocks on current social and political trust, including the impacts of lifetime exposure to shocks. Results show that while both current and past weather shocks decrease political trust, weather shocks during the last three years of the Meher season, the major agricultural season, significantly reduced both political and social trust. Estimations from disaggregated trust measures show that current and past weather shocks negatively affect individual political trust measures—"I believe the government does what is right for people like me" and "I am confident of the ability of the government officials to do their job." Heterogeneity analysis also shows that people's political trust in the face of current weather shock is more responsive in urban areas, while the response to past weather shocks is sensitive in both rural and urban samples.

The remaining chapters of the dissertation are organized as follows. Chapter two presents a full-fledged study about the buffering role of social capital in rural Ethiopia, followed by chapter three,

which presents the intergenerational transmission of prosocial attitudes in the context of developing countries. Chapter four presents the impact of exogenous weather shock on social and political trust in Ethiopia. The dissertation ends by providing summarized conclusions and implications from the three integrated studies.

Chapter Two

Insurance Without Formal Insurance: The Buffering Role of Social Capital in Rural Ethiopia (article published in Food Policy)

Gonfa, A. S., Boka, J. B., & Zewdu, G. A. (2025). Insurance without formal insurance: the buffering role of social capital in rural Ethiopia. *Food Policy*, 134, 102880.

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Abstract

The literature is unclear whether social capital can insure effectively against shocks. We provide evidence from rural Ethiopia, a setting characterized by prevalent shocks, lack of formal insurance markets, and functioning informal traditional institutions, using four waves of household panel surveys with over 6000 observations. We measure social capital as the social network-based resources available to rural households via local informal institutions, alternatively measured as network size, network diversity, and simple membership in institutions. Fixed effect estimation results show that the buffering role of social capital extends beyond insurance against idiosyncratic shocks, with variation across welfare and social capital measures. Social capital helps protect against multiple and simultaneous shocks, buffering shortfalls in not only total consumption but also food and consumables consumption. Rural households thus benefit from informal insurance in local institutions in the absence of formal insurance markets. Rural insurance policies and efforts to address food insecurity and rural development challenges should consider resources embedded in these institutions.

Keywords: Social capital, social network, Local informal institution, informal insurance, shock

2.1. Introduction

What constitutes social capital and what benefits it may offer to those accessing it remain unclear. Economics literature defines social capital as resources embedded in social networks that people invest in ex-ante to mitigate ex-post adverse events. Social capital is embedded in social ties between the participants where the ties are patterns of interactions that persist over time (Postelnicu and Hermes, 2018). The link formed over time and repeated exchanges through membership in the same institution/group help to provide insurance against the effects of unfavorable events. How much a person accesses social capital resources depends on the person's connections (whom they know and group members), the strength of the connections, and the resources available to the connections (Sobel, 2002).

Social capital in the form of resources embedded in social networks such as local informal associations and community networks serve insurance against shocks. We define shocks as adverse events that affect the physical, material, and emotional well-being of a person, leading to a loss of household income, a reduction in consumption, and/or a loss of productive assets. Some argue that social capital resources help to buffer against certain forms of shocks, mainly idiosyncratic (Cao et al., 2022; Wuepper et al., 2017; Wossen et al., 2016; Dinh et al., 2012; Dercon et al., 2006; Asfaw and Braun, 2004; Fafchamps & Lund, 2003; Narayan and Pritchett 1999, Townsend, 1994). Social capital enhances household's willingness and capacity to adopt agricultural technology and innovations (Wossen et al., 2015; Varshney et al., 2022), improves the community's ability to preserve communal resources (Ostrom, 1990; Ajuha, 1998), enhances financial inclusion (Mwangi and Ouma, 2012), and protects households from adopting deleterious coping mechanisms (Tewodaj, 2006, Mogues, 2019). During the recent global pandemic, COVID-19 too, community-level mutual support has played a significant role in reducing the potential adverse effects of the pandemic (Cartensen et al., 2021; Liu and Wen, 2021; Makridis and Wu, 2021; Wu, 2021). Besides its insurance role at times of crisis, networking among rural households through membership in an institution is essential even to access the poorly available credit services provided by formal financial institutions mainly microfinance as their services necessitate group collateral (Grootaert et al., 2002; Okten and Osili, 2004; Clarke and Dercon, 2009; Dinh et al., 2012). Although the

positive aspects of social capital dominate, recent empirical work has documented the dark side of social capital¹.

Regarding measurement, some measure social capital as being a member of a certain local institution and/or participation in informal networks (Matakos et al, 2022; Mogue, 2019; Wossen et al., 2016; Berhanu, 2011), as having people to rely on during hard times (Wossen et al., 2016; Fafchamps & Gubert, 2007; Fafchamps & Lund, 2003), as the size of kinships/family networks and clans structure (Cao et al., 2022; Cruz et al, 2020; Acemoglu et al., 2014; Di Falco & Bulte, 2011; 2009), and few more as trust about strangers (Wossein et al., 2016; Wossein et al., 2015). In this study, we use alternative measures of social capital in Ethiopia, a country where traditional informal institutions serve as important insurance mechanisms. We exploit the advantage in the functioning of such institutions and measure resources available to the networks in terms of both their size and diversity which are often short of measurement in many studies.

In this paper, we discuss results from longitudinal household data from 1632 households spanning four years and a total of over 6000 observations, covering four major regional states, 16 districts, and 96 kebeles (the smallest administrative unit) that account for about 86% of the Ethiopian population. Ethiopia is a poor East African country that has experienced more than fifteen widespread shocks in the last forty years, of which six were severe droughts (FAO Ethiopia profile report, 2016²), but whose formal insurance market in rural areas (accounting for 78 percent of its more than 120 million population, WB 2022³) is either non-existent or inaccessible. Access to financial and credit markets is much more constrained in rural settings, where less than 10 percent of Ethiopian rural households have access to credit (Feed the Future, 2022). Ethiopia's national

¹ *Woldehanna et al. (2022) presented the double-edged role played by social capital in which expenditures related to social ceremonies adversely affect household welfare but membership in the institutions helps to insure against shocks. According to Di Falco and Bulte (2011), social capital associates with a change in the decision of a household's portfolio holding from sharable to non-sharable and hence reduce investment in productive sectors, mainly because of sharing obligation between clan members. The undesirable consequence of social capital may also extend beyond households and affect national economic development. In chiefdoms, a large network of chiefs may be associated with worse development outcomes as the chiefs become less constrained and free to distort incentives to engage in economically undesirable activities (Acemoglu et al., 2014). Similarly, public goods provision and political competition are stronger in villages with fragmented social networks than non-fragmented ties between communities (Cruz et al., 2020).*

² <https://www.fao.org/aquastat/en/countries-and-basins/country-profiles/country/ETH>

³ <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=ET-1W>

insurance coverage is only 7.8 percent (WB, 2021) implying the rural insurance coverage is far less. On the other hand, traditional indigenous informal associations are available in rural Ethiopia (Pankhurst, 2008; Mariam, 2003; Pankhurst and Mariam, 2000). The roles these institutions play in coping with shocks are therefore worth exploring.

Results from fixed effects estimation show that social capital in large and diversified networks is associated with insurance against consumption decreases in the face of health shock. Larger social networks are also associated with buffering against the effects of economic shock and simultaneous shocks (health and economic and health and market shocks). Membership in local institutions helps to shield against consumption downfall in connection with market shock and multiple idiosyncratic shocks (health and economic shocks). Informal insurance, widely practiced in rural Ethiopia, is, thus associated with buffering beyond idiosyncratic shocks and helps protect against multiple and simultaneous shocks. Policies and interventions that aim to mitigate rural food insecurity and rural development challenges, therefore, need to consider the insurance role played by traditional institutions.

This paper has three contributions to the existing literature. First, the paper expands the measurement of social capital in terms of coverage and alternative definitions by measuring social capital as social network-based resources available to rural households from traditional institutions⁴ in rural areas of Ethiopia. Second, it provides evidence that challenges the conventional wisdom that social capital only insures against idiosyncratic shocks. The paper contributes to the limited literature on the ability of social capital to insure against multiple and simultaneous shocks (Ansah et al., 2021; Mazumdar et al., 2014) by providing evidence from a rich data set with information on simultaneous occurrences of shocks. The insurance function of social capital depends on both the nature of the shock and the type of social capital. Our evidence shows that social networks' insurance depends on the network's availability, strength, and diversity, in which the buffering extends to multiple and simultaneous shocks. Third, the study expands the knowledge about the consumption smoothing role of social capital by providing evidence about

⁴ *Although the names may vary depending on languages, associations such as Iddir/Afosha (funeral association), Iqqub (rotating saving and credit association), Mahber (religious/social association), credit and saving association, Debo (labor sharing arrangement), and Wonfel (labor sharing arrangement that necessitates reciprocity) have long been practiced in many parts of the country (Aredo 1993a, 1993b; Pankhurst and Mariam, 2000; Mariam, 2003; Pankhurst, 2008; Kebede and Butterfeld, 2009; Flemmen and Zenebe, 2016; Mogue, 2019). Details about each local institution are in section two of this paper.*

total consumption expenditure, complementing the literature that has previously focused on food consumption (Cao et al., 2020; Mbugua et al., 2020; Wosseini et al., 2016, Wuepper et al., 2018; Asfaw & Braun, 2004; and Fafchamps& Lund, 2003).

The remaining sections of the paper are organized as follows. Section two presents an overview of social capital and local institutions in Ethiopia. Section three continues with data and descriptive statistics, followed by section four, which presents the empirical approach, results, and discussion. We conclude the paper and provide policy implications in section five.

2.2. Social capital and the local informal institutions in Ethiopia: Overview

The definition of social capital is mainly rooted in the prominent works of Bourdieu (1986), Coleman (1988), and Putnam (1993). Putnam (1993: 2), for instance, defines it as “features of social organization, such as networks, norms, & trust, that facilitate coordination and cooperation for mutual benefit” while Lin et al (2001:58) put it as “resources embedded in a social structure that is accessed and /or mobilized in purposive actions”. Postelnicu and Hermes’ (2018) work on the economic value of social capital defines it as intangible capital embedded in networks. In economics literature, social capital constitutes resources embedded in social networks in which people invest ex-ante to mitigate ex-post adverse events.

Studies about the origins of social networks in Africa take them back to pre-colonial social culture practiced in many countries. Patel et al (2013) presented that in the pre-colonial period, South Africa relied on women, mutual aid, kinship, communal and community support systems that laid its foundation on the traditional principle ‘Ubuntu’ meaning “people are people through people”. Likewise, the indigenous people of Zimbabwe relied on traditional support systems for their social protection, of which a support system called ‘ZunderaMambo’ was prominent and used to address problems of food insecurity at the community level. The Indigenous association called Iddir/Afoshia in Ethiopia also dates to the period of pre-Italian occupation (Pankhurst and Mariam, 2000), and it continues to exist as a self-help association serving the purpose of extending support to its members at times of both bad and happiness in both rural and urban areas.

Aside from *iddir*, which is relatively well studied, the major local institutions that provide informal insurance in Ethiopia are described below. Our social capital measures cover these institutions although we do not distinguish between them in our quantitative analysis.

Iddir is an indigenous social organization established by mutual agreement between community members to provide support at times of death of members and their relatives. It is the most widespread type both in rural and urban areas and often transcends divides of gender, generation, wealth, education, religion, and ethnicity (Pankhurst, 2008). Though its primary function is to take care of burial and consolatory activities at the time of death of a member, it also provides support when loss of various forms occurs including theft of cattle and crops, fire to house or crops, death of cattle and loss of harvests, and provide loan and assistance during illness as well as happiness such as weddings (Mariam, 2003; Pankhurst, 2008; Dercon et al, 2006). At the time of need,

support is raised under different modalities. For some of *iddirs*, a given amount of money will be taken out from the institution's deposit and given to the affected members. For others, money raised through fixed contributions from members ex-post the problem. Many more also contribute food, drinks, materials, and labor that will be served during the event. Some *iddirs* exempt very poor and old people from contribution, granting them full rights from membership. There is a possibility that few can contribute labor and maintain membership in *iddir* (Mariam, 2003; Pankhurst and Mariam, 2000; Pankhurst, 2008).

Iqqub is a rotating saving and credit association where members come together voluntarily to pay a small penny into a common pool periodically so that each member, in rotation, can receive one large sum. A particular *iqqub* lasts for a specific period and another with a target sum of money shall be formed with the same group or with a certain degree of variation of members, regularly. People from all walks of life, ranging from rural poor to urban rich, regardless of status, participate, and the contribution depends on the economic status of members (Aredo, 1993). The membership may be mixed and constitutes people belonging to certain common denominations: colleagues at work, neighbors, friends, and customers of the same bar. Members need not be very close to one another, but one must be known to some members. The functioning of *iqqub* is often regulated by a written agreement which does not guarantee legal status to the organization.

Mahber is a socio-religious association that holds gatherings with spiritual and social functions named after saints (Kebede and Butterfeld, 2009). It is an association whose membership is based on similarity in religion (or sometimes social objective) and is often based on a match in interest to commemorate saints of the same interest. Mostly, the association has a sort of homogeneity in gender, age group, social status, and objectives. It is common among Orthodox Tewahido Christianity followers and involves monthly gatherings by members. Besides the religious benefit of teaching members to refrain from evil deeds and strengthen themselves in their religion, *mahber* is also seen as a social gathering where members regularly meet and closely interact. Membership in the same *mahber* exhibits strong ties between members (Flemmen and Zenebe, 2016). There are also non-religious *mahbers* with the objective of self-help between members of similar groups based on place of birth, same school experience, and other denominations by those residing outside the locality. The objectives also extend to delivering some other social obligation to a locality such

as participation in local development or support of non-members. Our survey data, however, addresses religious *mahber* which encompasses practices by followers of all religions.

Debo and Wonfel are work parties where people from the same village (or beyond) share their labor to perform time-sensitive agricultural tasks. While *debo* is a form of festive labor whereby the host provides food and drink for a large work party and is not obliged for reciprocity, *wonfel* does not involve drink and food supply but necessitates reciprocity among members. Wonfel is relatively smaller when compared with *debo* and both are labor-sharing arrangements largely practiced in rural areas (Wossen et al., 2015; Mogues, 2019). There are also *debos* in the forms of accompanying during social events such as weddings and christenings.

2.3. Data and Description

2.3.1. Data

This study uses four rounds of household surveys spanning over 2011 to 2014 that covered four regions of Ethiopia (Oromia, Amhara, the then Southern Nations, Nationalities, and Peoples Region (SNNPR), and Tigray), which together account for 86% of the country's population, according to the Population Census Commission 2008. It covers four districts (woredas) from each region and six kebeles (smallest administrative units) from each district, with 17 households randomly selected from each kebele. All in all, the data includes 16 districts, 96 kebeles, and 1632 households. The kebeles in each woreda are selected using random sampling (lottery method) while the households are selected using systematic sampling, based on a complete list of kebeles and households obtained from the respective administrations. Attrition in the panel is none as the panel follows households, not their individual members. In Ethiopia, entire households are less likely to migrate because their livelihoods are linked to land and there is a risk of losing land rights if the household migrates (mainly due to expropriation by local governments) (FDRE proclamation no.456/2005; De Brauw and Mueller, 2012). Furthermore, Appendix D presents a test for selection bias that may emanate from missingness due to item non-responses and shows that the missingness is random and unlikely bias our estimates.

Information on household and individual socio-economic attributes, including the main variables of interest, is extensively included in the survey. We aggregate consumption from four consumption categories in the dataset. Food consumption information is based on a one-week recall period and annualized using 52 weeks of a year. It encompasses more than 34 items that can be purchased from the market, those used from one's own harvest and stock including those obtained from land rent and crop sharing, and those in the form of gifts. The values of items consumed from one's own stock, received in kind as payment for land rent and crop sharing, and received from gifts, are calculated based on the information obtained on how much it would cost if purchased from the market. For all the items, data on quantity, unit of measurement, and direct total expenditure (or how much it would cost if purchased from the market) are obtained and checked for consistency. Non-food consumables consisting of purchases such as matches, soaps, batteries, charcoal, kerosene, personal care goods, etc., in the last month of the survey period are reported and thus annual consumables consumption is constructed. To account for only realistic

yearly expenditures of a household, we excluded zero consumption reports on food and consumables. Non-food durable consumption is, again, constructed from expenditure on purchases of durables such as shoes, clothes, mobile phones, radios, and so on in the last 12 months of the survey period. Non-food non-durables consumption, which is 12 months of expenditure on education, housing, taxes, weddings & funerals, and other social events, and transport are other consumption data available in the survey. Total consumption is, thus, the value obtained from total household spending on these four consumption categories, and sub-aggregation as food and non-food is also made for use in the analysis. Annual food and consumables consumption, the major and welfare-determining household consumption, is constructed from the expenditure on food and consumables for use as a robustness check. The nominal consumption data, for all consumption categories and the aggregates, is first adjusted for regional differences using spatial regional price indices suggested in the Ethiopian Socio-Economic Survey (ESS)⁵. We then generated real consumption by adjusting the region-adjusted expenditure data with annual inflation obtained from the World Bank database. Real consumption is, thus, converted into per capita consumption after adjustment for adult equivalent household size.

In the shocks' module of the survey, households' experiences with unexpected events in the previous twelve months are included. About 21 events categorized under six types of shocks namely health, economic, natural, market, social, and institutional shock are recorded. Health shock encompasses health-related events such as illness, death, or disability of household members. Natural shock includes natural events such as floods, droughts, untimely rains, hailstorms, insect plagues/ plant diseases /weed infestations, fire outbreaks, and frost. Economic shock includes the death/theft of cattle/livestock, theft of crops, and loss of equipment events. Market shock encompasses events such as an increase in farm input prices, a decrease in farm output prices, and an increase in the prices of purchased goods.

The relevant social capital indicators in the survey are detailed information about membership in the six local institutions described above, including the number of members in each institution. Based on information about the local institutions, we create three alternative measures of social capital: (1) membership in institutions, which is a dummy variable equal to 1 if the household is a

⁵The ESS survey refers to the Ethiopian Socio-Economic Survey conducted by the Central Statistical Agency (CSA) of Ethiopia and the World Bank between 2011 and 2015.

member of at least one of the institutions and 0 otherwise; (2) social capital diversification, which is the number of institutions to which a household belongs; and (3) network size, represented by the total number of members of the local institutions to which a household belongs. The network size is used as an index constructed from the sizes of the six local institutions using the Inverse Hyperbolic Sine (IHS) transformation. IHS is preferred to horizontal summation and other forms of transformation in that it eases log transformation by keeping zero values and provides optimal size construction using non-zero values. It also helps to reduce the rightward skewness of our variable of interest in the presence of zero values, which serves the same role as log transformation with the advantage of fulfilling assumptions in regression models and making the estimated coefficients more robust to outliers and extreme values (Aihounton & Henningsen, 2021). Moreover, it is difficult to choose membership and/or size in one institution over the other, whereas generating indices through principal component analysis may be misleading given the diverse nature of the social networks being considered.

2.3.2. Descriptive statistics

Table 2.1 shows descriptive statistics on main variables, including household characteristics. About half of the total households do not have formal education, and, on average, household heads attain 2.38 years of schooling or only basic education. The households are smallholder farmers, with an average cropland size of one hectare and four livestock (in TLU) holdings. Off-farm participation has averaged 32-40 percent across the survey years. Natural, market, health, and economic shocks are said to have affected households in that order of prevalence. Natural shocks were recorded by more than 48% of households in 2011, with the lowest exposure reported in 2014. In 2012, over 34% of households had health shocks, compared to 19% in 2014. In 2014, the shock incidence was low, with approximately 6 percent and 7 percent of households experiencing economic and market shocks, respectively.

Household real consumption per capita has increased over the years with food consumption dominating the trend. Food and consumables consumption accounted for more than 80 percent of the total consumption. Consumption is rising at a declining rate across all consumption categories, except for non-food, which increased at an increasing rate between 2013 and 2014. On average, 92% of households have membership in at least one local institution, and many more belong to

multiple institutions, implying that households diversify their social capital. The average network size, which measures the number of members of local institutions in which a household has membership, ranges from 144 to 193⁶, demonstrating a reasonable connection by the households.

Table 2.1: Descriptive statistics on major variables¹

Variables	Mean across year								
	All year	2011		2012		2013		2014	
	Mean	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Demographic variables									
Age (average age of household)	24.51	23.20	10.35	23.71	10.90	24.86	11.26	26.38	11.81
Education (of head, in years of schooling)	2.42	2.38	2.99	2.44	3.06	2.35	3.06	2.56	3.16
Household size (adult equivalents)	4.84	4.86	1.88	4.83	1.86	4.79	1.84	4.88	1.84
Other HH x-tics (asset/wealth variables)									
Cropland size (in hectares)	1.03	1.05	0.95	0.98	0.85	1.02	1.01	1.08	1.06
Livestock size (in tropical livestock units)	3.93	3.95	3.70	3.87	3.77	3.91	3.79	4.10	3.61
Off-farm participation (=1 if participated)	0.35	0.33	0.47	0.36	0.48	0.40	0.49	0.32	0.47
Shock Variables									
Health Shock	0.27	0.32	0.46	0.34	0.47	0.24	0.43	0.19	0.39
Natural Shock	0.36	0.48	0.50	0.39	0.49	0.43	0.50	0.14	0.34
Economic Shock	0.11	0.19	0.39	0.11	0.31	0.10	0.30	0.06	0.24
Market Shock	0.36	0.78	0.42	0.39	0.49	0.19	0.40	0.07	0.25
Outcome variables (per capita, annual, in Eth Birr, & real values)									
Total consumption	2331.40	2096.02	1343.42	2436.08	1602.32	2484.29	1935.05	2355.86	1892.71
Food Consumption	1874.33	1714.77	1144.6	1982.79	1379.84	2043.31	1770.89	1789.35	1686.84
Food & consumables consumption	1993.22	1834.14	1200.75	2101.92	1432.26	2166.25	1809.69	1912.28	1719.58
Non-food consumption	338.18	261.88	312.85	334.17	500.01	318.03	333.09	443.58	508.95
Social Capital variables									
Social capital membership (1= member of at least one institution, 0= none)	0.92	0.92	0.26	0.91	0.27	0.93	0.25	0.92	0.27
Social capital diversification (number of institutions in which HH has membership)	1.83	1.89	1.13	1.73	1.01	1.79	1.09	1.91	1.14
Social Capital Size (sum of sizes of institutions in which HH has a membership)	174.46	186.49	262.88	175.04	251.37	144.27	164.99	192.82	290.45
Total Observations	6008	1503		1507		1491		1507	

Source: Computed from the Survey data

In addition to the descriptive statistics, we conducted mean difference tests and show that the average consumption of a shock-exposed household is statistically different from the counterfactual, particularly for idiosyncratic shocks. The insignificance in the case of natural shock may imply its covariate nature (Appendix B).

⁶ This number is not the average number of members in a single local institution, but rather the average for the size of all the institutions in which a household has membership.

2.4. Empirical Strategy

Based on the context in a rural setting and risk-sharing models by Mace (1991), Ravallion and Chaudrui (1997), and Islam and Maitra (2012), we consider a village with members $i = 1, 2, 3 \dots I$, S states of nature with a probability of occurrence π_s . In a state s , each household receives an income of $y_{its} > 0$. ρ represents the rate of time preference assumed to be the same for all households. Let c_{its} is the consumption of household i if state s occurs in period t .

Each household, thus, has a separate utility function:

$$\sum_{t=1}^T \rho^t \sum_{s=1}^S \pi_s u_i(c_{ist})$$

$u_i(\cdot)$ is assumed twice continuously differentiable with $u' > 0$, $u'' < 0$.

Maximizing the weighted sum of utilities for each i (members of the village) will give Pareto-efficient allocation of risk in the village, which is derived from a social planner's problem of full consumption insurance and complete risk sharing in a community/village.

Maximize

$$\sum_i \sum_t \sum_s \mu_{is} \pi_s \rho^t u(c_{its}; \theta_{its})$$

subject to

$$\sum_i c_{its} = \sum_i y_{its} \forall t, s$$

Where π_s is the probability of states s ; $s = 1, \dots S$. c_{its} is household consumption; y_{its} household income; μ_{is} time invariant pareto weight associated with the HH i ($0 < \mu_i < 1$); $i = 1, \dots I$ in state s ; ρ is the rate of time preference assumed to be the same for all HHs; θ_{its} factors that change tastes.

Assuming an exponential utility function (CARA)⁷:

⁷The assumption of Constant Absolute Risk Aversion (CARA) utility function is not crucial for our analysis. But, assuming Constant Relative Risk Aversion (CRRA) gives an estimating equation in log format and makes zero values meaningless, in our case for the dependent variable-consumption. The central factor is risk aversion behavior of the

$$u(c_{its}; \theta_{its}) = -\frac{1}{\alpha} \exp\{-\alpha(c_{its} - \theta_{its})\}.$$

Absolute risk aversion remains the same at every level of wealth. Assume households in rural Ethiopia are risk averse regardless of the wealth they have and rely on social networks for insurance against shocks.

Suppressing the state notation for expositional convenience and from the first order conditions,

$$\Delta C_{it} = \Delta C_t^{av} + (\theta_{it} + \Delta \theta_t^{av})$$

Where $\Delta C_t^{av} = \frac{1}{I} \sum_i C_{it}$ and $\Delta \theta_t^{av} = \frac{1}{I} \sum_i \theta_{it}$, implying that under the assumption of full consumption insurance individual consumption depends on group/village average consumption as taste does not change frequently. C_t^{av} represents the group's/village's average consumption and C_{it} is household consumption.

The empirical model that shows the effect of shocks on household consumption, thus, become $\Delta C_{it} = \alpha_0 + \beta S_{it}^{h,n,e,m} + \sigma X_{it} + \rho \Delta C_t + \varepsilon_{it}$

where ΔC_{it} is change in consumption of the household i in period t, $S_{it}^{h,n,e,m}$ represents shocks (health, natural, economic, and market) faced by household i in period t, X_{it} is household characteristics, and ΔC_t denotes group/village consumption in period t. Under full insurance and perfect market assumption, $\rho = 1$ and $\beta = 0$ such that household consumption is fully insured against shock.

