

# The Role of Social Capital in Improving Health Outcomes, Equity, and Resilience: A Quantitative Analysis

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## Acronyms

<b>CBHI</b>	community-based health insurance
<b>CHE</b>	catastrophic health expenditure
<b>CES-D</b>	Centre of Epidemiological Studies Depression
<b>FRP</b>	financial risk protection
<b>LMIC</b>	low- and middle-income country
<b>NIDS</b>	National Income Dynamics Study
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OOP</b>	out-of-pocket
<b>SES</b>	socioeconomic status
<b>SOCAT</b>	Social Capital Assessment Tool
<b>THI</b>	total household income
<b>WHO</b>	World Health Organization



## Executive Summary

### Introduction

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Since the launch of the World Health Organization (WHO) Commission on Social Determinants of Health's framework in 2010, addressing the social determinants of health is now a well-established policy objective for almost all health care systems. The framework established the importance of social determinants, defined as “the social circumstances in which people live and work,” for health outcomes and equity (WHO, 2010). The framework distinguished between several components, such as structural determinants, including socioeconomic status, and intermediary determinants, including living and working conditions. Within this framework, social capital stood out as uniquely cutting across the structural and intermediary determinants.

Social capital has been widely studied and linked to a range of socioeconomic outcomes, including economic growth, innovation, political governance, and crime (Akcomak & ter Weel, 2009; Easterly et al., 2006). The perceived importance of social capital for economic and social development has long been established. For example, the World Bank's Social Capital Initiative launched in 1996 highlighted its potential importance for the economic development of low- and middle-income countries (LMICs). The United Nation's World Social Capital Monitor launched in 2016 attempts to measure social capital across countries based on its importance for achieving the Sustainable Development Goals.

Despite a large body of work examining the impact of social capital across a wide range of socioeconomic outcomes, controversy still surrounds the conceptualization and definition of social capital. The popularization of the concept of social capital is often attributed to Bourdieu (1986), Coleman (1988), and Putnam (1993, 2000), who have each proposed definitions. These multidisciplinary origins and appeal of the concept have been highlighted as contributing to the lack of a single definition (Grootaert & van Bastelaer, 2002).

Among the various conceptualizations and definitions, there is a common emphasis on social relationships, trust, reciprocity, networks, and the resources embedded in them. As such, regardless of the specific definition or description, the idea of social capital is always relational. It has been suggested that social capital exists at both the individual and community levels (Laporte, 2014). In addition, due to its multidimensionality, different components of social capital have also been conceptualized, such as structural and cognitive social capital (Bain & Hicks, 1998). Structural social capital reflects the associational links between individuals and can be characterized as what individuals do. Commonly this is captured by measuring an individual's civic participation, such as organizational membership, social networks, and political engagement. Cognitive social capital is characterized by how individuals



feel regarding social relations (Harpham et al., 2002). This is commonly captured by measuring trust, sense of belonging, and reciprocity (DeSilva et al., 2007).

Research on the relationship between social capital and health began in the late 1990s (Kawachi et al., 2008). Putnam (2000) suggested that “of all the domains in which I have traced the consequences of social capital, in none is the importance of social connectedness so well established as in the case of health and well-being.” Despite the growing importance of social determinants of health in policy dialogues, it has been noted that the relationship between social capital and health in LMICs has been a significantly underexplored topic in the wider research agenda of understanding health outcomes and inequities (Story, 2013).

A discrepancy remains between the size of the literature hypothesizing a link between social capital and health in LMICs, and the quantity and quality of the empirical evidence exploring this relationship. Many studies have convincingly outlined several theoretical mechanisms through which social capital may influence health-related outcomes in LMICs (Folland, 2008), including following:

- Providing access to additional resources through informal channels and reducing financial barriers to health care utilization and the economic implications of accessing health care
- Increasing institutional trust between individuals, communities, and health care providers and systems, which influences individuals’ willingness to engage with the health care system and utilization of health care
- Affecting an individuals’ levels of social participation and integration, influencing mental health, and individual’s resilience and ability to deal with negative psychological shocks
- Impacting individuals’ access to health-related information and the cost of obtaining information potentially influencing an individual’s health behaviors

These mechanisms provide strong theoretical reasons for why social capital can be an important determinant of health and health-related outcomes. However, there is little empirical evidence specifically testing these theories.

This multidimensional report has a number of aspects. First, it highlights the existing evidence on the relationship between social capital and health in LMICs. Second, it details and clarifies the various mechanisms through which social capital may influence health. A principal component of the report is a quantitative analysis to examine the relationship between social capital, health, and related outcomes. Finally, based on the findings from previous literature and results from the quantitative analysis, the report provides development practitioners with recommendations on key considerations to design and implement social capital programs, with the objective of improving health outcomes and equity. It should be noted that no country-specific recommendations are provided in this report. It is





intended to serve as an adaptable knowledge product for development practitioners in LMICs.

## Methods

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The first part of the study includes a literature review of existing knowledge on the relationship between social capital and health in LMICs, to identify associations between measures of social capital and health outcomes in several LMICs. The second part of the study outlines the mechanisms that have been proposed to create a link between social capital and health. Understanding the mechanisms and their relative influence is important to guide policy design for programs that aim to build social capital to improve health outcomes.

The third, and primary, part of the study is a quantitative analysis exploring the relationship between social capital and health in South Africa. Social capital has been identified as a central component of development in South Africa since its Reconstruction and Development Programme, which states that “social movements and CBOs [community-based organizations] are a major asset in efforts to democratize and develop our society” (African National Congress, 1994).

The researchers analyzed data from the South African National Income Dynamics Study, a publicly available panel dataset covering the period from 2008 to 2017. The following four questions were identified by gaps in the literature review and the availability of data and associated constraints:

- Does social capital influence physical and mental health outcomes?
- Does social capital influence health care utilization?
- Does social capital improve household resilience as measured by financial risk protection?
- Does the influence of social capital on health outcomes vary by household socioeconomic status?

The primary measures of health outcomes are individual’s self-reported overall health and the Centre of Epidemiological Studies Depression Scale. Health care utilization was measured through an indicator of whether individuals had utilized health care in the past 30 days. Finally, financial risk protection was measured by whether a household had suffered a catastrophic health expenditure in the past year (i.e., a health care expenditure totaling more than 10% of household income).

Two indicators were used to measure social capital, namely metrics capturing perceptions of generalized trust and metrics capturing perceptions of localized trust. Generalized trust captures aspects of institutional trust and social capital between individuals and health care systems, and localized trust captures features of individuals and communities, such as reciprocity.



Fixed effects estimates were obtained to address some methodological challenges associated with examining the relationship between social capital and health. In addition, robustness checks and alternative specifications were run using different measures of health outcomes and social capital.

## Results

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Results from the literature review show increasing evidence of the relationship between social capital and health in LMICs. However, several studies do not address the methodological issues inherent in examining the relationship between social capital and health, which leaves questions about the causal nature of the relationship.

The quantitative analysis found very low levels of social capital, as measured by generalized and localized trust, in South Africa. The results suggest that localized trust is positively related to self-reported overall health status, whereas there is no statistically significant relationship between generalized trust and self-reported overall health. In contrast, the relationship between social capital and mental health in South Africa is negative, with improvements in individual cognitive social capital resulting in declines in mental health scores. This finding that the relationship between social capital and health is not unequivocally positive, and that effects can be both beneficial and detrimental, matches findings from preexisting literature. The findings also suggest that, in this setting, the relationship between cognitive social capital and mental health is stronger than the relationship with the overall health status.

It appears that the influence of localized trust on self-reported health outcomes is largely driven by individuals with low socioeconomic status, which suggests that interventions to build social capital may have a pro-poor characteristic that naturally reduces health inequities.

Regarding the influence of social capital on health, the findings are less clear. There is suggestive evidence that increases in localized trust may reduce health care utilization. On the other hand, there is clearly no observable relationship between social capital and financial risk protection.

Examining more specific health measures found that increases in social capital may slightly reduce the probability that an individual is HIV-positive but may increase the chance that they have been ill in the past 30 days. Finally, in examining the relationship between structural social capital (as measured by organizational membership) and health, the study found that the impact depends on the type of organization in which an individual participates.



## Conclusions and Recommendations

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The concept of social capital has a long history. Its role in global health became more imperative after the publication of the WHO Commission on Social Determinants of Health's framework in 2010, which acknowledged social capital as a determinant of health and health inequity. The findings of this report reinforce the relationship between social capital and health, and health-related outcomes. Although the relationship is complex, social capital may be a tool that can be leveraged to improve individual and community health.

It is generally recognized that social capital requires time and continued concerted efforts to develop (Folland & Rocco, 2014). In addition, there is no one-size-fits-all solution to building social capital in any context.

The findings of the report lead to several recommendations for development practitioners:

- Governments and development partners should consider policies and interventions that build and promote social capital as part of the toolkit to improve health outcomes and achieve wider health sector objectives.
- Social capital interventions should target specific contexts or populations in which social capital is low or has eroded (e.g., conflict-affected communities, individuals suffering from HIV/AIDS, pregnant women and new mothers, and individuals who are vulnerable to social isolation).
- Due to the potential for social capital to have detrimental influences on health and health-related behaviors, interventions aimed at building social capital should be mindful of the context and preexisting community-level social norms.
- Social capital should be considered in health equity-oriented programming due to its potentially beneficial impact on the distribution of health.
- The push for participatory-based program design should be continued, which can simultaneously target development outcomes while building social capital as a byproduct.



# 1. Introduction

Over the past three decades, interest in the social and non-biological determinants of health has greatly increased. Estimates suggest that up to 50% of the reduction in global mortality in children under 5 between 1990 and 2010 can be attributed to investments and policy interventions outside the health sector (Kuruville et al., 2014). The World Health Organization (WHO) (2022) defines the social determinants of health as “the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.” Social capital has been identified as a key social determinant of health, with the potential to significantly influence health outcomes and equity (WHO, 2010). Further, it has been suggested that social capital within communities and between communities and formal health systems may represent the seventh building block of high-functioning health systems (United States Agency for International Development, 2011).<sup>1</sup>

Social capital has received relatively limited attention as a factor influencing health, however, particularly in low- and middle-income countries (LMICs). The limited research on social capital and health in LMICs is even less understandable, given a number of factors. First, strengthening communities is critical in safeguarding population health in the context of high resource scarcity and volatility. Second, additional means of improving health outcomes warrant exploration, given the shortcomings of formal health systems in LMICs. And third, the potential health effects of social capital could be significantly larger in LMICs, compared to high-income contexts. Together, these factors suggest strengthening social capital within and between communities as a potentially effective policy option when assessing ways to improve health outcomes, equity, and household resilience.

## 1.1 Report Objectives

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The primary objective of this report is to shed light on the relationship between social capital, health outcomes, equity, and household resilience. The specific aims are fourfold:

- Provide a background on the concept and definition of social capital.

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<sup>1</sup> The WHO building blocks originate from the Framework for Action “Everybody’s business: Strengthening Health Systems to Improve Health Outcomes” (2007). The six building blocks proposed are as follows: (1) service delivery; (2) health workforce; (3) information; (4) medical products, vaccines, and technologies; (5) financing; and (6) leadership and governance.



- Summarize the literature on the relationship between social capital and health, including identifying important pathways in the relationship.
- Undertake an illustrative quantitative analysis using an easily replicable approach based on publicly accessible survey data. Analyze the South African National Income Dynamics Study (NIDS) to examine the relationship between social capital and health, and use the results of the literature review to inform the examination of mechanisms through which this relationship may operate.
- Provide recommendations for international development practitioners on designing and implementing programs aimed at improving health outcomes.

The quantitative analysis in this report uses data from South Africa, and the results provide insight into the effect of social capital on health outcomes and resilience in this setting. It is worth highlighting that the principal motivation of the analysis is to elucidate the possible relationship between social capital and health in LMICs generally. Therefore, the quantitative analysis primarily serves as a case study to illustrate how social capital may relate to health and household resilience and highlight evidence gaps that remain in understanding this relationship.

Despite the concept of social capital being used widely across several disciplines, there is a lack of consensus on its definition. This report does not intend to resolve the definition question, but it is necessary to clarify the meaning of social capital.

The report is outlined as follows. Section 2 summarizes the definitions and conceptualizations of social capital, including how they have been measured and used in empirical work. Section 3 provides an overview of the empirical literature examining the relationship between social capital and health, focusing primarily on LMICs. Section 4 highlights several of the mechanisms by which social capital is hypothesized to influence health. Section 5 outlines the key questions of the quantitative analysis and outlines the data used, and Section 6 presents the empirical results of the analysis. Finally, Section 7 discusses the key findings and explores the policy implications and recommendations.



## 2. Definition and Conceptualization of Social Capital

The notion of social capital has been addressed across a number of disciplines, but no single definition of social capital is widely agreed upon. This has resulted in critiques of the concept of social capital as being vague, ambiguous, and “mean[ing] different things to different people” (Grootaert & Seralgedin, 1998; Portes, 1998). Despite these criticisms and issues with pinning down the concept, research continues to examine the potential role that social capital plays in explaining many socioeconomic phenomena.

Although many definitions have been offered, four attempts at describing social capital have dominated the literature. **Table 1** presents the literature’s most popularly cited definitions of social capital. Each definition relates to ideas of social interaction, relations, structures, and values, but there are important differences between these definitions (Folland & Rocco, 2014). Bourdieu views social capital as encompassing the resources that individuals can access and use through social structures and connections to others (Kawachi et al., 2008). These might be considered common resources that provide mutual benefit to all network members. Coleman (1988) identifies three forms of social capital: obligations and expectations, information channels, and social norms. This definition conceptualizes social capital as a collective asset not within the control of any one individual. For instance, Coleman argues that groups with high trust outperform groups characterized by low trust. Although Bourdieu views social capital as a private good, and Coleman views it as simultaneously a private and public good, Putnam views social capital as primarily a public good. In Putnam’s conceptualization, social capital is not an attribute of individuals, but a feature of populations and as such is a collective trait (Guiso et al., 2004). The key feature of social capital in this definition is that it facilitates coordination and cooperation for mutual benefit, thereby creating externalities for the whole community (Grootaert & van Bastelaer, 2001). Finally, the World Bank’s interest in social capital originated in the late 1990s, stemming from an increasing recognition that social capital significantly contributes to sustainable development and may be leveraged for poverty alleviation. Rather than re-conceptualize social capital, the World Bank’s definition attempts to consolidate the previous conceptualizations, with the goal of strengthening the methodological and empirical underpinnings for measuring and monitoring social capital and its impact on development outcomes.



**TABLE 1: POPULAR DEFINITIONS OF SOCIAL CAPITAL**

Author (year)	Definition
Bourdieu (1986)	"[Social capital is] the aggregate of the actual or potential resources which are linked to possessions of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition—or in other words to membership of a group—which provides each of its members with the backing of the collectively-owned capital, a credential which entitles them to credit, in the various senses of the word."
Coleman (1988)	"Social capital is defined by its function. It is not a single entity, but a variety of different entities, having two characteristics in common: they all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure."
Putnam (1993, 2000)	"Features of social organizations, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993). Putnam later added "while physical capital refers to physical objects and human capital refers to properties of individuals, social capital refers to connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000).
World Bank (2011)	"[Social capital is] the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions... Social capital is not just the sum of the institutions which underpin a society; it is the glue that holds them together."

These definitions also introduced various typologies by which social capital is classified. Nahapiet and Ghoshal (1998) developed a widely used typology of social capital of three dimensions: structural, cognitive, and relational. The structural dimension is tied to the social structure through network ties and social organization, and the cognitive dimension focuses on shared language and narratives. The relational dimension is focused on the characteristics of social relationships and generally includes trust. Although structural social capital has been characterized as what individuals “do,” cognitive social capital is what individuals “feel” regarding social relations (Harpham et al., 2002). These dimensions of social capital should not be considered independent, because higher cognitive social capital can result in a higher propensity for greater linkages and greater structural social capital (Uphoff, 2000). Trust and reciprocity are also important in enabling networks to engage in collective action.

Giordano and Lindstrom (2011) noted that social capital is a contextual phenomenon that cannot be directly observed or quantified. However, an important difference between cognitive and structural social capital relates to their respective

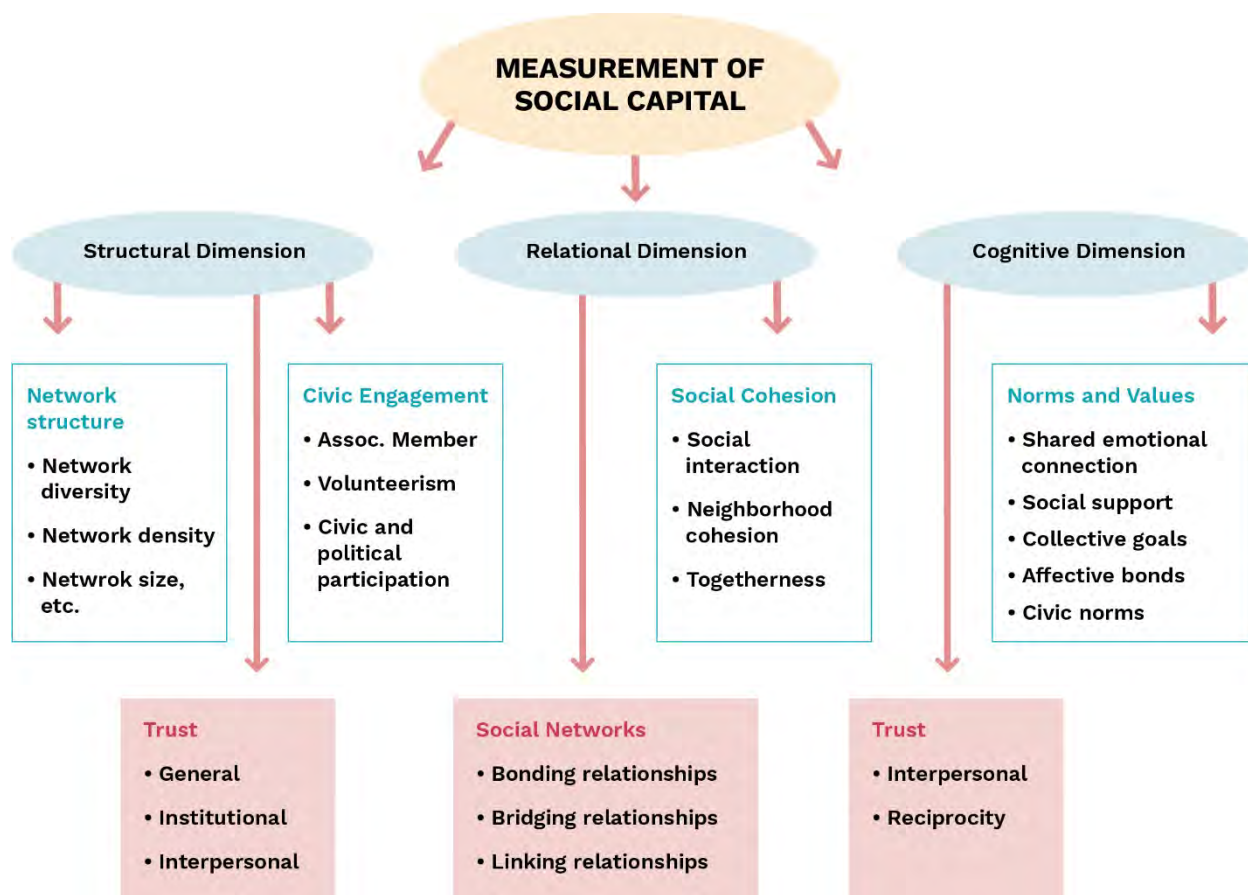


observability and measurement (Uphoff, 2000). Cognitive social capital relates to individuals' perceptions and may be regarded as subjective evaluations of the social environment. Structural social capital is, to an extent, observable and can be measured through aspects of individual and group behaviors relating to the quantity and quality of social relationships and membership of groups and associations.

Researchers have identified three main categories of social connections that create social capital: bridging, bonding, and linking ties. Bonding ties occur within groups, such as family or individuals with an important shared trait. Bridging ties occur across similar groups, or between people who are different in a salient way. Linking ties connect individuals to people or entities with power or resources (Claridge, 2017).

**Figure 1**, from Acquah et al. (2014), organizes components of measurement of social capital along the three dimensions, including network structure and ties. Even in terms of measurement, there is substantial overlap across the dimensions, for example with trust or civic engagement, indicating that these dimensions are intended as complementary but not fully distinct.

**FIGURE 1: COMPONENTS OF SOCIAL CAPITAL**



Source: Acquah et al. (2014)





Different types of social capital may play relatively more or less significant roles in determining different outcomes. Although certain aspects and categories have been proposed as being more important—“the *central area* of social capital is trust” (Paldam, 2000)—it is likely that the relative importance of different types or categories of social capital varies. It may be, for instance, that cross-type connectedness is more important for influencing economic mobility, while civic engagement plays a larger role in determining health. For example, the association between cognitive social capital and mental health has been observed as being considerably stronger than the relationship between structural social capital and mental health (De Silva et al., 2005). This suggests there is no overall most important type of social capital to target from a policy perspective. This subject of which type of social capital has more relative importance remains highly underexplored.