Based on the argument by Ravallion and Chaudrui (1997), however, the inherent nature of insurance market failure would give biased estimates from testing $\rho = 1$ and $\beta = 0$ whenever a component of village level consumption in household consumption changes. We therefore include village fixed effects in place of village consumption and time fixed effects.

The following specification shows the effect of shocks on household consumption.

$$C_{it} = \alpha_0 + \beta_1 S_{it}^j + \sigma X_{it} + \delta_v + \mu_t + \varepsilon_{it} \quad (1)$$

households in a sense that wealth effect is not significant in influencing risk choice by households, a generally accepted assumption in rural developing countries context.

Where S_{it}^j represents one of the shocks (health, economic, natural, and market) a household i faced at period t including multiple shocks at a time. δ_v is village fixed effect, and μ_t is time dummies.

Unlike Islam and Maitra (2012) and Mbugua et al (2020) who included interaction term of time dummies with village-fixed effects to control for price changes that are village-specific and control for village-level shocks, we use real consumption which is adjusted by regional price indices and village level shocks are part of our interest in explaining the insurance role of social capital.

We present two alternative specifications of our main model to estimate the role of social capital in insuring against shocks. We first estimated the association between specific types of shock and per capita consumption. Second, we estimated the association with multiple types of shocks. In both contexts, the buffering role of social capital is captured by the coefficient of the interaction variable (shock and social capital).

$$\ln\left(\frac{C_{it}}{HHS_{it}}\right) = \alpha_0 + \beta_1 S_{it}^j + \gamma_1 (S_{it}^j * SC_{it}) + \sigma X_{it} + SC_{it} + \delta_v + \mu_t + \varepsilon_{it} \quad (2)$$

$$\ln\left(\frac{C_{it}}{HHS_{it}}\right) = \alpha_0 + \beta_1 S_{it}^z + \gamma_1 (S_{it}^z * SC_{it}) + \sigma X_{it} + SC_{it} + \delta_v + \mu_t + \varepsilon_{it} \quad (3)$$

Where S_{it}^j represents specific shocks such as health, economic, natural, and market shock. S_{it}^z denotes multiple shocks such as health and economic, health and natural, and health and market shock. HHS_{it} represents an adult equivalent household size and SC_{it} is social capital index or social capital measures alternatively measured (details are in the result section). $\frac{C_{it}}{HHS_{it}}$ denotes consumption per capita and its log form is considered in the estimation. Here, the γ_1 measures the effect of social capital in insuring against the various types of shocks and if $\gamma_1 > 0$ it implies that social capital is associated with insurance against shocks.

The main challenge in this model is the possibility that SC_{it} is endogenous due to the wealth effect of network formation. Wealth may create an opportunity to develop more networks and bring better consumption smoothing ability to the rich than the poor households. Addressing this endogeneity problem is, thus, important to prevent the estimated results from becoming biased and to develop a strong associational inference about the variables. To address this, we have employed multiple measures. First, we have controlled both direct and indirect sources of wealth in the rural setting including crop land size, livestock size (in TLU), off-farm participation, education, and age.

Second, following the approach by Wossen et al (2016), Islam and Maitra (2012) and Mbugua et al (2020), we argue that the use of panel data and fixed effect specification will address the problem. Particularly, the fixed effect will provide consistent estimates of parameters by sweeping out the effect of time-invariant unobserved factors which determine both social capital and the ability to smooth consumption. One of the major advantages of using a longitudinal household-level data set is that we can control many permanent and time-varying factors that may affect consumption as well as vulnerability to shocks and decisions to join local institutions. Hence, household fixed effects fully absorb any permanent heterogeneity at the household level, that are likely to make some households more likely to invest on social networks and to report unfavorable events. Furthermore, the inclusion of time dummy controls elements of heterogeneity that are common to the villages.

Despite employing these measures, there might still be some correlation between time-varying unobservable variables and the variable of interest. We, therefore, interpret the results as association, not as causal. Furthermore, we run instrumental variable (IV) regression as a robustness check although finding a suitable instrument is highly challenging. Previous studies (Wossen et al, 2016) have shown that people born and raised in the same area have more social connections than their counterparts. We hypothesize that a person's length of residence in an area affects his/her social capital, where greater length of residence implies more social capital. Likewise, a person born in his or her village of residence may have more social connections than otherwise. We, therefore, employed these two instruments and showed that our fixed effect results are robust. Both instruments are valid and relevant to our social capital and welfare measures in use, as evidenced by weak instruments test and test for exclusion restriction. For the weak instruments test, we reported first stage F test statistics. And for the exclusion restriction we regress the instruments on the dependent variable (consumption) and showed no correlation.

2.5. Results and Discussion

2.5.1. Insurance against Idiosyncratic Shocks

Table 2.2a presents fixed effects estimation results showing how social capital, measured in different ways, is associated with consumption per capita in the face of health shock. The columns represent alternative measures of social capital, with the first two columns presenting the results when social capital is measured as network size, columns (3) and (4) for social capital diversification, and columns (5) and (6) for membership in local institutions, each presenting the main result from baseline and fixed effect estimates, respectively. The findings show that network size and diversity are associated with protection against consumption decreases in the face of health shocks. The mere existence of networks has shown no significance.

Table 2.2a: Fixed effect results for insurance against health shock2

Outcome variable: Total Consumption Per Capita (log)	Social Capital Size		SC Diversification		SC membership	
	Baseline	FE	Baseline	FE	Baseline	FE
Health Shock	-0.191*** (0.057)	-0.191*** (0.056)	-0.106*** (0.041)	-0.139*** (0.040)	-0.069 (0.073)	-0.079 (0.073)
Social Capital (Size)	0.009 (0.007)	0.011* (0.007)				
Interaction (SC size & H shock)	0.026*** (0.010)	0.024** (0.010)				
Social Capital (Diversification)			-0.011 (0.011)	-0.005 (0.011)		
Interaction (SC diversif. & H shock)			0.026 (0.016)	0.036** (0.016)		
Social Capital (membership)					-0.003 (0.037)	-0.007 (0.037)
Interaction (SC membership & H shock)					0.014 (0.076)	0.011 (0.076)
Crop land size		0.109*** (0.013)		0.109*** (0.013)		0.108*** (0.013)
Livestock (in TLU)		0.008* (0.005)		0.009* (0.005)		0.009* (0.005)
Off-farm participation		0.056*** (0.020)		0.058*** (0.020)		0.058*** (0.020)
Education of HH head		0.007 (0.008)		0.007 (0.008)		0.007 (0.008)
CBHI participation		0.093*** (0.027)		0.095*** (0.027)		0.094*** (0.027)
PSNP participation		-0.069** (0.033)		-0.067** (0.033)		-0.068** (0.033)
Year fixed effect		Yes		Yes		Yes
Number of Observations	6,008	6,008	6,008	6,008	6,008	6,008
Joint test F-statistic (prob>F = 0.000)		22.31		21.36		21.23

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2.2b: Fixed effect results for insurance against economic shock3

Outcome variable: Total Consumption Per capita (log)	Social Capital Size		SC Diversification		SC membership	
	Baseline	FE	Baseline	FE	Baseline	FE
Economic Shock	-0.267*** (0.081)	-0.257*** (0.080)	-0.072 (0.059)	-0.063 (0.058)	-0.261* (0.157)	-0.214 (0.156)
Social Capital (Size)	0.012* (0.006)	0.013** (0.006)				
Interaction (SC size & Econ. shock)	0.044*** (0.015)	0.045*** (0.015)				
Social Capital (Diversification)			-0.004 (0.010)	0.004 (0.010)		
Interaction (SC diversif. & Econ shock)			0.013 (0.023)	0.016 (0.022)		
Social Capital (membership)					-0.013 (0.034)	-0.017 (0.034)
Interaction (SC member. & Econ shock)					0.224 (0.159)	0.192 (0.158)
Crop land size		0.111*** (0.013)		0.110*** (0.013)		0.109*** (0.013)
Livestock (in TLU)		0.008* (0.005)		0.008* (0.005)		0.008* (0.005)
Off-farm participation		0.055*** (0.020)		0.057*** (0.020)		0.058*** (0.020)
Education of HH head		0.008 (0.008)		0.007 (0.008)		0.008 (0.008)
CBHI participation		0.095*** (0.027)		0.094*** (0.027)		0.093*** (0.027)
PSNP participation		-0.072** (0.033)		-0.071** (0.034)		-0.070** (0.034)
Year Fixed Effect		Yes		Yes		Yes
Number of Observations	6,008	6,008	6,008	6,008	6,008	6,008
Joint test F-statistic (prob>F = 0.000)		22.40		20.99		21.08

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2.2b shows results for the effect of economic shocks on household welfare and the buffering role of the three forms of social capital. The findings indicate that economic shocks experienced by households are associated with a loss of around one-fourth of annual total consumption. Households who experienced incidents such as cattle/livestock death/theft, crop theft, and equipment loss reduced their total consumption significantly. However, social capital in the form of strong networks (large size) is associated with insurance against the decline. Network diversity and membership in local institutions showed no significance. These results suggest that household's recovery from economic losses through informal insurance may necessitate larger networks rather than their mere availability and diversity.

Tables 2.2a and 2.2b show that not all measures of social capital can protect against idiosyncratic shocks. Our findings indicate that the established assertion about the insurability of idiosyncratic shocks through social networks in informal institutions is contingent on the network's metrics. The

mere availability of networks has shown no association with insurance, while larger and diversified networks do. The findings in Tables 2.2a and 2.2b are consistent with the prominent work by Sobel (2002), who asserts that how much a person benefits from social capital resources depends on the person's connections (whom they know and group members), the strength of the connections, and the resources available to the connections.

2.5.2. Insurance against Covariate Shocks

The dominant finding in literature is that informal insurance fails to protect against covariate shocks (particularly drought) as such shocks affect every community member. Repeated events may even destroy local informal institutions, reducing the likelihood of insurance (Berhanu, 2011). Our estimates yield similar results. In our data, natural shocks encompass natural events such as floods, droughts, untimely rains, hailstorms, insect plagues/plant diseases/weed infestations, fire outbreaks, and frost that occurred in the months before the survey periods. The inclusion of these events may help to capture the diverse events that potentially relate to the geographical heterogeneity between survey locations. Following standard practice, we use the previous year's natural shock rather than the shock in the survey year. Table 2.3a shows that social capital in all its forms has shown no association with buffering against natural shock.

Table 2.3a: Fixed effect results for insurance against natural shock⁴

Outcome variable: Total Consumption Per capita (log)	Social Capital Size		SC Diversification		SC membership	
	Baseline	FE	Baseline	FE	Baseline	FE
Natural shock (lag)	-0.286*** (0.061)	-0.245*** (0.059)	-0.180*** (0.051)	-0.146*** (0.049)	-0.132* (0.073)	-0.139* (0.072)
Social Capital (Size)	0.002 (0.009)	0.007 (0.009)				
Interaction (SC size & lag Natu. shock)	0.026** (0.011)	0.018 (0.011)				
Social Capital (Diversification)			0.002 (0.015)	0.020 (0.015)		
Interaction (SC divers. & lag Nat. shock)			0.013 (0.020)	-0.007 (0.020)		
Social Capital (membership)					0.007 (0.048)	0.003 (0.048)
Interaction (SC memb & lag Natu. shock)					-0.026 (0.077)	-0.021 (0.075)
Crop land size		0.140*** (0.018)		0.139*** (0.018)		0.139*** (0.018)
Livestock (in TLU)		0.007 (0.006)		0.007 (0.006)		0.007 (0.006)
Off-farm		0.077*** (0.026)		0.076*** (0.026)		0.077*** (0.026)
Education of HH head		0.002 (0.009)		0.002 (0.009)		0.003 (0.009)

CBHI participation		0.105*** (0.039)		0.104*** (0.039)		0.105*** (0.039)
PSNP participation		-0.113*** (0.043)		-0.117*** (0.043)		-0.117*** (0.043)
Year fixed effect		Yes		Yes		Yes
Number of observations	4,505	4,505	4,505	4,505	4,505	4,505
Joint test F-statistic (prob>F =0.000)		12.63		12.72		12.26

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The total number of observations is less because the regressors include lagged shocks.

Table 2.3b provides results on insurance against market shock. The market shock is measured by one or more of the following: a rise in the price of agricultural inputs, a fall in the prices of farm outputs, and an increase in the prices of purchased goods and services. The result in Table 2.3b suggests that social capital in the form of membership in local institutions is associated with protection against a decrease in total consumption in the face of market shock. Network size and diversity have shown no association. The protection provided by participation in local institutions appears to be related to the possibility of protecting against market shocks by deferring the price burden at shock time to a later period, with the assistance of networks that do not have to be large and diverse. Farm output price decreases, for example, can be mitigated by borrowing from a network to repay them later when the market recovers.

Table 2.3b: Fixed effect results for insurance against market shock⁵

Outcome variable: Total Consumption Per capita (log)	Social Capital Size		SC Diversification		SC membership	
	Baseline	FE	Baseline	FE	Baseline	FE
Market Shock	-0.120** (0.047)	-0.095** (0.048)	-0.006 (0.033)	0.004 (0.035)	-0.174*** (0.063)	-0.166*** (0.063)
Social Capital (Size)	0.013* (0.007)	0.016** (0.007)				
Interaction (SC size & Market shock)	0.014 (0.009)	0.009 (0.009)				
Social Capital (Diversification)			0.004 (0.011)	0.015 (0.011)		
Interaction (SC divers. & Market shock)			-0.021 (0.015)	-0.028* (0.015)		
Social Capital (membership)					-0.032 (0.039)	-0.035 (0.038)
Interaction (SC memb & Market shock)					0.139** (0.065)	0.130** (0.065)
Crop land size		0.111*** (0.013)		0.109*** (0.013)		0.110*** (0.013)
Livestock (in TLU)		0.008* (0.005)		0.008* (0.005)		0.008* (0.005)
Off-farm		0.056*** (0.020)		0.056*** (0.020)		0.059*** (0.020)

Education of HH head		0.008 (0.008)		0.008 (0.008)		0.008 (0.008)
CBHI participation		0.092*** (0.027)		0.091*** (0.027)		0.093*** (0.027)
PSNP participation		-0.074** (0.033)		-0.073** (0.034)		-0.072** (0.034)
Year fixed effect		Yes		Yes		Yes
Number of observations	6,008	6,008	6,008	6,008	6,008	6,008
Joint test F-statistic (prob>F =0.000)		22.36		21.42		21.89

*Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.*

Our results on covariate shocks, however, need to be taken with caution. Appendix C shows the share of households in a woreda affected by the same natural and market shocks. The share of households affected by the same shocks within a community range from 12 to 59% for a natural shock, and from 10 to 73% for a market shock, rarely exceeding 50%. While there is no clear threshold above which a shock should be defined as covariate, the term, "covariate shock," evokes a phenomenon that affects the majority of households in the same community, which is not the case with our data.

2.5.3. Insurance against multiple shocks

The empirical evidence on the relationship between informal insurance and multiple shocks is scanty (Ansah et al., 2021; Mazumdar et al., 2014). We provide results under two situations. First, a situation when the two idiosyncratic shocks (health and economic) co-occur (Table 2.4a), and second, when households experience both an idiosyncratic shock and a covariate shock at the same time (Table 2.4b for health and natural shock; Table 2.4c for health and market shock). Table 2.4a shows that multiple idiosyncratic shocks are associated with a significant reduction in household consumption (by more than 50 percent), whereby social network size and membership in local associations are associated with buffering against the reduction. These findings may be attributed to the possibility that events designated under the two types of shocks (when occurring concurrently) are given priority and mandatory support by the local institutions, both from the moral point of view (that may result from social connectedness) and by implicit agreement between the members (the institutions may sometimes indicate it in their bylaws).

Table 2.4a: Fixed effect results for insurance against multiple idiosyncratic shocks (co-occurrence of health and economic shocks) 6

Outcome variable: Total Consumption Per capita (log)	Social Capital Size		SC Diversification		SC membership	
	Baseline	FE	Baseline	FE	Baseline	FE
Multiple shock-Health & Economic	-0.562*** (0.146)	-0.524*** (0.140)	-0.090 (0.109)	-0.121 (0.105)	-0.600** (0.246)	-0.589** (0.244)
Social Capital (size)	0.013 (0.008)	0.014* (0.008)				
Interaction (HEshock-multiple & SC size)	0.093*** (0.026)	0.088*** (0.025)				
Social Capital (diversification)			0.000 (0.013)	0.004 (0.014)		
Interaction (HEshock-multiple & SC divers.)			0.008 (0.041)	0.028 (0.040)		
Social Capital (membership)					0.041 (0.041)	0.040 (0.040)
Interaction (HEshock-multiple & SCmember.)					0.534** (0.251)	0.536** (0.248)
Crop land size		0.101*** (0.017)		0.101*** (0.017)		0.101*** (0.017)
Livestock (in TLU)		0.011* (0.006)		0.012* (0.006)		0.011* (0.006)
Off-farm		0.034 (0.027)		0.038 (0.027)		0.038 (0.027)
Education of HH head		0.021* (0.011)		0.020* (0.011)		0.020* (0.011)
CBHI participation		0.105*** (0.036)		0.109*** (0.036)		0.108*** (0.036)
PSNP participation		-0.089** (0.043)		-0.084* (0.043)		-0.084* (0.043)
Year fixed effect		Yes		Yes		Yes
Number of Observations	4,218	4,218	4,218	4,218	4,218	4,218
Joint test F-statistic (prob>F =0.000)		11.97		10.05		10.62

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2.4b illustrates that the multiple shocks (the simultaneous occurrence of health and natural shocks) are related to a 25 percent fall in household consumption. This percentage reduction is smaller when compared with the situation under multiple idiosyncratic shocks (Table 2.4a), possibly due to the availability of the Productive Safety Net program in the survey areas, which aimed to supply food to victims of natural disasters and the poorest of the poor. Social capital in the form of network diversification provides marginal insurance against the shock, while the other types have had no association. Table 2.4c presents the results for the simultaneous occurrence of health and market shocks. The shock is associated with a significant decrease in per capita consumption, which may be mitigated by large social networks. Membership in local institutions and network diversity have shown no association.

Table 2.4b: Fixed effect results for insurance against simultaneous idiosyncratic and covariate shocks (co-occurrence of health and lagged natural shocks) 7

Outcome variable: Total Consumption Per capita (log)	Social Capital Size		SC Diversification		SC membership	
	Baseline	FE	Baseline	FE	Baseline	FE
Multiple shock – Health & lag Nshock	-0.316*** (0.103)	-0.254*** (0.098)	-0.240*** (0.073)	-0.242*** (0.071)	-0.125 (0.119)	-0.135 (0.122)
Social Capital (size)	0.009 (0.008)	0.012 (0.008)				
Interaction (H&lagNshock & SC size)	0.039** (0.017)	0.021 (0.017)				
Social Capital (diversification)			-0.002 (0.012)	0.009 (0.012)		
Interaction (H&lagNshock & SC dive.)			0.063** (0.028)	0.049* (0.028)		
Social Capital (membership)					-0.003 (0.042)	-0.004 (0.041)
Interaction (H&lagNshock & SCmem.)					0.009 (0.124)	-0.010 (0.126)
Crop land size		0.138*** (0.018)		0.138*** (0.018)		0.137*** (0.018)
Livestock (in TLU)		0.008 (0.006)		0.008 (0.006)		0.008 (0.006)
Off-farm		0.089*** (0.026)		0.087*** (0.026)		0.089*** (0.026)
Education of HH head		0.001 (0.009)		0.001 (0.009)		0.002 (0.009)
CBHI participation		0.098** (0.038)		0.099*** (0.038)		0.098** (0.038)
PSNP participation		-0.118*** (0.043)		-0.118*** (0.043)		-0.121*** (0.043)
Year fixed effect		Yes		Yes		Yes
Number of Observations	4,505	4,505	4,505	4,505	4,505	4,505
Joint test F-statistic (prob>F =0.000)		12.12		12.38		11.77

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2.4c: Fixed effect results for insurance against multiple idiosyncratic and covariate shocks (co-occurrence of health and market shocks) 8

Outcome variable: Total Consumption Per capita (log)	Social Capital Size		SC Diversification		SC membership	
	Baseline	FE	Baseline	FE	Baseline	FE
Multiple shock – Health & Market	-0.517*** (0.117)	-0.471*** (0.111)	-0.142** (0.064)	-0.144** (0.068)	-0.377* (0.225)	-0.403** (0.205)
Social Capital (size)	0.014 (0.010)	0.014 (0.010)				
Interaction (HM shock & SC size)	0.071*** (0.020)	0.066*** (0.019)				
Social Capital (diversification)			-0.002 (0.014)	0.004 (0.014)		
Interaction (HMshock & SC dive.)			0.011 (0.026)	0.021 (0.026)		
Social Capital (membership)					0.004 (0.051)	-0.006 (0.050)
Interaction (HMshock & SCmem.)					0.264 (0.228)	0.312 (0.208)

Crop land size		0.072*** (0.016)		0.072*** (0.016)		0.071*** (0.016)
Livestock (in TLU)		0.010 (0.007)		0.011 (0.007)		0.012 (0.007)
Off-farm		0.088*** (0.030)		0.087*** (0.030)		0.089*** (0.030)
Education of HH head		0.016 (0.010)		0.016 (0.010)		0.016 (0.010)
CBHI participation		0.093*** (0.036)		0.097*** (0.036)		0.096*** (0.036)
PSNP participation		-0.148*** (0.047)		-0.137*** (0.047)		-0.139*** (0.047)
Year fixed effect		Yes		Yes		Yes
Number of Observations	3,758	3,758	3,758	3,758	3,758	3,758
Joint test F-statistic (prob>F =0.000)		13.41		12.21		12.43

*Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.*

Our findings reveal that the forms of social capital that are associated with protection in a single shock context do not necessarily remain to provide insurance in the face of multiple shocks. Buffering against the shocks is determined not only by their combinations but also by the forms of social capital.

2.5.4. Robustness Checks

We present results of robustness checks under two scenarios: one using food and consumables consumption per capita as a welfare measure and the other employing fixed effect instrumental variable estimates.

2.5.4.1. Robustness check using food and consumables consumption

Since food and consumables consumption accounts for more than three-fourths of total household consumption (ranging from 83 to 87.5 percent over the survey period), analyzing the insurance role of social capital against the shocks' effect on it is essential in validating the situation under total consumption as well as in expanding the evidence about informal insurance. Such an estimate will also provide evidence on whether households switched their expenditure from non-food to food as an alternative coping mechanism. Tables 2.5a, 2.5b, and 2.5c illustrate the results.

Table 2.5: Robustness check results using Food & Consumables Consumption ⁹

Table 2.5a: Fixed effect results for insurance against idiosyncratic shocks ¹⁰

Outcome variable: Food & consumables consumption per capita (log)	FE: Health shock			FE: Economic shock		
	SC size	SC divers.	SC member.	SC size	SC divers.	SC member.
Health shock	-0.253*** (0.071)	-0.214*** (0.051)	-0.104 (0.086)			
Economic shock				-0.236** (0.098)	-0.068 (0.070)	-0.250 (0.182)
Social Capital (size)	0.004 (0.008)			0.007 (0.008)		
Interaction (Hshock & SC size)	0.025** (0.013)					
Interaction (Eshock & SC size)				0.038** (0.018)		
Social Capital (diversification)		-0.029** (0.014)			-0.017 (0.013)	
Interaction (Hshock & SC divers.)		0.047** (0.020)				
Interaction (Eshock & SC divers.)					0.013 (0.027)	
Social capital (membership)			-0.062 (0.045)			-0.081* (0.042)
Interaction (Hshock & SC member.)			-0.020 (0.091)			
Interaction (Eshock & SC member.)						0.217 (0.184)
Crop land size	0.132*** (0.018)	0.132*** (0.018)	0.130*** (0.018)	0.134*** (0.018)	0.134*** (0.018)	0.133*** (0.018)
Livestock (in TLU)	0.006 (0.006)	0.007 (0.006)	0.006 (0.006)	0.006 (0.006)	0.006 (0.006)	0.006 (0.006)
Off-farm	0.076*** (0.026)	0.080*** (0.026)	0.079*** (0.026)	0.076*** (0.026)	0.080*** (0.026)	0.079*** (0.026)
Education of HH head	0.005 (0.011)	0.005 (0.011)	0.005 (0.011)	0.005 (0.011)	0.006 (0.011)	0.006 (0.011)
CBHI participation	0.111*** (0.036)	0.112*** (0.036)	0.112*** (0.036)	0.112*** (0.037)	0.111*** (0.036)	0.111*** (0.036)
PSNP participation	-0.089** (0.043)	-0.088** (0.043)	-0.088** (0.043)	-0.095** (0.043)	-0.094** (0.043)	-0.093** (0.043)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	6,008	6,008	6,008	6,008	6,008	6,008
Joint test F-statistic (prob>F=0.000)	21.45	21.02	20.83	21.26	20.55	20.63

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2.5b: Fixed effect results for insurance against covariate shocks ¹¹

Outcome variable: Food & consumables consumption per capita (log)	FE: Natural shock (lag)			FE: Market shock		
	SC size	SC divers.	SC memb.	SC size	SC divers.	SC memb.
Natural shock (lag)	-0.343*** (0.075)	-0.239*** (0.063)	-0.158* (0.091)			
Market shock				-0.119** (0.058)	-0.020 (0.044)	-0.231*** (0.074)
Social Capital (size)	0.004 (0.012)			0.012 (0.009)		
Interaction (lag Nshock & SC size)	0.020					

	(0.014)			0.003 (0.011)		
Interaction (Mshock & SC size)						
Social Capital (diversification)	0.003 (0.019)			0.001 (0.015)		
Interaction (lag Nshock & SC divers.)	-0.003 (0.025)					
Interaction (Mshock & SC divers.)				-0.044** (0.018)		
Social Capital (membership)				-0.019 (0.061)		
Interaction (lag Nshock & SC memb.)				-0.093 (0.096)		
Interaction (Mshock & SC memb.)				0.145* (0.076)		
Crop Land size	0.171*** (0.024)	0.171*** (0.024)	0.170*** (0.024)	0.135*** (0.018)	0.133*** (0.018)	0.134*** (0.018)
TLUlivestock	0.002 (0.008)	0.002 (0.008)	0.002 (0.008)	0.005 (0.006)	0.006 (0.006)	0.006 (0.006)
off_farm	0.118*** (0.034)	0.118*** (0.035)	0.119*** (0.034)	0.075*** (0.026)	0.077*** (0.026)	0.079*** (0.026)
Eduhead	-0.007 (0.013)	-0.006 (0.013)	-0.006 (0.013)	0.006 (0.011)	0.006 (0.011)	0.006 (0.011)
CBHI2	0.118** (0.052)	0.117** (0.052)	0.117** (0.052)	0.109*** (0.036)	0.106*** (0.036)	0.110*** (0.036)
PSNP	-0.143** (0.058)	-0.147** (0.058)	-0.148** (0.058)	-0.098** (0.043)	-0.098** (0.044)	-0.096** (0.043)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4,505	4,505	4,505	6,008	6,008	6,008
Joint test F-statistic (prob>F = 0.000)	16.73	16.81	16.63	22.16	21.39	21.96

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The total number of observations is less in the regressions with natural shocks because the regressors include lagged shocks.