## 2.1 Measurement of Social Capital

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The above-outlined complexity of the conceptualization of social capital has direct implications for its measurement. In an attempt to comprehensively measure different aspects of social capital at individual, household, community, organizational, and country levels, several tools have been developed. Grootaert and van Bastelaer (2002) developed the World Bank’s Social Capital Assessment Tool (SOCAT). The SOCAT is a quantitative-qualitative survey instrument that can be implemented independently or incorporated into household surveys to collect data on multiple aspects of social capital. Grootaert et al. (2004) developed the Integrated Questionnaire for the Measurement of Social Capital. Recently, a number of large-scale projects aimed at measuring social capital in high-income countries have been initiated. The Social Capital Project is a multiyear project, beginning in 2017, which developed an index providing “the clearest picture ever taken of the health of American communities” (United States Congressional Joint Economic Committee, 2017). The Social Capital Atlas provides information on the state of social capital in the United States, disaggregated at the county level (Chetty et al., 2022).

The complexity in definitions and conceptualization has resulted in similar challenges when measuring and operationalizing social capital for analytic purposes. The Organisation for Economic Co-operation and Development (OECD) compiled a social capital question “data bank” of 1,300 questions aimed at capturing aspects of social capital from more than 50 surveys ([OECD measurement of social capital project and question databank](#)).

Practically focused on measurement of social capital, the OECD (2013) identified four key conceptualizations of social capital with applied measures: personal relationships, social network support, civic engagement, and trust and cooperative norms. Chetty et al. (2022) focused on similar areas for their social capital analysis



that correspond to personal relationships, social network support, and civic engagement.

A number of tools and indices have been developed to measure the various aspects of social capital comprehensively. Most empirical studies, particularly in LMICs, continue to rely on the use of simple single proxy indicators to capture and quantify different forms of social capital. **Table 2** outlines several indicators and measurement tools that have been used to quantify individual and area-level social capital.

**TABLE 2: SURVEYS AND TOOLS FOR MEASURING SOCIAL CAPITAL**

Measurement type	Measure
Index	<ul style="list-style-type: none"> <li>• Social Capital Assessment Tool—Krishna &amp; Shrader (2000)</li> <li>• World Bank’s SOCAT—Grootaert &amp; van Bastelaer (2002)</li> <li>• Adapted Social Capital Assessment Tool—Harpham, Grant, &amp; Thomas (2002)</li> <li>• The Petris Social Capital Index—Sheffler &amp; Brown (2008); Brown et al. (2006)</li> <li>• Putnam’s Social Capital Index—Putnam (2000)</li> <li>• Integrated Questionnaire for the Measurement of Social Capital—Grootaert et al. (2004)</li> <li>• Social Capital Assessment Tool in Pregnancy for Maternal Health in Low- and Middle-Income Countries—Agampodi et al. (2019)</li> </ul>
Structural social capital proxy	<ul style="list-style-type: none"> <li>• Individual Indicators of Voluntary Organization Membership—Putnam (1993)</li> </ul>
Network/structural social capital	<ul style="list-style-type: none"> <li>• Network-Based Measures—Jackson (2019)</li> </ul>
Structural and cognitive social capital proxies	<ul style="list-style-type: none"> <li>• United Kingdom Office of National Statistics—Office of National Statistics (2014); Office of National Statistics (2015)</li> <li>• World Value Surveys—Inglehart et al. (2014)</li> </ul>

Attempts to measure social capital make two points clear: (1) social capital is difficult to measure and quantify at an aggregate level due to the multiple forms of social capital (i.e., capturing aggregate social capital requires indicators for all types of social capital); and (2) data requirements for the measurement of social capital vary with the forms of social capital (i.e., certain forms of social capital have more intensive data requirements than others). For example, network data are more demanding to collect and therefore less readily available and used in LMICs.

Data limitations remain a key constraint in building an understanding of the role of social capital in LMICs. Stiglitz et al. (2009) highlighted the need for greater focus on the development of better measures of social capital, given the perceived importance of the concept. The lack of progress in data collection around social capital may be a result of its not clearly falling under the remit of any single sector. As indicated previously, recognition of social capital’s importance has recently led to several



initiatives in high-income countries starting to intentionally collect detailed data. Increasing the intentional collection of data on social capital in LMICs will be a crucial step to building greater understanding of the link between social capital and health and guiding policymakers.

### 3. Empirical Literature Examining Social Capital and Health

A majority of the studies quantitatively examining the relationship between social capital and health have taken place in high-income countries. These studies have largely identified a positive relationship between social capital and various health outcomes (Kawachi et al., 1997; Scheffler & Brown, 2008; Subramanian et al., 2002; Iversen, 2008).

A growing empirical literature has examined whether the positive relationship between social capital and health extends to LMICs, and studies have been conducted across a wide range of countries and regions. **Table 3** presents a synopsis of empirical studies examining the relationship between social capital and health outcomes. The table illustrates the diversity of contexts in which the relationship between social capital and health has been studied. A number of the cited studies explicitly attempted to go beyond observing associations between social capital and health outcomes, by seeking to identify a potential causal relationship.

**TABLE 3: EMPIRICAL LITERATURE EXAMINING THE RELATIONSHIP BETWEEN SOCIAL CAPITAL AND HEALTH OUTCOMES**

Author (year)	Country	Research question	Indicators	Description and results
Baron-Epel et al. (2008)	Israel/2004–2005	<ul style="list-style-type: none"> <li>Assess levels of social capital among Israeli Arab and Jewish populations and examine the association between individual social capital and self-reported health</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Measures included social trust, neighborhood safety, perceived helpfulness, trust in local and national authorities, and social support</li> </ul> <p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>Self-reported health measured on Likert scale</li> </ul>	<ul style="list-style-type: none"> <li>Individual social capital is associated with better self-reported health among Jewish Israelis, but this relationship does not hold as strongly among Arab-Israeli populations.</li> </ul>
Alaba and Chola (2013)	South Africa/2008	<ul style="list-style-type: none"> <li>Analyze factors affecting self-reported health at individual and community levels</li> </ul>	<p><i>Social Capital</i></p> <ul style="list-style-type: none"> <li>Two indicators of social capital: individual and neighborhood</li> <li>Individual social capital, measured by two variables denoting trust and civic participation (membership to organizations)</li> <li>Neighborhood social capital measured using four variables denoting support, association, behavior, and safety, in a summative index aggregated across households to create a neighborhood social capital score</li> </ul> <p><i>Health and use</i></p>	<ul style="list-style-type: none"> <li>Found that individual social capital, measured by social trust and civic participation, was not significantly related to self-rated health.</li> <li>Neighborhood social capital was significantly associated with health.</li> <li>Authors noted the context-specific-nature of impact of social capital on health, with variations in association across nine South African provinces.</li> </ul>



Author (year)	Country	Research question	Indicators	Description and results
D'Hombres et al. (2010; 2011)	Eight former soviet republics: Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine/2001	<ul style="list-style-type: none"> <li>Investigate the impact of social capital on self-reported health</li> </ul>	<ul style="list-style-type: none"> <li>How would you describe your health at present?</li> </ul> <p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Three indicators of social capital</li> <li>Individual degree of trust—individuals state if they greatly or quite trust the majority of people (generalized trust)</li> <li>Participation in local organizations—church, sport, art, music, neighborhood, youth, women, charitable organizations, or any other voluntary organization</li> <li>Social isolation—binary equal to 1 if an individual feels alone</li> </ul> <p><i>Health and utilization</i></p> <ul style="list-style-type: none"> <li>Self-reported health</li> </ul>	<ul style="list-style-type: none"> <li>Trust and isolation are significantly related to self-reported good health in the predicted direction, and authors mostly found an insignificant association between membership and self-reported good health.</li> <li>Membership in organizations, social isolation, and trustworthy behavior are choice variables, implying that social capital indicators are by definition endogenously determined and depend on individual specificities.</li> <li>Distinguish the social capital impact from other community effects (such as health care supply) that are simultaneously correlated with health and measures of social capital.</li> </ul>
Goryakin et al. (2014)	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Ukraine/2010	<ul style="list-style-type: none"> <li>Investigate the impact of social capital on self-reported physical and mental health</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Trust—a majority of people can be trusted giving a score between 0 and 10 and made binary (=1 if &gt;5)</li> <li>Being an active member of a voluntary organization</li> <li>Social isolation—self-reported loneliness</li> </ul>	<ul style="list-style-type: none"> <li>Appears to identify a causal association running from several dimensions of individual social capital to general and mental health.</li> <li>Individual trust appears to be more strongly related to general health, while social isolation is related to mental health.</li> </ul>



Author (year)	Country	Research question	Indicators	Description and results
			<p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>Physical self-reported health: question with Likert scale grouped into binary indicator</li> <li>Mental self-reported health: questionnaire with 12 items; 1 assigned to individuals reporting no mental health symptoms, and 0 if one or more symptoms</li> </ul>	
Harpham et al. (2004)	Colombia/2002	<ul style="list-style-type: none"> <li>Is there an independent association between social capital and mental health after accounting for array of demographic and violence variables</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Structural and cognitive measures of social capital</li> <li>Authors developed an instrument to capture individuals' perceptions and experience of social capital</li> <li>An Adapted Social Capital Assessment Tool</li> <li>Questions covered group participation, general, thick and thin trust, social cohesion, informal social control, social support, and civic participation</li> </ul> <p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>Self-reporting questionnaire (SRQ20) recommended by WHO (1994)</li> <li>Assessing prevalence of depression and anxiety at community level</li> </ul>	<ul style="list-style-type: none"> <li>Study found that cognitive aspects of social capital such as trust, sense of belonging, and shared values are associated with improved mental health in Colombia.</li> </ul>



Author (year)	Country	Research question	Indicators	Description and results
Hollard and Sene (2016)	16 sub-Saharan African countries (Benin, Botswana, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Nigeria, Senegal, South Africa, Tanzania, Uganda, and Zambia)	<ul style="list-style-type: none"> <li>Estimate the causal effect of social capital in determining access to basic health facilities in sub-Saharan Africa</li> <li>Question relates to the effect of social capital on community governance</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Generalized trust</li> <li>Trust in neighbors</li> </ul> <p><i>Health and use</i></p> <p>Afrobarometer respondents were asked about the services of local health centers in each district over seven dimensions:</p> <ul style="list-style-type: none"> <li>Clinics being too expensive</li> <li>Lack of medicine/supplies</li> <li>Doctor absenteeism</li> <li>Long waiting times</li> <li>Dirty facilities</li> <li>Problems of illegal payments</li> <li>Lack of attention/respect</li> </ul> <p>Above variables used to proxy for aspects of health care quality</p>	<ul style="list-style-type: none"> <li>Findings suggest that the effect of social capital on health care access/quality is causal.</li> <li>One standard-deviation increase in trust is predicted to lead to a 0.22 standard-deviation fall in doctor absenteeism, a 0.31 standard-deviation fall in waiting time, and a 0.30 standard-deviation fall in bribes.</li> <li>One standard-deviation rise in trust leads to a 0.33 standard-deviation rise in access to clean water.</li> </ul>
Lau and Ataguba (2015)	South Africa/2008–2010	<ul style="list-style-type: none"> <li>Examine the relationship between social capital and health</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Generalized trust</li> <li>Personalized trust</li> <li>Organization membership</li> </ul> <p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>Self-reported health</li> </ul>	<ul style="list-style-type: none"> <li>Individual personalized trust, individual community service group membership, and neighborhood personalized trust were beneficial to self-rated health.</li> </ul>
Miller et al. (2006)	Indonesia/1993 and 1997	<ul style="list-style-type: none"> <li>Examine the role of community social capital in the</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Construct a community-level social capital index, based on</li> </ul>	<ul style="list-style-type: none"> <li>Study found a positive relationship between community-level social</li> </ul>



Author (year)	Country	Research question	Indicators	Description and results
		<p>individual's health production function</p>	<p>the number of categories of organizations present in a community, and use it as a proxy for social capital. Questions related to the density of local civic organizations.</p> <ul style="list-style-type: none"> <li>Programs include: save and borrow group, cooperative, pharmacy garden, family planning acceptors' group, child development group, adolescents' group, senior citizens' group, youth group, health fund, and maternal and child health groups.</li> </ul> <p><i>Health and use</i></p> <p>Number of measures of mental and physical health</p> <ul style="list-style-type: none"> <li>Self-reported levels of sadness, anxiety, and insomnia, fatigue or exhaustion, short-temper or hypersensitivity, and bodily pains during the previous four weeks</li> <li>Self-reported health status</li> <li>Self-reported ability to perform a number of basic activities of daily living</li> </ul>	<p>capital and individual-level health outcomes.</p>
Musalia (2016)	Kenya/2005	<ul style="list-style-type: none"> <li>Examine the relationship between social capital and self-reported health</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Generalized social trust</li> <li>Individual social trust</li> <li>Membership in organizations</li> </ul>	<ul style="list-style-type: none"> <li>Social trust is associated with better physical and mental health, but membership with voluntary organizations has</li> </ul>





Author (year)	Country	Research question	Indicators	Description and results
			<p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>• Self-reported physical health</li> <li>• Self-reported worry/anxieties</li> </ul>	<p>a negative relationship with physical health.</p>
Myroniuk and Anglewicz (2015)	Malawi/2008–2010	<ul style="list-style-type: none"> <li>• Examine the relationship between social participation and health in rural Malawi</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>• Enlarge the scope of social participation beyond conventional measure of the number of group memberships, or religious participation, to include more active and culturally relevant forms of social participation, such as funerals, drama performances, bars, places to dance, markets, weddings, and political meetings</li> <li>• Create an index of social integration using aggregate membership</li> </ul> <p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>• SF-12 summary measures of mental and physical health</li> </ul>	<ul style="list-style-type: none"> <li>• Greater social participation is associated with better physical health but worse mental health.</li> </ul>
Ronconi et al. (2012)	Argentina/1997	<ul style="list-style-type: none"> <li>• Estimate the causal effect of individual-level social capital on health using a measure of informal social interactions</li> </ul>	<p><i>Social capital</i></p> <p>Individual social capital measured by informal social interactions</p> <ul style="list-style-type: none"> <li>• Whether a person often meets with friends</li> <li>• Whether a person often meets with relatives</li> </ul>	<ul style="list-style-type: none"> <li>• Focus on a structural measure of social capital at the individual level.</li> <li>• Social capital has a causal effect on self-rated health status.</li> <li>• Informal social capital has a strong negative association with self-rated</li> </ul>



Author (year)	Country	Research question	Indicators	Description and results
			<ul style="list-style-type: none"> <li>Whether a person reports living alone</li> </ul> <p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>Self-assessed binary variable (1= individual reports health problems, 0 = no health problems)</li> </ul>	health problems in both men and women.
Sirven (2006)	Madagascar/2001	<ul style="list-style-type: none"> <li>Analyze the pathways between income and self-rated health through the mediating role of social capital</li> </ul>	<p><i>Social capital</i></p> <ul style="list-style-type: none"> <li>Membership in associations</li> <li>Participation in collective actions</li> <li>Network involvement and remittances</li> <li>Proportion of households setting up a traditional ceremony</li> </ul> <p><i>Health and use</i></p> <ul style="list-style-type: none"> <li>Self-reported subjective health index: “Would you say your needs in the domain of health are fulfilled?” The variable is dichotomized with 1 (fair health) for yes and 0 for no (poor health).</li> </ul>	<ul style="list-style-type: none"> <li>Having higher social capital as measured by collective actions and social networks results in better health outcomes.</li> </ul>

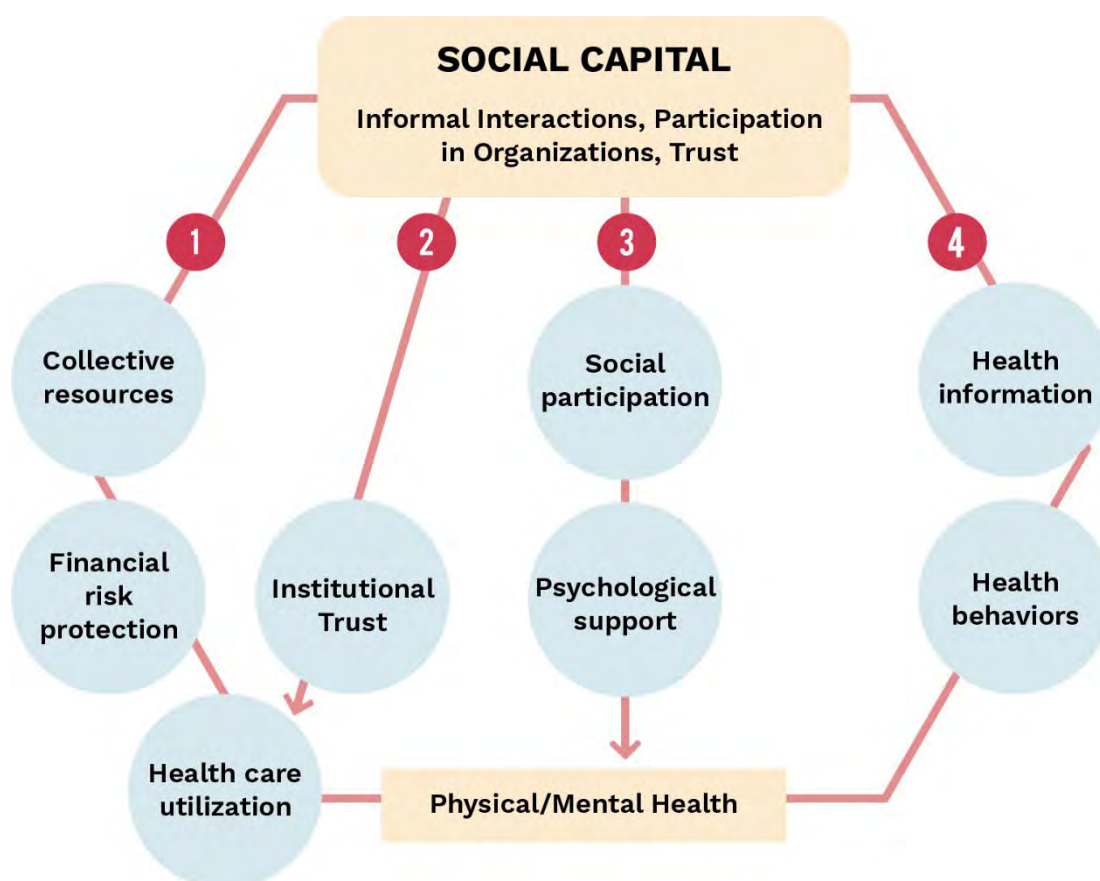
## 4. Mechanisms Behind the Relationship between Social Capital and Health

Although the literature identifying associations between social capital and health in LMICs is growing, identifying the reasons for this link remains challenging and understudied. The mechanism through which social capital contributes to better health may depend on the conceptualization and form of social capital considered (e.g., informal interactions, participation in organizations, trust), or the context in which the relationship is examined. Most empirical research attempting to identify key mechanisms in the relationship has focused on high-income countries. The principal mechanisms driving the social capital-health relationship, however, likely substantially differ in LMICs. For instance, health care use is likely to be a particularly relevant link between social capital and health in LMICs due to continuing barriers to accessing health care and potential choices between traditional and modern forms of health care.

As a result of the challenges in identifying mechanisms, most work to date has been speculative in suggesting a rationale for why such a relationship exists. **Figure 2** illustrates multiple hypothesized mechanisms through which social capital may influence health.



**FIGURE 2: MAPPING THE SOCIAL CAPITAL-HEALTH RELATIONSHIP**



Source: Authors own

These four mechanisms are described in more detail in the sections that follow.

### 4.1 Collective Resources (1)

The financial cost of health care continues to pose a substantive barrier to access and use. The magnitude of out-of-pocket (OOP) payments may result in impoverishment or individuals and households forgoing health care services following a negative health shock (Gabani & Guinness, 2019). Financial protection against medical expense is one of two primary motivations for universal health coverage, but many LMICs offer limited or no formal credit or insurance systems (WHO, 2010). Social capital may play a role in increasing the use of health care or reducing associated financial hardship caused by medical expenses by enabling access to collective resources. This form of resource pooling for mutual insurance may manifest in several ways.



In countries with large informal economies, informal networks may provide a degree of mutual insurance (Murgai et al., 2002). It has been suggested that social capital and cohesion is important in the formation of such informal insurance arrangements that rely on social networks and reciprocal trust (Szreter & Woolcock, 2004). This enables the development of arrangements through which individuals can rely on community-level resources to provide a degree of protection from variations in income and health (Myroniuk & Anglewicz, 2015). The degree of formalization of these informal arrangements varies. In their most simplistic form, norms suggest an expectation of financial solidarity between members of a social network or community. For example, Aye et al. (2002) illustrated how households rely on an extended network to support the financing of accessing health care in Côte d'Ivoire. They argued that social capital is therefore a facilitating factor in the use of health care in the same manner as a household's individual economic resources. This informal inter-household sharing of resources heavily relies on preexisting networks, and levels of trust can be invaluable for individuals excluded from formal insurance mechanisms or in settings with limited safety nets.

In some instances, these informal arrangements may be culturally institutionalized. In the absence of formal insurance, traditional informal risk-sharing schemes have been developed in many LMICs. These schemes are slightly more formalized because they involve established rules and commitments. The development of such schemes relies heavily on local social capital. For instance, in Eritrea, voluntary mutual aid community associations (known as *Mahber*) are built on existing social networks (Habtom & Ruy, 2007). In addition, *Iddirs*, which started as societies to cover funeral costs but have expanded to cover wider risks such as livestock deaths and health care costs, are a central part of the community fabric (Clarke & Dercon, 2016). Similar schemes can be found in Tanzania (Dercon et al., 2006), South Africa (Roth, 2001; Thomson & Posel, 2002), and India (Rutherford, 2001). A key characteristic of schemes such as these is that membership is selective, meaning that the development of social ties and levels of trust are central to participation. Szreter and Woolcock (2004) highlighted that these informal cooperative arrangements are more commonly established in settings with higher levels of social homogeneity, such as higher degrees of income equality or lower ethnic diversity.