Table 2.5c: Fixed effect results for insurance against multiple shocks ¹²

Outcome variable: Food & consumables consumption per capita (log)	FE: multiple- health & economic shocks			FE: multiple- health & (lag) natural shocks			FE: multiple- health & market shock		
	SCsize	SC diver	SC memb	SC size	SC diver	SC memb	SC size	SC diver	SC memb
Multiple - health & economic shock	-0.623*** (0.180)	-0.177 (0.119)	-0.611*** (0.169)						
Multiple – health & lag natural shock				-0.460*** (0.133)	-0.424*** (0.093)	-0.202 (0.137)			
Multiple – health & market shock							-0.530*** (0.130)	-0.266*** (0.082)	-0.457* (0.234)
Social capital (size)	0.008 (0.010)			0.010 (0.011)			0.005 (0.013)		
Interaction (HE shock & SC size)	0.096*** (0.031)								
Interaction (HN shock & SC size)				0.038* (0.022)					
Interaction (HM shock & SC size)							0.053** (0.022)		
Social capital (diversification)		-0.016 (0.018)			-0.011 (0.017)			-0.011 (0.019)	
Interaction (HE shock & SC divers.)		0.030 (0.046)							
Interaction (HN shock & SC divers.)					0.081** (0.034)				
Interaction (HM shock & SC divers.)								0.016	

								(0.030)	
Social capital (membership)			-0.016 (0.050)			-0.047 (0.054)			-0.068 (0.065)
Interaction (HE shock & SC memb.)			0.505*** (0.179)						
Interaction (HN shock & SC memb.)						-0.066 (0.145)			
Interaction (HM shock & SC memb.)									0.234 (0.236)
Crop land size	0.114*** (0.022)	0.115*** (0.022)	0.115*** (0.022)	0.168*** (0.025)	0.169*** (0.024)	0.167*** (0.024)	0.089*** (0.021)	0.089*** (0.021)	0.088*** (0.021)
Livestock (in TLU)	0.012 (0.008)	0.013 (0.008)	0.012 (0.008)	0.003 (0.008)	0.004 (0.008)	0.004 (0.008)	0.007 (0.010)	0.009 (0.010)	0.009 (0.010)
Off-farm participation	0.038 (0.033)	0.043 (0.034)	0.041 (0.033)	0.135*** (0.034)	0.134*** (0.035)	0.136*** (0.035)	0.115*** (0.038)	0.116*** (0.039)	0.117*** (0.038)
Education of HH head	0.022* (0.013)	0.021 (0.013)	0.021 (0.013)	-0.009 (0.013)	-0.008 (0.013)	-0.007 (0.013)	0.020 (0.014)	0.020 (0.014)	0.020 (0.014)
CBHI participation	0.129*** (0.047)	0.133*** (0.048)	0.132*** (0.047)	0.107** (0.052)	0.109** (0.051)	0.107** (0.052)	0.106** (0.047)	0.108** (0.047)	0.109** (0.047)
PSNP participation	-0.103* (0.055)	-0.099* (0.055)	-0.098* (0.055)	-0.147** (0.057)	-0.147*** (0.057)	-0.150*** (0.057)	-0.183*** (0.060)	-0.174*** (0.059)	-0.176*** (0.060)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4,218	4,218	4,218	4,505	4,505	4,505	3,758	3,758	3,758
Joint test F-statistic (prob>F=0.000)	11.44	10.21	11.17	16.54	16.76	16.43	12.38	11.68	11.86

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2.5a provides results consistent with the main results for idiosyncratic shocks. Larger and diversified social networks are associated with protection against a fall in food and consumables consumption in the face of health shock. Larger social networks help to provide the same against economic shock. Table 2.5b also proves the robustness of our main result in connection with insurance against covariate shocks. All forms of social capital are found insignificant in insuring against natural shocks, while membership in local institutions is associated with marginal protection against market shocks. Similarly, Table 2.5c illustrates the robustness of our results concerning insurance in the face of multiple shocks (such as health and economic, health and natural, and health and market shocks), where large social networks are associated with buffering against each. In each robustness, the signs and coefficients of controls are consistent with those of the main models.

2.5.4.2. Robustness check using Fixed Effect Instrumental Variable (FEIV)

To address potential endogeneity that may result from the effect of wealth on network formation, we employed multiple measures in the main estimation. We have controlled both direct and indirect sources of wealth in the rural setting, including cropland size, livestock size (in TLU), off-farm

participation, education, and age. We also used panel data and fixed effect specifications. The fixed effect provides consistent estimates of parameters by sweeping out the effect of time-invariant unobserved factors that determine social capital and the ability to smooth consumption. The inclusion of a time dummy also controls elements of heterogeneity that are common to the villages, particularly those associated with seasonal changes. Despite employing these measures, the possible correlation between time-varying unobservable variables and the variable of interest may not be nullified, and hence causal interpretations remain a challenge. We, therefore, run instrumental variable (IV) regression as a robustness check. Previous studies (Wossen et al, 2016) have shown that people born and raised in the same area have more social connections than their counterparts. We hypothesize that duration of residence in an area is positively associated with his/her social capital. Likewise, a person born in his/her village of residence may have more social connections than otherwise. The use of IV also helps to solve problems of measurement error that may associate with potential households' recall problem in reporting exposure to shocks over the twelve months (Hausman, 2001).

Table 2.6 summarizes the FEIV results. The last row of Tables 2.6a and 2.6b presents the first stage F-tests, demonstrating that the models do not have a weak instruments problem. As we use two instruments for the two endogenous variables, the models are neither over nor under identified. Consistent with the results in the main estimation, large social networks are associated with insurance against health, economic, and multiple shocks (health and economic, and health and market). Diverse networks are related to protection against health shocks and the simultaneous occurrence of health and natural shocks. Similarly, Institutional membership is associated with insurance against market shock and multiple idiosyncratic shocks (Appendix A).

Table 2.6: Robustness check results using Fixed Effect Instrumental Variable (FEIV) ¹³

Table 2.6a: FEIV results when social capital is measured by social network size ¹⁴

Outcome: Total consumption per capita (log)	Health Shock	Economic Shock	Natural Shock (lag)	Market Shock	Multiple – Health & economic	Multiple – Health & Natural	Multiple – Health & Market
Social capital (size) (SCsize)	0.011* (0.007)	0.013** (0.006)	0.007 (0.009)	0.016** (0.007)	0.014* (0.008)	0.012 (0.008)	0.014 (0.010)
Health shock	-0.191*** (0.056)						
Interaction (SCsize & Hshock)	0.024** (0.010)						
Economic shock		-0.257***					

								(0.080)
Interaction (SCsize & Eshock)								0.045***
								(0.015)
Natural shock (lag)								-0.245***
								(0.059)
Interaction (SCsize & Nshock)								0.018
								(0.011)
Market shock								-0.095**
								(0.048)
Interaction (SCsize & Mshock)								0.009
								(0.009)
Multiple – Health & Eco shocks								-0.524***
								(0.140)
Interaction (SCsize & H&Eshocks)								0.088***
								(0.025)
Multiple – Health & Nshocks)								-0.254***
								(0.098)
Interaction (SCsize & H&Nshocks)								0.021
								(0.017)
Multiple – Health & Mshocks								-0.471***
								(0.111)
Interaction (SCsize & HMshocks)								0.066***
								(0.019)
Crop land size	0.109***	0.111***	0.140***	0.111***	0.101***	0.138***	0.072***	
	(0.013)	(0.013)	(0.018)	(0.013)	(0.017)	(0.018)	(0.016)	
Livestock (in TLU)	0.008*	0.008*	0.007	0.008*	0.011*	0.008	0.010	
	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.007)	
Off-farm participation	0.007	0.008	0.002	0.008	0.021**	0.001	0.016	
	(0.008)	(0.008)	(0.009)	(0.008)	(0.011)	(0.009)	(0.010)	
Education of HH head	0.056***	0.055***	0.077***	0.056***	0.034	0.089***	0.088***	
	(0.020)	(0.020)	(0.026)	(0.020)	(0.027)	(0.026)	(0.030)	
CBHI participation	0.093***	0.095***	0.105***	0.092***	0.105***	0.098**	0.093***	
	(0.027)	(0.027)	(0.039)	(0.027)	(0.036)	(0.038)	(0.036)	
PSNP participation	-0.069**	-0.072**	-0.113***	-0.074**	-0.089**	-0.118***	-0.148***	
	(0.033)	(0.033)	(0.043)	(0.033)	(0.043)	(0.043)	(0.047)	
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Number of Observations	6,008	6,008	4,505	6,008	4,218	4,505	3,758	
F test (first stage)	13.38	12.72	19.52	15.16	10.66	14.87	17.15	

*Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Differences in the number of observations are due to the use of lagged and multiple shocks.*

Table 2.6b: FEIV results when social capital is measured by network diversity ¹⁵

Outcome: Total consumption per capita (log)	Health Shock	Economic Shock	Natural Shock (lag)	Market Shock	Multiple – Health & economic	Multiple – Health & Natural	Multiple – Health & market
Social capital diversity (SCdiv)	-0.005	0.004	0.020	0.015	0.004	0.009	0.004
	(0.011)	(0.010)	(0.015)	(0.011)	(0.014)	(0.012)	(0.014)
Health shock	-0.139***						
	(0.040)						
Interaction (SCdiv&Hshock)	0.036**						
	(0.016)						
Economic Shock		-0.063					
		(0.058)					
Interaction (SCdiv & Eshock)		0.016					
		(0.022)					
Natural shock			-0.146***				

				(0.049)			
Interaction (SCdiv & Nshock)				-0.007			
				(0.020)			
Market shock				0.004			
				(0.035)			
Interaction (SCdiv & Mshock)				-0.028*			
				(0.015)			
Multiple –Health &E shocks						-0.121	
						(0.105)	
Interaction (SCdiv & HEShock)						0.028	
						(0.040)	
Multiple –Health &N shocks							-0.242***
							(0.071)
Interaction (SCdiv & HNshock)							0.049*
							(0.028)
Multiple –Health &M shocks							-0.144**
							(0.068)
Interaction (SCdiv & HMshock)							0.021
							(0.026)
Crop land size	0.109***	0.110***	0.139***	0.109***	0.101***	0.138***	0.072***
	(0.013)	(0.013)	(0.018)	(0.013)	(0.017)	(0.018)	(0.016)
Livestock (in TLU)	0.009*	0.008*	0.007	0.008*	0.012*	0.008	0.011
	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.007)
Off-farm participation	0.058***	0.057***	0.076***	0.056***	0.038	0.087***	0.087***
	(0.020)	(0.020)	(0.026)	(0.020)	(0.027)	(0.026)	(0.030)
Education of HH head	0.007	0.007	0.002	0.008	0.020*	0.001	0.016
	(0.008)	(0.008)	(0.009)	(0.008)	(0.011)	(0.009)	(0.010)
CBHI participation	0.095***	0.094***	0.104***	0.091***	0.109***	0.099***	0.097***
	(0.027)	(0.027)	(0.039)	(0.027)	(0.036)	(0.038)	(0.036)
PSNP participation	-0.067**	-0.071**	-0.117***	-0.073**	-0.084*	-0.118***	-0.137***
	(0.033)	(0.034)	(0.043)	(0.034)	(0.043)	(0.043)	(0.047)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	6,008	6,008	4,505	6,008	4,218	4,505	3,758
F test (first stage)	20.63	26.65	11.85	13.75	18.28	19.94	11.29

*Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Differences in the number of observations are due to the use of lagged and multiple shocks.*

2.6. Conclusions and Policy Implications

2.6.1. Conclusions

In this study, we examine the role of informal insurance, measured using various measures of social capital, in protecting against shocks. We use social capital embedded in traditional indigenous informal institutions and show that social capital's roles in protecting consumption in the face of shocks depend on the types of social capital and welfare metrics. The study contributes to the body of literature on informal insurance and covers different forms of social capital with varying levels of resources accessible to rural households.

We approach the subject using multiple social capital and welfare indicators. Social capital, measured by social network size, network diversity, and institutional membership, is associated with varying degrees of protection against health, economic, market, and multiple shocks. A strong social network (indicated by larger network size) is associated with insurance against health, economic, market, and multiple shocks (concurrent health and economic shocks, and the co-occurrence of health and market shocks). Diverse networks are related to insurance against health shock and marginal insurance against multiple shock (health and natural shocks). Membership in local institutions is associated with protection against market shock and the co-occurrences of health and economic shocks. The findings are robust under alternative estimations, fixed effect and fixed effect instrumental variable, as well as for total consumption per capita and food and consumables consumption per capita.

The results show that social capital embedded in local informal institutions is important in protecting rural households in the absence of (or with limited access to) a formal insurance market. Protection goes beyond idiosyncratic shocks and covers multiple and simultaneous shocks.

2.6.2. Policy Implications

We draw the following policy implications. One, policymakers and authorities interested in rural insurance should understand the power of informal resources inherent in local informal institutions to make amicable and impactful insurance-related interventions. Local informal institutions, typically founded without the interference of other organizations such as government authorities and NGOs and have lasted for decades at the will of their members, are rich in resources, values,

and norms, and can serve as a footstep in expanding insurances. Second, policies that aim to mitigate rural food insecurity and rural development challenges need to align formal intervention programs with indigenous institutions. Specifically, formal social protection programs can be implemented through informal traditional institutions, through which challenges related to selection, information asymmetry, and corruption will be mitigated. Supporting the existing informal institutions and aligning formal intervention programs with them may remain mandatory as the reach of formal schemes for rural poor, according to Clarke and Dercon (2009) and Panda et al. (2020), is lagging long due to constraints in the general financial system such as information asymmetry, transaction costs, enforcement constraints, and ambiguity aversion. Third, researchers and practitioners must understand the nuances of social networks ingrained in traditional institutions besides availability and participation. Network diversity and size are essential aspects that must be considered, implying availability of social networks does not necessarily guarantee society's benefit from the networks, but the benefits depend on the size and diversity of the network.

2.7. References

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2.8. Appendices

Appendix A:

Table 1.6c: Results from FEIV, when social capital is measured by membership in institutions. ¹⁶

Outcome: Total Consumption per capita (log)	Health Shock	Economic Shock	Natural Shock (lag)	Market Shock	Multiple – Health & economic	Multiple – Health & Nshock	Multiple – Health & market
Social capital (membership)	-0.007 (0.037)	-0.017 (0.034)	0.003 (0.048)	-0.035 (0.038)	0.040 (0.040)	-0.004 (0.041)	-0.006 (0.050)
Health shock	-0.079 (0.073)						
Interaction (Scmemb &Hshock)	0.011 (0.076)						
Economic shock		-0.214 (0.156)					
Interaction (Scmemb &Eshock)		0.192 (0.158)					
Natural shock (lag)			-0.139* (0.072)				
Interaction (Scmemb &Nshock)			-0.021 (0.075)				
Market shock				-0.166*** (0.063)			
Interaction (Scmemb &Mshock)				0.130** (0.065)			
Multiple – Health & Econ shock					-0.589** (0.244)		
Interaction (Scmemb &Heshock)					0.536** (0.248)		
Multiple – Health & Natu. Shock)						-0.135 (0.122)	
Interaction (Scmemb&Hnshock)						-0.010 (0.126)	
Multiple – Health & market shock							-0.403** (0.205)
Interaction (Scmemb &Hmshock)							0.312 (0.208)
Crop land size	0.108*** (0.013)	0.109*** (0.013)	0.139*** (0.018)	0.110*** (0.013)	0.101*** (0.017)	0.137*** (0.018)	0.071*** (0.016)
Livestock (in TLU)	0.009* (0.005)	0.008* (0.005)	0.007 (0.006)	0.008* (0.005)	0.011* (0.006)	0.008 (0.006)	0.012 (0.007)
Off-farm participation	0.058*** (0.020)	0.058*** (0.020)	0.077*** (0.026)	0.059*** (0.020)	0.038 (0.027)	0.089*** (0.026)	0.089*** (0.030)
Education of HH head	0.007 (0.008)	0.008 (0.008)	0.003 (0.009)	0.008 (0.008)	0.020* (0.011)	0.002 (0.009)	0.016 (0.010)
CBHI participation	0.094*** (0.027)	0.093*** (0.027)	0.105*** (0.039)	0.093*** (0.027)	0.108*** (0.036)	0.098** (0.038)	0.096*** (0.036)
PSNP participation	-0.068** (0.033)	-0.070** (0.034)	-0.117*** (0.043)	-0.072** (0.034)	-0.084* (0.043)	-0.121*** (0.043)	-0.139*** (0.047)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	6,008	6,008	4,505	6,008	4,218	4,505	3,758
F test (first stage)	35.73	34.59	24.26	35.59	24.17	24.40	19.34

Note: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Differences in the number of observations are due to the use of lagged and multiple shocks.

Appendix B: Results of mean difference test

Mean difference test in consumption, because of exposure to shocks

Mean consumption

Type of shock	Affected HHs	Non-affected	Difference	Test result
Health	7.46	7.59	0.14	0.00
Economic	7.48	7.57	0.08	0.00
Natural	7.57	7.55	-0.02	0.36
Market	7.49	7.59	0.10	0.00
Health & Economic	7.36	7.60	0.23	0.00
Health & Natural	7.44	7.58	0.14	0.00
Health & Market	7.39	7.61	0.22	0.00

Appendix C: Share of households affected by the same type of covariate shock, by sample woreda

Natural shock

Occurrence	Woreda																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
0	299	335	214	187	153	219	158	198	315	308	233	225	301	226	280	249	3,900
1	61	45	166	173	223	157	226	194	65	80	167	175	87	122	112	135	2,188
Percent	0.17	0.12	0.44	0.48	0.59	0.42	0.59	0.49	0.17	0.21	0.42	0.44	0.22	0.35	0.29	0.35	0.36
Total	360	380	380	360	376	376	384	392	380	388	400	400	388	348	392	384	6,088

Market shock

Occurrence	Woreda																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
0	294	320	207	238	224	254	173	107	341	319	321	291	164	197	221	247	3,918
1	66	60	173	122	152	122	211	285	39	69	79	109	224	151	171	137	2,170
percent	0.18	0.16	0.46	0.34	0.40	0.32	0.55	0.73	0.10	0.18	0.20	0.27	0.58	0.43	0.44	0.36	0.36
Total	360	380	380	360	376	376	384	392	380	388	400	400	388	348	392	384	6,088

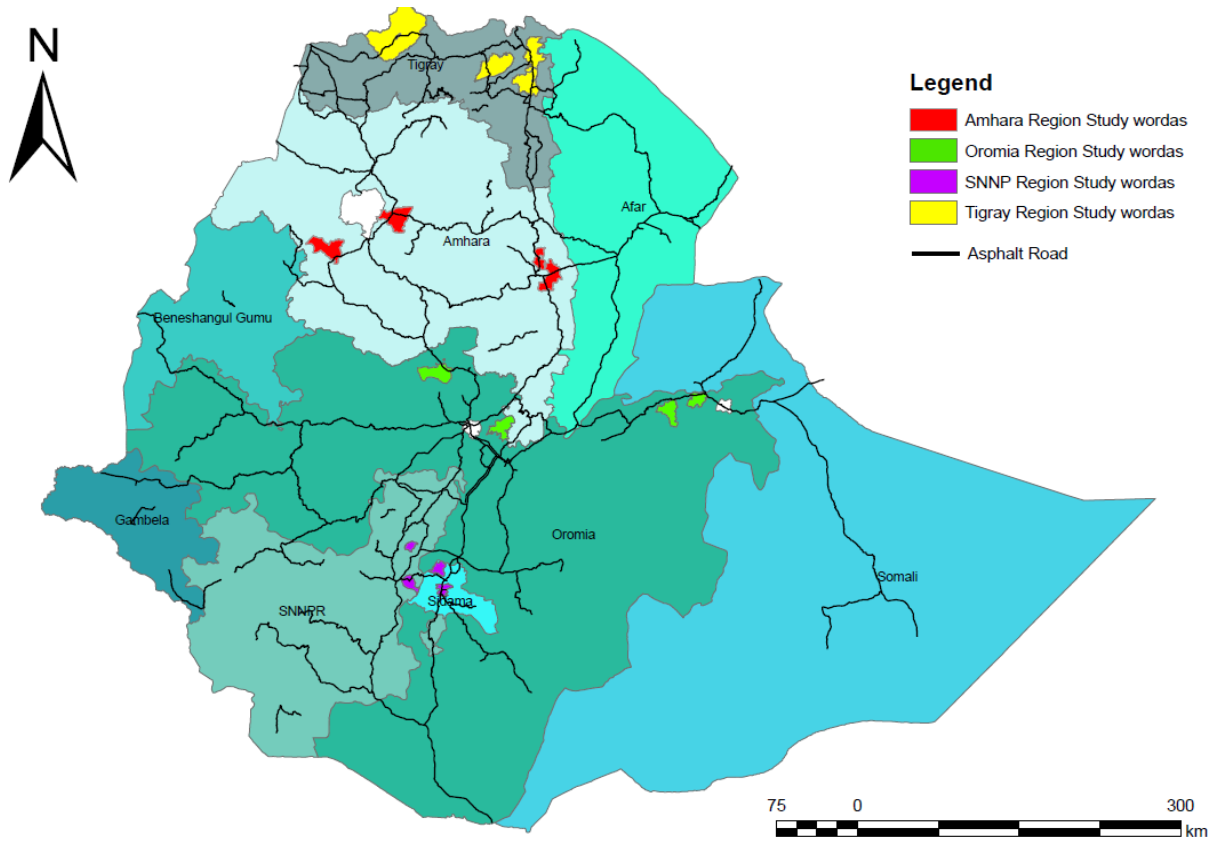
Appendix D: Selection bias test results, in relation to missingness

Results from logit model showing missingness are unrelated to our key variables and unlikely to bias our estimates

In regression variables	Coefficient	Std. err.	Z	P>z	[95% confidence interval]	
Health Shock	0.24	0.70	0.34	0.73	-1.13	1.62
Natural shock	0.91	0.71	1.27	0.20	-0.49	2.31
Economic shock	0.77	1.07	0.72	0.47	-1.32	2.87
Market shock	0.32	0.67	0.48	0.63	-1.00	1.64
Social capital variable	-0.34	0.27	-1.27	0.20	-0.86	0.18
Crop land size	-0.28	0.25	-1.16	0.25	-0.76	0.20
Livestock (in TLU)	-0.03	0.07	-0.45	0.65	-0.18	0.11
Off-farm	-0.40	0.66	-0.60	0.55	-1.69	0.90
Education of HH head	0.03	0.10	0.32	0.75	-0.17	0.24
CBHI participation	Omitted due to collinearity					
PSNP participation	0.99	1.13	0.87	0.38	-1.23	3.21
Year	Omitted due to collinearity					

Note: The insignificances show that the missingness is random and does not bias the results.

1 Appendix E: Figure 2.1. Study site map



Source: Authors' construction using location of study wordas

Chapter Three

Intergenerational Transmission of Prosocial Attitudes: Evidence from Developing Countries

(Paper presented at CSAE Conference 2025: Economic Development in Africa. 23-25 March 2025, St Catherine's College, University of Oxford, Oxford, UK)

Abstract

Despite its increasing importance in economics literature, much is not known about the formation of prosocial attitudes. This study provides evidence about the intergenerational transmission of prosocial attitudes using Young Lives panel data from three developing countries: Ethiopia, India, and Vietnam, comprising children and parents observed for over eight years and with more than 7,000 observations. Results show that prosocial attitudes are transmitted from parents to children through parents' socialization actions, with heterogeneity in transmission between countries. Child prosocial attitude is associated with the attitudes of parents in Ethiopia, but no evidence of association in India and Vietnam samples. The outside-family social environment is also strongly associated with the prosocial attitude of children, indicating the influences of peers and school in attitude formation. Individual countries' evidence about the influence of outside family social environment on child prosocial attitude shows mixed results, showing negative results for the Ethiopia sample but positive for India. Both the transmission from parents to children and the influence of outside-family social environment show no heterogeneity based on the child's gender and location of residence (rural-urban), but heterogeneous based on the child's mother and father ethnicity and religion similarity. The results are robust across alternative estimations and measurements. Interventions targeting personality development in childhood and adolescence, therefore, should account for both within and outside family social environments. Parents need to be mindful of their behaviors and actions at home, while schools and the community should be conscious about the values and ethics in their environment. Moreover, governments and schools should devise strategies that can prevent the possible transmission of delinquent behaviors from parents to children.