Finally, social capital may even increase participation in more formal insurance schemes. Zhang et al. (2006) found that higher household and community-level social capital was associated with a higher willingness to join a government community-based health insurance (CBHI) scheme in rural China. Mladovsky (2014) also found that higher individual social capital increased the likelihood of enrollment in CBHI schemes in Senegal.

This mechanism, however, also has the potential to exacerbate social inequalities in health care use and health outcomes. If beneficiaries have higher preexisting social capital, such programs may unintentionally worsen inequalities in health care access.



Schurmann and Johnston (2009) found that although local risk-sharing programs have the potential to reduce health inequities through promoting social inclusion, they can also worsen exclusionary processes if clumsily implemented.

## 4.2 Health Care Utilization and Institutional Trust (2)

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Health may also be influenced by social capital between communities and the formal health care system. There are two sets of factors that suppress the demand for health care: constraints that affect households' ability to utilize health care, and preferences that affect households' willingness to consume health care. The first mechanism (see Section 4.1) illustrates how social capital may increase health by relaxing income constraints through access to collective resources, and in the second mechanism, social capital between communities and health care providers may influence utilization preferences. This can be referred to as "institutional trust." This form of social capital can manifest in improved health care utilization and outcomes in a number of ways. Goepf (2006) showed that trusting patients are more likely to access health care at earlier stages of illness. Trusting patients also have a higher propensity to disclose sensitive information to health workers, enabling more accurate diagnoses (Thom et al., 2004). It has also been argued that trust plays a role in the use of information (Thiede, 2005). For instance, Ware et al. (2009) found that social capital in the form of institutional trust improved adherence to antiretroviral therapy. Disease surveillance involved a greater degree of community participation and was better implemented in communities with greater social capital in Niger (Ndiaye et al., 2003). Studies have found that institutional trust plays a large role in determining provider choice in Sri Lanka and Cambodia (Russell, 2005; Ozawa & Walker, 2011). In addition, trust in public providers encourages enrolment in CBHI (Ozawa & Walker, 2011; Schneider, 2005).

The issue of social capital—institutional trust—between communities and health care systems has been an important topic related to disease pandemics. Notably, evidence from SARs in 2003, Ebola in 2014, and Zika in 2015 has suggested that social capital can assist the response to such outbreaks (Makridis & Wu, 2021; Vinck et al., 2019; Trapido, 2019).

Another way in which social capital may result in higher rates of health care utilization—and ultimately better health—is through increased community bargaining power and political strength. It has long been recognized that the placement of public services and development programs is strategically selected (Rosenzweig & Wolpin, 1986). Lavy et al. (1996) suggested that a community's local infrastructure is



often related to the degree of community “progressivity.”<sup>2</sup> High levels of community social capital may be leveraged for collective action and lobbying, which improves the provision and quality of local public services (Kawachi et al., 1997). For example, community-based monitoring of public primary health care facilities led to health care quality improvements in Uganda (Björkman & Svensson, 2009).

### 4.3 Social Participation and Psychological Support (3)

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Social capital may influence health more directly through its impact on mental health. Untreated mental health disorders account for 13% of the total global burden of disease (WHO, 2011). Mental health care services in LMICs are frequently unavailable or of poor quality. Estimates suggest between 76% and 85% of people with severe mental health conditions in LMICs are not receiving treatment (WHO, 2011). This has led to calls for protective factors in the community to be identified and used as the basis for interventions (Patel, 2010).

In the Putnam definition of social capital involving social participation, this participation may result in direct health benefits. Therefore, social capital may reduce the prevalence of mental health conditions by reducing stress stemming from social isolation. Cognitive social capital may improve individuals’ sense of belonging, self-esteem, and perception of supportive resources. In addition to potentially providing access to financial support, social capital may act as psychological resources in the event of negative shocks.

### 4.4 Informational Resources (4)

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A final commonly cited mechanism through which social capital may impact health is through the dissemination of information. A significant portion of the literature illustrates the lack of information to be an important factor in poor health behaviors and the underutilization of health care services (Dupas, 2011). Studies have shown that individual’s behaviors are responsive to information on health risks and the

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<sup>2</sup> “Progressivity” here refers to a number of unobserved, amorphous community-level factors that may be related to the accessibility and density of local institutions and services. For example, these could be many things including the degree to which community leadership values health care, education and access to social support; or the degree to which women in the community have a voice and role in decision-making. The factors are varied, numerous, and unmeasured in most cases, which is why it is challenging to describe them explicitly and succinctly. Please see the cited literature for more broad discussion of these community-level factors.



benefits of specific health behaviors. For instance, Dupas (2011) found that teenagers in Kenya changed their sexual behavior in response to information on the differential risk of contracting HIV by the age of sexual partners. Alerting households to local drinking water contamination led to the increased adoption of purification techniques in India (Jalan & Somanathan, 2008). Improving information on the health returns to health behaviors and services can therefore lead to the adoption of better health behaviors and improved health outcomes.

Health information may be an important mechanism through which social capital influences health. Social capital may reduce the cost of information acquisition, as it expands the informational resources available to individuals. Unlike psychological support, in which the intensity of ties in a social network may be more important, having a larger number of weak ties may be more effective for the spread of information. Therefore, individuals who are better connected in communities may have the most access to varying sources of health information. This was observed in Bangladesh, where households with lower social capital were excluded from information on self-care treatments for diarrhea (Edgeworth & Collins, 2006).

As well as enabling information transmission, social capital may also directly facilitate the diffusion of good practices. If there is a cost to behavior change, sometimes the provision of information is not sufficient. It may be necessary for individuals to observe the returns and benefits of the adoption of health behaviors and practices. Social capital may also facilitate the faster translation of good practices into norms through social learning. For instance, it has been found that households learn about the quality of health care offered by different providers by observing the care received by members of their community (Adelman et al., 2009). Likewise, it was found that the adoption of female hygiene products was higher among girls who had a greater number of friends who, as part of a program, received these products for free (Oster & Thornton, 2009).

#### 4.5 Potential Negative Relationship between Social Capital and Health

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It is also possible that social capital may have an ambiguous or even negative effect on health. For instance, it has been noted that in homogeneous communities, relatively high levels of social capital may be observed but these communities may be less tolerant of deviations in behaviors, even if there is a beneficial health effect (Goryakin et al., 2014). There is also evidence that high levels of social participation or group membership can be associated with worse mental health (Mitchell & LaGory, 2002). It has been suggested this may be due to the stress of meeting societal obligations to provide financial and non-financial support to the community (Kawachi & Berkman, 2001). Therefore, more active participation in the community may signal higher social capital but also be a source of distress. The effect of community participation also may depend on the types of activities available. Myroniuk and





Anglewicz (2015) suggested that some of the most common venues of participation in Malawi—bars and funerals—may negatively impact mental and physical health. Even participation in venues perceived as beneficial may result in negative impacts. Participating in organized clubs has been found to both lower the risk of HIV infection, presumably through information sharing (Campbell & Macphail, 2002; Gregson et al., 2004) and increase the risk of HIV infection due to greater exposure to sexual partners (Pronyk et al., 2008).

This illustrates how the influence of social capital on health, through the various mechanisms, is highly context dependent. For instance, if the primary mechanism at work is through social capital encouraging resource pooling and sharing to enable access to and the utilization of health care services, the ultimate health effect of social capital on health will depend on the quality of health care services supplied.

## 4.6 Summary

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In summary, there are many mechanisms that link social capital and health. A majority of previous studies examining the relationship between social capital and health have only speculated on potential mechanisms through which any identified social capital-health relationship operates. The lack of formal examination of mechanisms is in part a result of data constraints. In this report, in addition to quantitatively examining the social capital-health relationship, the relationship between social capital and health care utilization is also examined in an attempt to identify whether this intermediate outcome may be responsible for any subsequent health effects. Further, the relationship between social capital and financial risk protection (FRP) is explored to examine the role of social capital in promoting household resilience. Gaining a better understanding of the relative importance of the mechanisms in action in various settings is crucial in providing guidance on policy prescriptions that can strengthen the social capital-health association and improve population health.



## 5. Quantitative Analysis

The quantitative analysis in this report attempts to address four key questions:

1. Does social capital affect physical and mental health outcomes?
2. Does social capital effect health care utilization?
3. Does social capital improve household resilience as measured by FRP?
4. Does the effect of social capital on health outcomes vary by household socioeconomic status (SES)?

Question 1 relates to most of the previous quantitative studies in that it attempts to identify the presence of a relationship between social capital and health. Questions 2 and 3 attempt to further explore the relationship by examining potential mechanisms through which social capital may influence health. As outlined previously, two of the key mechanisms that might link social capital and health are health care utilization and household resilience and FRP.

The relationship between social capital and household resilience may also be considered of interest, independent of a health effect. Preventing households from suffering catastrophic health expenditure (CHE) has become an important objective for many LMIC health systems. The importance of this objective was recognized as the measure for one of the United Nations Sustainable Development Goals indicators for health: Indicator 3.8.2 is “The proportion of population with large household expenditures on health as a share of total household expenditure or income.” Despite this, evidence suggests that health systems often perform poorly in reducing the negative economic impact that households can suffer in the face of health shocks (Wagstaff, 2008). Therefore, the potential of social capital to impact household resilience to economic shocks may have important policy implications.

Finally, Question 4 undertakes an exploratory analysis of whether the relationship between social capital and health may have health equity implications. It is generally accepted that variations in health care utilization rates and health outcomes between poorer and richer individuals and households reflect differences in constraints such as income, insurance, and living conditions, rather than differences in preferences. As such, these variations in health care utilization and outcomes are viewed as inequities rather than inequalities (Wagstaff & van Doorslaer, 2000).

Two facts continue to dominate conversations on health equity in LMICs. First, individuals of lower SES often use relatively less health care services, despite having higher levels of need. Second, despite these lower utilization rates, individuals of lower SES frequently spend a higher proportion of their income on health care than those of higher SES.



Understanding the effect of social capital across levels of household income has important implications for whether social capital-related interventions might also have the potential to reduce socioeconomic-related health inequalities.

## 5.1 Data

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### **South African National Income Dynamics Study**

The quantitative analysis used data from the NIDS. The NIDS is an ongoing longitudinal survey tracking approximately 28,000 individuals and their cohabitants, representing about 7,300 households since 2008 (Southern African Development Research Unit, 2019). A stratified, two-stage cluster sample design was employed in sampling the households included in the first wave, resulting in a nationally representative sample (Woolard et al., 2010). Each survey is implemented approximately every two years, collecting data related to “household composition and structure; fertility and mortality; migration; labor market participation and economic activity; human capital formation, health, and education; vulnerability, and social capital.”<sup>3</sup>

All five waves of the NIDS currently available were included in the analysis (2008–2017), specifically the adult sample, which includes all individuals aged 15 years and older at the time of the survey interview.

### **Social Capital Variables**

Two indicators were used to measure social capital: metrics capturing the perceptions of generalized trust, and metrics capturing the perceptions of localized trust. These trust measures are among the most commonly used proxies for social capital used in empirical work (Hollard & Sene, 2016; Musalia, 2016; Bisung et al., 2014; Alaba & Chola, 2013; D’Hombres et al., 2010; Goryakin et al., 2014). Generalized trust was measured by asking all adults surveyed: “Imagine you lost a wallet or purse that contained R200 and it was found *by a complete stranger*. Is it very likely, somewhat likely, or not likely at all to be returned with the money in it?” Localized trust was measured by asking all adults surveyed: “Imagine you lost a wallet or purse that contained R200 and it was found *by someone who lives close by*. Is it very likely or not likely at all to be returned with the money in it?” Responses for both questions were given on a 3-point Likert scale: “not likely at all,” “somewhat likely,” and “very likely.”

A number of reasons informed the choice of trust as the proxy for social capital. First, previous empirical studies have shown a stronger relationship between cognitive social capital and health outcomes than structural social capital measures,

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<sup>3</sup> <http://www.nids.uct.ac.za/about/what-is-nids>

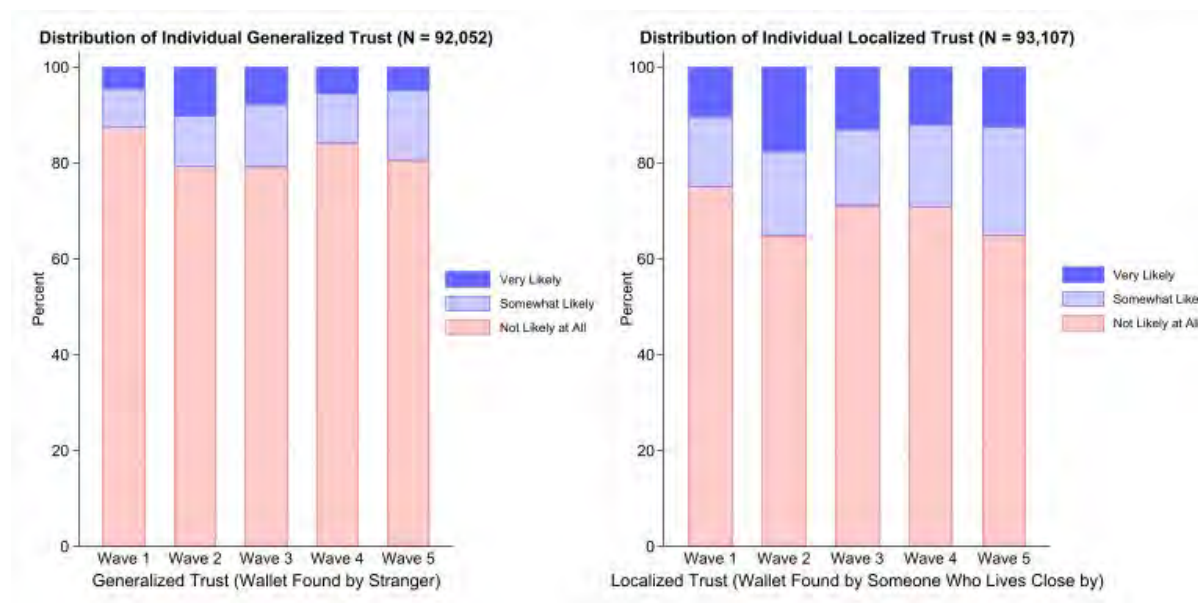


particularly for mental health outcomes (De Silva et al., 2005). Second, although the NIDS captures information on civic participation (group/association membership), a commonly used measure of (structural) social capital, this information was only collected in the first two survey waves of the NIDS panel. Therefore, using these measures would involve dropping a significant proportion of the sample. Finally, one of the mechanisms examined is the impact of social capital on health care utilization, which, as outlined previously, may depend on institutional trust. Measures of generalized and localized trust are arguably better proxies for institutional trust than measures of structural social capital.

One critique of such survey questions is that they only capture stated beliefs and preferences about trustworthiness and cooperation, and it is unclear whether responses to these questions accurately reflect revealed behaviors and actions (Bertrand & Mullainathan, 2001). However, Tannenbaum et al. (2020) found that survey measures of generalized trust were strong and significant predictors of behavioral measures of social capital (i.e., the actual act of returning a lost wallet), thereby validating these survey measures of social capital.

**Figure 3** shows the distributions of generalized and localized trust across individuals. Levels of both generalized and localized trust in South Africa are low, but, perhaps intuitively, levels of localized trust are relatively higher than generalized trust.

**FIGURE 3: DISTRIBUTION OF INDIVIDUAL GENERALIZED AND LOCALIZED TRUST**



We tested the correlation of generalized and localized trust to determine whether they were capturing different phenomena and not just measuring the same beliefs. These are ordinal variables, so we used Kendall's rank and Spearman's correlation coefficients. The correlation coefficients were between 0.45 and 0.47, indicating that



they were only moderately positively related, suggesting that they were capturing different beliefs and potentially different aspects of social capital.

### ***Health Outcome Variables***

The first research question examines the relationship between social capital and health outcomes. Two primary measures of health status were used in the analysis: an indicator measuring individuals' overall health status and an indicator measuring individuals' mental health status. This enabled an exploration of whether the relationship between social capital and health varies, based on the type of health being examined. The evidence linking social capital and mental health has not been as extensive as the evidence for overall self-reported health (Goryakin et al., 2014).

Individuals' overall health status was captured by self-reported health status, the most commonly used measure of health in studies using survey data. Individuals reported their overall health status using a 5-point Likert scale ranging from “poor” to “excellent.”

Mental health was measured using a validated 10-item version of the Centre of Epidemiological Studies Depression (CES-D) Scale developed by Radloff (1977).<sup>4</sup> The CES-D-10 has been shown to be a robust and clinically validated measure of depression (Yu et al., 2015). CES-D-10 scores were calculated by aggregating responses to 10 questions indicating ways that individuals have felt or how they have behaved related to mental well-being.<sup>5</sup> Specifically, respondents were asked about the frequency of 10 symptoms over the previous week: being unusually bothered, having trouble keeping their minds on current activities, feeling depressed, feeling that all activities were an effort, feeling hopeful about the future, feeling fearful, having restless sleep, being happy, feeling lonely, and being unable to get going. The responses are given on a 4-point Likert scale: “rarely or none of the time (<1 day),” “some or little of the time (1–2 days),” “occasionally or a moderate amount (3–4 days),” or “all of the time (5–7 days).” The CES-D 10-item scale is a continuous variable between 0 and 30, with higher scores representing worse mental health. The scores were calculated using similar procedures to previous studies using NIDS data

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<sup>4</sup> Exists in a short form with 10 items and in a longer form with 20 item questions, but only the short form is captured in the NIDS survey

<sup>5</sup> [http://www.recoveryanswers.org/assets/center\\_of\\_epidemiologic\\_studies\\_depression\\_scale\\_ces-d-10.pdf](http://www.recoveryanswers.org/assets/center_of_epidemiologic_studies_depression_scale_ces-d-10.pdf)

[https://www.brandeis.edu/roybal/docs/CESD-10\\_website\\_PDF.pdf](https://www.brandeis.edu/roybal/docs/CESD-10_website_PDF.pdf)



(Alaba & Chola, 2013; Meffert et al., 2015). The scale has been validated for the poorer populations living in LMICs (Ali et al., 2016), as well as the population in South Africa (Baron et al., 2017). Armenta et al. (2014) also showed it to be a stable measure of depression over time. We also created a binary for poor mental health for any individuals with CES-D-10 scores greater than 16. This is the American Psychological Association's threshold for identifying individuals at risk of clinic depression<sup>6</sup>.

### ***Health Care Utilization Variables***

The NIDS asks all surveyed adults if they have suffered from a variety of acute illnesses in the past 30 days (e.g., fever, diarrhea, chest pain, headache). Respondents are then asked when was the last time they sought health care. Health care utilization is captured as a binary variable equal to 1 if an individual indicates they utilized health care in the past 30 days.

Given that only those with a health reason will seek and utilize health care, it is necessary to condition on health status when examining the effect of social capital on health care utilization. As such, a number of health-related variables were included in the models with health care utilization as the outcome. Specifically, the cumulative number of acute illnesses suffered in the past 30 days was included. We also captured information on whether individuals have been diagnosed with several chronic health conditions, including asthma, stroke, high blood pressure, diabetes, and cancer. This is included in the model for health care utilization as the cumulative number of chronic health conditions an individual suffers. In addition, because HIV represents one of the main disease burdens in South Africa, a separate variable indicating individuals' HIV status was included.<sup>7</sup> By including these measures of health status, the aim is to be able to identify the effect of social capital on health care utilization, conditional on health status. If individuals with different levels of social capital systematically vary in their health status, this would not allow for the isolation of the effect of social capital. Given that research Question 1 posits that social capital influences health status, this clarifies the importance of controlling for potential health differences.

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<sup>6</sup> <https://www.apa.org/pi/about/publications/caregivers/practice-settings/assessment/tools/depression-scale>

<sup>7</sup> The self-reported health status variables were not included as covariates in the models with health care utilization as the outcome. This is because of the timing of the measures and the potential for reverse causality between self-reported health status and health care utilization.



## **Financial Risk Protection Variables**

FRP relates to the financial consequences for households of receiving health care. FRP in health is typically measured by comparing a household's OOP expenditure to a threshold defined by living standards in the absence of spending or categorizing expenditure as impoverishing if it pushes households below the poverty line.

The effect of social capital on FRP was examined using two related indicators. First, the impact of social capital on OOP expenditure on health care as a percentage of total household income (THI) was examined. This is defined as follows:

$$OOP \text{ as } \% \text{ THI} = \left( \frac{OOP}{Y} \right) * 100$$

Where *OOP* is OOP expenditure on health care, and *Y* is household income. We then took the income-based approach to defining CHE, defining health care expenditures as catastrophic if they exceeded 10% of THI.

Social capital may impact FRP in various ways. As noted, social capital may have a direct effect on health, which may reduce or increase the need to utilize and pay for health care. Social capital may also enable access to external resources. OOP as a percentage of THI and the probability of CHE were used to examine whether social capital has a protective effect through increased household income. In addition to collecting data on household income, the NIDS also collects information on remittances received from family and friends outside the household. These two sources of income were added.

The NIDS dataset provides the health care expenditure variables at the household level. Therefore, individual-level data are aggregated to household level. Empirical analysis of CHE is commonly undertaken at the household level under the assumption of shared or pooled household resources. This creates several issues with the NIDS data. Although individuals are identifiable across NINDS survey waves, households are only identifiable within survey waves of the NIDS panel and are only identifiable across waves “insofar as they are made up of the same individuals.”<sup>8</sup> To create a household panel, households must be identifiable across survey waves. Therefore, we assumed that if the first three people were constant in a household in each wave, this constituted the same household, and we created a common household identifier. This created a sample of 2,389 households from the NIDS data.