Keywords: *Prosocial attitude, Intergenerational Transmission, within-family social interaction, Outside-family Social Environment*

3.1. Introduction

The economic importance of non-selfish human behavior came into focus following empirical work in behavioral and experimental economics. Classical economics has praised the selfishness of human beings and neglected the non-selfish possibilities, although the matter was silently acknowledged even in antiquity. The following quote from the Theory of Moral Sentiments by Adam Smith (1790:3) shows recognition of the matter by that time. “How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it, except the pleasure of seeing it”.

Recent literature shows that human personality and attitudes are crucial determinants of individual choices and outcomes in many domains of life. Prosociality, which is defined as other-regarding preferences (altruistic attitudes), is particularly an important aspect of personality. It determines a wide range of economic decisions and outcomes such as the provision of public goods, labor market success, well-being, and investment in risky assets (Frey and Meir, 2004; Dohmen et al., 2012; Becker et al. 2012; Deming, 2017; Dhar et.al., 2019; Kosse et al.,2020; Kosse and Tincani, 2020). Despite its importance, much is not known about how prosociality is formed. Evidence specific to the formation of prosocial attitudes in children, particularly in the context of developing countries, is exiguous. To this end, this study addresses key factors affecting the formation of prosocial attitudes in childhood and adolescence, focusing on the roles of parents, peers, and schools. Transmission of the attitude from parents to children, the role of outside family social environments, and whether the transmission varies depending on child and parental characteristics are central to the study.

Evidence about the transmission of attitudes and preferences evolves along the lines of nature vis-à-vis nurture⁸. Empirical works in economics emphasize nurture, where a person’s social environment plays a crucial role in shaping his/her attitudes and preferences. Individual attitudes are influenced by the attitudes of parents, role models, and social interactions. Prosocial behavior evolves from intrinsic infant behavioral actions to adult-level maximization decisions. It emerges from day-to-day affective social interaction in which the helpless neonatal becomes a helpful

⁸ *Genetic aspects of the transmission are discussed in Fehr and Fischbacher (2003), Kosfeld et al. (2005), and Cesarini et al. (2008, 2009).*

toddler through encouragement and guidance from caregivers (Dahl and Brownell, 2019). Home and social environments with various motives then come in and take part in shaping the behavior of a child in childhood and later ages of life.

For our empirical strategy, we employ Bisin & Verdier (2001) and consider that the prosocial attitude of children in childhood and adolescence may be formed by direct vertical socialization and oblique socialization. In other words, the formation can be through interaction within a family where parents' socialization actions influence a child's prosocial attitude either as a prosocial attachment figure or as altruistic object with imperfect empathy and power of control over the child and/or through socialization outside the family where imitation and learning mainly through interaction with the environment outside the family such as peers and school shape the child's attitudes.

Besides the limited literature in the area, a few studies show the transmission of attitudes, preferences, and traits from parents to children, and the essential role outside family environments play in attitude formation. Dohmen et al. (2012), using the German Socio-Economic Panel Study, show not only that risk and trust attitudes are transmitted from parents to children, but also that attitudes in the local environment also affect children's attitudes. Another study by Zumbuehl et al. (2021) using the same data finds that parental involvements are passively associated with children's favorable attitudes and traits. Sepahvand and Shahbazian (2021) replicated Dohmen et al (2012) using data from Burkina Faso and present evidence of intergenerational transmission of risk attitudes from parents to children. From a representative Danish survey, Brenoe and Epper (2022) find that patience is substantially transmitted from parents to children, with a mediating role of parenting styles in the intergenerational transmission of time preferences. A large-scale experimental study by Chowdhury et al. (2022) in rural Bangladesh finds that parents' risk, time, and social preferences are significantly positively correlated with their children's economic preferences.

Evidence related to the transmission of Cognitive and Non-cognitive abilities from parents to children shows strong mother-son and father-son correlation of abilities, which further associates with children's educational and labor market outcomes (Gronqvist et al., 2017). Studies about the transmission of gender attitudes in a setting of high discrimination against women and girls show mixed results. Dhar et al. (2019) provided evidence of transmission of discriminatory gender

attitude from parents to children in India, while Leight (2021) showed no evidence of intergenerational transmission of male-dominance decision making between the natal households and the current marital households in rural Ethiopia. A study by Kosse et al. (2020) on transmission as a means of formation of prosocial attitudes shows that prosocial attachment figures (prosocial individuals with a close social connection to the child, mainly parents) and intense social interactions are the main drivers of child prosociality. Agostinelli et al. (2020) also document the increasing role of outside family social environments, especially at the child's adolescence. As children reach adolescence, peer interactions become increasingly central to their attitude development, with a decreasing direct influence of parents. A prominent work by Bisin and Verdier (2001) regarding cultural transmission and preference dynamics between generations provides empirical foundations specific to the role of social environment in attitude formation. These and other previous studies, however, focus on a single country context and on transmission of risk, time, social and economic preferences, and traits. Very few present transmissions of prosocial attitudes, and almost none provide cross-country evidence about prosocial attitude formation in children. Moreover, evidence specific to prosociality in the context of developing countries is scant.

In this study, I present cross-country and individual-country evidence about the intergenerational transmission of prosocial attitudes and the role of outside family social environment in attitude formation in children using Young Lives panel data from three developing countries: Ethiopia, India, and Vietnam. Young Lives data⁹ is one of the richest datasets of the developing world, having information on parents and children from a longitudinal survey of over twenty years. We use child surveys of the Young Lives data, particularly the older cohorts (those born in 1994/5), and focus on children between the ages 8 and 15 observed in three rounds of the surveys: round 1 at age 8, round 2 at age 12, and round 3 at age 15. Information from about 1000 children in each of the countries was followed up for three rounds (over eight years), with a total of more than 7,000 observations used in this study. It is necessary to deal with the transmission of behavior and attitudes from parents to children over these developmental stages, as the socialization of children in childhood and adolescence is not only vertical but also oblique socialization. The interaction

⁹ Details about the data can be accessed from <https://ukdataservice.ac.uk>

between the two socializations and their relative strengths determines the behaviors of children in childhood and adolescence.

Unlike cognitive development interventions, which are effective in early childhood, mostly before age three (Heckman and Mosso, 2014), behavioral interventions are expected to persist over childhood, adolescence, and even into adulthood. We consider only the transmission from parents to children in childhood and adolescence, mainly because oblique socialization through peer interaction becomes increasingly central at these stages, and the direct influence of parents may wane as children surpass adolescence (Agostinelli et al. 2020). We combine childhood and adolescent data to see the association between parental attitudes and children's attitudes without neglecting the possible effects of the child's environment (peer and school interactions). We excluded other rounds of surveys at adulthood (ages 19, 22, and more) partly because family and children's behaviors were lacking from the data, and due to the declining direct role of parents at this stage of development.

The study has at least three contributions to literature. One, it fills the gap in literature about the formation of attitude in the context of developing countries by providing evidence that supports nurture-based transmission with a greater role of social environments, contrasting evidence on only genetically based transmissions. Two, the novelty of using cross-country data from developing countries in two continents, Africa and Asia, makes the study among the very few, if not the first, cross-country studies that present evidence from multiple countries regarding prosocial attitude formation in children. Furthermore, the study generates evidence from longitudinal observations and adds to the existing limited studies that solely rely on the German Socio-Economic Panel Survey. Other previous studies about attitude formation are either cross-sectional or experimental. The use of longitudinal data is expected to add another dimension of evidence by capturing not only the overtime dynamics in the attitudes of parents and children but also changes in other household and community characteristics shaping the attitude formations. Furthermore, given the fact that Young Lives surveys are an international study of childhood

poverty, the data may provide additional evidence about whether the fortune of childhood poverty¹⁰ affects prosocial attitude transmission differently.

Estimation results of the cross-country sample show that prosocial attitudes are transmitted from parents to children. The outside family environment is also significantly associated with the child's prosocial attitude. The individual countries' estimations show that intergenerational transmission of prosocial attitudes is not guaranteed across, rather it varies across cultures and societies. Parents' prosocial attitudes are associated with those of the children in the Ethiopia sample, while the association is not significant for the India and Vietnam samples. The mixed results may be attributed to the difference in parenting styles and the hidden within-family black boxes across countries and regions. *Moreover, fast economic growth in India and Vietnam, which may not necessarily be captured by the wealth index (as control), may explain the insignificance in transmission from parents to children.* The outside family environment exhibits similar results, where it is associated with prosocial attitude formation in children, showing both negative and positive associations depending on country contexts. The results imply that interventions targeting personality development, particularly prosocial attitudes, should emphasize both within and outside-family social environments.

This paper proceeds as follows. In section two, I present data and description with some background about the Young Lives data and the sampling in the three countries considered for this study. In section three, I present the theoretical and empirical strategy of the study, describing more on theories and models of cultural transmission based on the works of Basin Verdier (2001). Section four provides results and discussions of the main model together with those from alternative estimations as robustness checks. Heterogeneity in transmission based on child gender, location of residence, and parents' ethnicity and religion similarity is also presented in section four. Section five concludes and provides the implications of the study.

¹⁰ Childhood poverty refers to “growing up without access to sufficient financial and natural resources, health services, education, supportive family and community structures, and safe environments to ensure survival, development, and quality of life” (Young Lives project, UK Data Archive Study Number 5307, round 1 methodology)

3.2. Data and Description

3.2.1. Data

The study uses three rounds of Young Lives data: the child surveys round 1, round 2, and round 3, accessible from UK Data Archives, ODID, University of Oxford. The Young Lives project is a long-term international research project investigating the changing nature of childhood poverty in four developing countries (Ethiopia, India, Peru, and Vietnam) for more than 20 years in connection with the assessment of progress towards the Millennium Development Goals (MDGs). The four countries' samples are considered to have large geographic coverage and merit of diversity despite their skewness to children living in poverty as per the project's aim¹¹. In this study, Peru's data is not used mainly because it covered smaller samples than the targets initially identified (fewer than 700 children out of the expected 1000) and partly due to relatively high attrition in the sample. A brief description of the sample used in this study from the remaining three countries is presented as follows¹².

The Ethiopian sample covers four regions of the country, namely: Oromia, Amhara, the then SNNP, and Tigray; and one city administration (Addis Ababa), where the regions together account for 96 percent of Ethiopia's population. The sample covers three to five districts (woreda) from each region and at least one PA (kebele – lower administrative unit) from each district. A total of 20 sentinel sites and 50 children born between April 1994 and June 1995 were included from each sentinel site (PA or Kebeles). The India sample is from two states, Andhra Pradesh & Telangana, and four regions in Andhra Pradesh state, namely Srikakulam, Prakasam, Vizayanagaram, and one urban site. About three to four districts are included from each state, and about one to five sentinel sites are covered from each district, with a total of 20 sentinel sites and 50 households/children from each sentinel. The Vietnam sample covers five regions, namely: the North-east region, Red River delta region, South-central coast region, Mekong River delta region, and a city (Da Nang). One province from each region and four sentinel sites in each province, with a total of 20 sentinel sites, and 50 children from each sentinel site are included.

¹¹ Details about the samples and methodology including a description of the focus on children in poverty can be accessed from each country's survey reports, accessed from <https://ukdataservice.ac.uk>)

¹² Details about the sampling and survey design of the Young lives longitudinal survey can be accessed from the project's official page <https://www.younglives.org.uk> or https://www.younglives.org.uk/sites/default/files/migrated/GuidetoYLResearch_0.pdf

Attrition in the Young Lives Survey for older cohorts excluding deaths is 1.8 for rounds 1 to 2 and 1.2 for rounds 2 to 3, with some degree of variation between countries. The overall attrition, including deaths for older cohorts from rounds 1 to 3, is 2.9 for Ethiopia, 3.2 for India, and 2.4 for Vietnam, showing low attrition in the survey, and yet the major components of the attrition are non-random (Barnett et al., 2013; Young Lives, 2017).

Information on child and parent prosocial attitudes, the outside family social environment, and other relevant controls are extracted from young lives data of the countries. The Young Lives survey has various modules, among which are modules comprising measures of prosocial attitudes and children's interaction with the outside family social environment. Child's prosocial attitude is constructed as an index from the following measures, measured on a Likert Scale measurement: the child's action of helping others in school/work, discussing with others or taking action about problems affecting the community, and looking for information about problems affecting the community.

Similarly, Family (parent) prosocial attitude is constructed as an index from the following information in the survey (measured on Likert scale): household's involvement (the household head or any member of the household) in the last five (three) years in terms of - talking to others in the community about problems affecting the community, voting in national election, voting in local elections, taking actions with others about problems affecting the community, and actively participated in an awareness creation campaigns. The outside family social environment is constructed as an index from responses by the child (on Likert Scale) to the following assertions regarding the child's peer and school social capital. The measures include "my friends look up to me as a leader", "my friends include me in games at school", "other children in my class treat me with respect", "pupils in my class never tease me at school", "my teacher treats me worse than other children", "find it hard to talk to other children in class/at work", "at the shops I am treated with fairness", and "adults in my street treat me worse than other children of my age". To reduce the potential contamination between the outside family social environment variable and family prosocial variable, parents' social capital, measured in terms of their network in the community, is included as a control. In all cases, the index construction is made using Principal Component Analysis. The simple average index is also constructed to use for a robustness check.

3.2.2. Descriptive statistics

Figures 3.1 to 3.3 present the distribution of child prosocial variables, family prosociality, and outside-family social environment variables across countries and cohorts. The figures show that the means of prosocial indices have variation across cohorts and countries, possibly indicating the expected behavioral dynamics of children over development ages and the corresponding attitude changes of the family in response to life dynamics, possibly related to economic and non-economic factors. The outside family social environment also exhibits dynamic patterns across cohorts and countries. The figures show that the three variables do not necessarily follow the same pattern across cohorts and countries. Child and family prosocialities of the three countries' samples, for instance, exhibit varying patterns between cohorts, where the largest average child prosocial index is registered at the age of 12 for Ethiopia and at the age of 8 for India and Vietnam samples. Child's outside-family social environment patterns also show variation between countries, with slight heterogeneity between cohorts of the same country.

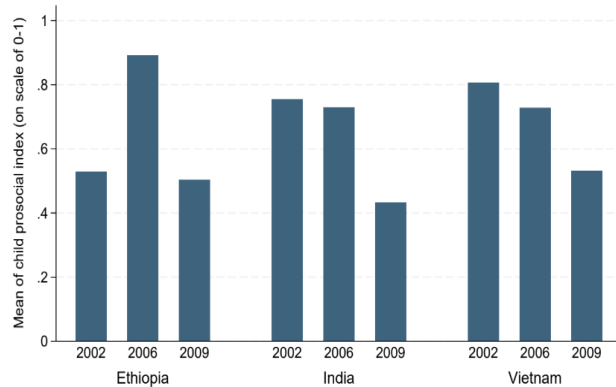


Figure 3.1: Child prosociality (average) over years, by country

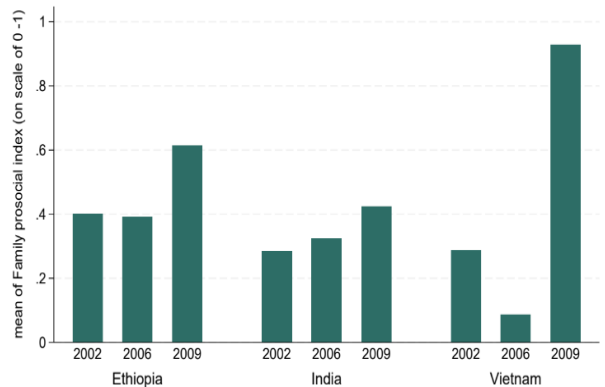


Figure 3.2: Family prosociality (average) over years, by country

2Figure 3.1: Child prosociality (average) over years, by country

3Figure 3.2: Family prosociality (average) over years, by country

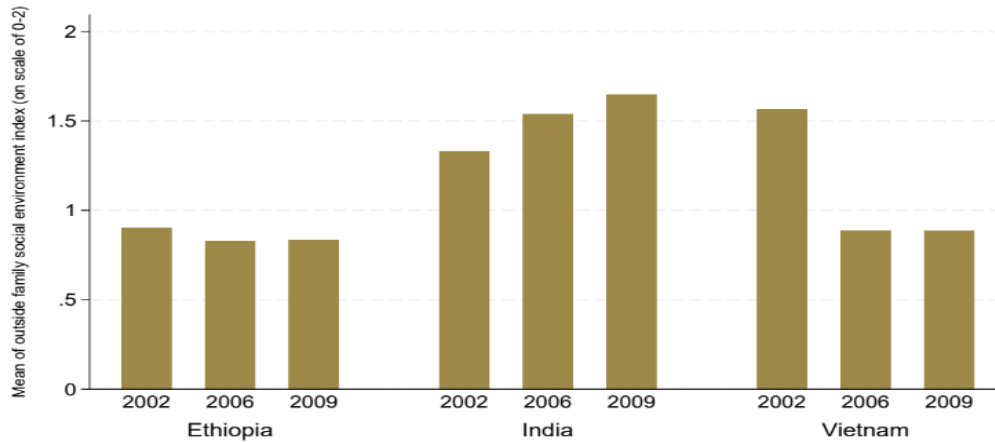


Figure 3.3: Outside-family social environment (average) over years, by country

4 Figure 3.3. Outside family social environment (average) over years, by country

Source: Author's computation from the survey data

Table 3.1 shows descriptive statistics of covariates, focusing on child, household, and community characteristics. The average household size in the three sample countries is greater than five, reaching a maximum of 26 household members in a single family in India, and about 16 and 17 in Ethiopia and Vietnam, respectively. The large family characteristics of the households in the sample countries may signal that within-family social interaction is likely important in shaping the behavior and attitude of children in these countries. Family disruption data constructed from parental (or any household member) death, divorce, and separation experiences in a household show that about 23 percent, 14 percent, and seven percent of the children in Ethiopia, India, and Vietnam, respectively, have faced family disruption before or during the survey periods. Family disruption may affect children's attitude formation, as those disruptions may correlate with behavioral changes of the survivors. The wealth index data shows that households in the India and Vietnam samples are, on average, at the medium wealth status, whereas the Ethiopian samples are dominated by poor households. Parents' social networks in Ethiopia are higher but moderate (average) for the India and Vietnam samples.

Male and female samples are almost proportional in the sample countries, and the sample children are in a relatively good health condition, with a reported health status of "at least as good as other children in their community". The child schooling data shows that the sample children were either late in joining school or outside school in the Ethiopian sample, while they are at the expected school level in the India and Vietnam samples. The education level of caregivers and that of fathers,

on average, is below primary education for the Ethiopia and India samples, while it is above primary for the Vietnam sample. Almost all the caregivers in Ethiopia and India samples are in the no education category. Only about 27 percent of the total sample households are living in urban areas, with a large dominance of rural households in all three countries, amounting to about 62 percent, 76 percent, and 81 percent in Ethiopia, India, and Vietnam, respectively. The spouses are almost from the same ethnicity in the India and Vietnam samples, while some sort of variation exists in the Ethiopia sample (about 12 percent). The difference in religion of the parents (mother and father) is negligible across the whole sample, ranging from no difference in India to about four percent in Vietnam. The media access is high for the Vietnam sample, while it is moderate for the others. Radio is the dominant media in the Ethiopia sample, while TV takes the lead for the remaining countries' sample (Table 3.1).

Table 3.1: Descriptive statistics of main controls ¹⁷

VARIABLES	ALL	ETHIOPIA				INDIA				VIETNAM			
	Mean	Mean	SD	Mn	Mx	Mean	SD	Mn	Mx	Mean	SD	Mn	Mx
Household size	5.53	6.56	2.07	2	16	5.27	1.94	2	26	4.81	1.41	2	17
Household wealth (index)	0.43	0.29	0.18	0	0.86	0.46	0.20	0.01	0.93	0.52	0.20	0.01	0.97
Parents' ethnic difference	0.05	0.12	0.33	0	1	0.01	0.08	0	1	0.03	0.17	0	1
Parents' religion differences	0.02	0.02	0.14	0	1	0.00	0.05	0	1	0.04	0.20	0	1
Child schooling (grade)	4.37	3.08	2.64	0	11	5.00	2.86	0	12	4.99	2.83	0	11
Parent social capital	0.67	0.90	0.30	0	1	0.54	0.50	0	1	0.58	0.49	0	1
Family disruption	0.13	0.22	0.42	0	1	0.13	0.34	0	1	0.05	0.21	0	1
Bad event	0.37	0.50	0.50	0	1	0.27	0.44	0	1	0.34	0.48	0	1
RADIO ownership	0.31	0.52	0.50	0	1	0.14	0.35	0	1	0.28	0.45	0	1
TV ownership	0.49	0.16	0.36	0	1	0.47	0.50	0	1	0.83	0.38	0	1
MOBPHONE ownership	0.23	0.12	0.33	0	1	0.27	0.44	0	1	0.30	0.46	0	1
Media Access	0.68	0.56	0.50	0	1	0.58	0.49	0	1	0.89	0.32	0	1
Child Health	1.31	1.28	0.64	0	2	1.44	0.62	0	2	1.20	0.68	0	2
Rural-urban	0.27	0.38	0.48	0	1	0.24	0.43	0	1	0.19	0.39	0	1
Care giver education	0.85	0.51	0.76	0	3	0.50	0.78	0	3	1.51	0.75	0	3
Father education	1.12	0.77	0.89	0	3	0.91	0.98	0	3	1.66	0.73	0	3
Child sex proportion	0.50	0.52	0.50	0	1	0.49	0.50	0	1	0.49	0.50	0	1
N	7,125	2,308				2,396				2,421			

Source: Author's computation from the survey data

3.3. Theoretical and Empirical Strategy

We base our theoretical framework on cultural transmission theories from the works of Cavalli-Sforza and Feldman (1981) and Bisin and Verdier (2001) who modeled how cultural traits can be acquired through learning and other forms of social interaction. Cultural transmission occurs through direct vertical socialization (describes the role played by parents) and oblique socialization (referring to imitation and learning behaviors mainly through interactions with the environment outside the family). Unlike genetic factors that often evolve and are transmitted to generations through biological evolution, cultural and behavioral factors such as attitudes, beliefs, and preferences are transmitted across generations through socialization.

Following Bisin and Verdier (2001), we consider that children acquire traits through their parents' socialization choices and by learning from the social environment in which they grow up. Child's prosocial attitude is the result of the interaction of socialization inside the family (“direct vertical socialization”) and socialization outside the family (“oblique socialization”).

Suppose there are two possible types of social behavior, prosocial and non-prosocial, in a population to which the child is exposed. Let the two possible types of behavior be denoted as $\{b_1, b_2\}$. The fraction of individuals in a community with behavior $u \in \{b_1, b_2\}$ is q^u . Considering a family composed of a parent and a child, we assume all children are born without defined preferences of behavior and are first exposed to their parents' behavior.

Direct vertical socialization to the parent's behavior, say u , occurs with a probability of $d^u(q^u)$. If a child from a family with behavior u is not directly socialized, which occurs with a probability $1 - d^u(q^u)$, the child takes the behavior of a role model chosen randomly in a population to which the child is exposed (can be school or peer). i.e, the child picks behavior u with a probability q^u and behavior $v \neq u$ with probability $q^v = 1 - q^u$.

Let P^{uv} denotes the probability that a child from a family with behavior u is socialized to behavior v . By the law of large numbers, P^{uv} will also denote the fraction of children with a type u parent who prefer type v behavior. The socialization mechanism is, thus, characterized by the following transition probabilities:

$$P^{uu} = d^u(q^u) + (1 - d^u(q^u))q^u \quad (1)$$

$$p^{uv} = (1 - d^u(q^u))(1 - q^u) \quad (2)$$

For all $u, v \in \{b_1, b_2\}$

The dynamics of the fraction of the population with behavior u is then characterized by¹³ :

$$\dot{q}^u = q^u(1 - q^u)[d^u(q^u) - d^v(1 - q^u)] \quad (3)$$

This is the basic equation in this paper for the dynamics of prosocial behavior in terms of transmission of prosocial attitude from parent (and or) outside-family social environment to child.

On top of the condition that the distribution of behavior in the population will converge to a non-degenerate distribution (convert to prosocial community behavior), whether vertical transmission and oblique transmission (social environment) are substitutes or complements can have different implications for the dynamics of prosocial behavior. Because our study considers children between the ages of 8 and 16, who are at a stage of high oblique socialization, we assume a substitution between vertical prosocial behavior transmission and oblique transmission¹⁴.

Now, we turn to the endogenous behavioral transmission mechanism, which asserts that parents take actions to socialize their children. Such actions determine $d^u(q^v)$ in the main equation. Assuming imperfect empathy in the sense that parents are biased toward their preferences and do not evaluate the child's action with the child's utility function, parents socialize children to a specific behavioral model that they think will increase the child's welfare implying an altruistic behavior of parents whose utility stems from the evaluation of the child's action with own desired preferences even if the child may turn out to have a different preference. To further justify the possibility of direct socialization by parents, we consider the parents' power of control over the inputs accessible to the child. Parents have control over inputs such as time spent with the child, behavioral and cultural homogeneity of the neighborhood in which the family resides, and the school to which the child is sent¹⁵. It should be noted, however, that the direct socialization model

¹³ Assuming the dynamics in continuous time limit, meaning continuous time approximation can be derived, for instance, from an economy with overlapping generations of agents living t units of time and having children $1 - h$ units of time after birth, by taking the limit for $t, h \rightarrow 0$, with $\frac{h}{t} \rightarrow 0$.

¹⁴ Details about the definition of substitution and the proof based on cultural transmission are in Bisin & Verdier (2001).