Because the analysis was now at the household level, this changed the interpretation of the social capital variable. Each household was composed of multiple individuals, so the dummy variables indicating the individual's level of social capital (low,

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<sup>8</sup> <http://www.nids.uct.ac.za/nids-data/documentation/faqs/data-about-nids>



medium, or high trust) now signified the proportion of household members with low, medium, and high social capital. These proportions were multiplied by 100 to give percentages of household members with each level of social capital. Finally, the individual-level data were aggregated to the household level, so observations were weighted by the number of individuals in each household.

### **Covariates**

A number of covariates that are posited to potentially be associated with both social capital and health outcomes were included across all models. Variables capturing individuals' SES, such as household income, education level, and employment status, were included. Sociodemographic variables, marital status, and age (including a binary capturing if an individual is over age 60) were also included. Information on whether an individual has received a disability grant, which is a means-tested provision of financial assistance to low-income individuals who are unfit to work and whether they are covered by medical aid, was included. Car or motorbike ownership status and several measures of lifestyle choices, such as how physically active an individual is and smoking and drinking habits, were included. Finally, household environmental factors were included, such as type of housing, household water source, toilet type, and whether a household has electricity.

### **Analysis**

Beyond issues of conceptual definition and the identification of indicators that serve as a proxy for aspects of social capital, several methodological considerations complicate the empirical analysis of the effect of social capital on health outcomes. Durlauf (2002) and Durlauf & Fafchamps (2005) outlined several issues that suggest that social capital is likely to be endogenous. This endogeneity complicates identification of the parameter of interest, as social capital is correlated with the error term (i.e.,  $E[X_{it}] \neq 0$ ). Without addressing these methodological challenges that emerge in empirical analysis of the effect of social capital on health outcomes, researchers should be careful in interpreting any estimates produced.

First, it has been noted that the relationship between social capital and health may suffer from reverse causation. Examples in the literature examine the influence of health on social capital. Sirven and Debrand (2011) found that the effect of health on organization membership was much stronger than the effect of membership on health. In most cases, reverse causation will cause naïve estimates of the effect of social capital on health to be upward bias, overstating its impact.

A second potential issue potentially resulting in the endogeneity of social capital is omitted variables. This will also lead to biased estimates if one or more relevant explanatory variables for health, which are also correlated with social capital, are omitted from the model. The sign of the subsequent bias will depend on the sign of the correlation between social capital and the omitted variables, as well as the sign





of the omitted variables' effect on health. Including covariates attempts to reduce this risk, but many relevant covariates might be unobservable by definition (e.g., preferences). This is particularly problematic because social capital is—to an extent—a choice variable. Therefore, self-selection increases the possibility that there may be unobservable factors related to social capital and health outcomes.

A final consideration relates to the types of variables used in the analysis examining health and social capital. As noted, due to the multidimensional and complex nature of social capital, quantitative analysis requires the use of proxy indicators. Frequently, indicators are self-reported (e.g., beliefs or membership in organizations). This has the potential to introduce measurement error, which can bias estimates. If classical measurement error is introduced, this will attenuate estimates of the impact of social capital on health toward zero, and if more complex forms of non-classical measurement error exist, the effect on estimates is unknown. In addition, much of the literature relies on self-reported indicators of health status. If the same biases affect self-reported social capital and health, then this can result in a spurious correlation.

Without addressing the above issues, it is unlikely that any identified relationship between social capital and health will provide sufficient evidence of a causal link. This has important policy implications. Without knowing whether the relationship between social capital and health is causal, it is impossible to determine whether policy interventions seeking to influence or targeting social capital will have subsequent health effects.

We implemented several approaches to deal with some of the methodological challenges involved in establishing causality in the social capital-health relationship. Panel data were used to overcome omitted variable and self-selection bias using fixed effects estimation. This resulted in examining how within-individual changes in social capital relate to changes in health outcomes, thereby controlling for unobserved variables in the relationship between social capital and health, which do not vary over time.<sup>9</sup>

In addition, two models using two different measures of social capital and two indicators of health status were estimated to reduce the risk of measurement error.

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<sup>9</sup> For individuals who do not move, this also controls for all factors that do not vary inside communities, such as community fixed effects (e.g., community-specific health care supply and local services).



The analysis examined whether the effect of social capital on health is heterogeneous across levels of household income by interacting social capital with quartiles of household income.

All models were estimated separately for generalized and localized trust. Details of the econometric approaches adopted are outlined in **Technical Appendix A.1**.



## 6. Results

### 6.1 The Effect of Social Capital on Health Outcomes and Equity

Individual level descriptive statistics are presented across levels of social capital measured by localized trust in **Table 4**. Reflecting the distributions of social capital in **Figure 3**, it is clear that a majority of the sample consists of low localized trust individuals. The mean level of self-reported overall health status is largely similar across levels of localized trust. There is a low mean CES-D-10 score for all groups, indicating good average mental health; however, the average score increases slightly with localized trust. The mean incidence of CHE is similar and under 10% for all levels of social capital measured by localized trust. OOP as a percentage of THI is largely comparable across individuals with different levels of localized trust.

There is a very clear unconditional positive association between THI and localized trust. The mean THI for individuals with high localized trust is almost three times higher than for individuals with low localized trust. This potentially reflects different characteristics of the environments in which individuals at different income levels reside. Otherwise, the characteristics of low, medium, and high localized trust individuals appear largely comparable.

**Figure 4** and **Figure 5** show changes in self-reported overall health status over time by level of social capital (generalized and localized trust). This reiterates the similarities of average health status across groups with different levels of social capital, and also illustrates the stability of self-reported health over time.

**TABLE 4: SUMMARY STATISTICS**

Variables	Low localized trust				Medium localized trust				High localized trust			
	N	Mean (overall SD)	Between SD	Within SD	N	Mean (overall SD)	Between SD	Within SD	N	Mean (overall SD)	Between SD	Within SD
<b>Outcomes</b>												
Health status	64,215	3.7 (1.1)	1.0	0.7	16,728	3.8 (1.1)	1.0	0.4	12,054	3.8 (1.1)	1.0	0.37
CES-D-10 mental health	63,563	6.8 (4.5)	3.7	3.0	16,527	7.2 (4.3)	4.0	1.8	11,840	7.4 (4.2)	4.1	1.57
Catastrophic health expenditure	55,185	0.1 (0.2)	0.2	0.1	14,353	0.1 (0.3)	0.2	0.1	10,366	0.1 (0.3)	0.3	0.10
OOP as percentage of THI	55,185	4.8 (265.3)	131	217	14,353	6.5 (328.4)	212	216	10,366	4.3 (139.5)	150	2.56
<b>Covariates</b>												
Annual total household Income	56,776	56,190 (114,111)	121,351	53,088	14,853	75,138 (374,607)	254,025	237,941	10,591	145,724 (5,846,633)	6,282,320	330,412
Gender	64,302	0.6 (0.5)	0.5	0.0	16,741	0.6 (0.5)	0.5	0.0	12,055	0.6 (0.5)	0.5	0.00
Employment status	64,242	0.3 (0.4)	0.4	0.2	16,721	0.3 (0.4)	0.4	0.1	12,028	0.3 (0.4)	0.4	0.13
Self-employed	64,238	0.0 (0.2)	0.2	0.1	16,722	0.0 (0.2)	0.2	0.1	12,029	0.1 (0.2)	0.2	0.08
Marital status	33,781	0.2 (0.4)	0.4	0.1	7,743	0.3 (0.4)	0.4	0.1	6,539	0.3 (0.5)	0.4	0.06
Age	64,280	37.2 (17.4)	17.5	2.3	16,736	38.2 (17.7)	17.7	1.5	12,054	38.1 (17.8)	17.8	1.31
Over age 60	64,280	0.1 (0.3)	0.3	0.1	16,736	0.1 (0.4)	0.3	0.1	12,054	0.1 (0.4)	0.3	0.06
Owns radio	33,742	0.3 (0.5)	0.4	0.3	7,733	0.4 (0.5)	0.5	0.1	6,580	0.4 (0.5)	0.5	0.13
Receives disability grant	64,221	0.0 (0.2)	0.2	0.1	16,723	0.0 (0.2)	0.2	0.1	12,038	0.0 (0.2)	0.2	0.05
<b>Education</b>												
No education	63,390	0.1 (0.3)	0.3	0.1	16,496	0.1 (0.3)	0.3	0.0	11,860	0.1 (0.3)	0.3	0.04
1st tertile education	63,390	0.4 (0.5)	0.5	0.2	16,496	0.4 (0.5)	0.5	0.1	11,860	0.3 (0.5)	0.5	0.09
2nd tertile education	63,390	0.4 (0.5)	0.5	0.2	16,496	0.4 (0.5)	0.5	0.1	11,860	0.4 (0.5)	0.5	0.12

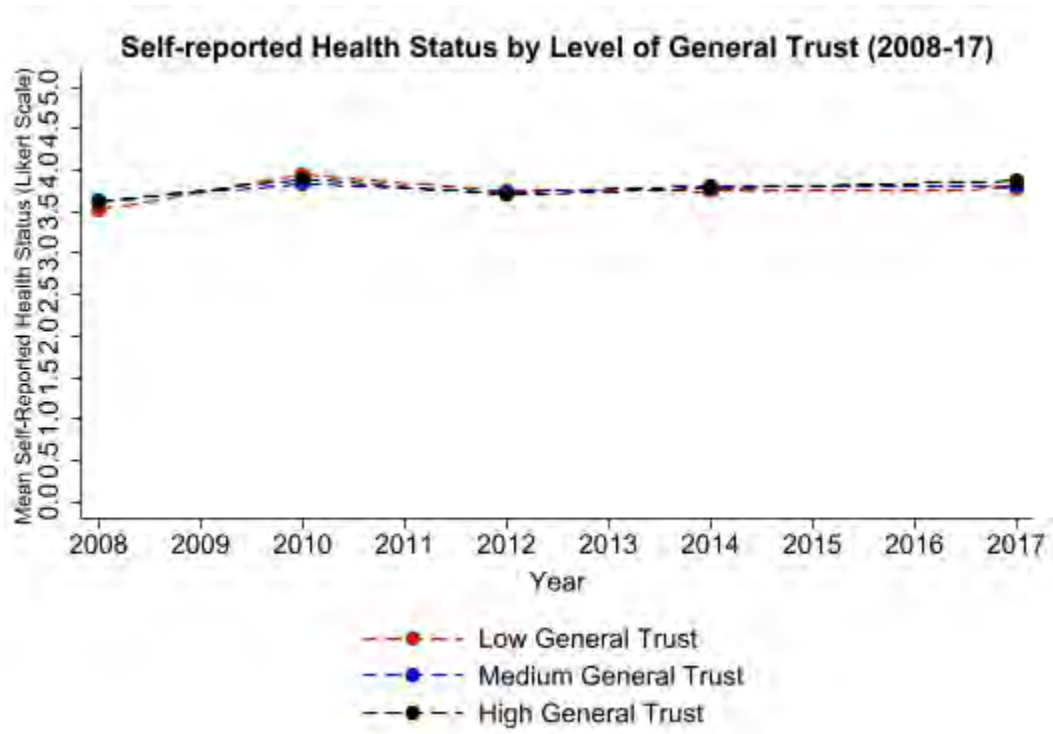


Variables	Low localized trust				Medium localized trust				High localized trust			
	N	Mean (overall SD)	Between SD	Within SD	N	Mean (overall SD)	Between SD	Within SD	N	Mean (overall SD)	Between SD	Within SD
3rd tertile education	63,390	0.1 (0.3)	0.3	0.1	16,496	0.2 (0.4)	0.3	0.1	11,860	0.2 (0.4)	0.4	0.10
Computer literate												
Not computer literate	62,794	0.7 (0.5)	0.4	0.2	16,281	0.6 (0.5)	0.5	0.1	11,660	0.6 (0.5)	0.5	0.12
Basic computer literate	62,794	0.2 (0.4)	0.4	0.2	16,281	0.2 (0.4)	0.4	0.2	11,660	0.2 (0.4)	0.4	0.14
Highly computer literate	62,794	0.1 (0.3)	0.3	0.2	16,281	0.1 (0.3)	0.3	0.1	11,660	0.2 (0.4)	0.3	0.11
Car/motorbike ownership	64,204	0.0 (0.2)	0.2	0.1	16,725	0.0 (0.2)	0.2	0.1	12,056	0.1 (0.3)	0.2	0.10
Phone ownership	64,196	0.7 (0.5)	0.4	0.3	16,719	0.7 (0.4)	0.4	0.2	12,047	0.7 (0.4)	0.4	0.14
Receives medical aid	64,183	0.1 (0.3)	0.3	0.1	16,701	0.1 (0.3)	0.3	0.1	12,028	0.2 (0.4)	0.3	0.08
Housing type												
Lowest quality housing type	64,109	0.0 (0.1)	0.1	0.1	16,693	0.0 (0.1)	0.1	0.0	11,985	0.0 (0.1)	0.1	0.04
Low quality housing type	64,109	0.1 (0.3)	0.3	0.2	16,693	0.1 (0.3)	0.3	0.1	11,985	0.1 (0.3)	0.3	0.11
Medium quality housing type	64,109	0.0 (0.2)	0.2	0.1	16,693	0.1 (0.2)	0.2	0.1	11,985	0.1 (0.2)	0.2	0.09
High quality housing type	64,109	0.1 (0.4)	0.3	0.2	16,693	0.1 (0.3)	0.3	0.1	11,985	0.1 (0.3)	0.3	0.10
Highest quality housing type	64,109	0.7 (0.5)	0.4	0.3	16,693	0.7 (0.5)	0.5	0.2	11,985	0.7 (0.5)	0.4	0.16
Piped (tap) water in dwelling or yard	64,229	0.7 (0.5)	0.4	0.2	16,721	0.7 (0.5)	0.5	0.1	12,041	0.7 (0.5)	0.5	0.11
Flush toilet at residence	64,216	0.5 (0.5)	0.5	0.2	16,723	0.5 (0.5)	0.5	0.1	12,029	0.5 (0.5)	0.5	0.09
Electricity	63,898	0.8 (0.4)	0.3	0.2	16,598	0.8 (0.4)	0.4	0.1	11,986	0.8 (0.4)	0.4	0.12
Exercise regularly												
Never	21,062	0.7 (0.4)	0.4	0.2	4,870	0.7 (0.5)	0.4	0.1	4,208	0.7 (0.5)	0.5	0.09
Infrequently	21,062	0.1 (0.3)	0.3	0.1	4,870	0.1 (0.3)	0.3	0.1	4,208	0.1 (0.4)	0.3	0.08
Frequently	21,062	0.2 (0.4)	0.3	0.1	4,870	0.2 (0.4)	0.4	0.1	4,208	0.2 (0.4)	0.4	0.08



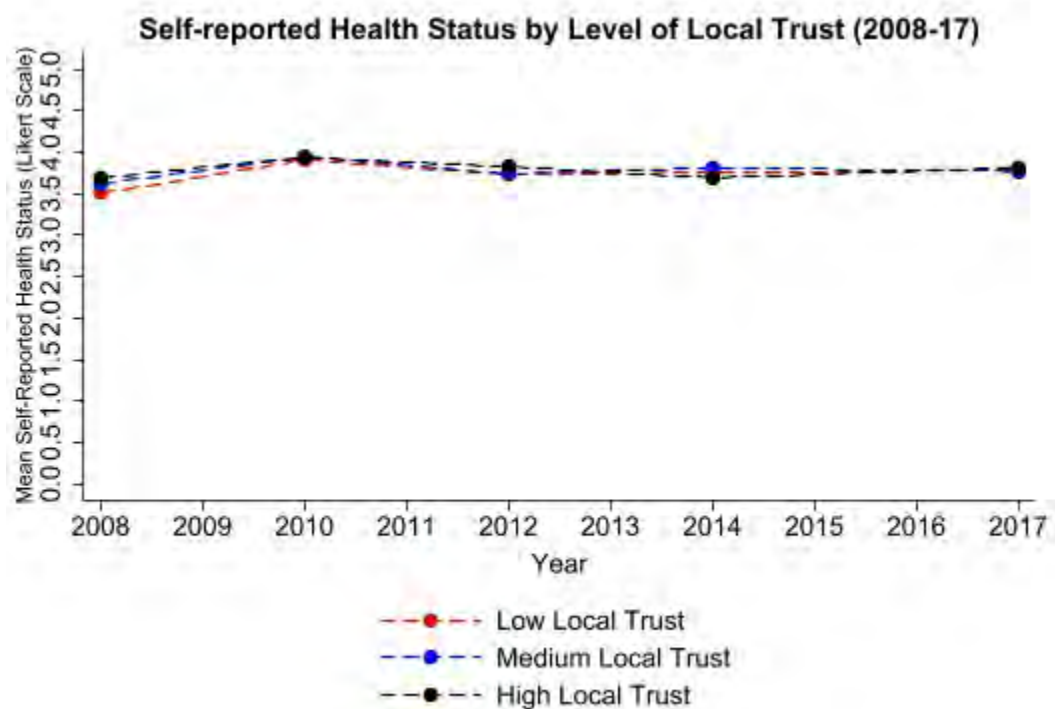
Variables	Low localized trust				Medium localized trust				High localized trust			
	N	Mean (overall SD)	Between SD	Within SD	N	Mean (overall SD)	Between SD	Within SD	N	Mean (overall SD)	Between SD	Within SD
Drink alcohol often												
Never	49,327	0.7 (0.4)	0.4	0.2	11,523	0.8 (0.4)	0.4	0.1	9,191	0.8 (0.4)	0.4	0.11
Infrequently	49,327	0.2 (0.4)	0.4	0.2	11,523	0.2 (0.4)	0.4	0.1	9,191	0.2 (0.4)	0.4	0.11
Frequently	49,327	0.0 (0.2)	0.1	0.1	11,523	0.0 (0.2)	0.2	0.1	9,191	0.0 (0.2)	0.2	0.05
Number people in household	12,666	5.6 (3.2)	3.2	0.9	3,479	5.5 (3.3)	3.3	0.5	2,696	5.3 (3.1)	3.1	0.42

FIGURE 4: CHANGES IN HEALTH STATUS BY GENERALIZED TRUST OVER TIME





**FIGURE 5: CHANGES IN HEALTH STATUS BY LOCALIZED TRUST OVER TIME**



**Table 5** shows the results from models estimating the effect of generalized and localized trust on self-reported overall health status (Eq. (1) and Eq. (2) of **Technical Appendix A.1**).<sup>10</sup> The coefficients on medium trust and high trust are interpreted in relation to low trust. Models G.1 and G.2 and L.1 and L.2 relate to Eq. (1), and models G.3 and G.4 and L.3 and L.4 relate to Eq. (2).

<sup>10</sup> Although self-reported health status is an ordinal variable measured on a Likert scale, we estimated linear probability models rather than ordinal logistic regressions. This is because ordered logistic fixed effects models have issues when calculating marginal effects and would have resulted in less intuitive coefficients, particularly for the interaction effects of Eq. (3).





**TABLE 5: EFFECT OF SOCIAL CAPITAL ON SELF-REPORTED OVERALL HEALTH STATUS**

Variables	Generalized trust				Localized trust			
	Model (G.1)	Model (G.2)	Model (G.3)	Model (G.4)	Model (L.1)	Model (L.2)	Model (L.3)	Model (L.4)
Constant	3.75*** (0.00)	4.21*** (0.00)	3.68*** (0.01)	3.32*** (0.75)	3.74*** (0.00)	4.21*** (0.00)	3.68*** (0.01)	3.28*** (0.75)
Low trust	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Medium trust	0.03** (0.01)	0.02* (0.01)	-0.002 (0.01)	-0.01 (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.01 (0.01)	0.02 (0.01)
High trust	0.04*** (0.02)	0.01 (0.01)	0.005 (0.02)	0.01 (0.02)	0.07*** (0.01)	0.02** (0.01)	0.01 (0.01)	0.02* (0.01)
Covariates	N	Y	N	Y	N	Y	N	Y
Two-way fixed effects	N	N	Y	Y	N	N	Y	Y
R-squared	0.0001	0.2253	0.0051	0.0086	0.0005	0.2242	0.0047	0.0033
F-statistic	6.52	669.29	166.89	46.73	24.75	847.5	161.86	45.88
Observations	91,945	81,161	91,945	81,161	92,997	82,138	92,997	82,138

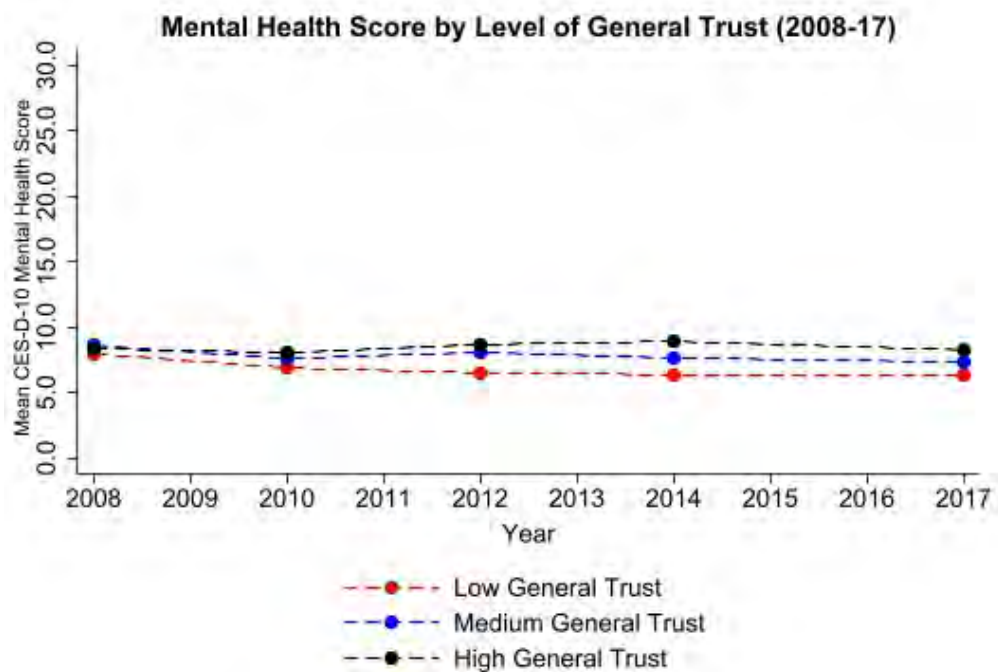
**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for THI, which we included as a covariate.