¹⁵ Though generally possible, the school choice may not occur for our rural sample as well as urban less developing countries where access to alternative schools is almost impossible or involves higher cost of relocation resulting from distance to the alternative.

does not rule out the possible effects of outsiders' behavior on the child's preference. Hence, our empirical model also considers the effects of the child's social environment (constructed from peer and school social capital of the child) on the child's behavior/attitude.

Our main specification to measure the average relationship between parents and children, as well as the outside-family social environment and children, is as follows:

$$ChildPros_{ict} = \alpha_0 + \beta_1 FamilyPros_{ict} + \beta_2 OutsideFamEnv_{ict} + \sigma Z_{ict} + \gamma X_i + \varepsilon_{it} \quad (4)$$

In equation (4), the outcome $ChildPros_{ict}$ is a prosocial index of child i in country c at period t , which is constructed from three variables included in the survey and used as a measure of child prosocial attitude. These include the child's action of helping others in school/work, discussing with others or taking action about problems affecting the community, and looking for information about problems affecting the community. The key regressor $FamilyPros_{ict}$ is a prosocial index of the family/parent of the child, constructed from the following information in the survey and measured on Likert scale measurements. These include the household's involvement (the household head or any member of the household) in the last five (three) years in terms of talking to others in the community about problems affecting the community, voting in national election, voting in local elections, taking actions with others about problems affecting the community, and actively participated in an awareness creation campaigns. The $OutsideFamEnv_{ict}$ is the outside family social environment index to which the child is exposed, constructed from the child's peer and school social capital. It measures the social environment of the child that includes the child's perception about the attitudes of others concerning his/her social condition among peers, in school, and in the community¹⁶. It is constructed from responses, measured on Likert scale, to assertions such as my friends look up to me as a leader, my friends include me in games at school, other children in my class treat me with respect, pupils in my class never tease me at school, my teacher treats me worse than other children, find it hard to talk to other children in class/at work, at the shops I am treated with fairness, and adults in my street treat me worse than other children of my age. To reduce the potential contamination between the outside family social environment variable

¹⁶ One may present that the outside-family social environment affects the family prosocial attitude. I, however, don't want to take part in the argument and attempt to show independence between the two. Rather, mention the curiosity taken in data by only considering the child's social capital in school and among peers and further control the parents' social capital. Correlation between the two, if certain, also poses no challenge to our analysis.

and family prosocial variable, parents' social capital measured in terms of their network in the community is included as a control.

The child prosocial variable, family prosocial variable, and outside family social environment variable are constructed from the respective measures using Principal component Analysis. The simple average index is also constructed to use it for robustness check. Principal component analysis (PCA) reduces the dimensionality of interrelated variables while maintaining the variation b/n them and forms new variables as a linear combination of components (Jolliffe, 2002). The simple average index constructs a summary index by providing equal weight to the components. The main model is estimated by using PCA indices.

In line with the study's interest in examining what determines child prosociality, an extensive number of controls are used in the estimation (*in Z_{it} and X_i*). The controls include child schooling (highest grade achieved), child age (in year), child sex, child health condition (0=worse, 1=same to others, 2=better than others), bad event (1=household faced bad event since last survey period), Family disruption (1=if parent/household member died or divorced), media access (1= household has TV/Radio/mobile), Parent Social Capital (1=member of any community association), Parents' ethnic similarity (1=different), Parents' religion similarity (1= different), household size, rural-urban (1=urban), caregiver education (0=no formal educ, 1=primary educ, 2= secondary, 3=higher educ), father education (same category to that of caregiver), and household wealth (measured in wealth index). To capture the possibility of dissimilar behavioral attitudes of mother and father which may result in weaker socialization technology of parents (Dohnmen et al. 2012), we control the ethnic diversity and religious diversity of parents. To account for other country-level variations we included country fixed effects. Year fixed effect is also included to capture variations that may associate with time/year of survey. The data do not allow analyzing transmission of mother and father attitudes separately since the respondents in the household questionnaire were asked about their households (with phrases such as "you and another household member), not necessarily about the respondent's individual attitude.

It is less likely that the within and outside-family social environments are exogenous. An attempt to solve endogeneity by finding relevant instruments or using other alternative models is challenging, partly due to the nature of the variables under consideration (attitude/behavioral) and partly due to data limitations. For example, the data didn't capture grandparents' attitudes, which

dismisses the possibility of using instruments related to ancestors. I, however, constructed two instruments from the dataset, one for each of the main variables of interest – family prosocial attitude and outside family social environment. The instruments are generated from the data by employing the “leave one out” method. Meaning, family prosocial attitude is instrumented by the average of the prosocial attitude of the community, which is generated by excluding the attitude of the parents of a child under consideration. Similarly, the outside-family social environment of a particular child is instrumented by the average of the outside family social environment of other children in the community, excluding the child under consideration. The community average prosocial attitude is considered to correlate with the attitude of the child through the parents’ prosocial attitude. This can be possible for two reasons. One, the social environment in which the parent of the Young Live child has been living is assumed to have established social norms and values long before the birth of the child. The child is less likely to contribute to this established social environment. Second, the children under consideration are at the ages of childhood and early adolescence, which limits their ability to directly influence and be influenced by the average community attitudes except through their interaction with family and peers. Although these types of instruments are not free from criticisms, particularly in relation to fulfilling exclusion restrictions, they remain instrumental where community characteristics and networks are important. Tests for weak instruments and overidentification are checked and presented in the results section. Furthermore, I take caution in interpreting the results, and all the relationships are interpreted as associations.

3.4. Results and Discussions

3.4.1. Results and discussion from cross and individual country estimations

Table 3.2 shows results from two-stage least squares instrumental variable estimations regarding the relationship between child and family prosocial attitudes, as well as child prosocial attitudes and the outside family social environments to which the child has been exposed. First stage F-statistics are presented in the last row of table 3.2, showing that the estimations are not suffering from weak instruments problem. Comparison test results¹⁷ between the pooled panel and random effect estimations favor the 2SLS-IV. Results from cross cross-country model (column 2) show that parents' prosocial attitudes are significantly associated with the attitudes of children. A child from a prosocial family is likely to become prosocial, which is mainly attributed to transmission through within-family interaction. This result is analogous to the findings by Kosse et al. (2020), which show that prosocial attitudes develop in response to prosocial role models (likely both the parents or either mother or father) and intense social interactions. Likewise, outside family social environments, such as the interaction of the child at school and with peers significantly associated with the prosocial attitude of children. A child treated well at school and among peers and has good participation in the social environment is likely to become prosocial, which implies the significant role of oblique socialization in children's attitude formation.

Results from individual country samples show mixed evidence, where prosocial attitudes are transmitted from parents to children for the Ethiopia (column 4) sample, but no evidence of transmission for the India (column 6) and Vietnam samples (column 8). Similarly, the outside family social environment is associated with the attitudes of children in the Ethiopia and India samples, but no evidence of association in the case Vietnam sample. The association between the external social environment and child prosocial attitude in the Ethiopia and India samples is significant and large, but opposite in terms of the direction of the relationship. The social environments at school and with peers negatively associate with the attitudes of children in the Ethiopian sample, while the association is positive under the India sample, implying the direction of association with the child's prosocial attitude is not certain across cultures and societies. Evidence from both countries shows the significant association between outside family social environment and prosocial attitude formation in children.

¹⁷ Breusch & Pagan Lagrangian multiplier test for RE: Test: Var(u) =0; chibar2(01) =0.00, Prob >chibar2=1.0000

Table 3.2: Two stage Least square Instrumental variable estimation results from cross country and individual country models ¹⁸

Outcome: Child prosocial attitude	Cross country		Ethiopia		India		Vietnam	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No controls	Full	No controls	Full	No controls	Full	No controls	Full
Family prosocial attitude	0.115** (0.046)	0.131*** (0.046)	0.193*** (0.069)	0.132* (0.071)	0.007 (0.072)	0.007 (0.078)	-0.107 (0.167)	0.058 (0.181)
Outside family social environment	0.464*** (0.111)	0.471*** (0.116)	-0.315* (0.190)	-0.429** (0.197)	0.984*** (0.185)	1.025*** (0.202)	0.375 (0.239)	0.288 (0.276)
Child education (high grade achieved)		0.010 (0.008)		-0.001 (0.011)		-0.007 (0.016)		0.025 (0.020)
Child age		0.007 (0.033)		-0.002 (0.062)		0.081 (0.058)		-0.069 (0.069)
Household size		-0.015** (0.006)		0.001 (0.009)		-0.006 (0.010)		-0.036*** (0.013)
Wealth of HH		0.323*** (0.077)		-0.179 (0.168)		0.020 (0.130)		0.527*** (0.145)
Sex of child		-0.030* (0.017)		0.019 (0.035)		-0.020 (0.035)		-0.061* (0.035)
Parents ethnicity (1=Mother & Father differ)		-0.026 (0.020)		-0.052 (0.057)		0.250 (0.255)		-0.045 (0.098)
Parents religion (1=Mother & Father differ)		-0.040 (0.043)		0.178 (0.122)		0.201 (0.664)		0.146* (0.077)
Bad event (1=faced HH)		0.155** (0.063)		0.008 (0.041)		-0.019 (0.048)		0.003 (0.040)
Family disruption(1=faced)		0.019 (0.024)		0.101** (0.045)		-0.066 (0.057)		-0.090 (0.091)
Rural-urban (1=urban)		0.010 (0.032)		-0.031 (0.053)		0.046 (0.055)		-0.270*** (0.065)
Media access (1=have access)		-0.129*** (0.030)		-0.017 (0.045)		0.003 (0.047)		-0.019 (0.057)
Parent social capital(1=member)		0.001 (0.024)		-0.111** (0.055)		0.029 (0.040)		0.029 (0.044)
Other controls		Yes		Yes		Yes		Yes
Year Fixed effect		Yes		Yes		Yes		Yes
Country Fixed effect		Yes						
N	7,125	7,125	2,308	2,308	2,396	2,396	2,421	2,421
F-test (first stage)	68.36	61.07	24.44	21.59	26.02	23.98	15.74	11.53

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Note: other controls include education levels of caregiver and father (each with 0=no education, 1=primary education, 2=secondary education, 3= higher education), and child health condition (0= less than other children of same age, 1= same to others, 2 = better than others).

The individual country results in table 3.2 look interesting in the sense that the outside-family social environment negatively affect the prosocial attitude of a child in the Ethiopia sample, while the outside family social environment is significantly and positively associated with the prosocial attitude of children in India, but no association for the within-family prosocial attitude. The significance and magnitude of the coefficient of the outside-family social environment variable are larger for both the Ethiopia and India samples, which may imply potentially large influences of the social environment on children in these countries. Results from the Ethiopia sample also show that outside family social environments may adversely affect prosocial attitude formation in children. Both the cross-country and individual country results are consistent across the estimations with and without covariates, confirming potential intergenerational transmission of prosocial attitudes as well as the outside-family social environments' influences in attitude formation, without neglecting heterogeneity in the association between countries.

The mixed results in the transmission of family prosocial attitudes may imply that the within-family socialization across geographic locations is variable, which can result from differences in culture and values, including parent-child relationships and parenting styles. Parents from different cultural contexts and with varying parenting styles can influence their children's choices either by molding children's preferences through socialization actions or by imposing direct constraints on their choices that do not align with the parents' interests (Doepke and Zilibotti, 2017).

To substantiate the results, I explored the World Value Survey database and compared the values related to prosocial attitudes recorded for the three countries in this study. I consider that the potential differences in values and cultures between the sample countries in my dataset can be partly substantiated by similar variations from the World Value Survey data. From the world value survey data of the three countries, information in the survey on two variables: 'how much important is family in life' and 'unselfishness as one of the important qualities of children' can be used, at least, to give a signal about the possible difference in transmission of prosocial attitudes between societies as reflected by the difference in the values of the respondents in the world value surveys of the countries. The two variables from the World Value Survey are supposed to have a high correlation with the prosocial attitude of children as well as family influence. In the year 2001, which is much closer to the first Young Lives survey, for example, only about 39 percent of Vietnam's respondents in the World Value Survey consider unselfishness as one of the important

qualities children should have, and only about 36 percent of Indian respondents valued the same. From the World Value Survey data of the years 2006 and 2007, which, again, coincide with young lives' round 2 survey periods, about 92 percent of Ethiopian World Value Survey respondents consider family as important in life (World Value Survey database)¹⁸. The significance of the transmission in the Ethiopia sample and the insignificance in the India and Vietnam samples, therefore, seem to coincide with this evidence in the World Value Surveys.

3.4.2. Robustness checks

Results in table 3.2, which present the intergenerational transmission of prosocial attitudes and the influence of outside family social environment in attitude formation, are checked for robustness using alternative estimations. Table 3.3 exhibits result from random effect and random effect instrumental variables estimations. Random effect IV and random effect are suitable for the robustness checks, given the fact that the interest is to see how children in varying prosocial and external environment settings are forming prosocial attitudes. In other words, the study focuses on between variation instead of within variation, mainly because significant changes in the prosocial attitude of parents between the survey periods are less likely, and the comparison may be based on differences in already formed parental attitudes.

The cross-country estimation results confirm evidence of intergenerational transmission of prosocial attitude from parents to children under both the RE-IV and RE estimations. Likewise, parental attitude transmits to children in the Ethiopia sample, but no evidence of transmission in the India and Vietnam samples. The outside family social environment significantly and largely associates with prosocial attitudes of children in both the models (columns 1 and 5), with a large and significant positive association in the India sample but a negative association in the Ethiopia sample. The main results about intergenerational transmission of prosocial attitudes, the association with outside family social environments, and the mixed results based on country contexts are, therefore, robust across alternative estimations.

¹⁸World value survey data is an international data on social, political, economic, religious and cultural values of people in the world, covering 120 countries, generated every 5 years (details in <https://www.worldvaluessurvey.org/wvs.jsp>). Note that this data is used to indicate the possibility of variation in transmission of attitudes by presenting differences in values attached to same attitude between countries. The inconsistency in the years considered is mainly due to difference in year of world value surveys between countries.

Table 3.3: Results of robustness checks using Random Effect Instrumental Variable (RE-IV) and Random Effect estimations ¹⁹

Outcome: child prosocial attitude	RE-IV				RE
	(1) Cross country	(2) Ethiopia	(3) India	(4) Vietnam	(5) Cross country
Family prosocial attitude	0.127*** (0.047)	0.132* (0.072)	0.006 (0.081)	0.060 (0.174)	0.022*** (0.008)
Outside-family social environment	0.432*** (0.118)	-0.429** (0.198)	0.975*** (0.203)	0.265 (0.278)	0.218*** (0.022)
Controls	Yes	Yes	Yes	Yes	Yes
Country fixed effect	Yes				Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
N	7,125	2,308	2,396	2,421	7,125
First stage F statistic	27.81	17.46	14.71	12.5	

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Note: Controls are same as those of the main models presented in table 3.2.

Table 3.4: Results of robustness checks using simple average indices ²⁰

Outcome: Child prosocial attitude	2SLS-IV			
	Cross country	Ethiopia	India	Vietnam
Family prosocial attitude	0.120*** (0.025)	0.143* (0.081)	0.141** (0.063)	-0.097 (0.119)
Outside-family social environment	0.126*** (0.016)	-1.082*** (0.302)	0.253*** (0.074)	-0.088 (0.098)
Controls	Yes	Yes	Yes	Yes
Country fixed effect	Yes			
Year fixed effect	Yes	Yes	Yes	Yes
N	6,951	2,305	2,292	2,354
First stage F statistic	1183.59	33.19	30.23	23.83

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Note: Controls are same as those of the main models presented in table 3.2.

Table 3.4 presents another result of robustness checks using simple average indices instead of indices constructed using principal component analysis. Since the Principal Component Analysis (PCA) reduces the dimensionality of interrelated variables while maintaining the variation b/n them and forms new variables as a linear combination of components (Jolliffe, 2002), but the simple average index constructs a summary index by providing equal weight to the components, checking the consistency of the results from the two different index measurements is essential. The results reaffirm the transmission of prosocial attitude from parents to children and the potential influences of outside family social environment on the prosocial attitude formation of children.

Between-country variation remains consistent, where parents' prosocial attitudes and outside family social environments are associated with prosocial attitudes of children in the Ethiopia and India samples, but no evidence of association in the Vietnam sample. Tables 3.3 and 3.4 show the results about intergenerational transmission of prosocial attitude, and the influences of outside family social environment on attitude formation of children are robust and consistent across alternative measures and estimations.

3.4.3. Heterogeneity analysis

Prosocial attitude formation in children, particularly the formation through socialization actions, may show heterogeneity based on children's gender, their location of residence (mainly urban-rural dichotomy), and the parents' positive or negative assortative matings. Parental, child, and community characteristics may facilitate or create obstacles to socialization and, thus, lead to a stronger/weaker relationship between parent and child attitudes (Dohmen et al., 2012). Table 3.5 presents the results of heterogeneity based on child sex, rural-urban, and parents' (mother and father) ethnicity and religion similarity. These variables remain sources of heterogeneity mainly because of the differences across cultures and societies in dealing with those diversities. Table 3.5 shows that prosocial attitude transmission is stronger for homogenous parents (a family with the same ethnicity and religion of mother and father). The positive assortative mating helps parents to transmit attitudes without interference, which could otherwise happen in case of different religions and ethnicities of the two parents. This result resembles the one in Dohmen et al. (2012) on the effect of positive assortative matings in attitude transmissions. Since some measures of family prosocial attitudes in our dataset refer to any member of the household, I cannot provide evidence that distinguishes potential variation in transmission between mothers' and fathers' attitudes.

I also see whether the transmission of prosocial attitude interacts with the gender of the child. There could be a potential that the gender of the child is associated with the socialization ability of the parents, as well as the outside-family social environment's influence on the child. Columns 1 and 2 in table 3.5 show that transmission of prosocial attitude from parents to children holds for both sons and daughters, while the outside family social environment's influence, though significantly associated with both, is larger on the daughters. Favorable outside-home social environments for female children help them to become more prosocial, which may be attributed to the otherwise hostile outside-home environments' fortune to females in less developed countries.

Table 3.5: Results of heterogeneity based on gender, rural-urban, and parent ethnicity & religion (2SLS-IV)²¹

Outcome: child prosocial Attitude	Child sex		Location of residence		Parents' ethnic & religion similarity	
	(1) Male	(2) Female	(3) Urban	(4) Rural	(5) Differ in at least one	(6) Same in both
Family prosocial attitude	0.128** (0.062)	0.142** (0.070)	0.193* (0.113)	0.103* (0.055)	0.036 (0.217)	0.148*** (0.049)
Outside-family social environment	0.317** (0.146)	0.601*** (0.181)	0.691*** (0.230)	0.371*** (0.142)	-0.455 (0.494)	0.511*** (0.121)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	3,552	3,573	1,904	5,221	481	6,644
F test (first stage)	24.27	35.0	16.30	40.85	2.7	59.22

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Note: Controls are the same as the main model (table 3.2) except for the variable of heterogeneity in each estimation.

To shed further light on the transmission and socialization process, I also highlight potential variation in transmission between rural and urban samples. Given the economic, political, and social dichotomy between rural and urban developing countries, social interactions and parenting styles may differ between rural and urban areas, which need not necessarily bring differences in transmission. Both parents' prosocial attitude and the outside-family social environments are associated with the attitudes of children in both rural and urban samples, with a larger influence of the outside family social environment on children in urban areas (columns 3 and 4 in table 3.5).

3.5. Conclusions and Implications

This study examines the intergenerational transmission of prosocial attitudes by providing evidence related to the association between parents' prosocial attitudes and child prosociality, using a rich panel dataset from three developing countries in two continents, spanning over many years. The study adds to the body of literature, at least, by providing the lacking evidence regarding children's attitude formation in the context of developing countries. I approach prosocial attitude formation based on cultural transmission theory, examining the child's prosocial attitude correlation with within-family and outside-family socialization actions. Estimation results show that prosocial attitudes in children are associated with parents' prosociality and that of external social environments. The intergenerational transmission shows mixed results, meaning parents' attitudes are associated with children's attitudes in some countries and not in others. External social environments, such as school and peers, are essential in determining the children's prosocial attitudes. Parents' and the external social environment's influence on children vary depending on parents' characteristics. Prosocial attitudes of parents with the same ethnicity and religion significantly associate with prosocial attitudes of children, while those of the parents that are different in at least one of the two show no association, indicating smooth transmission among similar parental characteristics. Similarly, social environments at schools and peers are largely associated with the development of prosociality in children of parents with ethnic and religion similarity. It also positively associates with both daughters and sons, and with both rural and urban children, with a larger magnitude of association to daughters and to those in urban areas.

This study contributes to the ongoing debate between nature and nurture-based attitude transmissions. The results provide evidence in support of attitude transmissions based on social interactions, both through within-family interactions and learning from outside-family social environments. Furthermore, mixed results from individual country estimations show that attitude transmission based on social environments varies between cultures and societies, though the transmission is observed in the cross-country context. This study also contributes to policy making by providing evidence regarding the development of behavior and attitudes and the factors shaping them, which are a prerequisite for potential policy interventions aiming at promoting one type of attitude over the other.

I draw the following inferences from the findings. One, within-family socialization actions that are often left to the parents' discretion need to be followed up by devising strategies that enhance parents' awareness about their behavior and the desired attitude of their children, considering the general belief that children belong to the country, not only to the parents. Two, governments and community organizations should protect environments external to the family, such as schools and the community, from delinquent behaviors since they are essential in shaping children's attitudes. Finally, although it is difficult to establish causality in parent-child behavioral relationships, long-term experimental studies may help to extract causal relationships in varying contexts. Additional data about the behaviors and experiences of grandparents may also help in this regard.

3.6. References

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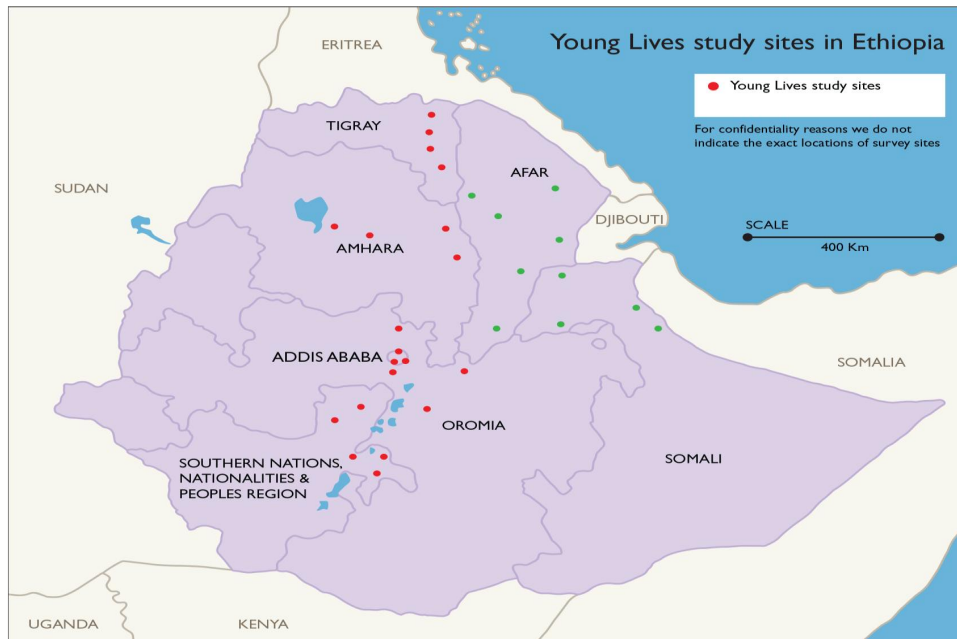
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3.7. Appendices

5 Appendix I: Figure 3.4. Young live study sites



Source: Young Lives reports, <https://www.younglives.org.uk>

Appendix II: Full result tables for tables 3.3, 3.4, and 3.5

Table 3.3#: Results of robustness check using RE-IV and RE, full ²²

Outcome: Child prosocial attitude	RE-IV				RE
	Cross country	Ethiopia	India	Vietnam	Cross country
Family prosocial attitude	0.127*** (0.047)	0.132* (0.072)	0.006 (0.081)	0.060 (0.174)	0.022*** (0.008)
Outside-family social environment	0.432*** (0.118)	-0.429** (0.198)	0.975*** (0.203)	0.265 (0.278)	0.218*** (0.022)
Child education	0.009 (0.008)	-0.001 (0.011)	-0.003 (0.016)	0.024 (0.020)	0.009 (0.008)
Child age	0.008 (0.033)	-0.002 (0.062)	0.080 (0.057)	-0.067 (0.070)	0.001 (0.032)
Household size	-0.015** (0.006)	0.001 (0.009)	-0.005 (0.010)	-0.036*** (0.014)	-0.013** (0.006)
Wealth of HH	0.320*** (0.077)	-0.179 (0.169)	0.015 (0.134)	0.544*** (0.145)	0.335*** (0.074)
Sex of child	-0.026 (0.020)	0.019 (0.035)	-0.021 (0.035)	-0.061* (0.035)	-0.019 (0.019)
Ethnic similarity (1=differ)	-0.041 (0.043)	-0.052 (0.058)	0.291 (0.278)	-0.046 (0.098)	-0.054 (0.043)
Religion similarity (1=differ)	0.152** (0.064)	0.178 (0.122)	0.281 (0.712)	0.144* (0.078)	0.160*** (0.060)
Bad event faced HH(1=faced)	0.025 (0.024)	0.008 (0.041)	-0.018 (0.048)	0.005 (0.040)	0.017 (0.023)
Family disruption(1=faced)	0.011 (0.033)	0.101** (0.046)	-0.065 (0.059)	-0.090 (0.092)	0.006 (0.032)
Rural-urban (1=urban)	-0.126*** (0.030)	-0.031 (0.053)	0.057 (0.056)	-0.275*** (0.064)	-0.148*** (0.029)
Media access (1=access)	-0.031 (0.026)	-0.017 (0.046)	0.003 (0.047)	-0.025 (0.057)	-0.016 (0.026)
Parent social capital(1=member)	0.001 (0.024)	-0.111** (0.056)	0.033 (0.041)	0.028 (0.044)	0.018 (0.022)
Caregiver education (0=no educ)					
Primary education	0.080*** (0.029)	-0.001 (0.047)	-0.020 (0.049)	0.279*** (0.086)	0.082*** (0.029)
Secondary education	0.075** (0.036)	0.000 (0.072)	0.064 (0.065)	0.168* (0.086)	0.070** (0.035)
Higher education	0.116 (0.076)	-0.048 (0.200)	-0.062 (0.148)	0.295** (0.125)	0.109 (0.075)
Father education (0=no educ)					
Primary education	-0.001 (0.028)	0.024 (0.044)	-0.019 (0.046)	0.017 (0.093)	-0.001 (0.028)
Secondary education	-0.059* (0.032)	-0.065 (0.055)	-0.084 (0.055)	-0.003 (0.094)	-0.049 (0.031)
Higher education	-0.138** (0.054)	0.066 (0.112)	-0.190** (0.094)	-0.147 (0.120)	-0.125** (0.052)

Child health (0=less than others)	0.006	0.076	-0.042	-0.026	0.020
Same to others	(0.034)	(0.060)	(0.076)	(0.064)	(0.031)
Better than others	-0.049	0.051	-0.109	-0.064	-0.020
	(0.038)	(0.062)	(0.082)	(0.074)	(0.033)
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Country Fixed effect	Yes				Yes
N	7,125	2,308	2,396	2,421	7,125
First stage F statistic	27.81	17.46	14.71	12.5	

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3.4#: Results of robustness check using simple average indices (2SLS-IV), full ²³

Outcome: Child prosocial attitude	(1) Cross country	(2) Ethiopia	(3) India	(4) Vietnam
Family prosocial attitude	0.120*** (0.025)	0.143* (0.081)	0.141** (0.063)	-0.097 (0.119)
Outside family social environment	0.126*** (0.016)	-1.082*** (0.302)	0.253*** (0.074)	-0.088 (0.098)
Child education	-0.002 (0.003)	-0.002 (0.005)	0.004 (0.004)	0.013* (0.007)
Child age	-0.032*** (0.012)	-0.051* (0.029)	-0.028* (0.017)	-0.025 (0.026)
Household size	-0.005** (0.002)	-0.004 (0.004)	-0.001 (0.003)	-0.011** (0.005)
Wealth of HH	0.127*** (0.028)	-0.032 (0.079)	0.038 (0.040)	0.195*** (0.048)
Sex of child	-0.016** (0.007)	0.013 (0.017)	-0.028*** (0.011)	-0.026** (0.013)
Ethnic similarity (1=differ)	-0.006 (0.017)	-0.022 (0.026)	0.051 (0.036)	0.012 (0.039)
Religion similarity (1=differ)	0.073*** (0.025)	0.078* (0.046)	0.126 (0.078)	0.053 (0.034)
Bad event faced HH(1=faced)	0.000 (0.009)	-0.014 (0.019)	-0.002 (0.013)	0.004 (0.014)
Family disruption(1=faced)	0.006 (0.012)	0.021 (0.020)	-0.018 (0.017)	0.004 (0.032)
Rural-urban (1=urban)	-0.059*** (0.011)	-0.032 (0.025)	-0.013 (0.017)	-0.106*** (0.023)
Media access (1=access)	0.011 (0.010)	0.038* (0.022)	-0.004 (0.014)	0.011 (0.021)
Parent social capital(1=member)	-0.034*** (0.009)	-0.055* (0.030)	-0.051*** (0.011)	0.001 (0.015)
Caregiver education (0=no educ)				
Primary education	0.024** (0.011)	-0.002 (0.022)	-0.000 (0.014)	0.072** (0.031)
Secondary education	0.025* (0.013)	0.026 (0.030)	0.009 (0.021)	0.037 (0.032)
Higher education	0.067***	0.117*	0.065*	0.077*

	(0.025)	(0.066)	(0.037)	(0.045)
Father education (0=no educ)				
Primary education	0.004	0.005	-0.017	0.046
	(0.011)	(0.021)	(0.014)	(0.032)
Secondary education	-0.008	-0.022	0.002	0.034
	(0.012)	(0.026)	(0.017)	(0.034)
Higher education	-0.038**	-0.058	-0.005	-0.024
	(0.019)	(0.049)	(0.026)	(0.044)
Child health (0=less than others)				
Same to others	-0.004	0.031	0.009	0.013
	(0.012)	(0.029)	(0.022)	(0.020)
Better than others	-0.009	0.031	0.002	0.034
	(0.013)	(0.030)	(0.022)	(0.024)
Year fixed effect				
Country Fixed effect				
Observations	6,951	2,305	2,292	2,354
First stage F statistic	1183.59	33.19	30.23	23.83

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3.5#: Results of heterogeneity (2SLS-IV), full ²⁴

Outcome: child prosocial attitude	Child sex		Location of residence		Parents ethnic & religion similarity	
	Male	Female	Urban	Rural	Differ in at least one	Same in both
Family prosocial attitude	0.128**	0.142**	0.193*	0.103*	0.036	0.148***
	(0.062)	(0.070)	(0.113)	(0.055)	(0.217)	(0.049)
Outside family social environment	0.317**	0.601***	0.691***	0.371***	-0.455	0.511***
	(0.146)	(0.181)	(0.230)	(0.142)	(0.494)	(0.121)
Child education	0.004	0.016	0.005	0.014	0.047*	0.006
	(0.011)	(0.012)	(0.016)	(0.009)	(0.028)	(0.008)
Child age	0.051	-0.039	0.036	0.009	-0.036	0.006
	(0.047)	(0.047)	(0.070)	(0.037)	(0.132)	(0.034)
Household size	-0.014*	-0.018*	0.018	-0.026***	-0.032	-0.016**
	(0.008)	(0.010)	(0.011)	(0.007)	(0.023)	(0.007)
Wealth of HH	0.395***	0.241**	-0.154	0.418***	0.112	0.365***
	(0.101)	(0.117)	(0.188)	(0.084)	(0.307)	(0.080)
Sex of child			-0.040	-0.020	-0.003	-0.031
			(0.041)	(0.022)	(0.076)	(0.021)
Ethnic similarity (1=differ)	-0.022	-0.059	0.045	-0.082		
	(0.062)	(0.060)	(0.078)	(0.052)		
Religion similarity (1=differ)	0.153	0.160*	0.301**	0.085		
	(0.099)	(0.084)	(0.131)	(0.069)		
Bad event faced HH(1=faced)	-0.004	0.037	-0.011	0.035	0.158	0.012
	(0.034)	(0.033)	(0.060)	(0.026)	(0.104)	(0.025)
Family disruption(1=faced)	0.033	-0.016	0.069	-0.019	0.129	0.005
	(0.045)	(0.047)	(0.062)	(0.038)	(0.107)	(0.035)
Rural-urban (1=urban)	-0.179***	-0.079*			0.108	-0.142***
	(0.040)	(0.045)			(0.144)	(0.031)
Media access (1=access)	-0.013	-0.037	0.008	-0.039	-0.007	-0.046*

	(0.037)	(0.039)	(0.069)	(0.029)	(0.137)	(0.028)
Parent social capital(1=member)	-0.003	0.005	-0.100*	0.027	-0.014	-0.000
	(0.033)	(0.035)	(0.056)	(0.027)	(0.118)	(0.025)
Caregiver education (0=no educ)						
Primary education	0.090**	0.070	0.049	0.072**	0.161	0.064**
	(0.038)	(0.045)	(0.054)	(0.034)	(0.147)	(0.030)
Secondary education	0.075	0.079	0.053	0.065	0.090	0.073*
	(0.048)	(0.055)	(0.068)	(0.043)	(0.151)	(0.038)
Higher education	0.275***	-0.021	0.006	0.219**	-0.463	0.157**
	(0.099)	(0.116)	(0.130)	(0.101)	(0.337)	(0.078)
Father education (0=no educ)						
Primary education	-0.037	0.031	-0.022	-0.002	-0.137	0.009
	(0.036)	(0.045)	(0.062)	(0.032)	(0.105)	(0.030)
Secondary education	-0.054	-0.063	-0.125*	-0.040	-0.283**	-0.052
	(0.043)	(0.048)	(0.066)	(0.036)	(0.128)	(0.033)
Higher education	-0.183**	-0.103	-0.115	-0.168**	-0.122	-0.153***
	(0.073)	(0.079)	(0.097)	(0.066)	(0.170)	(0.057)
Child health (0=less than others)						
Same to others	0.024	-0.027	0.037	-0.017	0.137	-0.020
	(0.050)	(0.047)	(0.073)	(0.040)	(0.137)	(0.036)
Better than others	-0.040	-0.090	-0.063	-0.046	0.242*	-0.084**
	(0.052)	(0.055)	(0.076)	(0.047)	(0.144)	(0.040)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	3,552	3,573	1,904	5,221	481	6,644
First stage (F-statistics)	24.27	35.0	16.30	40.85	2.7	59.22

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Chapter Four

The Impact of Weather Shock on Political and Social Trust: Evidence from Ethiopia

Paper presented at conferences:

- (1) Environment for Development (Efd) annual meeting, October 2025, Dar es Salaam, Tanzania.*
- (2) CSAE Economic Development in Africa Workshop 2025, 01-05 December 2025, Addis Ababa University, Addis Ababa, Ethiopia. Accepted for presentation at CSAE Conference 2026-Economic Development in Africa, 22-24 March 2026, at St Catherine's College, University of Oxford, UK*

Abstract

Trust determines economic outcomes. However, evidence on what affects trust, particularly the impact of the natural environment on social and political trust, is limited. We provide evidence from Ethiopia, a setting with frequent weather shocks induced by climate variability, affecting most of the population whose livelihoods depend on weather-dependent agriculture. We examine how weather shocks affect social and political trust by combining high-precision exogenous climate data with Young Lives Ethiopia panel surveys. Fixed effect results from seemingly unrelated regression show that both current and past weather shocks negatively affect political trust, with heterogeneity in the degree of effect based on the timing of the shock in major Ethiopian agricultural seasons, Meher and Belg. Current shock and the past three years' shock decrease political trust of households by 0.22 and 0.30 standard deviations, respectively. Similarly, exposure to the shocks over the last three years in Meher and Belg seasons by a household decreases political trust by 0.23 and 0.13 standard deviations, respectively. Meher season's weather shock in the last three years also reduces the social trust of households by 0.14 standard deviation. The negative effects of the shocks on political trust may imply blame effects on government, while the one on social trust during the major season, Meher, may signal the adverse effects of the shock on cooperation between members of society and hence further imply the possibility for societal cooperation to be abandoned by weather shocks occurring in critical periods. Policies and strategies to mitigate the economic impacts of shocks, therefore, ought to consider the effects on trust, which, otherwise, will affect many domains of life.

Keywords: Trust, Social Trust, Political Trust, shock, weather shock

4.1. Introduction

Human-caused climate change has been increasing and continues to increase extreme weather events in every region across the globe. Emissions of greenhouse gases have caused global warming and brought a faster increase in global surface temperature since 1970 than in any other 50-year period over at least the last 2000 years (IPCC, 2023). Africa is among the vulnerable regions that have historically contributed the least to current climate change but are disproportionately affected by the consequences. The climate risk country profile report by the World Bank (2021) shows that in Ethiopia average temperature has increased by an average of 1°C since 1960, and precipitation has been declining in the last three to four decades with high year-to-year volatility. The future is alarming as temperatures are expected to increase for East Africa and specifically for Ethiopia, where the mean monthly temperature changes expected to increase by 1.8°C by the 2050s and by 3.7°C by the end of the century. The impact remains widespread, ranging from economic, social, and political to behavioral and attitudinal effects across generations.

The impact of weather shocks on economic, social, and behavioral outcomes has become a prominent research agenda in recent years, partly due to the multidimensional effects of the changes and due to their exogenous nature (methodological factor). In Ethiopia, weather shocks induced by climate variability have occurred at different times in various parts of the country, affecting the livelihoods of weather-dependent large rural agricultural communities. The impact is more significant as smallholder subsistence farming accounts for more than 90 percent of agricultural production and more than 80 percent of all employment (World Bank, 2021). In a rain-fed agriculture context like Ethiopia, weather shocks during growing seasons affect not only subsistence farmers via lower crop yields and a corresponding income shock but also access to food and basic consumption as goods prices in markets soar (De Juan and Hanze, 2021).

Besides the impact on livelihoods, drought and other forms of weather shock affect preferences and attitudes. Literature presents shocks as belief-twisting events, witnessing the changes in beliefs after the great depression (Cogley and Sargent, 2008; Giuliano and Spilimbergo, 2024). Learning from experience model also shows that people form beliefs by updating information encountered in their lifetime, giving more weight to data experienced during their lifetimes while neglecting data from too far in the past. Individuals are highly flexible throughout their lives and constantly

change their attitudes in response to changing life circumstances, of which exposure to shock remains detrimental in shaping circumstances, particularly in weather-dependent livelihood settings like Ethiopia.

In the process of adaptation to weather shock and exercising risk-coping strategies, individuals interact with neighbors, other people near or far, actors in goods and money markets, and government structures/institutions, where the interactions may have positive or negative effect on people's levels of social and political trust (Buggle & Durante, 2021; Dang & Dang, 2021; Giuliano and Spilimbergo, 2024). People may cooperate in response to natural disasters, enhancing trust between them. Informal support among the community during shocks also increases social trust, while no support results otherwise. The way political leaders and their institutions respond to the shock affects people's political trust, bringing either a rally-around-the-flag effect or a blame effect (Ahlerup et al., 2024; You et al., 2020). The government and its institutions' favorable response (an attempt) during (after) unfavorable events helps the government gain support, while the failure produces blame. The rally-around-the-flag effects may go beyond political support. It may serve as a glue that keeps social and political systems together and makes societies more prepared for and/or become resilient to crisis, when they arise (Zmerli and van der Meer, 2017; Donahue et al., 2014). On the other hand, weakening political trust may result in other undesirable consequences, such as support for violence and conflict (Detges, 2017; Von Uexkull et al., 2021).

Trust is among the cultural attitudes that determine economic outcomes, both at the macro and micro levels. It determines differences in income per capital across countries (Horvath, 2013; Algan and Cahuc, 2010; Zak and Knack, 2001; Knack and Keefer, 1997), affects international trade and investment, and financial development and access (Butter and Mosch, 2003; Guiso et al., 2006, 2008; Leblang et al., 2022), shapes regional growth (Forte et al., 2015), substitutes/complements formal institutions (Cline and Williamson, 2016; Chauhan et al., 2022), determine corporate capital structure (Chauhan et al., 2022), promotes cooperation and efficiency gains (Fukuyama, 1996; La porta et al., 1997), increases human capital accumulation (Dearmon and Grier, 2009), affects daily transaction between people (Arrow, 1972), improves firm performance (Tzafir, 2005), and determine stock market participation, liquidity, and price crash risk (Guiseo et al., 2008; Blau, 2017; Cao, et al., 2016).

Cognizant of the economic effects of trust, this study examines whether and how people's social and political trust is affected by alarmingly increasing extreme weather events. It provides evidence from the context of a weather-shock-prone country, Ethiopia. I define social trust as interpersonal trust, denoting cultural norms that promote good conduct outside a small family or kin network. It encompasses non-family-familiar others (neighbors) and unfamiliar others (people in general). Unlike many studies that define political trust as trust in a political leader, president or prime minister, I define political trust as trust in the general government and its institutions, including trust in police and local government officials. This definition of political trust aligns with the situation in our country of study, Ethiopia, in the sense that people vote for local representatives and often interact with local government officials and institutions, where the majority (rural) have no direct control and even often no know-how about the top country officials.

The study will have at least four contributions to the literature. One, it adds to the evolving literature on the impact of weather shocks on trust and, hence, to the literature on the relationship between the natural environment and behavioral variables, by providing evidence from the weather-dependent developing economy in East Africa. Second, it provides comprehensive evidence on the impacts of short- and long-term shocks on social and political trust, by exploiting the data on households' exposure to shocks over the lifetime lived in the community together with the differential effects recent shocks may have. By doing so, the study will add to previous studies that approached the two situations independently. Third, the study, by using geospatial data on precipitation and temperature, will analyze the impact of real-time shocks during growing seasons, considering not only the rainfall aspects but also the potential water balance in the atmosphere, adding to previous evidence on the impacts of rainfall shocks. Furthermore, the study, by exploiting the panel nature of the data, over which household-level trusts are observed multiple times in varying circumstances, will provide evidence regarding the changes in interpersonal trust and political trust in response to changing weather conditions. Such evidence may provide additional dimensions to the commonly used cross-sectional studies based on World Value Surveys and Afrobarometer surveys.

In this study, I present results from Young Lives Ethiopia longitudinal survey rounds 2 and 3 (year 2006 and 2009) from about 3000 households per survey and a total of more than 5000 observations, covering four major regional states (Oromia, Amhara, Tigray, and the then Southern Nations and Nationalities People (SNNP)) and one city administration (i.e, Addis Ababa), together accounting

for about 96 percent of that time's Ethiopian population. The two rounds are selected in relation to the availability of data on our outcome variable, trust. I use data from parents based on information in household questionnaires of both the young and old cohort children's surveys. I calculated the Standardized Precipitation Evapotranspiration Index (SPEI) for all months in the years over which the household lived in the community. I constructed shock dummies based on a classic 1 standard deviation above or below the long-term mean classification¹⁹. Many studies have explored the impact of weather shocks, especially drought, on trust in Africa using Afrobarometer surveys, among which the study by Ahlerup et al (2024) has some sort of similarity with this study. Building on the work by Ahlerup et al (2024) and similar previous studies, this study provides evidence from a special setting (Ethiopia) characterized by the following three properties. People do not directly vote for their country's top political leaders (president or prime minister). Cooperation in a community reflected by social networks in the form of membership in long-aged traditional institutions is prominent (Gonfa et al., 2025). A prevalent weather shock setting manifested by more than 16 widespread weather shocks in the last five decades, of which six of them were stringent droughts (FAO Ethiopia profile report, 2016²⁰).

Fixed effect results from seemingly unrelated regression show that weather shocks affect both social and political trust, with variation in the size of effects and significance. Both current and the last three years' weather shocks significantly decrease political trust, where the effects from the last three Meher seasons are more pronounced than the one in Belg seasons. The resulting decrease in political trust may imply the blame-effect of the shock on the government, while the difference between seasons may signal the sensitivity of people during peak production times. Weather shocks in the Meher season in the last three years also reduce social trust, signaling the possibility that natural shocks may deteriorate society's demand for cooperation when they occur during high agricultural times. The results are robust to alternative measures, showing the same adverse effect of weather shock on individual social and political trust measures.

The remaining sections of the paper are organized as follows. Section two describes data and empirical strategy, followed by section three, where results and discussions are presented. I provide conclusions and implications in section four.

¹⁹ *Details on the measurements are described in the data section of this paper.*

²⁰ <https://www.fao.org/aquastat/en/countries-and-basins/country-profiles/country/ETH> .

4.2. Data, Description, and Empirical Strategy

4.2.1. Data

This study uses data from the Young Lives longitudinal study in Ethiopia, which has been following children for over 20 years, starting 2002. Our analysis employs information on parents (households) and exploits the sensibility of weather shocks' impact on adults' trust. Since information about social and political trust is included in the household questionnaire in two rounds, we use round 2 (2006) and round 3 (2009) data. Households/parents from both cohorts of the young live children, 2000 young and 1000 old cohorts per survey round, totaling more than 5000 observations spanning four years, are used. The Young Lives Ethiopia survey covers four major regional states (Oromia, Amhara, Tigray, the then Southern Nations, Nationalities and Peoples (SNNP), and one city administration (Addis Ababa), all together accounting for about 85% of the Ethiopian population. The survey includes 3-5 woredas from each region and at least one kebele (the lower administration unit) from each woreda. It covers 20 sentinel sites consisting of 50 households from the old cohort children and 100 households from the young cohort children per site, totaling 3000 households/children per survey year. Figure 4.1 in Appendix I shows the study sites.

I use data from all samples, including urban areas. The inclusion of urban areas is basically for two reasons. One, urban areas in Ethiopia depend partly on agriculture, and weather-dependent agriculture remains a major economic activity for urban residents. The urban is not strictly separated from rural in terms of economic activities, mainly due to the wider base of agriculture as a means of livelihood. All cities and towns in Ethiopia, including the capital city Addis Ababa, have rural kebeles (administrative units) in their urban administrations. Second, the day-to-day economic activities in rural areas determine prices in urban areas. Shocks in rural areas, thus, are swiftly felt by urban residents, both through supply shortages and price changes. However, I also conducted heterogeneity analysis on rural and urban sub-samples.

Information on trust was collected from the respondents by asking alternative trust questions about the two trust categories. For the social trust, households were asked to what extent they agree with each of the following statements: "I feel I can trust my neighbors to look after my house if I am away", and "I feel I can trust people to look after my child". For the political trust, same households asked to what extent they agree with each of the following statements: "local police do their job

well”, “I believe the government does what is right for people like me”, and “I am confident of the ability of the government officials to do their job”. The responses are measured on a Likert scale, on a scale of four in round 2 and on a scale of 5 in round 3, ranging from strong disagreement to strong agreement. We bring the responses from the two rounds to a similar scale by recategorizing the option “more or less” in a scale of five into a category “agree”. This is based on the notion that a “more or less” response to a positive statement indicates agreement, which otherwise could be disagreement in a negative statement. Furthermore, the inconsistencies in coding strongly agree 1, agree 2, disagree 3, and strongly disagree 4 in round 2, while strongly disagree 1, disagree 2, “more or less” 3, agree 4, and strongly agree 5 in round 3 are corrected during data cleaning, arranging each from strongly disagree (1) to strongly agree (4) scales.

In the literature, there is a concern that the type of trust questions in Young Lives data (commonly called the Rosenberg questions, which are framed by impersonating the object) may not have the ability to accurately capture trust attitudes. Equally, there are arguments that impersonal framing of the questions, say, as ‘people’ may be valuable in encouraging respondents to think about the general context in which they live instead of referring to specific groups, such as friends or relatives with whom they may have had or good experiences, potentially reflected with short memory (Bugge and Durante, 2021). Despite the disagreement regarding the framing of trust questions, it is justifiable to use survey-based trust information since responses to survey-based trust questions are found to be good predictors of actual behavior in trust experiments, both in the lab and in the field experiments (Sapienza et al., 2013; Fehr et al., 2002).

The social trust variable is constructed as an index from responses to the two separate social trust questions using principal component analysis. I followed a similar method of construction for the political trust variable. In the main analysis, I prefer the use of composite indices mainly because the separate indicators in each of the trust categories may not stand alone to provide a complete representation of the respective trust categories. The feeling about trusting a neighbor to look after a material asset (house), for example, is different from the feeling about trusting people to look after a child in some senses. Likewise, the feeling about government in general may not adequately reflect political trust and needs to be complemented by the feelings about actors in government institutions, such as officials and police, especially in a setting where people do not directly vote

for their top government officials but their local representatives. The composite measure, therefore, may provide a better proxy than separate measurements targeting different attributes.

For the weather shock variable, I constructed weather shock data from gridded precipitation and temperature information attached to the Young Lives' communities. While the coordinates remain confidential, the Young Lives UK data center recently released precipitation and temperature data for each of the sentinel sites of the Young Lives samples, over the years 1901-2017. The Young Live data is matched with the Terrestrial Air Temperature and Precipitation Gridded Monthly Time series information from the University of Delaware and becomes available without coordinates (mainly due to confidentiality related to child rights). From the data, I calculated the Standardized Precipitation Evapotranspiration Index (SPEI) for all months in the years over which the household has lived in the community. The age of husband and wife, together with the number of years each lived in the community, are used to construct the shock exposure of the households until each survey year. SPEI is an extension of the widely used Standardized Precipitation Index (SPI) and considers not only precipitation but also potential evapotranspiration (PET) in determining drought and unfavorable wet conditions. Given the increasing trend in global temperature, the use of the weather shock index, which includes temperature, seems preferable to those without temperature information, as it considers the impacts of warming-related droughts on various ecological and agricultural systems. Furthermore, SPEI is superior to other measures due to its multi-scalar characteristics that enable identification of various weather shock types and effects (Vicente-Serrano et al., 2010). For the calculation of the SPEI, I obtained the study sites from the Young Lives country report 2003 (Alemu et al., 2003) and attached latitudes²¹ to each of the sentinel sites. It is these latitudes that I used in the calculation of water balance and hence SPEI, employing the Thornthwaite method.

In line with the literature, I constructed SPEIs for each month of Belg and Meher seasons on a time scale of three months. A three-month SPEI (SPEI-3) is more effective in indicating available moisture conditions in primary agriculture settings, while the more than 3 months' time scale measurements may not be suitable for agricultural shocks but are good indicators for reduced stream flow and reservoir storage (SPEI-4 to SPEI-12) and reduced reservoir and ground water

²¹ I obtained a publicly available Young Lives report about the location of sentinel sites, attached the latitudes of each location, and used it in the calculation of SPEI, without breaching the confidentiality of the respondents. I don't have longitude information, which I don't need in the calculation of monthly SPEI in the Thornthwaite method.

recharge (SPEI-12 to SPEI-48) (climate insights, 2024). Accordingly, shock dummies are generated for each month in Belg season (February – May) and Meher season (June – September) following a standard classification of 1 standard deviation above/below the long-term mean, encompassing moderate wet/dry, severe wet/dry, and extreme wet/dry conditions and neglecting mild wet/dry conditions whose effects may not be strong in regions with frequent previous experiences of weather shocks. Precipitation and temperature records starting from the year 1940 are used to calculate long-term means from which each period’s shock is measured in standard deviation. In other words, weather shock is defined as a condition in which an $SPEI \leq -1.00$ or $SPEI \geq 1.00$. The fact that Young Live surveys are conducted between the months of October and December of each survey year features the data more compatible with the shocks in the two major agricultural seasons in Ethiopia. Figure 4.1 shows Weather variability (SPEI) in Ethiopia over the years 1940 – 2009, by survey region.