Without controlling for unobserved fixed effects, both generalized and localized trust have a strongly statistically significant positive correlation with health status (i.e., moving from low generalized or localized trust to medium or high trust is associated with better health status). However, this positive association disappears for generalized trust when controlling for individual unobservable fixed effects, and only moving from low localized trust to high localized trust has a significant positive effect on overall health status. In addition, the magnitude of the improvements in health status is generally quite small.

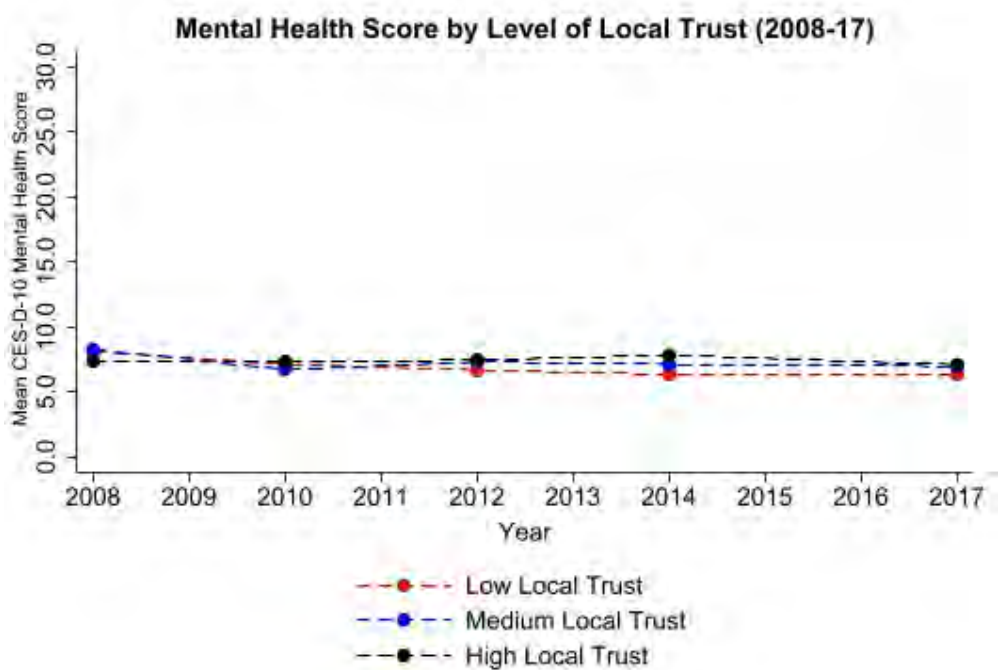
**Figure 6** and **Figure 7** show changes in CES-D-10 over time by level of social capital (generalized and localized trust). Individuals with lower social capital appear to have marginally better mental health scores.



**FIGURE 6: CHANGES IN CES-D-10 MENTAL HEALTH SCORES BY GENERALIZED TRUST OVER TIME**



**FIGURE 7: CHANGES IN CES-D-10 MENTAL HEALTH SCORE BY LOCALIZED TRUST OVER TIME**





**Table 6** shows the results from running Eq. (1) and Eq. (2) for both generalized and localized trust on CES-D-10 mental health scores. Similar to **Table 5**, the coefficients on medium trust and high trust are interpreted in relation to low trust, and models G.1 and G.2 and L.1 and L.2 relate to Eq. (1), and models G.3 and G.4 and L.3 and L.4 relate to Eq. (2), our preferred specification.

**TABLE 6: EFFECT OF SOCIAL CAPITAL ON CES-D-10 MENTAL HEALTH SCORE**

Variables	Generalized trust				Localized trust			
	Model (G.1)	Model (G.2)	Model (G.3)	Model (G.4)	Model (L.1)	Model (L.2)	Model (L.3)	Model (L.4)
Constant	6.724*** (0.0177)	7.783*** (0.174)	7.587*** (0.0400)	3.449 (2.505)	6.811*** (0.0192)	7.866*** (0.173)	7.598*** (0.0404)	2.900 (3.109)
Low trust	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Medium trust	1.007*** (0.0440)	1.126*** (0.0456)	1.125*** (0.0557)	1.151*** (0.0608)	0.364*** (0.0374)	0.544*** (0.0383)	0.561*** (0.0459)	0.600*** (0.0498)
High trust	1.719*** (0.0602)	1.832*** (0.0643)	1.711*** (0.0736)	1.819*** (0.0801)	0.589*** (0.0440)	0.824*** (0.0452)	0.912*** (0.0536)	0.946*** (0.0577)
Covariates	N	Y	N	Y	N	Y	N	Y
Two-way fixed effects	N	N	Y	Y	N	N	Y	Y
R-squared	0.013	0.0780	0.0246	0.0451	0.0025	0.0678	0.0131	0.0369
F-statistic	612.4	213.84	251.64	49.79	114.48	179.71	136.53	32.51
Observations	90,894	80,348	90,894	80,348	91,930	81,313	91,930	81,313

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for THI, which we included as a covariate.

The relationship between the CES-D-10 mental health score and social capital is statistically significant across all models. Moving from low generalized (local) trust to medium or high generalized (local) trust is associated with worse mental health scores. In addition, the relationship between generalized trust and worsening mental health is much larger in magnitude than the relationship between localized trust and mental health. An individual moving from low generalized trust to high generalized trust is associated with a 1.8 unit increase in the CES-D-10 score (**Table 6:** Model G.4). Considering the mean CES-D-10 mental health score is 6.95, this represents a 25% worsening of mental health outcomes associated with an individual moving from



low generalized trust to high generalized trust. It is worth noting that these low average mental health scores are not close to the American Psychological Association’s threshold for identifying individuals at risk of clinic depression (CES-D-10 score of >16). **Table 7**, however, shows that higher generalized trust does increase the probability that an individual is at risk of clinic depression—determined by having a CES-D-10 score >1—by between 1.4 and 2.1 percentage points (**Table 7**: Model G.4).

**TABLE 7: EFFECT OF SOCIAL CAPITAL ON THE PROBABILITY OF HAVING CES-D-10 SCORE >16**

Variables	Generalized trust				Localized trust			
	Model (G.1)	Model (G.2)	Model (G.3)	Model (G.4)	Model (L.1)	Model (L.2)	Model (L.3)	Model (L.4)
Constant	0.040*** (0.00)	0.053*** (0.01)	0.063*** (0.00)	-0.404 (0.37)	0.043*** (0.000)	0.053*** (0.01)	0.064*** (0.00)	-0.435 (0.37)
Low trust	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Medium trust	0.009*** (0.00)	0.013*** (0.00)	0.013*** (0.00)	0.014*** (0.00)	0.0001 (0.00)	0.004** (0.00)	0.006** (0.00)	0.007*** (0.00)
High trust	0.021*** (0.00)	0.024*** (0.00)	0.020*** (0.00)	0.021*** (0.00)	-0.008*** (0.00)	-0.003* (0.00)	-0.002 (0.00)	-0.002 (0.00)
Covariates	N	Y	N	Y	N	Y	N	Y
Two-way fixed effects	N	N	Y	Y	N	N	Y	Y
R-squared	0.0008	0.0177	0.0054	0.0045	0.0002	0.016	0.0045	0.0048
F-statistic	28.97	0.00	35.38	8.84	9.84	33.56	23.03	7.31
Observations	90,894	80,348	90,894	80,348	91,930	81,313	91,930	81,313

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for THI, which we included as a covariate.

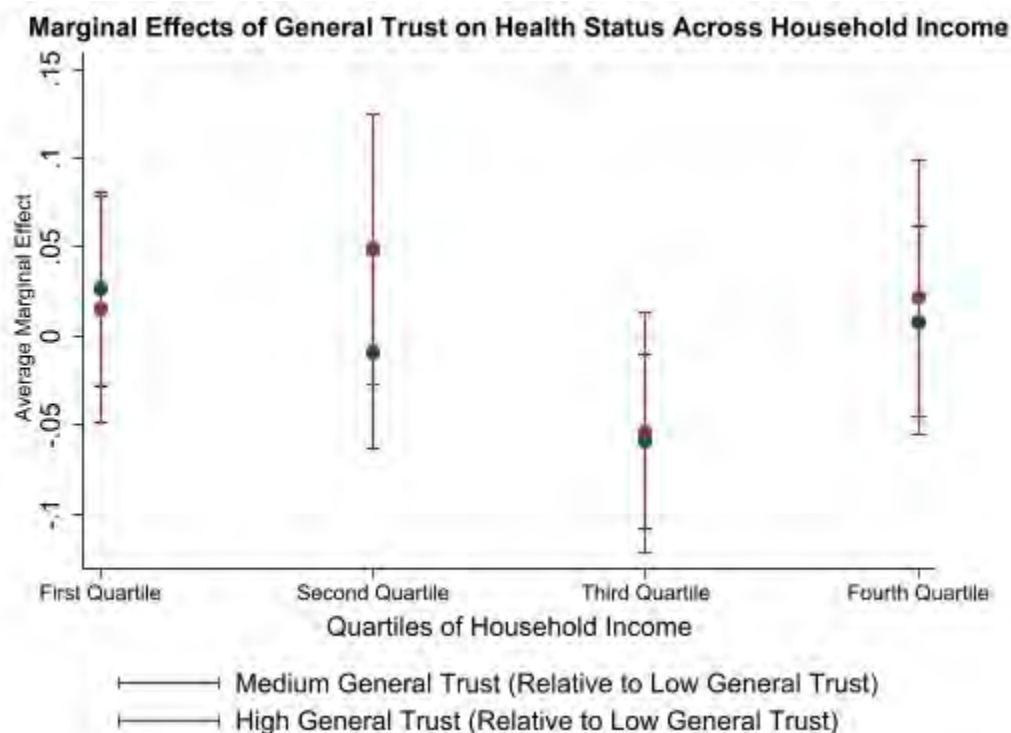
Finally, we examined heterogeneity in the effect of social capital on overall health and mental health. **Figure 8** and **Figure 9** illustrate the variation in the effect of changes in social capital on individuals’ overall health status across individuals based on household income (results of estimation of Eq. (3) in **Technical Appendix A.1**).<sup>11</sup>

<sup>11</sup> Coefficients for all heterogeneity analysis are presented in Technical Appendix A.2.



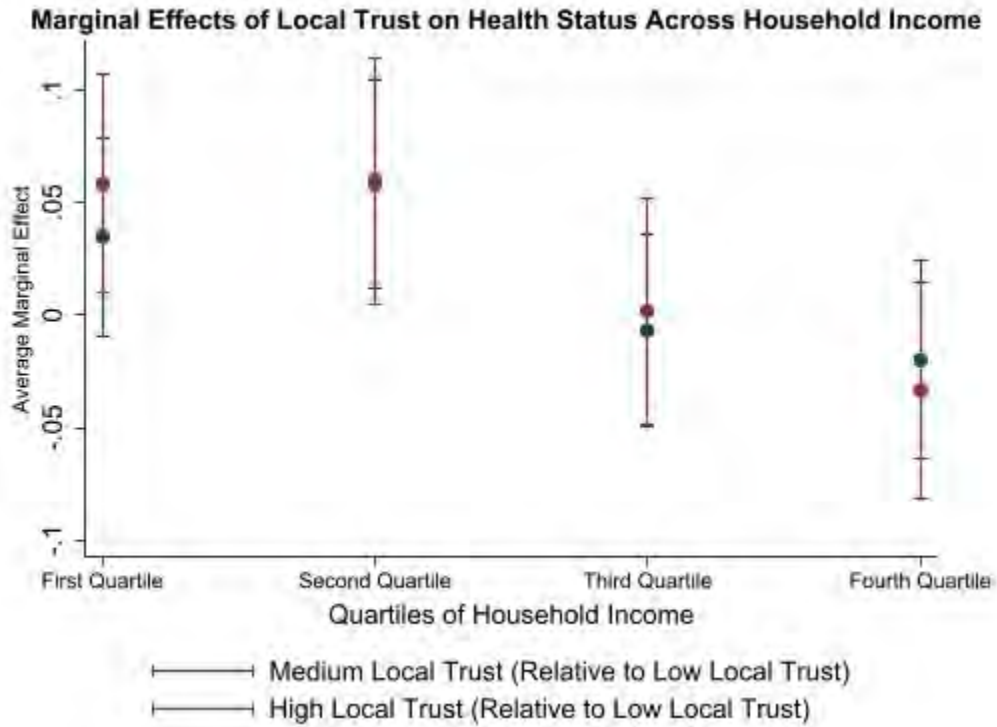
**Figure 8** displays no obvious pattern in the relationship between generalized trust and health status across SES. **Figure 9**, however, suggests that although localized trust is not a significant determinant of health status for individuals with higher SES and household income, for individuals residing in households with lower incomes, increases in localized trust have a positive effect on overall health status. The effect of localized trust on health status is not statistically significantly different between household income quartiles.

**FIGURE 8: HETEROGENEITY IN THE RELATIONSHIP BETWEEN GENERALIZED TRUST AND OVERALL HEALTH STATUS BY HOUSEHOLD INCOME**





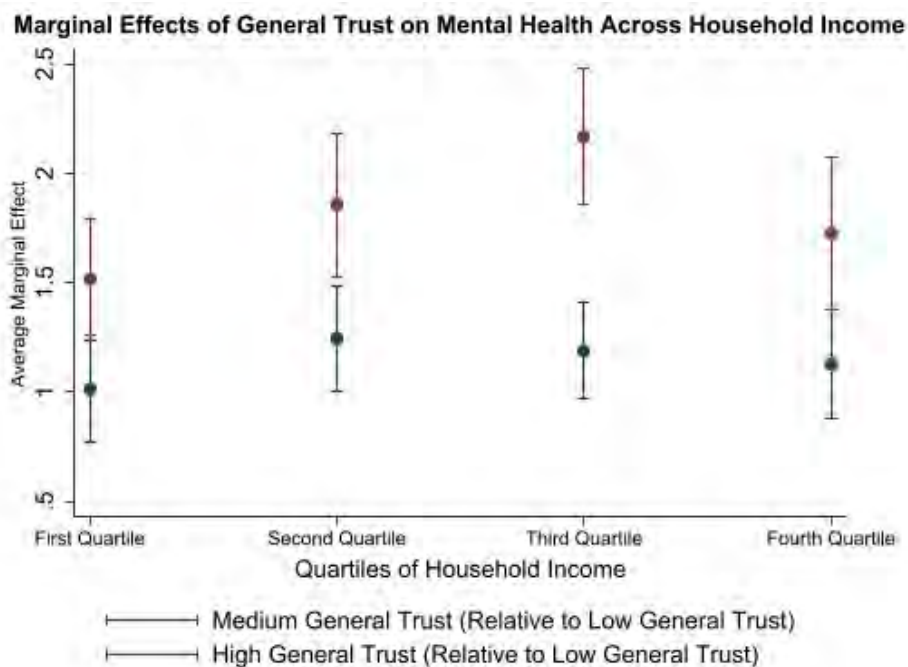
**FIGURE 9: HETEROGENEITY IN THE RELATIONSHIP BETWEEN LOCALIZED TRUST AND OVERALL HEALTH STATUS BY HOUSEHOLD INCOME**





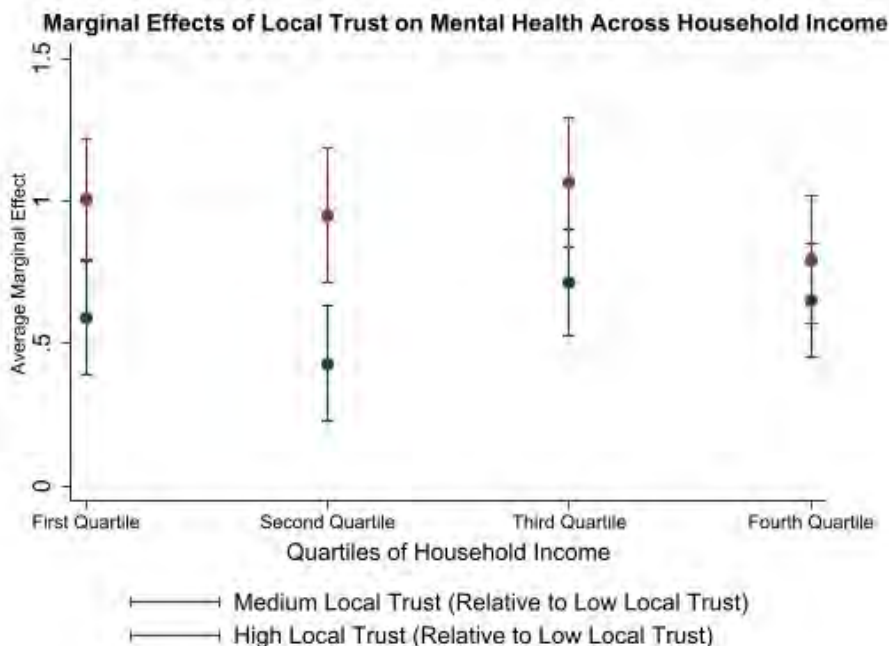
**Figure 10** and **Figure 11** present the results of estimation Eq. (3), illustrating the variation in the effect of changes in social capital on individuals' CES-D-10 mental health score.

**FIGURE 10: HETEROGENEITY IN THE RELATIONSHIP BETWEEN GENERALIZED TRUST AND CES-D-10 MENTAL HEALTH SCORES BY HOUSEHOLD INCOME**





**FIGURE 11: HETEROGENEITY IN THE RELATIONSHIP BETWEEN LOCALIZED TRUST AND CES-D-10 MENTAL HEALTH SCORES BY HOUSEHOLD INCOME**



**Figures 10** and **11** show that the negative mental health effect of increases in social capital is observed for individuals residing in households in all quartiles of the income distribution. Further, the relationship between social capital and mental health is clearly monotonic for all groups, with larger increases in social capital being associated with a larger reduction in mental health scores.

That localized trust specifically is a significant determinant of health status for lower SES individuals is consistent with the hypothesis that the mechanism through which social capital impacts health is through informal insurance and risk pooling across households, without formal contracts. These mechanisms are much more reliant on measures of localized trust than wider trust and are more likely to be developed by lower-income households. Localized trust is likely to influence the existence of and participation in community support networks among resource-constrained households.

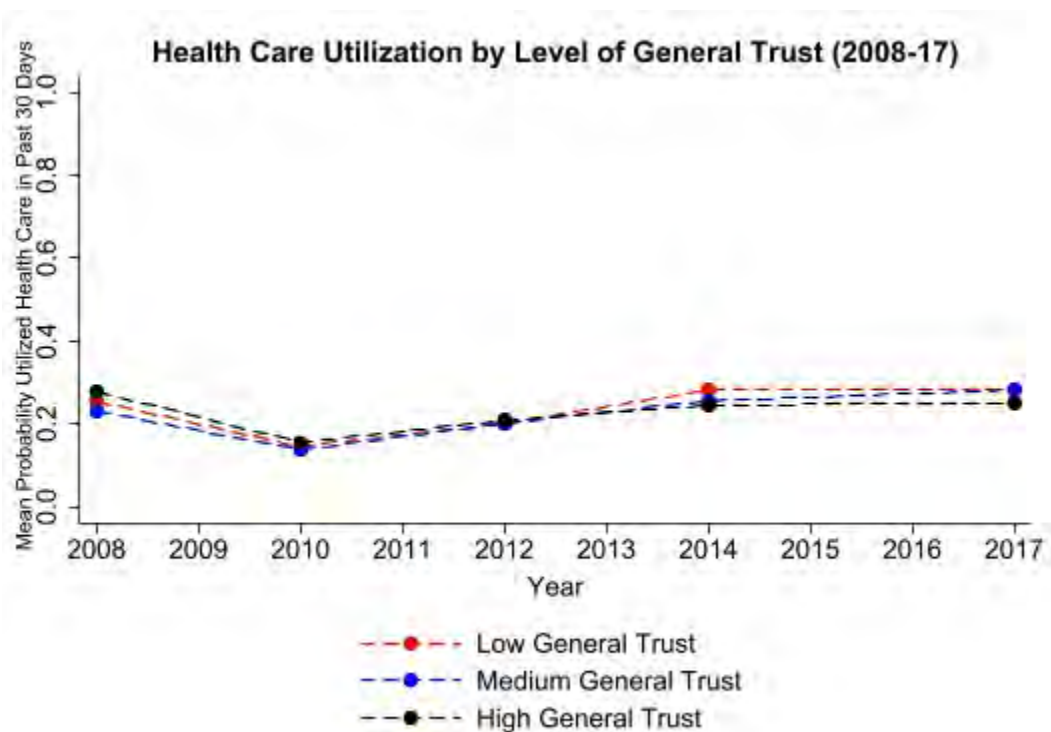
## 6.2 The Effect of Social Capital on Health Care Utilization

**Figure 12** and **Figure 13** show changes in the probability that individuals utilized health care in the past 30 days over time by level of social capital (generalized and localized trust). Similar to health status, the rates of health care utilization are comparable across levels of social capital.