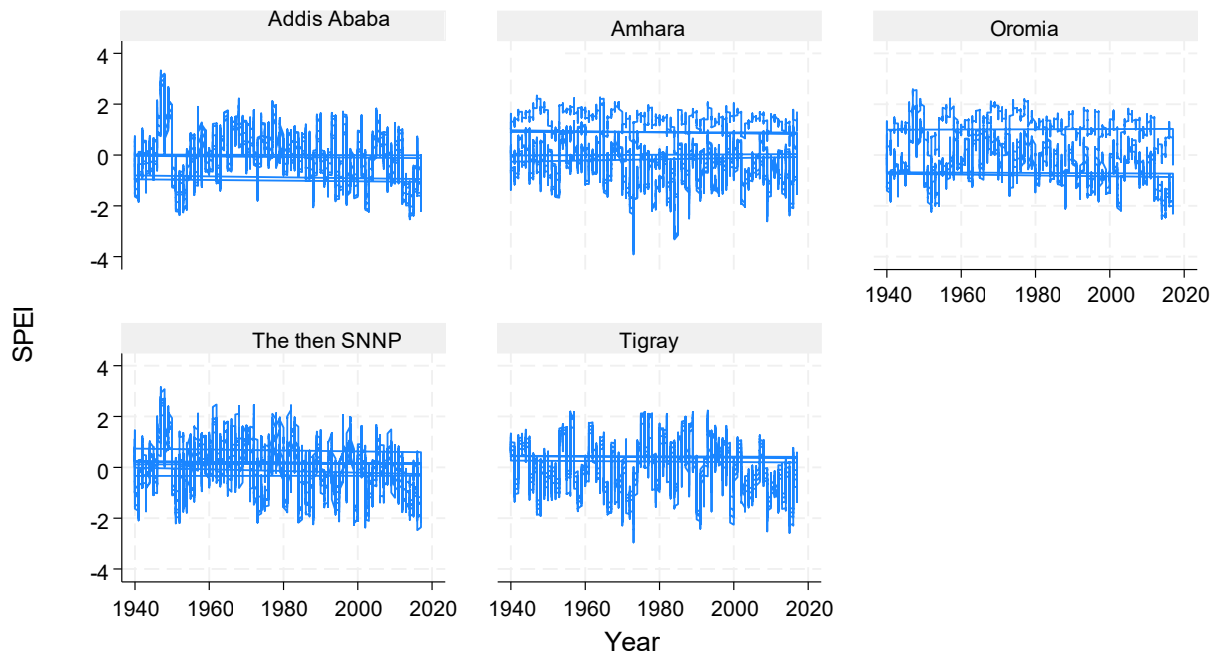


Figure 4.1. Weather variability (SPEI) in Ethiopia over the years 1940 – 2009, by survey region⁶

Information on other household characteristics that may potentially be associated with trust are solicited from the survey data, which includes education of husband, education of wife, theft experiences by a household and its members including theft of cattle, crops and other crimes, family disruption/deaths, media access (access to radio, television, and mobile phones), wealth of a household, and household size.

4.2.2. Descriptive statistics

Table 4.1 illustrates descriptive statistics on the main regressor and outcome variables, including the components of trust measures in the survey data. Statistics on household and community characteristics are also presented in the table. To maintain consistency with the main estimation, the statistics are calculated based on a restricted sample (with an aim to exclude missing values) in the regression analysis. Measures of political trust, such as trust towards the police, the government, and government officials, each show an overall average of 3 (agree) on a scale of 4, with a certain degree of variation in their means between the two survey years. Likewise, social trust indicators' overall average for the two years marginally exceeds 3 (agree) with some degree of variation between the years. Interestingly, the means of each of the social trust indicators (“I feel I can trust my neighbors to look after my house if I am away”, and “I feel I can trust people to look after my child”) decrease over the two survey years. The average of the two indicators of political trust (trust about the police and government officials) decreases while trust about the government shows a marginal increase, over the survey periods.

Over the two years, on average, about 83 percent of the households are affected by weather shocks, where the percentage reached as high as 90 percent in 2006. The past three years' exposure to shock by the households is, overall, about 89 percent, while the share of households hit by the shock amounts to 95 percent in 2006 and 82 percent in 2009. Similarly, households' exposure to shocks during the two major seasons (Meher and Belg) shows substantial variation in 2006, with high shock incidence during the Meher season.

Households in the Young Live Survey, in general and on average, have an education level of not more than primary school level, where the mothers/wives, on average, have no education. The husband's average level of schooling is primary school. Over the two survey years, on average, husbands lived in the community for about 35 years, while the wives lived for about 27 years, with a minimum of less than one year (indicated as zero) for both and a maximum of 84 years for husbands and 64 years for wives. The maximum years lived in the community are registered by those born in the community and have been living there till the survey period. About 15 percent of households reported theft experience in 2006, while the percentage reduced to 10 percent in 2009. About 18 percent of households experienced family disruption in the form of the death of a household member. About 63 percent of the households are rural, and the average wealth

(measured by wealth index) shows that the sample households are poor households with a wealth index of 0.31, measured on a scale between 0 (very poor) and 1 (rich). Data on access to media measured by ownership of TV, radio, or mobile phones shows that about 57 percent of the households had access in 2006 and increased to 63 percent in 2009.

Table 4.1: Descriptive statistics on major variables ²⁵

	overall average	2006				2009			
		Mean	SD	Mn	Max	Mean	SD	Mn	Max
HH characteristics									
Household size	6.32	6.30	2.05	2	16	6.34	2.01	2	14
Husband educ.level (0=no educ, 1=prim, 2=sec, 3=higher)	1.05	1.04	0.82	0	3	1.06	0.82	0	3
Wife educ.level (0=no educ, 1=prim, 2=sec, 3=higher)	0.67	0.67	0.79	0	3	0.68	0.79	0	3
husband age	44.33	42.80	9.83	23	84	45.87	9.97	21	93
wife age	35.03	33.57	7.24	19	64	36.50	7.26	16	68
husband lived in community (in yr)	35.02	33.83	16.89	0	84	36.35	17.25	3	93
wife lived in community (in yr)	26.52	25.22	12.35	0	64	27.87	12.40	3	68
Theft experience (1 if faced)	0.12	0.15	0.35	0	1	0.10	0.30	0	1
rural-urban (1=urban)	0.37	0.37	0.48	0	1	0.37	0.48	0	1
Family disruption/death (1=died)	0.18	0.18	0.38	0	1	0.18	0.38	0	1
Media access (ownership of TV, radio or mobile phone)	0.60	0.57	0.49	0	1	0.63	0.48	0	1
Wealth	0.31	0.29	0.17	0	0.87	0.33	0.17	0.01	0.86
Trust Variables									
Political trust (on 1 to 4 scale)									
local police do their job well	3.09	3.18	0.90	1	4	3.00	0.56	1	4
I believe the government does what is right for people like me	3.10	3.08	0.85	1	4	3.11	0.58	1	4
I am confident of the ability of the government officials to do their job	3.04	3.08	0.92	1	4	2.99	0.56	1	4
Social trust (on 1 to 4 scale)									
I feel I can trust my neighbors to look after my house if I am away	3.28	3.43	0.84	1	4	3.12	0.60	1	4
I feel I can trust people to look after my child	3.18	3.32	0.87	1	4	3.04	0.61	1	4
Shock variables									
Current year shock (both Belg & Meher)	0.83	0.90	0.30	0	1	0.76	0.43	0	1
Current-year shock - Meher	0.50	0.43	0.49	0	1	0.57	0.49	0	1
Current-year shock - Belg	0.65	0.75	0.43	0	1	0.54	0.50	0	1
Past 3 years shock (both Belg & Meher))	0.89	0.95	0.22	0	1	0.82	0.38	0	1
Past 3 years shock - Meher	0.78	0.84	0.37	0	1	0.72	0.45	0	1
Past 3 years shock - Belg	0.43	0.53	0.50	0	1	0.33	0.47	0	1
Total observation	5,045	2523				2522			

Source: Computed from survey data

4.2.3. Estimation strategy

By exploiting the advantage of the exogenous nature of weather shocks, I construct my model for the two trust outcome variables, social and political trust, and estimate using Fixed effect Seemingly Unrelated Regression (FE SUR). Social trust (or political trust) revealed by a household living in a particular community in a given survey year is a function of that year's shock (or the previous years' shock depending on interests in our analysis) and other household and community characteristics. Given the dynamics in attitude formation and the panel nature of data I have, I consider within variation, exploiting the change in individual's trust over periods under conditions of with and without weather shocks. Furthermore, I run seemingly unrelated regression considering the possible interdependence of social and political trust of a person. Test results show that political trust and social trust are interdependent and hence estimating by SUR remains valid²².

I, thus, estimate

$$SocTr_{ict} = \alpha_i + \beta_1 weather\ shock_{ict} + \gamma X_{ict} + \theta_t + \varepsilon_{it} \quad (1)$$

$$PolTr_{ict} = \alpha_i + \beta_1 weather\ shock_{ict} + \gamma X_{ict} + \theta_t + \varepsilon_{it} \quad (2)$$

Where $SocTr_{ict}$ and $PolTr_{ict}$ represent social trust and political trust of household i in community c at time t , respectively. The weather shock variable $weather\ shock_{ict}$ denotes shock dummy faced by households lived in community c at time t . The shock variable is at one time a survey year weather shock constructed from weather shock dummies over the months of production seasons (4 months of Belg and 4 months of Meher) right before the month of survey. In another estimation, the weather shock represents the last three years' shock dummy before the month of survey (constructed based on the time gap between the two panels and focus on the eight production months indicated). We also estimate the impact of lifetime exposure to shock on social and political trust. The lifetime exposure to shock represents shock frequency and is constructed from shock dummies over the years the husband and wife lived in a community. Exposure by the husband and wife is separately considered for estimation, as both have been exposed to different environments, and the number of years each lived in the community differs.

²² Breusch-Pagan test of independence: $chi2(1) = 592.938, Pr = 0.0000$

The vector X_{ict} represents household characteristics that correlate with trust attitude, including theft dummy (1 if household experienced various forms of thefts), family disruption dummy (1 if household experienced death of household member/s), media access dummy (1 if household has either TV, radio, or mobile phones), education level of husband, education level of wife, and household size. α_i and θ_t represents individual and year fixed effects. ε_{it} denotes residual. Since the shock data is at the community level, households in the community during a given period face the same shock, implying a potential for within-community correlation of the residuals. We, thus, cluster standard errors at the community level to account for this potential arbitrary correlation. The clustering provides estimates robust to heteroscedasticity and particularly relevant for panel data with multiple potential sources of residual correlations where a regressor varies at a higher level (like community level shock in this case) but outcomes at lower levels (household in our case) (Mackinnon and Webb, 2021). β_1 is the coefficient of interest that estimates the impact of weather shock on the current level of trust, social and political trust.

To check the robustness of our results, we conducted alternative estimations. First, following the work by Adhvaryu and Fenske (2023) and Mackay et al. (2024), we changed the measurement of trust variables from an index generated through principal component analysis to an index generated by simple average responses of the trust components. The mean index for social and political trust is constructed from the average of the response values of the trust questions of each trust type in our data. Second, we estimate an ordered logit model using each of the measures of the two types of trust in our specification. Results from conditional fixed effects and correlated random effects logistic regression are presented for robustness. Heterogeneity based on rural and urban sub-samples is also conducted to check whether the effect is variable across populations or locations.

4.3. Results and Discussion

4.3.1. The impact of current weather shock on the current level of trust

Table 4.2 presents results on the impact of current weather shocks on the current level of trust. Weather shocks that occurred in the major seasons before the survey month(s) of the same year affect the political trust of people. The shock affected households' political trust is 0.22 standard deviation lower due to the weather shock, implying a negative impact of the weather shock on political trust. The impact of current weather shocks on social trust is not significant. The insignificance may indicate cooperation in the society that resulted from the existence of a long-aged traditional informal support scheme in rural Ethiopia, which serves as informal insurance in the time of adverse events²³. The significant negative impact on political trust may imply the blame effect of the shock. The decrease in political trust due to shock may be attributed to limited responses by government and its institutions (at a lower administrative structure), by not mobilizing and coordinating sufficient local resources, and/or providing insufficient support.

Table 4.2: Fixed effect results (SUR) regarding the impact of current weather shock on trust ²⁶

<i>Variables</i>	<i>Political Trust</i>		<i>Social Trust</i>	
	<i>Baseline</i>	<i>Main model FE</i>	<i>Baseline</i>	<i>Main model FE</i>
<i>Weather shock (current yr)</i>	-0.116** (0.049)	-0.219*** (0.050)	0.199* (0.111)	-0.013 (0.049)
<i>Household size</i>		0.006 (0.007)		-0.003 (0.008)
<i>Wealth</i>		-0.344*** (0.115)		-0.627*** (0.161)
<i>Husband education</i>		-0.030 (0.023)		-0.041** (0.020)
<i>Wife education</i>		-0.046** (0.023)		-0.024 (0.024)
<i>Theft experience</i>		-0.108*** (0.040)		-0.094** (0.043)
<i>Media access</i>		-0.079** (0.031)		0.071* (0.042)
<i>Family Disruption</i>		0.085** (0.037)		0.103*** (0.030)
<i>Year FE</i>		Yes		Yes
<i>N</i>	5,045	5,045	5,045	5,045

Robust standard errors in parentheses and are clustered at the community level. *** p<0.01, ** p<0.05, * p<0.1.

²³ See Gonfa et al., (2025) for details on local informal institutions serving insurance in rural Ethiopia.

In developing countries with rural dominance settings like ours, weather shock affects not only subsistence farmers themselves through lower yield and corresponding income shock but also limits residents' access to food through its effect on market prices, where a minor response error by the government may pass a bad signal to the victims. Such unintended disregard may result in significant blame effect. This result aligns with recent findings by Alherup et al. (2024) and Giuliano and Spilimbergo (2024).

We further explore whether shocks in Meher and Belg seasons have differential impacts on political and social trust, given the variation in the importance of the two production seasons. Table 4.3 presents the impact of weather shocks during the two major production seasons on the trust of people. Weather shocks in both Meher and Belg seasons negatively affect political trust, while shocks in both show no significance on social trust. Since the Belg season comes before the major season (Meher) and the negative impact in Belg is assumed to be compensated for in the following major season, it often remains unattended, and the suffering during this time may silently impact a household, justifying the high significance of the impact during the Belg season.

Table 4.3: Fixed effect results (SUR) regarding the impact of seasonal weather shock on trust ²⁷

<i>Variables</i>	<i>Political Trust</i>		<i>Social Trust</i>	
	<i>Baseline</i>	<i>Main model FE</i>	<i>Baseline</i>	<i>Main model FE</i>
<i>Weather shock (Meher season)</i>	-0.126*** (0.043)	-0.084* (0.046)	-0.051 (0.057)	0.045 (0.047)
<i>Weather shock (Belg season)</i>	-0.034 (0.050)	-0.130*** (0.049)	0.192** (0.088)	-0.027 (0.050)
<i>Household size</i>		0.004 (0.007)		-0.003 (0.008)
<i>Wealth</i>		-0.369*** (0.122)		-0.633*** (0.162)
<i>Husband education</i>		-0.030 (0.024)		-0.041** (0.020)
<i>Wife education</i>		-0.043* (0.023)		-0.023 (0.024)
<i>Theft experience</i>		-0.104** (0.041)		-0.098** (0.044)
<i>Media access</i>		-0.074** (0.033)		0.073* (0.042)
<i>Family Disruption</i>		0.090** (0.036)		0.105*** (0.030)
<i>Year FE</i>		Yes		Yes
<i>N</i>	5,045	5,045	5,045	5,045

Robust standard errors in parentheses and are clustered at the community level. *** p<0.01, ** p<0.05, * p<0.1.

4.3.2. Impact of past weather shocks on Trust

Table 4.4 illustrates the effect of past shocks on social and political trust. Weather shock experiences in the past three years resulted in a significant decrease in political trust. Weather shocks faced in the last three years (from the survey period) have reduced political trust by 0.30 standard deviations, implying a significant cumulative blame effect from the recent past on the government in connection with the handling of adverse weather shocks in a community. The impact on social trust is insignificant, which may be associated with available strong social networks in the community serving informal insurance during hard times (Dercon et al, 2006; Pankhurst, 2008; Flemmen and Zenebe, 2016; Gonfa et al., 2025).

Table 4.4: Fixed effect results (SUR) regarding the impact of past weather shock on trust ²⁸

<i>Variables</i>	<i>Political Trust</i>		<i>Social Trust</i>	
	<i>Baseline</i>	<i>Main model FE</i>	<i>Baseline</i>	<i>Main model FE</i>
<i>Weather shock (last 3 yrs)</i>	-0.165*** (0.059)	-0.298*** (0.064)	0.247*** (0.052)	-0.035 (0.056)
<i>Household size</i>		0.005 (0.007)		-0.003 (0.008)
<i>Wealth</i>		-0.347*** (0.117)		-0.628*** (0.161)
<i>Husband education</i>		-0.029 (0.023)		-0.041** (0.020)
<i>Wife education</i>		-0.043* (0.022)		-0.024 (0.024)
<i>Theft experience</i>		-0.094** (0.041)		-0.092** (0.044)
<i>Media access</i>		-0.079** (0.031)		0.071* (0.042)
<i>Family Disruption</i>		0.080** (0.036)		0.102*** (0.029)
<i>Year FE</i>		<i>Yes</i>		<i>Yes</i>
<i>N</i>	5,045	5,045	5,045	5,045

Robust standard errors in parentheses and are clustered at the community level. *** p<0.01, ** p<0.05, * p<0.1.

Disaggregating past years' weather shock exposure into production seasons, the results show that repeated weather shocks during major production seasons (Meher) reduce social trust. This finding seems reasonable as the covariate nature of weather shock may prevent informal self-help associations from functioning, especially when repeated over time. The inability of social networks to insure against the shock may make community members feel disparate and reduce their interpersonal trust. Both seasons' weather shock decreases political trust, and yet the magnitude is larger for the major production season (Meher) (Table 4.5).

Table 4.5: Fixed effect results (SUR) on Impact of past seasonal weather shock (last 3 years) 29

<i>Variables</i>	<i>Political Trust</i>		<i>Social Trust</i>	
	<i>Baseline</i>	<i>Main model FE</i>	<i>Baseline</i>	<i>Main model FE</i>
<i>Weather shock (past 3yrs Meher seasons)</i>	-0.189** (0.082)	-0.226*** (0.040)	-0.053 (0.105)	-0.138*** (0.049)
<i>Weather shock (past 3yrs Belg seasons)</i>	-0.076 (0.056)	-0.131*** (0.048)	0.148* (0.088)	0.026 (0.060)
<i>Household size</i>		0.005 (0.007)		-0.002 (0.008)
<i>Wealth</i>		-0.311** (0.125)		-0.607*** (0.159)
<i>Husband education</i>		-0.029 (0.023)		-0.042** (0.019)
<i>Wife education</i>		-0.042* (0.022)		-0.023 (0.024)
<i>Theft experience</i>		-0.083** (0.040)		-0.084* (0.043)
<i>Media access</i>		-0.080** (0.032)		0.068 (0.042)
<i>Family Disruption</i>		0.080** (0.036)		0.096*** (0.028)
<i>Year FE</i>		Yes		Yes
<i>N</i>	5,045	5,045	5,045	5,045

Robust standard errors in parentheses and are clustered at the community level. *** p<0.01, ** p<0.05, * p<0.1.

4.3.3. Impact of lifetime exposure to weather shock on trust

Considering the difference in exposure to shock by husband and wife over their lifetime, we constructed the frequency of shock faced by husband and wife separately using the number of years each lived in the community and their corresponding ages. The average age of a wife during the observation in the year 2006 was 33.57 years, while the average age of a husband was about 43 years. The wife and husband lived in the community, on average, for about 25 and 34 years, respectively (table 4.1). We construct a shock for each of the Belg and Meher months over the years each lived in a community, aggregate each year's shock dummy, and use it as the number of times a wife or a husband faced a weather shock over the lifetime. In the lifetime shock-exposure scenario, we exploit the advantage in the difference in locations the husband and wife lived and the corresponding difference in shock exposure, unlike the situations in the current and past three years shocks where husband and wife lived together in the same community.

Table 4.6 presents results on the impact of lifetime shock frequency on social and political trust of the household. This provides evidence regarding whose exposure to shock determines the current

trust level. Wife’s frequency of exposure to shock over lifetime significantly affects political trust, while the husband’s similar exposure has shown no significance. The exposure to weather shock by both has shown no effect on social trust. The results may imply that lifetime weather shock exposure has a differential impact on political trust based on gender, but no differential impact on social trust, although the coefficients in all cases are small.

Table 4.6: Fixed effect result (SUR) regarding impact of Lifetime exposure to weather shock ³⁰

VARIABLES	Political Trust		Social Trust	
	Baseline	Main model	Baseline	Main model
<i>Husband’s frequency of exposure to shock over lifetime</i>	0.001** (0.001)	0.001 (0.001)	0.003*** (0.001)	0.001 (0.001)
<i>Wife’s frequency of exposure to shock over lifetime</i>	-0.003*** (0.001)	-0.003*** (0.001)	-0.002** (0.001)	-0.001 (0.001)
<i>Household size</i>		0.005 (0.007)		-0.004 (0.007)
<i>Wealth</i>		-0.349*** (0.124)		-0.623*** (0.166)
<i>Husband education</i>		-0.032 (0.024)		-0.041** (0.020)
<i>Wife education</i>		-0.041* (0.023)		-0.020 (0.025)
<i>Theft experience</i>		-0.114*** (0.040)		-0.096** (0.043)
<i>Media access</i>		-0.077** (0.032)		0.071* (0.042)
<i>Family Disruption</i>		0.095*** (0.037)		0.111*** (0.030)
<i>Year FE</i>		Yes		Yes
<i>N</i>	5,045	5,045	5,045	5,045

Robust standard errors in parentheses and are clustered at the community level. *** p<0.01, ** p<0.05, * p<0.1.

4.3.4. Robustness check

4.3.4.1. Robustness check using alternative trust measures

To check the robustness of our results, I altered the measurement of trust variables from an index generated through principal component analysis to an index generated by simple average responses of the trust components. The mean index for social trust is constructed from the average of the response values of the two social trust questions in our data, measured on a Likert scale of 1 to 4- “I feel I can trust my neighbors to look after my house if I am away”, and “I feel I can trust people to look after my child”. Similarly, the mean index for political trust is constructed from the average of the response values of the three political trust questions in our data - “local police do their job

well”, “I believe the government does what is right for people like me”, and “I am confident of the ability of the government officials to do their job”. Such an index is used in previous studies (Adhvaryu and Fenske, 2023; Mackay et al., 2024) and is a good proxy to measure a variable using indices from alternative measures.

Table 4.7 presents fixed effect results from SUR where social trust and political trust are measured by a mean index constructed from the components. Both current and past weather shocks decrease political trust, while the effect on social trust is insignificant, implying the consistency and robustness of the results in the main model. The results of the seasonal shocks are also robust and consistent.

Table 4.7: Fixed effect results (SUR) when trust is measured as mean index ³¹

VARIABLES	Political Trust				Social Trust			
	Current yr shock	Current yr ses shock	3 years shock	3 yrs seasonal shock	Current yr shock	Current yr ses shock	3 years shock	3 yrs seasonal shock
<i>Weather shock (1 year)</i>	-0.144*** (0.032)				-0.009 (0.032)			
<i>Weather shock (1 yr Meher)</i>		-0.050* (0.029)				0.029 (0.031)		
<i>Weather shock (1 yr Belg)</i>		-0.084*** (0.031)				-0.017 (0.032)		
<i>Weather shock (3 yrs)</i>			-0.193*** (0.041)				-0.023 (0.036)	
<i>Weather shock (3 yrs Meher)</i>				-0.140*** (0.028)				-0.089*** (0.032)
<i>Weather shock (3 yrs Belg)</i>				-0.074** (0.031)				0.017 (0.039)
<i>Household Size</i>	0.007* (0.004)	0.006 (0.004)	0.007* (0.004)	0.007* (0.004)	-0.002 (0.005)	-0.002 (0.005)	-0.002 (0.005)	-0.001 (0.005)
<i>Wealth</i>	-0.269*** (0.069)	-0.286*** (0.073)	-0.272*** (0.070)	-0.248*** (0.074)	-0.405*** (0.104)	-0.409*** (0.104)	-0.406*** (0.104)	-0.392*** (0.103)
<i>Husband education</i>	-0.018 (0.013)	-0.018 (0.013)	-0.018 (0.013)	-0.017 (0.013)	-0.027** (0.013)	-0.027** (0.013)	-0.027** (0.013)	-0.027** (0.013)
<i>Wife education</i>	-0.031** (0.013)	-0.029** (0.013)	-0.028** (0.013)	-0.028** (0.013)	-0.015 (0.016)	-0.015 (0.016)	-0.015 (0.016)	-0.015 (0.016)
<i>Theft experience</i>	-0.051** (0.022)	-0.049** (0.022)	-0.042* (0.022)	-0.036* (0.022)	-0.060** (0.028)	-0.063** (0.028)	-0.059** (0.028)	-0.054* (0.028)
<i>Media access</i>	-0.036** (0.018)	-0.033* (0.019)	-0.035** (0.018)	-0.036** (0.018)	0.046* (0.027)	0.047* (0.027)	0.046* (0.027)	0.044 (0.027)
<i>Family disruption (death)</i>	0.052** (0.021)	0.055*** (0.021)	0.048** (0.020)	0.049** (0.021)	0.066*** (0.019)	0.067*** (0.019)	0.065*** (0.019)	0.062*** (0.018)
<i>Year FE</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045

Robust standard errors in parentheses and are clustered at the community level. *** p<0.01, ** p<0.05, * p<0.1

4.3.4.2. *Robustness check using ordered logit estimation on individual trust measures*

To further check the robustness of our results, I run separate estimations taking individual measures of social and political trust as outcome variables. As described in the data section of this paper, social trust includes two measures. “I feel I can trust my neighbors to look after my house if I am away”, and “I feel I can trust people to look after my child”. The political trust measures include: “local police do their job well”, “I believe the government does what is right for people like me”, and “I am confident of the ability of the government officials to do their job”. Using each of the measures (measured on Likert Scale), we estimate an ordered logit correlated random effect model. We run correlated random effects instead of conditional fixed effects, mainly to retain observations whose values do not change over the panel periods, which otherwise are excluded under the conditional fixed effect estimation. Correlated random effects results for the individual trust measures are presented in tables 4.8 and 4.9, while fixed effect results from conditional logistic regression are provided in Appendix II.