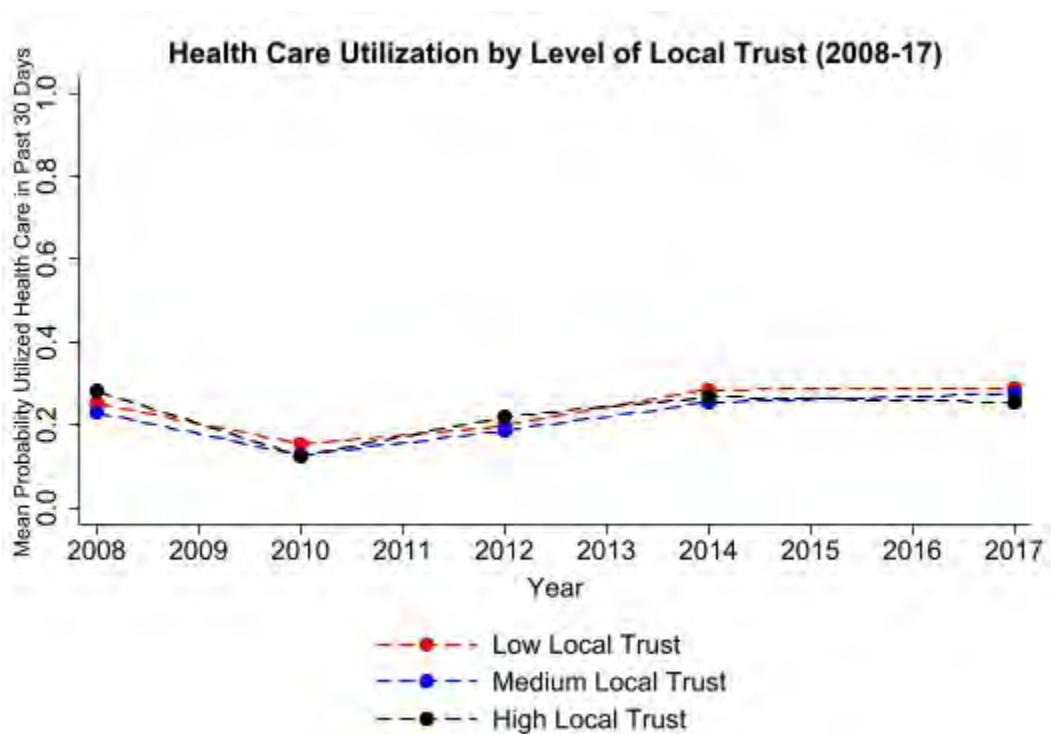




**FIGURE 12: CHANGES IN HEALTH CARE UTILIZATION BY GENERALIZED TRUST OVER TIME**



**FIGURE 13: CHANGES IN HEALTH CARE UTILIZATION BY LOCALIZED TRUST OVER TIME**





**Table 8** shows the effect of generalized and localized trust on the probability of an individual having utilized health care in the past 30 days. As noted in the data section for the Financial Risk Protection variables, the covariates are slightly different because they include variables intended to capture aspects of individuals' health status. The aim is to equalize the need for health care utilization across individuals with different levels of social capital. Model L.4 shows that a movement from low to medium localized trust reduces the probability that an individual has utilized health care in the past 30 days by 2.4 percentage points (**Table 8**: Model L.4). The effect is negative and goes against a priori expectations of a positive relationship, which could suggest that the models did not adequately control for changes in individuals' health status.

**Figure 14** and **Figure 15** show that the inverse relationship between social capital and health care utilization increases with household income.



**TABLE 8: EFFECT OF SOCIAL CAPITAL ON HEALTH CARE UTILIZATION**

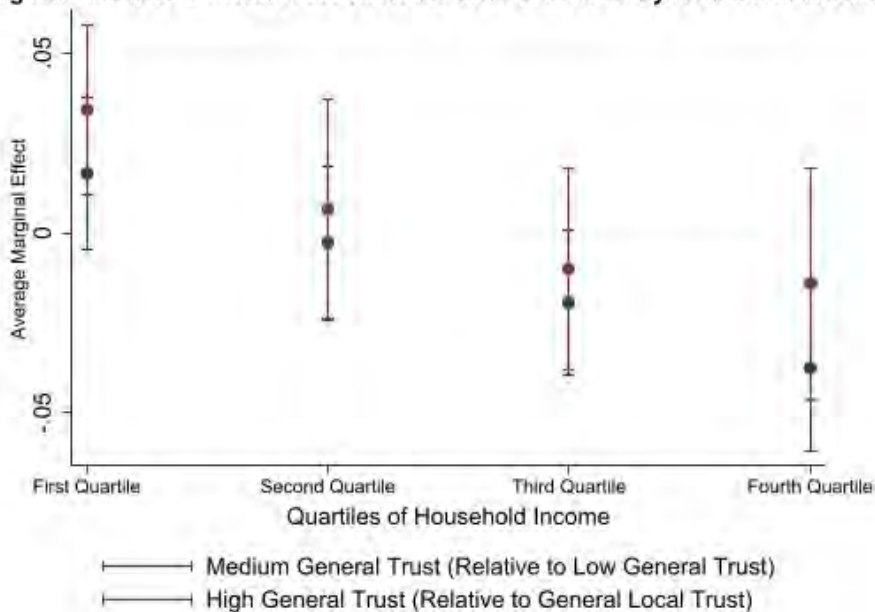
Variables	Generalized trust				Localized trust			
	Model (G.1)	Model (G.2)	Model (G.3)	Model (G.4)	Model (L.1)	Model (L.2)	Model (L.3)	Model (L.4)
Constant	0.240*** (0.00)	0.214*** (0.00)	0.156*** (0.00)	-0.096 (0.152)	0.241*** (0.00)	0.215** * (0.00)	0.158*** (0.00)	-0.074 (0.15)
Low trust	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Medium trust	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01* (0.01)	-0.0153* (0.00)	- 0.021** * (0.00)	-0.022*** (0.00)	-0.024*** (0.00)
High trust	-0.02*** (0.01)	0.00 (0.01)	0.01 (0.01)	0.01 (0.01)	-0.012*** (0.00)	-0.001 (0.00)	-0.004 (0.00)	-0.007 (0.01)
Health covariates	N	N	Y	Y	N	N	Y	Y
Other covariates	N	N	N	Y	N	N	N	Y
Two-way fixed effects	N	Y	Y	Y	N	Y	Y	Y
R-squared	0.00	0.01	0.13	0.17	0.00	0.01	0.13	0.16
F-statistic	5.3	334.7	405.3	405.3	7.8	349.2	417.9	417.9
Observations	92,052	92,052	92,052	81,241	93,107	93,107	93,107	82,220

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for THI, which we included as a covariate.



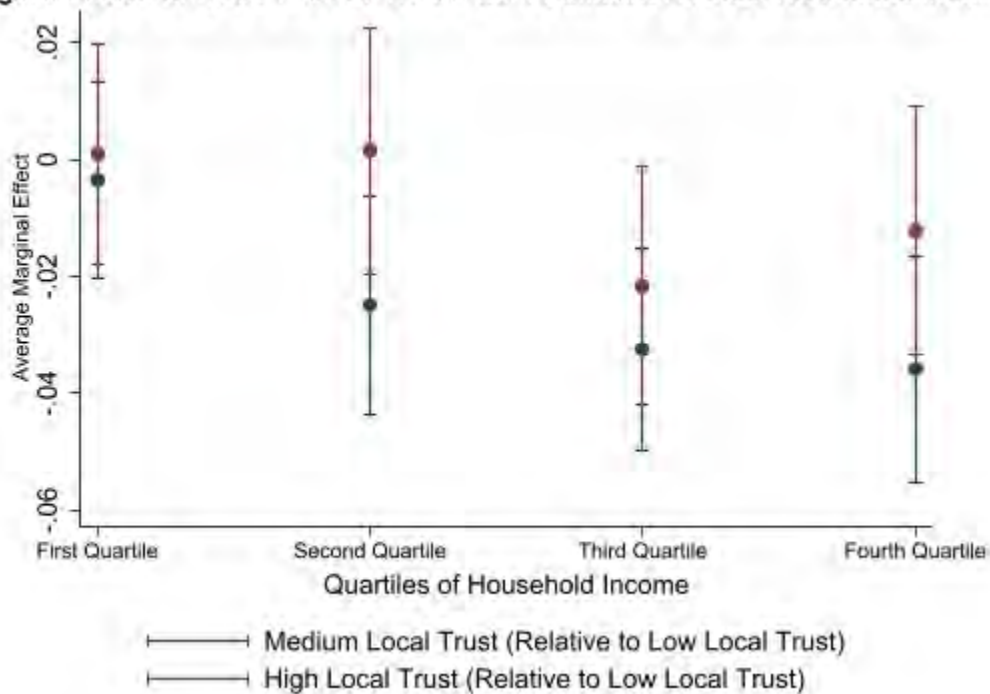
**FIGURE 14: HETEROGENEITY IN THE RELATIONSHIP BETWEEN GENERALIZED TRUST AND HEALTH CARE UTILIZATION BY HOUSEHOLD INCOME**

**Marginal Effects of General Trust on Health Care Utilisation by Household Income**



**FIGURE 15: HETEROGENEITY IN THE RELATIONSHIP BETWEEN LOCALIZED TRUST AND HEALTH CARE UTILIZATION BY HOUSEHOLD INCOME**

**Marginal Effects of Local Trust on Health Care Utilisation Across Household Income**





## 6.3 The Effect of Social Capital on Resilience and Financial Risk Protection

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As noted previously, to assess the effect of social capital on resilience and FRP, we must aggregate the individual-level sample to household level (2,389 households).<sup>12</sup> Therefore, instead of measuring an individual's levels of social capital, we measure the percentage of household members who are low, medium, or high trust.

**Figure 16** and **Figure 17** illustrate changes in the incidence of CHE over time, as measured by a household spending >10% of annual THI on OOP health expenditure.<sup>13</sup> Although the average annual incidence of CHE is relatively low (less than 10% of households suffering a CHE per year), the incidence of CHE is slightly higher in households in which a majority of members are high trust. This pattern persists across time.

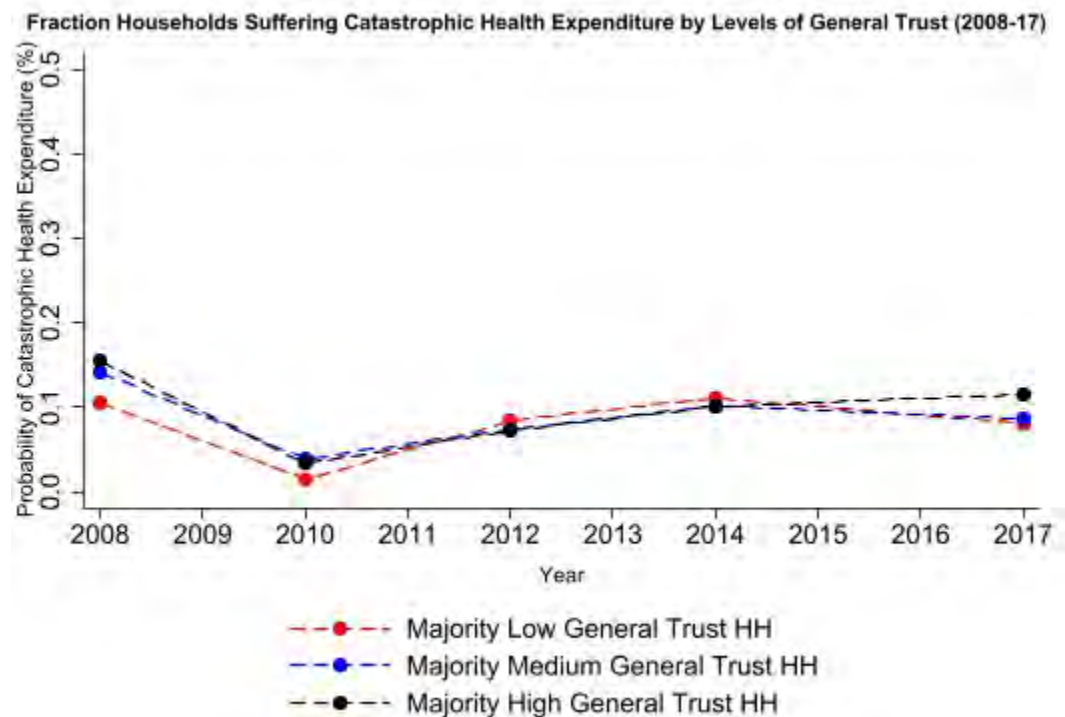
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<sup>12</sup> Note that from a sample of 2,389 households giving 11,945 observations, only 57% of observations have data on THI and health expenditure to enable the calculation of FRP indicators.

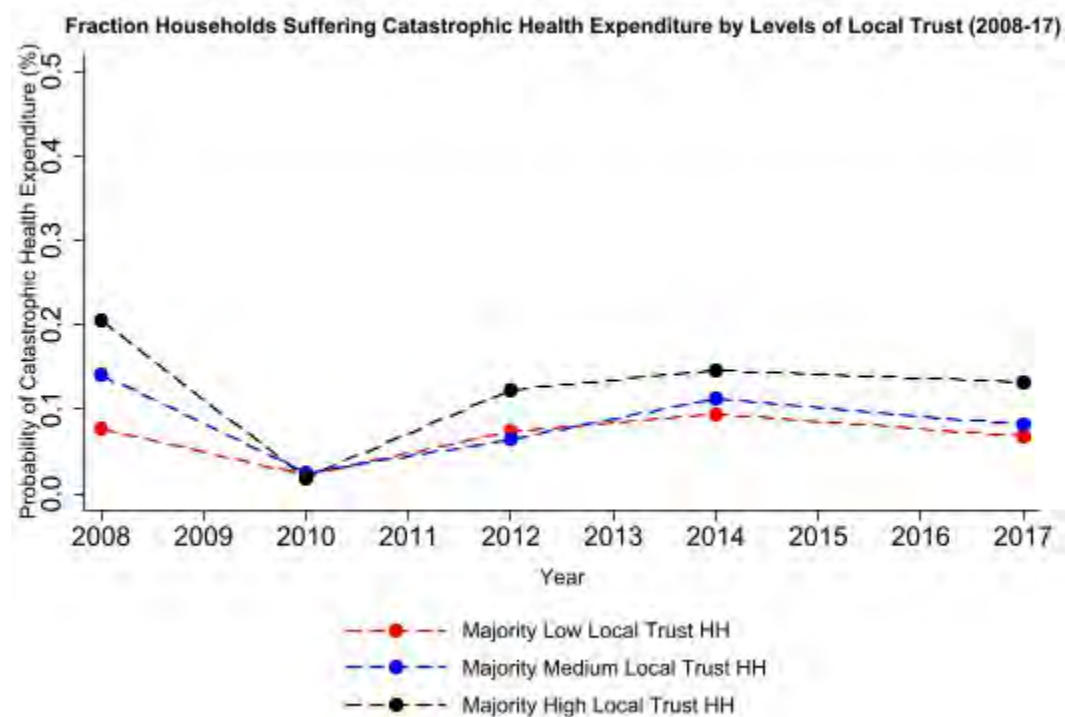
<sup>13</sup> Households are split by whether they are majority low, medium, or high trust (i.e., >50% household members are low, medium, or high trust). This results in some households not being represented in the figures because the household composition may be such that no trust category exceeds 50%. Such households still feature in the main analysis.



**FIGURE 16: CHANGES IN INCIDENCE OF CHE BY GENERALIZED TRUST OVER TIME**



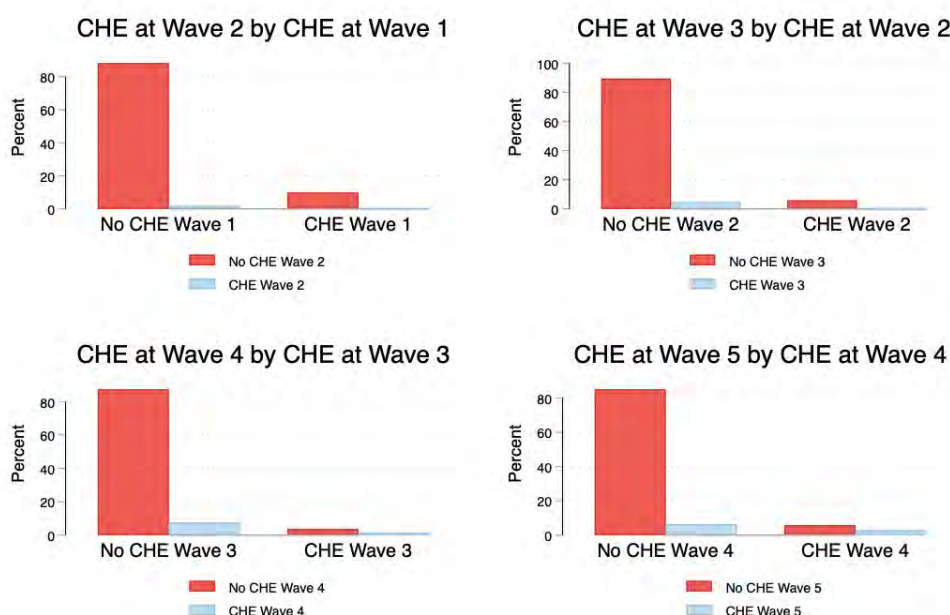
**FIGURE 17: CHANGES IN INCIDENCE OF CHE BY LOCALIZED TRUST OVER TIME**





**Figure 18** shows the distribution of CHE at period  $t$  by CHE at period  $t - 1$  across all years. This illustrates the high degree of persistence in CHE, such that there is not a large probability of households that did not suffer a CHE in period  $t - 1$  suffering a CHE in period  $t$ . This is partly explained by the low incidence of CHE, but also if a household suffers a CHE in period  $t - 1$ , there is a higher probability that it will suffer a CHE in period  $t$ . Alternatively, this can be seen in the transition matrix in **Table 9**. The columns indicate a household’s incidence of CHE in the previous period, and the rows indicate CHE incidence in the current period. Therefore, the first column indicates the conditional probability of a household suffering a CHE at period  $t$ , given that the household did not suffer a CHE in period  $t - 1$ . This again makes clear that households are at much greater risk of suffering a CHE if they had suffered one in the previous period.

**FIGURE 18: DISTRIBUTIONS OF CHE AT PERIOD  $t-1$  ACROSS ALL YEARS**



**TABLE 9: TRANSITION MATRIX OF CHE**

		Period $t - 1$		
		No CHE	CHE	N
Period $t$	No CHE	3,584 (93.92%)	240 (77.67%)	3,824
	CHE	232 (6.08%)	69 (22.33%)	301
N		3,816	309	4,125



**Table 10** displays the results of estimating Eq. (4) illustrating the relationship between the percentage of household members with different levels of social capital and the incidence of CHE. The coefficients in the models illustrate the change in probability of a household suffering a CHE from a 1 percentage point increase in the percent of medium or high trust household members from low trust household members. Given that households in our sample have an average of four members, each would represent 25% of household members. Using the only statistically significant result from these estimates (Model L.1), if one individual moved from low trust to high trust, this would result in a 2.5 percentage point increase in the probability of a household suffering a CHE. Overall, however, we found no meaningful relationship between household-level social capital and the probability of a household suffering a CHE in our data.

**TABLE 10: EFFECT OF SOCIAL CAPITAL ON PROBABILITY OF HOUSEHOLD SUFFERING A CHE**

Variables	Generalized trust				Localized trust			
	Model (G.1)	Model (G.2)	Model (G.3)	Model (G.4)	Model (L.1)	Model (L.2)	Model (L.3)	Model (L.4)
Constant	0.074*** (0.00)	0.020 (0.01)	0.094*** (0.01)	0.197 (0.122)	0.064*** (0.00)	0.030 (0.06)	0.093*** (0.01)	0.179 (0.122)
% household members low trust	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
% household members medium trust	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000** (0.00)	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)
% household members high trust	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.001*** (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
Covariates	N	Y	N	Y	N	Y	N	Y
Two-way fixed effects	N	N	Y	Y	N	N	Y	Y
R-squared	0.3348	0.1393	0.4661	0.4791	0.0048	0.1412	0.4644	0.4772
F-statistic	1.09	18.88	5.97	2.86	10.77	19.29	6.24	2.91
Observations	6,642	6,637	6,642	6,637	6,669	6,664	6,669	6,664

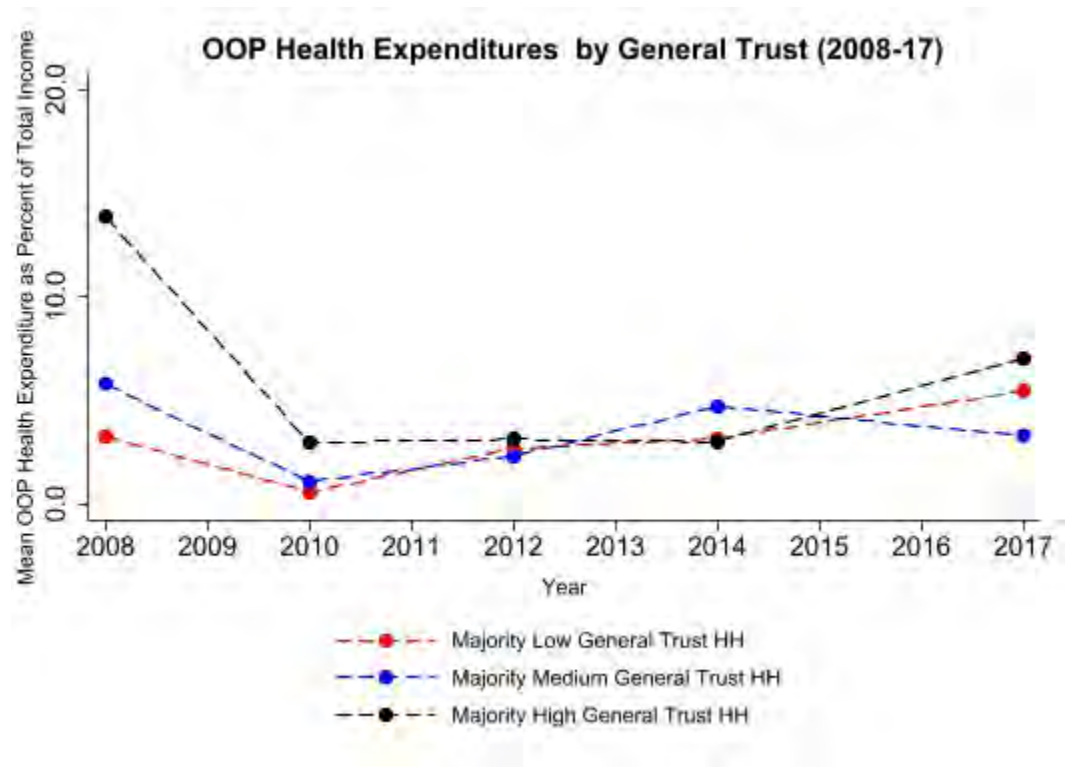
**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for THI, which we included as a covariate.