Table 4.8: Ordered logit CRE results regarding the impact of current shock on trust ³²

VARIABLES	Political Trust			Social Trust	
	Trust Police	Trust Government	Trust Gov't officials	Trust Neighbor	Trust People
Weather shock (current yr)	-0.006 (0.041)	-0.184*** (0.038)	-0.119*** (0.042)	0.161*** (0.042)	0.074* (0.043)
Household size	-0.009 (0.008)	0.022*** (0.007)	0.013 (0.008)	-0.016* (0.008)	0.010 (0.008)
Wealth	-0.261** (0.127)	-0.516*** (0.116)	-0.399*** (0.130)	-0.656*** (0.128)	-0.755*** (0.131)
Husband education	-0.024 (0.026)	-0.021 (0.024)	-0.014 (0.027)	-0.030 (0.026)	-0.039 (0.027)
Wife education	-0.006 (0.028)	-0.038 (0.025)	-0.028 (0.028)	0.019 (0.028)	0.003 (0.028)
Theft experience	-0.082* (0.047)	-0.026 (0.043)	0.012 (0.048)	0.012 (0.047)	-0.013 (0.048)
Media access	-0.071* (0.039)	0.018 (0.035)	-0.047 (0.040)	0.056 (0.039)	0.060 (0.040)
Family disruption (death)	0.083** (0.041)	0.071* (0.038)	0.061 (0.042)	0.093** (0.041)	0.069 (0.043)
N	5,045	5,045	5,045	5,045	5,045

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.8 shows a robust negative relationship between current weather shock and political trust, as evidenced by the negative effect of the shock on measures of political trust. Weather shock

reduces trust in government and government officials, while the effect on trust in police is insignificant. On the other hand, current weather shock increases both measures of social trust, trust in neighbors and trust in the general people, although the effect is insignificant in the main model.

Table 4.9: Ordered logit CRE results as a robustness check, impact of past shock on trust ³³

VARIABLES	Political Trust			Social Trust	
	Trust Police	Trust government	Trust gov't officials	Trust Neighbor	Trust People
Weather shock (past 3 years)	-0.032 (0.051)	-0.246*** (0.047)	-0.104** (0.053)	0.206*** (0.052)	0.120** (0.053)
Household size	-0.009 (0.008)	0.021*** (0.007)	0.013 (0.008)	-0.015* (0.008)	0.010 (0.008)
Wealth	-0.266** (0.127)	-0.525*** (0.116)	-0.395*** (0.130)	-0.650*** (0.128)	-0.747*** (0.131)
Husband education	-0.024 (0.026)	-0.021 (0.024)	-0.014 (0.027)	-0.031 (0.026)	-0.039 (0.027)
Wife education	-0.005 (0.028)	-0.034 (0.025)	-0.026 (0.028)	0.016 (0.028)	0.002 (0.028)
Theft experience	-0.079* (0.047)	-0.014 (0.043)	0.016 (0.048)	0.002 (0.047)	-0.019 (0.049)
Media access	-0.071* (0.039)	0.017 (0.035)	-0.046 (0.040)	0.056 (0.039)	0.061 (0.040)
Family disruption (death)	0.081* (0.041)	0.066* (0.038)	0.062 (0.042)	0.097** (0.042)	0.072* (0.043)
Observations	5,045	5,045	5,045	5,045	5,045

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.9 presents robustness check results regarding the impact of past shocks on political and social trust, by using individual trust measures. The result shows that past shocks' effect on the two measures of social trust –trusting people in their role to look after a house on behalf and trusting people regarding a role to look after a child on behalf are significant. Similarly, results about the past weather shocks' negative impact on current political trust, in the main model, are robust as the impact on the individual measures of political trust shows the same. Weather shock in the past three years (from the survey period) significantly reduced trust in government and government officials.

Results from fixed-effect conditional logit estimation also show robust and consistent results. The conditional fixed effect, however, provides a smaller number of observations since it estimates

conditioning on the total number of successes per group and excludes unchanged orderings between the panel rounds. The results are presented in Appendix II as additional evidence of the consistency and robustness of the results.

Robustness check results regarding the impact of seasonal weather shocks on trust show that the main results are robust and consistent. Results from the correlated random effects ordered logit model using individual trust measures are presented in Appendix III.

4.3.5. Heterogeneity Analysis

Based on our variables of interest, weather shock and trust, we hypothesize that the effects of weather shock on social and political trust may vary across rural and urban samples. However, in a weather-dependent economy like Ethiopia, weather shocks potentially affect not only the rural but also the urban areas. Tables 4.10 and 4.11 show the results of heterogeneity between urban and rural samples, based on the nature and seasons of shocks. Table 4.10 shows that the past three years' weather shock significantly reduces political trust in both rural and urban areas, while the current shock reduces political trust in urban areas but is not significant for the rural sample. The effect on social trust is not significant for both urban and rural samples, although the past three years' shocks marginally increase social trust in rural areas.

Disaggregating the shocks to major agricultural seasons, results presented in table 4.11, weather shock in the current year Meher season significantly reduces political trust in urban samples, while similar shock in the past three years reduces political trust in both urban and rural samples. The past three years' Meher season shocks have also negatively affected social trust, implying the critical nature of the season as well as the possibility that repeated weather shocks in major agricultural seasons may deteriorate society's cooperation and threaten the ability of social networks. On the other hand, weather shock in the current Belg season marginally decreases political trust in urban areas, with no significant effect on political trust in rural samples and social trust in both rural and urban samples. The past three years' shock in Belg season significantly decreases political trust in urban samples. The results show that people's political trust in the face of current weather shocks is more responsive in urban areas, while the response to past weather shocks is sensitive in both rural and urban samples.

Table 4.10: Fixed effect SUR results on the impact of weather shock on trust, rural and urban sub-samples³⁴

VARIABLES	Political Trust				Social Trust			
	Current shock		Past 3 yrs shock		Current shock		Past 3 yrs shock	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Weather shock (current 1yr)	-0.096 (0.079)	-0.218*** (0.074)			0.038 (0.049)	-0.026 (0.084)		
Weather shock (past 3yrs)			-0.178** (0.081)	-0.342*** (0.080)			0.092* (0.050)	-0.145 (0.094)
Household size	-0.002 (0.006)	0.015 (0.014)	-0.002 (0.006)	0.015 (0.013)	-0.003 (0.008)	-0.004 (0.015)	-0.003 (0.008)	-0.003 (0.015)
Wealth	-0.251 (0.195)	-0.349*** (0.113)	-0.252 (0.195)	-0.357*** (0.109)	-0.505*** (0.185)	-0.721*** (0.216)	-0.503*** (0.185)	-0.725*** (0.217)
Husband education	-0.045** (0.020)	-0.008 (0.041)	-0.044** (0.020)	-0.009 (0.041)	-0.069*** (0.018)	0.002 (0.038)	-0.070*** (0.018)	0.001 (0.038)
Wife education	-0.036 (0.027)	-0.053 (0.035)	-0.033 (0.026)	-0.050 (0.036)	-0.026 (0.028)	-0.028 (0.036)	-0.028 (0.028)	-0.028 (0.036)
Theft experience	-0.130*** (0.040)	-0.068 (0.074)	-0.123*** (0.040)	-0.047 (0.075)	-0.115** (0.046)	-0.052 (0.079)	-0.119*** (0.046)	-0.046 (0.083)
Media access	-0.104*** (0.039)	0.010 (0.063)	-0.104*** (0.039)	0.008 (0.063)	0.053 (0.053)	0.120* (0.072)	0.053 (0.053)	0.114 (0.074)
Family disruption (death)	0.107** (0.042)	0.072 (0.067)	0.103** (0.041)	0.061 (0.064)	0.113*** (0.034)	0.097** (0.043)	0.115*** (0.033)	0.086** (0.041)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,179	1,866	3,179	1,866	3,179	1,866	3,179	1,866

Table 4.11: FE SUR results regarding impact of seasonal weather shock on trust, rural-urban sub-samples³⁵

VARIABLES	Political Trust				Social Trust			
	Current seasonal shocks		Past seasonal shocks		Current seasonal shocks		Past seasonal shocks	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Weather shock (1yr Meher)	-0.022 (0.057)	-0.253*** (0.050)			0.043 (0.055)	0.042 (0.062)		
Weather shock (1 yr Belg)	-0.047 (0.066)	-0.072* (0.039)			-0.017 (0.061)	-0.004 (0.082)		
Weather shock (3yrs Meher)			-0.203*** (0.031)	-0.175** (0.083)			-0.117** (0.052)	-0.259* (0.144)
Weather shock (3yr Belg)			-0.088 (0.055)	-0.183** (0.090)			0.046 (0.069)	0.115 (0.161)
Household size	-0.003 (0.006)	0.016 (0.014)	-0.002 (0.006)	0.016 (0.013)	-0.002 (0.008)	-0.004 (0.015)	-0.002 (0.008)	-0.003 (0.015)
Wealth	-0.262 (0.209)	-0.359*** (0.107)	-0.216 (0.204)	-0.338*** (0.110)	-0.518*** (0.176)	-0.721*** (0.226)	-0.476*** (0.180)	-0.709*** (0.218)
Husband education	-0.045** (0.020)	-0.008 (0.042)	-0.044** (0.021)	-0.008 (0.041)	-0.070*** (0.018)	0.003 (0.038)	-0.069*** (0.018)	0.000 (0.039)
Wife education	-0.035 (0.027)	-0.053 (0.035)	-0.031 (0.027)	-0.050 (0.035)	-0.027 (0.028)	-0.026 (0.036)	-0.025 (0.027)	-0.028 (0.036)
Theft experience	-0.130*** (0.041)	-0.047 (0.075)	-0.105*** (0.039)	-0.046 (0.073)	-0.117** (0.047)	-0.054 (0.083)	-0.103** (0.045)	-0.050 (0.082)
Media access	-0.104*** (0.039)	0.013 (0.064)	-0.107*** (0.040)	0.011 (0.063)	0.053 (0.052)	0.125* (0.075)	0.049 (0.053)	0.112 (0.074)
Family disruption (death)	0.110*** (0.041)	0.075 (0.065)	0.100** (0.041)	0.062 (0.064)	0.113*** (0.034)	0.101** (0.043)	0.105*** (0.032)	0.087** (0.041)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,179	1,866	3,179	1,866	3,179	1,866	3,179	1,866

Robust standard errors in parentheses and are clustered at the community level. *** p<0.01, ** p<0.05, * p<0.1

4.4. Conclusion and Implications

In this study, we examine the impact of exogenous climatic shocks on social and political trust of households. We combined high precision exogenous climate data with Young Live Ethiopia panel surveys of the years 2006 and 2009 and show that weather shock significantly reduces political trust and variably affects social trust based on the season of the shock. The study contributes to the body of literature by providing evidence from prevalent climatic shocks and weather-dependent developing economy settings.

We approach, first, by estimating the impact of current weather shocks on current social and political trust, then, after estimating the impact of past shocks on current social and political trust, including the impact of lifetime exposure to shocks. Both current and past weather shocks decrease political trust but the effect on social trust is insignificant. Weather shocks during the last three years Meher season, the major agricultural season, however, significantly reduced both political and social trust. Estimation from disaggregated trust measures shows that current and past weather shocks negatively affect individual political trust measures – “I believe the government does what is right for people like me” and “I am confident of the ability of the government officials to do their job”. Heterogeneity analysis also shows that people’s political trust in the face of current weather shocks is more responsive in urban areas, while the response to past weather shocks is sensitive in both rural and urban samples. The findings are robust under alternative estimations, both under alternative specifications and measures of trust, such as FE, ordered logit CRE, and conditional fixed effect.

Since trust determines various economic, social, and political outcomes, it is essential to consider the evidence regarding the impact of climatic shocks on trust attitudes. Policy makers, while devising policies and strategies to address the economic effects of weather shocks, need to consider ways that reduce the impacts of weather shocks on human behavior- trust- as well. Considering the behavioral dimension of the impacts of weather shocks is essential, as households/ communities’ capacity to cope with similar shocks in the future highly depends on the trust itself. Mitigating the impact of weather shock on trust is equally important to mitigating the economic effect of the shock, as the negative impact on trust in turn adversely affects economic outcomes.

4.5. References

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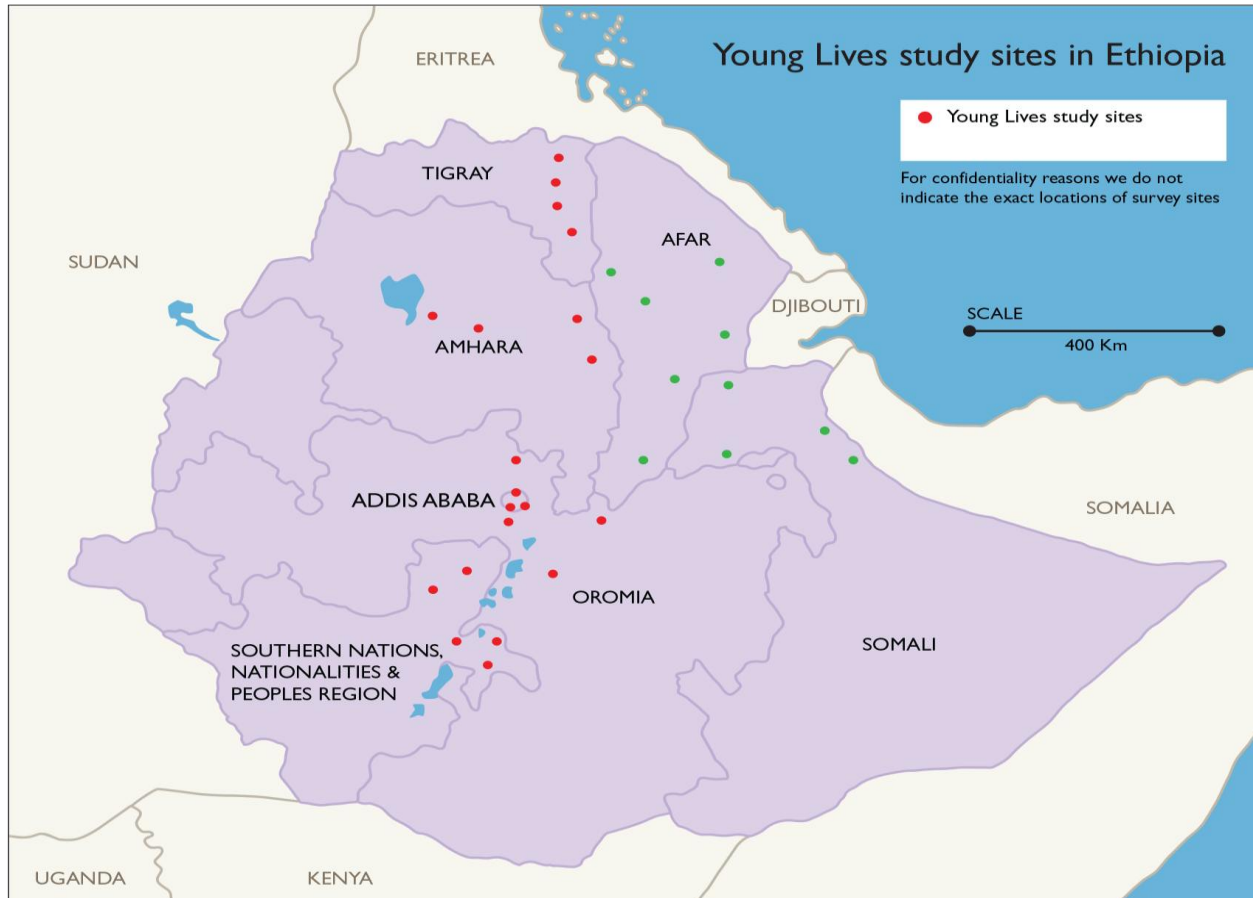
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4.6. Appendices

Appendix I: Figure 4.2. Young Lives Ethiopia study sites 7



Source: Alemu et al. (2003), Young Lives preliminary country report; Rossiter et al. (2017), Young lives school survey report, 2016-17.

Appendix II: Fixed effect (conditional logistic regression) results using each trust measures

VARIABLES	Current year shock					Past 3 years shock				
	Trust_ police	Trust_ government	Trust_ gov official	Trust_ neighbor about house	Trust_ people about child	Trust_ police	Trust_ government	Trust_ gov official	Trust_ neighbor about house	Trust_ people about child
Weather shock (1 yr)	-0.252 (0.160)	-0.431** (0.180)	- 0.352** (0.160)	0.230 (0.195)	-0.005 (0.176)					
Weather shock (3 yrs)						-0.402* (0.210)	-0.725*** (0.231)	-0.288 (0.209)	0.406* (0.245)	0.125 (0.224)
<i>Household size</i>	-0.049 (0.033)	0.116*** (0.040)	0.046 (0.035)	-0.055 (0.037)	0.079** (0.035)	-0.049 (0.033)	0.114*** (0.040)	0.044 (0.035)	-0.052 (0.037)	0.079** (0.035)
<i>Wealth</i>	-0.090 (0.511)	-2.305*** (0.599)	-0.769 (0.500)	- 1.576** (0.612)	- 1.251** (0.530)	-0.107 (0.512)	-2.322*** (0.603)	-0.798 (0.498)	- 1.605*** (0.613)	- 1.264** (0.530)
<i>Husband education</i>	-0.079 (0.110)	0.033 (0.129)	-0.117 (0.104)	-0.150 (0.122)	-0.107 (0.111)	-0.080 (0.110)	0.032 (0.130)	-0.121 (0.104)	-0.160 (0.122)	-0.108 (0.111)
<i>Wife education</i>	0.030 (0.117)	-0.075 (0.132)	0.020 (0.109)	0.044 (0.126)	-0.059 (0.111)	0.027 (0.117)	-0.071 (0.133)	0.024 (0.109)	0.058 (0.126)	-0.057 (0.111)
<i>Theft experience</i>	- 0.370** (0.177)	-0.090 (0.231)	0.043 (0.187)	-0.068 (0.199)	-0.213 (0.192)	- 0.351** (0.177)	-0.051 (0.234)	0.061 (0.188)	-0.099 (0.199)	-0.214 (0.191)
<i>Media access</i>	-0.316* (0.162)	-0.085 (0.192)	-0.150 (0.160)	0.194 (0.177)	0.180 (0.165)	- 0.319** (0.163)	-0.098 (0.193)	-0.143 (0.160)	0.190 (0.177)	0.182 (0.165)
<i>Family Disruption</i>	0.065 (0.175)	0.060 (0.206)	0.268 (0.170)	0.321* (0.186)	0.275 (0.178)	0.061 (0.176)	0.008 (0.207)	0.268 (0.170)	0.331* (0.186)	0.284 (0.178)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,140	916	1,194	836	980	1,140	916	1,194	836	980

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix III: Correlated random effect ordered logit results regarding the impact of seasonal weather shocks on trust measures

VARIABLES	Political Trust						Social Trust			
	Current seasonal shocks			Past seasonal shocks			Current shock		Past shocks	
	Trust Police	Trust gov't	Trust Gov't official	Trust police	Trust Gov't	Trust gov't official	Trust neighbor	Trust People	Trust neighbor	Trust People
Weather shock (1 yr Meher)	-0.103***	-0.056**	-0.032				-0.031	-0.027		
	(0.027)	(0.025)	(0.028)				(0.027)	(0.028)		
Weather shock (1 yr Belg)	0.023	-0.096***	-0.065**				0.131***	0.083**		
	(0.032)	(0.030)	(0.033)				(0.032)	(0.033)		
Weather shock (3 yr Meher)				-0.101***	-0.169***	-0.089**			-0.004	-0.075*
				(0.037)	(0.034)	(0.038)			(0.038)	(0.039)
Weather shock (3 yr Belg)				-0.041	-0.056	-0.033			0.122***	0.080*
				(0.040)	(0.036)	(0.041)			(0.040)	(0.041)
Household size	-0.009	0.020***	0.012	-0.008	0.021***	0.012	-0.014*	0.011	-0.015*	0.011
	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Wealth	-0.231*	-0.519***	-0.403***	-0.265**	-0.487***	-0.380***	-0.617***	-0.723***	-0.665***	-0.752***
	(0.128)	(0.117)	(0.131)	(0.127)	(0.116)	(0.130)	(0.128)	(0.132)	(0.127)	(0.131)
Husband education	-0.024	-0.021	-0.015	-0.024	-0.021	-0.014	-0.029	-0.038	-0.031	-0.040
	(0.026)	(0.024)	(0.027)	(0.026)	(0.024)	(0.027)	(0.026)	(0.027)	(0.026)	(0.027)
Wife education	-0.007	-0.037	-0.027	-0.003	-0.034	-0.025	0.016	0.001	0.018	0.004
	(0.028)	(0.025)	(0.028)	(0.028)	(0.025)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Theft experience	-0.076	-0.026	0.012	-0.068	-0.010	0.020	0.017	-0.011	0.010	-0.008
	(0.047)	(0.043)	(0.048)	(0.047)	(0.043)	(0.048)	(0.047)	(0.048)	(0.047)	(0.048)
Media access	-0.072*	0.022	-0.044	-0.073*	0.017	-0.047	0.051	0.057	0.052	0.056
	(0.039)	(0.035)	(0.040)	(0.039)	(0.035)	(0.040)	(0.039)	(0.040)	(0.039)	(0.040)
Family Disruption	0.081*	0.077**	0.065	0.074*	0.069*	0.061	0.088**	0.067	0.088**	0.062
	(0.041)	(0.038)	(0.042)	(0.041)	(0.038)	(0.042)	(0.041)	(0.043)	(0.041)	(0.043)
N	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Chapter Five

Summary of Conclusions and Implications of the Dissertation

This dissertation presents evidence regarding the interplay between shocks, social capital, trust, and prosocial attitudes using two longitudinal datasets in Ethiopia and Young Lives data from India and Vietnam. It addresses three interrelated research questions: do social capital in informal local institutions in rural Ethiopia buffer against shocks, does exposure to exogenous weather shocks affect people's social and political trust, and what determines prosocial attitude formation in children? The studies contribute to literature about the relationship between cooperation and various economic, social, and political outcomes. The contribution is, particularly, to literature and policies on the fields of risk sharing and informal insurance, attitude formation in children with a focus on nurture-based transmissions of attitudes, and the relationship between the natural environment and people's behavior.

From the study about the buffering role of social capital, we conclude that social capital embedded in traditional indigenous informal institutions protects household consumption in the face of shocks, and the protection conditions the types of social capital, shock, and welfare metrics. The buffering goes beyond idiosyncratic shocks and covers multiple and simultaneous shocks. Local informal institutions, typically founded without the interference of other organizations such as government authorities and NGOs and lasting for decades at the will of their members, are rich in resources, and can serve as a foothold in expanding rural insurance. Policymakers and authorities interested in rural insurance, therefore, should understand the power of informal resources inherent in local informal institutions to make amicable and impactful insurance-related interventions. Mitigating rural food insecurity and rural development challenges may also need to align formal intervention programs with indigenous institutions. Moreover, researchers need to understand the nuances of social networks ingrained in traditional institutions by exploring beyond availability/participation and including network diversity and sizes.

Based on the evidence regarding attitude formation in children, I conclude that parents' prosocial attitudes and outside-family social environments are associated with attitude formation in children;

however, the association is not guaranteed across all sample countries. The transmission of attitudes from parents to children yields mixed results, where parents' attitudes are associated with children's attitudes in the Ethiopian sample, but no evidence of association in the India and Vietnam samples. Similarly, external social environments such as school and peers are significantly correlated with the prosocial attitude of children in the Ethiopia and India samples, but the association is not significant in the Vietnam sample. Parents' and external social environment's influence on children also shows variation based on parents' characteristics, particularly religion and ethnic similarity between the mother and father of a child. The mixed results, therefore, may imply the roles played by parenting styles and within-family and cultural black boxes across societies. Interventions targeting personality development, thus, should consider both within and outside family social environments. Within-family socialization actions that are often left to the parents' discretion need to be followed up by devising strategies that enhance parents' awareness about their behavior and the desired attitude of children from the national interest's perspective. Environments external to the family, such as schools and the community, should also be protected by governments and community organizations, as they remain pivotal in shaping children's attitudes.

Based on the study about the impact of exogenous climatic shocks on social and political trust, I conclude that weather shocks significantly affect political trust. Both current and past weather shocks decrease trust in government and its institutions, while weather shocks in the major agricultural season, Meher, reduce both interpersonal and political trust. Policies to mitigate the economic effects of natural disasters should consider not only the direct effects of the shocks on livelihoods but also the impacts on human behavior, which further determine various economic, social, and political outcomes.

In general, the interplay between shocks, social capital, trust, and other-regarding preferences of human beings needs to be understood well, as they are key determinants of economic, social, and political outcomes. Results in this dissertation underpin personality development, cooperative preferences as a means of risk-sharing in a community, and how exogenous risks further affect social and political dynamics. The findings should serve as essentials in devising holistic rural development policies and strategies.

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