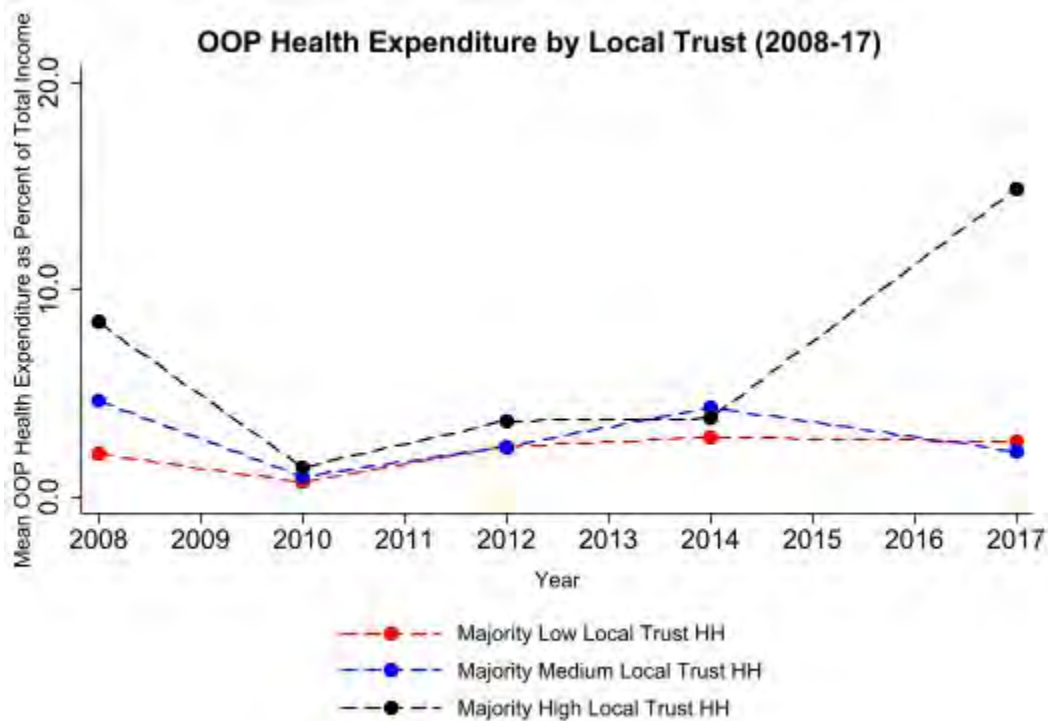
Finally, we examined the relationship between household-level social capital and OOP health expenditure as a percentage of THI. **Figure 19** and **Figure 20** show the changes in OOP health expenditure as a percentage of THI over time.

**FIGURE 19: CHANGES IN OOP HEALTH EXPENDITURE AS A PERCENTAGE OF THI BY GENERALIZED TRUST OVER TIME**





**FIGURE 20: CHANGES IN OOP HEALTH EXPENDITURE AS A PERCENTAGE OF THI BY LOCALIZED TRUST OVER TIME**



**Table 11** presents results of the impact of household-level social capital and OOP health expenditure as a percentage of THI. The coefficients in **Table 11** are interpreted on a similar basis to those in **Table 10**. There appears to be no statistically significant relationship between the percentage of household members with different levels of social capital and households' OOP health care expenditure as a percentage of THI.



**TABLE 11: EFFECT OF SOCIAL CAPITAL ON OOP HEALTH EXPENDITURE AS A PERCENTAGE OF THI**

Variables	Generalized trust				Localized trust			
	Model (G.1)	Model (G.2)	Model (G.3)	Model (G.4)	Model (L.1)	Model (L.2)	Model (L.3)	Model (L.4)
Constant	11.52* (6.58)	-201.3 (153.6)	48.37 (33.30)	-76.83 (115.2)	9.697 (5.904)	-201.9 (155.0)	46.13 (31.76)	-80.12 (114.2)
% household members low trust	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
% household members medium trust	-0.126 (0.09)	-0.157 (0.11)	-0.194 (0.27)	-0.158 (0.28)	0.055 (0.14)	-0.017 (0.13)	0.034 (0.03)	0.046 (0.05)
% household members high trust	-0.094 (0.08)	-0.094 (0.08)	0.076 (0.06)	0.112 (0.10)	-0.085 (0.07)	-0.227 (0.165)	0.048 (0.05)	0.061 (0.06)
Covariates	N	Y	N	Y	N	Y	N	Y
Two-way fixed effects	N	N	Y	Y	N	N	Y	Y
R-squared	0.1979	0.0054	0.3342	0.3373	0.000	0.0055	0.3342	0.3373
F-statistic	1.62	0.41	0.53	0.11	0.72	0.41	0.42	0.11
Observations	6,642	6,637	6,642	6,637	6,669	6,664	6,669	6,664

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for THI, which we included as a covariate.

A number of robustness checks were undertaken, outlined in **Technical Appendix A.3**. Specifically, these checks use alternative measures of health status as the outcome and alternative measures of social capital, namely a commonly used measure of structural social capital. The potential dynamic nature of social capital and health is also examined, whereby the effect of social capital on health outcomes might not be immediate. The results do not dispute any of the primary findings but clarify the complexity of the relationship between social capital and health.



## 7. Conclusions and Recommendations

### 7.1 Key Findings

Taken together, the results of the empirical analysis suggest that the effect of social capital on health outcomes is not straightforward. However, a number of key conclusions can be drawn from both the quantitative analysis and the existing literature examining social capital and health.

**Levels of structural and cognitive social capital are low in many LMICs.** The descriptive analysis revealed that a majority of individuals had low levels of both generalized and localized trust (**Figure 2**). It has been noted that the incidence of crime and violence has a strong influence on the accumulation and deterioration of social capital (Louw & Shaw, 1997). South Africa's high crime rate may therefore play a role in the low levels of trust observed. It has been argued that a wide range of social, demographic, and economic changes may have historically played a role in the erosion of social capital in South Africa. Specifically, increased migration and urbanization and heavier workloads may have acted to reduce individuals' willingness and ability to invest in social capital (Moser, 1998). These findings of low levels of generalized and localized trust in South Africa are consistent with the findings of Hollard and Sene (2016), who found low levels of trust in 16 countries in sub-Saharan Africa. Structural social capital, as measured by organizational participation, was also low, with 57% of individuals not having any organizational membership over the sample period. This suggests poor levels of civic and social participation by individuals in South Africa. This finding is also consistent with previous findings in other countries, such in India, where Hasan (2019) found low organization participation rates among mothers. Given that trust and organizational participation have gained acceptance as indicators to measure levels of social capital, this suggests that there is a deficit of social capital among many LMICs. Although low levels of social capital are not inherently a positive finding, this suggests that if social capital does indeed influence a number of health outcomes, there is a large untapped potential should effective policies to build social capital be identified and successfully implemented.

**The relationship between social capital and health outcomes is complex and not unequivocally positive.** The quantitative analysis suggests that although trust may have a positive effect on overall health status, the relationship between social capital and mental health may be negative. Specifically, the results suggest that increases in localized trust are positively associated with improvements in overall health status for individuals. Further, this effect appears to largely be driven by individuals in households at the lower end of the income distribution. An important policy implication from our results is that social capital interventions might effectively be



added to the range of policies targeting reductions in socioeconomic health inequalities for overall health status.

The findings also suggest that social capital, as measured by both types of trust, has a negative relationship with individuals' mental health status. The potential damaging effect of social capital on mental health has been identified in Malawi (Myroniuk & Anglewicz, 2015) and India (De Silva et al., 2007). Both of these studies identified an inverse relationship between structural social capital and mental health. No previous studies have identified a potential negative effect of cognitive social capital on mental health. Kawachi and Berkman (2001) suggested that higher social capital may in certain circumstances increase an individual's stress if it increases obligations of mutual support among low resource households. Given the prevalence of expectations around informal resource sharing arrangements and social sanctions against those who violate sharing norms in LMICs, this is highly feasible. There is increasing literature on the effects of such social pressure and obligations in LMICs. In examining the economic impact of social pressure to share income with the wider community in rural Kenya, Jakiela and Ozier (2012) found that women were willing to pay to hide information about their income from relatives and neighbors. Given the likely relationship between social capital and obligations, this outlines how it may negatively affect mental health. These observations that the effect of social capital on health outcomes can be bidirectional illustrate the consideration and care that policymakers must take if attempting to use social capital interventions targeting health improvements.

These results highlight how the relationship between social capital and health may depend on both the indicators used to capture each respective concept, as well as on the SES of individuals. The mixed research findings of the relationship between social capital and health might be explained by social capital residing within complex local social structures and contextual factors that influence whether social capital is an important determinant of health.

In addition to the primary relationship between social capital and health, this report explored whether social capital might influence health care utilization rates. This represents one of the possible mechanisms that might explain the link between social capital and health outcomes. **There is limited evidence of the influence of social capital on health care utilization.** The quantitative analysis suggests that individuals who move from low localized trust to medium localized trust have lower levels of health care utilization. However, there is no statistically significant difference in health care utilization between individuals with low and high localized trust, which tempers the belief that localized trust is associated with health care utilization because there is no obvious reason why such a relationship would not be linear. Generalized trust may increase an individual's propensity for health care utilization because it relates to trust in people with whom they do not have strong connections or relationships with or trust in institutions (e.g., health care providers)



(Hasan, 2019; Glanville & Story, 2018). No statistically significant relationship was identified between generalized trust and health care utilization.

Despite the lack of an obvious relationship identified through the quantitative analysis, there is a growing literature acknowledging the importance of social capital for health care utilization. Studying 21 countries, Palafox et al. (2017) found that both structural and cognitive social capital were positively associated with the detection and treatment of hypertension among the low-income countries examined (Bangladesh, India, Pakistan, Zimbabwe). Amoah and Phillips (2017) showed how individuals use their network to decide where to seek health care and how social capital can impact adherence to the health system referral policy. This illustrates how health system and provider quality is potentially a moderator of the impact of social capital on health care utilization. One increasingly studied area is the importance of trust in formal health systems as an important determinant of utilization. The issue of trust in the health system has grown in importance since the onset of various public health crises in LMICs, such as Ebola and COVID-19. A body of evidence has specifically examined the role of trust and the demand for vaccinations (Ozawa et al., 2016). Social capital was found to be crucial in building trust in health systems in settings in which those systems generate positive experiences. Specifically, social capital can have a protective effect against negative messaging in communities in which health services are satisfactory. This may explain the positive association between social capital and vaccine utilization rates (Nagaoka et al., 2012). Therefore, social capital may act to increase community resilience and protect health care utilization rates in response to disruptions, such as antivaccine campaigns. Such an effect also opens the potential for social capital to reduce health care utilization in settings in which the quality of health systems and delivery is poor or below the standard expected by users (Wang, 2009).

Given the evidence that social capital may play a role in health care utilization, a rationale for the lack of an association in the quantitative analysis may be due to the specific indicator of health care utilization used—whether an individual utilized health care in the past 30 days. Given that there is a small positive effect of social capital on overall health status observed, it may also be possible that, despite attempting to control for differences in health status and the need for health care utilization, those with higher social capital are overall healthier and require less health care. In this case, it would also suggest that health care utilization is not a primary mechanism through which social capital impacts health outcomes in this context. Without further study, this remains speculative.

Finally, the report examined the influence of social capital on FRP, as measured by the incidence of household CHE. This is an area with little empirical evidence, despite much work theorizing how social capital may impact individuals' and households' economic resilience to health. **The report finds no observable impact of social capital on the probability that a household will experience a CHE.** Given that CHE is related



to households' incomes and expenditures on health care services, this suggests that social capital does not significantly influence either (or both) of these components. Therefore, given that a limited relationship between social capital and health care utilization has been identified, health care expenditure is unlikely to significantly differ between households with different levels of social capital. In addition, although the analysis attempts to capture the informal resource sharing mechanisms that may operate between households by including transfers and remittances in household income, the reporting of these in the NIDS data is relatively poor, with a high proportion of missing. Therefore, data issues may be an issue contributing to the null results. It may also be the case that the type of support provided by social capital and networks in South Africa is not primarily financial.

There are a number of intertwining policy and research implications from the findings of this report and previous research examining the impact of social capital on health and household resilience. The key recommendations are outlined in the following section.

## 7.2 Recommendations

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**Governments and development partners should consider policies and interventions that build on and promote social capital as part of the toolkit to improve health outcomes and achieve wider health sector objectives.**

In targeting improvements in health and health-related resilience, the cumulative body of evidence suggests that governments and development partners consider policies that foster individual- and community-level social capital. Two key findings from the quantitative analysis, that there are generally low levels of social capital and that social capital, as measured by civic participation and trust, does affect health outcomes, reinforce the results of existing literature and strengthen the call for seriously considering programs designed to build social capital for health.

Although there is a growing empirical literature outlining the relationship between social capital and health outcomes, there are few studies examining how social capital is built and developed. Verduin et al. (2014) highlighted that evidence that social capital can be intentionally promoted is scarce. Glaeser et al. (2002) provided a theoretical framework outlining the determinants of investments in social capital. The framework suggests a number of measures that governments and development partners could implement to foster the growth of social capital in pursuit of health objectives:

- **Implement policies that increase community stability, which will likely increase individual and community investments in social capital by increasing the returns on these investments.** Economic migration, both within and across countries, is the most commonly cited reason for individuals to relocate. Therefore, policies aimed at increasing local economic opportunities and



generally improving local environmental conditions are likely to have a positive impact on social capital development.

- **Implement policies aimed at reducing the cost of social capital formation within communities.** Funding or subsidies could be provided to organizations or groups to expand into previously underserved communities, or to campaigns to encourage the establishment of groups or social organizations by communities. According to the framework set out by Glaeser et al. (2002), this would reduce the individual cost of investing in social capital by reducing the physical distance and travel costs to networks and groups. Alternatively, subsidizing transport costs for individuals to attend social groups that are not present in their local area would encourage links across communities. Moreover, policies could focus on groups with explicit health agendas, such as gatherings of new mothers to share postnatal and parenting advice, or sports groups that encourage physical activity.
- **Implement policies that improve transparency, which are likely to build institutional trust.** Policies that create connections between local institutions and communities are another measure to improve social capital. Björkman and Svensson (2009) showed that community-based monitoring of local public primary health clinics in Uganda improved their performance. The establishment of these community-based oversight committees may have also helped develop community-level social capital. In addition to building links between formal health care providers, this may have also established important health information flows within communities. Decentralization policies that involve local actors and communities in decision-making processes have the potential to improve social capital and engagement in health policies. Another example is the hiring of community mobilization coordinators focused on combating sociocultural resistance to immunization in rural areas in India. These coordinators focused on building trust between communities and the formal health system and contributed to the success of India's vaccination campaign against polio (Hasan, 2019).
- **Implement cash transfer programs.** Several studies on poverty alleviation programs identified that cash transfers can influence social capital, which may then have a subsequent health effect (Baird et al., 2013; Owusu-Addo et al., 2018).

The relationship between social capital and health is, however, not unequivocally positive. Therefore, policies must be context-specific and consider the potential damaging effects of social capital.

### **Target social capital interventions toward specific contexts or populations in which social capital is low or has eroded.**

Communities in which social capital and community cohesion have been damaged by violence, crime, or disaster may struggle to reestablish trust and social structures,





negatively impacting multiple aspects of physical, mental, and psychological health. Social capital interventions may have increased effectiveness in improving health outcomes in these groups and contexts. Specific groups to consider for targeting include the following:

- **Post-conflict communities.** The negative effect of conflict on social capital and the subsequent impact on mental and psychological health has been explored in several countries, including Sierra Leone, Rwanda, Cambodia, Guatemala, and Somalia (Bentancourt et al., 2014; Colletta & Cullen, 2000). Violence following Kenya’s 2007 elections was shown to significantly erode social capital, including involvement in community groups and generalized trust (Jakiela & Ozier, 2018). This highlights the importance of implementing policies to rebuild community cohesion, civic engagement, and social inclusion. In one of the few assessments, Verduin et al. (2014) examined the impact of community-based sociotherapy to promote social capital in a war-affected population in Rwanda. Sociotherapy involved a community-based psychosocial group intervention consisting of 15 weekly group sessions. Findings suggest that the intervention improved social capital and, as a result, also improved mental health. Brune and Bossert (2009) examined the impact of United States Agency for International Development-funded social capital interventions in post-conflict communities in Nicaragua. A range of interventions and activities were implemented, aimed at improving community participation, organization, and governance, with higher social capital being associated with improvements in health behaviors. Although there is limited evidence of the effectiveness of interventions to build social capital across a wide range of post-conflict settings, these studies highlight the potential benefit that social capital interventions can have on individuals and communities suffering such shocks.
- **Families and people living with HIV/AIDS.** Mukoswa et al. (2017) found that several social capital indicators are associated with better HIV-related outcomes among patients, and Bentancourt et al. (2014) showed how community social capital is harnessed to benefit children and families affected by HIV/AIDS in Rwanda. Communities characterized by *Ubufasha abaturage batanga* (“support from others”) provide an additional protective layer against mental health issues and social isolation, which can result from chronic and communicable health conditions. This community solidarity improves the health and economic resilience of households. In South Africa, an intervention combining group-based microfinance with gender and HIV training to reduce intimate partner violence and HIV among women was able to increase social capital (Pronyk et al., 2008). This study represented the first randomized trial to understand the potential to purposefully develop social capital.
- **Pregnant women and mothers of newborns.** Several studies have identified associations between maternal social capital and child health outcomes. This relationship has been examined in a number of countries, including Vietnam



(Harpham et al., 2006), India (Vikram, 2018; Story & Carpiano, 2017), Indonesia (Sujarwoto & Tampubolon, 2013), Peru (De Silva, 2007), and Ethiopia (De Silva, 2007). Both mothers' structural social capital (participation in community organizations) and cognitive social capital (trust) have been found to have a positive relationship with child nutritional outcomes. The effect may stem from information sharing or adoption of social norms such as positive health behaviors. For instance, do Carmo Leal et al. (2011) found that prenatal care utilization was much higher in pregnant women with higher levels of social capital. Given the long-term health and economic consequences of early-life health, this suggests substantive benefits for interventions aimed at developing maternal social capital. Further, interventions targeting maternal social capital may improve long-term health equity because studies have found a larger impact of maternal social capital on child health among mothers with lower education levels and economically marginalized families (Nobles & Frankenberg, 2009).

- **Populations disproportionately affected by social isolation.** Evidence suggests that the elderly frequently suffer from poor mental health due to social isolation (Banerjee et al., 2022), and studies have also shown that social capital is associated with better well-being among older populations in several LMICs (Christian et al., 2020). In addition, due to the two-way relationship between social capital and health as individuals age and develop age-related health conditions, the potential negative impact on social capital of age-related health decline should be considered. Common issues associated with aging, such as loss of hearing, vision, and mobility, impede the ability to participate in daily activities (Marmamula et al., 2021). Therefore, policies that guard against the onset of social isolation and loneliness in these vulnerable populations should be considered. For instance, this might include ensuring affordable access to devices to address functional impairments (e.g., hearing aids, eyeglasses, walkers, and wheelchairs) or providing devices to improve communication, such as mobile phones, credit, and device training (Annan & Archibong, 2021).

### **Interventions aimed at building social capital should be mindful of the context and preexisting community-level social norms.**

The evidence of the importance of social capital in determining a wide range of socioeconomic outcomes hints at the wider importance of the environment in which individuals live. Building individual social capital is important, but this exists within the wider community social structures and norms. Hasan (2019) found that the effect of individual social capital on immunization rates dissipates in communities in which collective social cohesion is high.

The ultimate effect of social capital can depend on preexisting norms and the social context in which it is placed. Cognitive social capital such as trust or social cohesion



increases the alignment of individuals with social norms, whether they are positive or negative health-related practices. Therefore, building individual social capital in a context in which harmful health-related behaviors are prevalent, such as tobacco use or excessive alcohol consumption, is counterproductive to health objectives. Indeed, some communities may have high levels of social capital that may be reinforcing negative health-related behaviors and restricting the ability of new information to lead to the adoption of improved behaviors (Vikram et al., 2012).

In contexts in which promotive or beneficial health-related behaviors and practices are lacking, social capital interventions should be implemented at the community-level rather than the individual level, alongside programs aimed at changing health behaviors. This ameliorates the potential negative “social contagion” aspect of social capital (Portes, 2014).

### **Social capital should be considered in health equity-oriented programming.**

The establishment of social capital as a significant determinant of health and health-related outcomes, adds another dimension that may explain disparities in health outcomes. The primary focus of equity-oriented health programming remains on addressing differences in health outcomes between households with different economic status( e.g., reducing differences in health outcomes between high wealth/income households and low wealth/income households). The importance of social capital suggests that even after addressing financial constraints contributing to health inequities, differences in health outcomes will persist. Further, given that social capital may be related to economic status, health inequities may display a similar pattern if not simultaneously addressed. The quantitative analysis suggests that improvements in social capital have a larger health impact on households with lower wealth/income levels, which indicates that interventions to build social capital for health may frequently address health inequities and be characterized as pro-poor policies.

The use of social capital in programming also has the capacity to worsen the unequal distribution of health. It has been noted that social capital might be used as a predictor of success when targeting individuals or communities for interventions or programs (Grootaert & van Bastelaer, 2001). This may result in communities with high social capital and the associated benefits from being targeted by public programs at the expense of those without social capital, thereby potentially increasing health inequities. It is therefore not recommended for social capital to be used in program targeting.

### **Participatory-based program design should be promoted.**

The finding that social capital has the potential to improve health outcomes strengthens the agenda for ensuring that health intervention and program design is a participatory process, including community and beneficiary voices. In addition to



potentially better tailoring interventions to local needs, thereby improving their effectiveness, participatory program design may have a direct beneficial effect on social capital among individuals and within communities.

An example of this is the World Bank’s commitment to community-driven development.<sup>14</sup> Community-driven development is described as “a modality of project design and delivery which transfers decision-making power and, often financial and technical resources, directly to communities or groups of end-users. Concentrating decision making and management power locally, within the community, is proposed as a means of better aligning development interventions with community needs and preferences, and countering state weakness in service delivery by harnessing social capital.” (Holdmuld & Rao, 2021). A key benefit of such a bottom-up approach is the improvement of social cohesion and fostering of good governance and health system accountability.

### 7.3 Future Research

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More work is needed to understand the mechanisms through which social capital influences health and household resilience. It is still unclear which mechanisms are the most important in the relationship between social capital and health outcomes and which factors affect the relative importance of different mechanisms. Scheffler (2008) noted that the mechanisms through which social capital influences health remain a black box. The analysis in this report suggests that health care utilization may not be the primary mechanism through which social capital is associated with health in South Africa. This finding should be considered exploratory. Future studies must emphasize building greater understanding of the relative influence of the various mechanisms through which social capital impacts health and household resilience (e.g., health preferences and behaviors, health knowledge, psychosocial effects, resource pooling). This will likely require specific survey design and data collection rather than the use of secondary survey data.

There remains a need to refine and improve the measurement of social capital in health-related research. Measurement tools should explicitly link aspects of social capital to the mechanisms through which it might influence health outcomes. For example, detailed information on social networks might better capture aspects of structural social capital than organizational membership. Further, tools should be validated in the different contexts in which the relationship between social capital and health is studied.

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<sup>14</sup> In 2020, the World Bank had a community-driven development portfolio of 327 ongoing projects in 90 countries, representing \$33 billion in financing (11% of World Bank Group lending).



Ideally, future studies evaluating the effectiveness of social capital interventions and policies in improving health outcomes and health related resilience will measure outcomes by more objective generalizable metrics (e.g., disability-adjusted life years averted), which enable appropriate comparisons to alternative health care interventions and relative assessments of cost-effectiveness.

The quantitative analysis undertaken tried to address some of the methodological issues that result in the endogeneity of social capital, but we do not consider our estimates to reflect a causal link between social capital and health. Specifically, most of the methods used do not address the potential for reverse causality between social capital and health, such that health may simultaneously effect social capital. More robust causal evidence of the link between social capital and health is still needed.

## 7.4 Conclusions

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This work adds to the body of evidence on the relationship between social capital and health. The first part of the report highlighted the various mechanisms through which these concepts may be related. The second part undertook an illustrative quantitative analysis of the relationship between social capital and health-related outcomes. The findings reinforce the idea that social capital is an important determinant of health-related outcomes. Although policies aimed at increasing individual- and community-level social capital should not be considered a panacea or a substitute to improvements in health systems, if adopted strategically, interventions and programs targeting improvements in social capital for health offer a potential pathway for development practitioners to improve population health in LMICs.



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## Technical Appendix

### A.1 Econometric Specifications for Primary Analysis

#### A.1.1 Econometric Specifications for Research Questions 1, 2 and 4: The Effect of Social Capital on Health Outcomes, Health Care Utilization, and Equity

The primary analysis examining the effect of social capital on health outcomes and health care utilization takes place at the individual level. Therefore, the basic empirical model of can be represented by the following estimation equation:

$$H_{it} = \beta_0 + \sum_{g=2}^3 \beta_g SC_{it} + \beta_4 X_{it} + \varepsilon_{it} \quad (1)$$

Where  $H_{it}$  is one of our health outcomes for individual  $i$  in year  $t$ .

When examining the effect of social capital on overall self-reported, health  $H_{it}$  is a categorical variable taking a value 1 indicating “poor health,” 2 “fair health,” 3 “good health,” 4 “very good health,” and 5 “excellent health.” For examining the effect of social capital on mental health,  $H_{it}$  is either a continuous variable capturing an individual’s 10-item version of the Centre of Epidemiological Studies Depression (CES-D-10) Scale or a binary variable equal to 1 if an individual has poor mental health.  $SC_{it}$  are binary variables indicating whether an individual has medium or high generalized (local) trust. In this case,  $\beta_g$  gives the relationship of moving from low social capital to medium or high social capital on health outcomes.  $X_{it}$  is a set of explanatory variables at the individual-level (e.g. gender, age, income etc.) and  $\varepsilon_{it}$  is the unexplained residual variation in  $H_{it}$ .

To overcome omitted variables or self-selection biases, panel data are used to control for individual and year fixed effects,  $\alpha_i$  and  $\gamma_t$ , estimating:

$$H_{it} = \beta_0 + \sum_{g=2}^3 \beta_g SC_{it} + \beta_4 X_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (2)$$



This reduces the issue of omitted variables by controlling for any individual-level confounders in the relationship between social capital and health, which do not vary over time.<sup>15</sup>

To examine whether the effect of social capital on health is heterogeneous across levels of household income, the following equation is estimated:

$$H_{it} = \beta_0 + \sum_{g=2}^3 \beta_g SC_{it} + \sum_{h=2}^4 \delta_h HHINC_{it} + \sum_1^6 \delta_h (HHINC_{it} * SC_{it}) + \sum_1^6 \delta_h (HHINC_{it} * \gamma_t) + \beta_4 X_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (3)$$

The common strong assumption of linear interaction effects in regression-based multiplicative interaction models is avoided by estimating separate parameters for the effect of the social capital for each household income quartile (Hainmueller et al., 2019). Specifically, the linear interaction effect would assume the effect of social capital varies at a constant rate across levels of the moderator examined. In this case, this would imply the following:

$$\partial Y / \partial SC = \alpha + \gamma HHINC_{it}.$$

It should be noted, when including interaction terms in a fixed-effect framework, as in Equation (3), this is modeling not only how changes in individual’s income influence the effect of social capital on health, but it also measures how this effect differs between individuals with different income levels. Therefore, it includes the influence of income-correlated time-constant unobservables on the effect of social capital on health (Giesselmann & Schmidt-Catran, 2022). Therefore, this requires a stronger assumption than standard fixed effects models, that either the individual-specific unobservables do not moderate the effect of social capital on health, or that these unobservables are uncorrelated with income.

### A.1.2 Econometric Specifications for Research Question 3: The Effect of Social Capital on Financial Risk Protection

To estimate the effect of social capital on financial risk protection, the following model is used:

$$FRP_{ht} = \beta_0 + \beta_1 \%HighSC_{ht} + \beta_2 \%MedSC_{ht} + \beta_4 X_{ht} + \beta_5 H_{ht} + \gamma_t + \alpha_h + \varepsilon_{ht} \quad (4)$$

<sup>15</sup> For individuals who do not move, this also controls for all factors that do not vary inside communities, such as community fixed effects (e.g., community-specific health care supply and local services).



Where  $FRP_{ht}$  relates either to out-of-pocket expenditure as a percentage of total household income, or whether a household suffered a catastrophic health expenditure (i.e., out-of-pocket >10% total household income).

As the analysis is now at the household level, this changes the interpretation of the social capital variable. Because each household is composed of multiple individuals, the dummy variables indicating individual's level of social capital (low, medium, or high trust) now signify the proportion of household members with low, medium, and high social capital. These proportions are multiplied by 100 to give percentages of household members with each level of social capital. Finally, because the individual-level data are aggregated to the household level, observations are weighted by the number of individuals within each household when estimating Equation (4).

Although the outcome is binary and suggests estimation with a logit/probit model, this would require estimation of a conditional (fixed-effects) logistic model. Fixed effects are not estimated in conditional logistic models, and therefore marginal effects cannot be calculated accounting for fixed effects. In addition, conditional logistic estimation will result in dropping observations for any household in which the outcome does not vary (i.e., all households that never/always have catastrophic health expenditure over the years observed). Therefore, like our model estimating the relationship between social capital and overall health status, we estimate a linear probability model. Further, Timoneda (2021) argues that in cases of rare outcomes (<25% catastrophic health expenditure in our case), linear probability models are more accurate.



## A.2 Heterogeneity Analysis Coefficients

**TABLE A. 1: HETEROGENEITY IN EFFECT OF SOCIAL CAPITAL ON OVERALL HEALTH**

Variables	Generalized trust	Localized trust
	Model (G.4)	Model (L.4)
Low trust	0 (.)	0 (.)
Medium trust—1st income quartile	0.03 (0.03)	0.017 (0.02)
Medium trust—2nd income quartile	-0.00 (0.03)	0.06*** (0.02)
Medium trust—3rd income quartile	-0.057** (0.03)	-0.011 (0.02)
Medium trust—4th income quartile	0.014 (0.03)	-0.018 (0.02)
High trust—1st income quartile	0.016 (0.03)	0.04 (0.02)
High trust—2nd income quartile	0.03 (0.04)	0.05* (0.03)
High trust—3rd income quartile	-0.03 (0.03)	0.01 (0.03)
High trust—4th income quartile	0.020 (0.04)	-0.04* (0.02)

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses.



**TABLE A. 2: HETEROGENEITY IN EFFECT OF SOCIAL CAPITAL ON MENTAL HEALTH**

Variables	Generalized trust	Localized trust
	Model (G.4)	Model (L.4)
Low trust	0 (.)	0 (.)
Medium trust—1st income quartile	1.00*** (0.12)	0.58*** (0.10)
Medium trust—2nd income quartile	1.22*** (0.12)	0.43*** (0.10)
Medium trust—3rd income quartile	1.20*** (0.12)	0.71*** (0.09)
Medium trust—4th income quartile	1.15*** (0.12)	0.67*** (0.10)
High trust—1st income quartile	1.35*** (0.14)	0.94*** (0.11)
High trust—2nd income quartile	1.92*** (0.16)	0.94*** (0.12)
High trust—3rd income quartile	2.13*** (0.16)	1.04*** (0.12)
High trust—4th income quartile	1.76*** (0.17)	0.84*** (0.11)

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses.



**TABLE A. 3: HETEROGENEITY IN EFFECT OF SOCIAL CAPITAL ON HEALTH CARE UTILIZATION**

Variables	Generalized trust	Localized trust
	Model (G.4)	Model (L.4)
Low trust	0 (.)	0 (.)
Medium trust—1st income quartile	0.02 (0.01)	-0.00 (0.01)
Medium trust—2nd income quartile	-0.00 (0.01)	-0.02*** (0.01)
Medium trust—3rd income quartile	-0.02* (0.01)	-0.03*** (0.01)
Medium trust—4th income quartile	-0.04*** (0.01)	-0.04*** (0.01)
High trust—1st income quartile	0.03*** (0.01)	0.00 (0.01)
High trust—2nd income quartile	0.01 (0.02)	0.00 (0.01)
High trust—3rd income quartile	-0.01 (0.01)	-0.02** (0.01)
High trust—4th income quartile	-0.01 (0.02)	-0.01** (0.01)

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses.



## A.3 Robustness Checks

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### A.3.1. Alternative Measures of Health Status

Given the presence of several variables capturing information on acute and chronic health conditions, these variables can be used as alternative health outcomes on which to examine the effect of social capital. Although these indicators are also self-reported, they are arguably less subjective than the primary health outcomes because they relate to specific conditions and ask whether these conditions have been diagnosed (for the chronic conditions). **Table A4** presents the results of examining the relationship between generalized and localized trust and variables indicating the number of illnesses an individual has had in the past 30 days, the number of chronic conditions an individual has been diagnosed with, and individuals' HIV status.



**TABLE A. 4: EFFECT OF TRUST ON HEALTH CONDITIONS**

Variables	HIV		Number of chronic conditions		Number of illnesses past 30 days	
	Model (G.1)	Model (L.1)	Model (G.1)	Model (L.1)	Model (G.1)	Model (L.1)
Low generalized trust	0 (.)	-	0 (.)	-	0 (.)	-
Medium generalized trust	-0.00** (0.00)	-	-0.00 (0.01)	-	0.019 (0.02)	-
High generalized trust	-0.00 (0.00)	-	0.015* (0.01)	-	-0.04 (0.03)	-
Low localized trust	-	0 (.)	-	0 (.)	-	0 (.)
Medium localized trust	-	- 0.003* (0.00)	-	-0.00 (0.01)	-	0.059*** (0.02)
High localized trust	-	-0.00 (0.00)	-	0.00 (0.01)	-	0.134*** (0.02)
Covariates	Y	Y	Y	Y	Y	Y
Two-way fixed effects	Y	Y	Y	Y	Y	Y
R-squared	0.00	0.00	0.16	0.15	0.08	0.08
F-statistic	.	.	.	.	.	37.7
Observations	81,241	82,220	81,241	82,220	81,241	82,220

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for total household income, which we included as a covariate.

### A.3.2 Alternative Measures of Social Capital

As previously noted, the National Income Dynamics Survey also captures an indicator of civic participation, which has commonly been used as a proxy for structural social capital. Specifically, individuals are asked whether they belong/are members of any of 16 organizations. The organizations individuals are surveyed on are *stokvela*, burial society, farmer’s association, informal trader’s group, community garden group, sewing group, school committee, water committee, development committee, youth





groups, women’s association, men’s association, tribal authority and trade union, singing/music group, study group, and sports group.

Despite data not being collected for the full five waves of the National Income Dynamics Survey, we examined the impact of civic participation as measured by group membership on overall and mental health status. **Table A5** shows the results for the relationship between the total number of groups an individual is a member of and health outcomes. The mean total group membership in the sample is 0.52, because a significant proportion of individuals do not engage with any organizations. It is also worth noting that the measure of group membership and measures of trust did not exhibit a strong correlation, suggesting that individuals with high levels of cognitive trust do not necessarily also have high levels of structural social capital, and vice versa. The results suggest opposing effects for overall health status and mental health scores.

**TABLE A. 5: EFFECT OF GROUP MEMBERSHIP ON HEALTH OUTCOMES**

Variables	Self-reported total health				CES-D-10 score			
	Model (G.1)	Model (G.2)	Model (G.3)	Model (G.4)	Model (L.1)	Model (L.2)	Model (L.3)	Model (L.4)
Total group membership	- 0.033** * (0.01)	- 0.027** * (0.01)	- 0.027** (0.01)	- 0.029** (0.01)	0.091** (0.04)	0.080* (0.04)	0.069 (0.06)	0.070 (0.06)
Covariates	N	N	N	Y	N	N	N	Y
Two-way fixed effects	N	Y	Y	Y	N	Y	Y	Y
R-squared	0.00	0.02	0.19	0.21	0.00	0.01	0.02	0.0468
F-statistic	10.9	245.1	10.6	19.4	4.4	138.8	7.1	10.72
Observations	33127	33127	26187	26187	31695	31695	25082	25082

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for total household income, which we included as a covariate.

The potential differential effects of different types of civic participation were explored by separating the organizations into subcategories. Groupings closely matched Lau & Ataguba (2015), such that organizations were split into financial (*stokvela* and burial society); production (farmer’s association, informal trader’s group, community garden group, sewing group); community services (school committee, water committee, development committee, youth groups, women’s



association, men’s association); political (tribal authority and trade union); and private interest (singing/music group, study group, sports group). **Table A6** presents the varying effects on health of participation in different types of organizations.

**TABLE A. 6: DIFFERENTIAL EFFECTS OF GROUP MEMBERSHIP ON HEALTH OUTCOMES**

Variables	Self-reported total health	CES-D-10 score
	Model (1)	Model (2)
Financial organizations	-0.112*** (0.03)	0.023 (0.14)
Productive organizations	-0.08 (0.10)	0.208 (0.41)
Community service organizations	0.021 (0.05)	1.047*** (0.20)
Political organizations	-0.392** (0.18)	-0.260 (0.62)
Private interest organizations	0.00 (0.04)	-0.654*** (0.20)
Covariates	Y	Y
Two-way fixed effects	Y	Y
R-squared	0.20	0.05
F-statistic	17.4	10.2
Observations	25407	24958

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for total household income, which we included as a covariate.

These results suggest that the type of civic participation may matter for health outcomes. Perhaps intuitively, participation in private interest organizations has a positive impact on mental health. Conversely, participation in community service organizations appears to have a negative impact on mental health.

### **A.3.3 Dynamic Effects Models—State Dependence (Attempt to Identify Causal Effect)**

Physical and mental health can take time to evolve, so there may be a dynamic nature in the relationship between social capital and health outcomes (e.g., health outcomes are affected not only by current social capital but also by past levels of



social capital). If it is the case that dynamics are important in explaining the relationship between social capital and health, the previous static models will not accurately capture social capital’s full effect. However, misspecification of the dynamic model can also bias effect estimates. There is little literature to guide on the timing of effects in the social capital-health relationship.

In addition, self-assessed health status and outcomes are known to be persistent over time (Contoyannis et al., 2004).<sup>16</sup> This means that individuals reporting excellent health in one period are more likely to report excellent health, or a close variation, in the following period. Given these two points, that the relationship between social capital and health may be dynamic and that past health status likely partially predicts current health status, a dynamic panel data approach was used, in which lagged health outcomes are included as an explanatory variable.

An additional benefit of using a dynamic panel data approach is the potential to account for reverse causality (Leszczensky & Wolbring, 2022).

Given that the structure of the relationship between social capital and health is relatively unclear, individual’s current health status might be defined by the following distributed-lag model:

$$H_{it} = \beta_0 + \beta_1 \lambda^0 SC_{it} + \beta_1 \lambda^1 SC_{it-1} + \beta_1 \lambda^2 SC_{it-2} + \dots + \beta_1 \lambda^k SC_{it-k} + \beta_4 X_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (4)$$

Where  $SC_{it}$  is an individual’s social capital in the current period,  $t$ , and  $SC_{it-1}$ ,  $SC_{it-2}$ ... are sequential lagged values of social capital until  $SC_{it-k}$ , the earliest period for which social capital is allowed to influence health status in the period  $t$ . If it is assumed that  $\lambda$  is the same for all regressors and that  $0 < \lambda < 1$  then the coefficient  $\beta_1$  follows a geometric decay, and the model can be rewritten as the first-order autoregressive model:

$$H_{it} = \beta_0 + \lambda H_{it-1} + \beta_1 SC_{it} + \beta_4 X_{it} + \gamma_t^* + \alpha_i + \varepsilon_{it}^* \quad (5)$$

Where  $\gamma_t^* = \gamma_t(1 - \lambda)$  and  $\varepsilon_{it}^* = \varepsilon_{it} - \lambda\varepsilon_{it-1}$ .

All lagged values of social capital are now captured in the lagged dependent variable,  $H_{it-1}$ . The coefficient of interest remains  $\beta_1$ , which now captures the short-term effect of social capital on health outcomes. However, the model is characterized by the lagged dependent variable on the right-hand side, which can be seen to be endogenous due to correlation with the error term. Therefore, dynamic panel models

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<sup>16</sup> Often referred to as state dependence



are commonly estimated using Arellano & Bond (1991) (Difference-Generalized Method of Moments (GMM) estimator) or Arellano & Bover (1995) and Blundell & Bond (1998) (System-GMM estimator). These methods use “internal” rather than “external” instrumental variables. The former estimates the differenced Equation 5 using lags of the right-hand side variables in levels as instrumental variables, and the latter estimates the level Equation 5 using lags of the right-hand side variables in levels and differences as instrumental variables. The System-GMM estimator is applied to estimate the above dynamic panel data model due to the strong persistence in health status (Blundell & Bond, 1998).

Due to the unbalanced nature of the panel, instead of using first-differences, forward orthogonal transformations are used (Arellano & Bover, 1995). First-differencing can magnify gaps in unbalanced panels; if a value of  $H_{it}$  is missing, for example, then both  $\Delta H_{it}$  and  $\Delta H_{it-1}$  will be missing in the transformed data. Forward orthogonal transformations of the data overcome this issue by subtracting the average of all observed (not missing) future observations from the current value<sup>17</sup>. Thus, regardless of missing data, this transformation is calculable for all periods except the last. The results include Windmeijer’s correction for finite samples.

The large and statistically significant coefficients on lagged health status in **Table A7** suggest the importance of including past health status as a determinant of current health status. Even including past health status as an explanatory variable, it appears that localized trust has a positive and significant effect on current health.

Due to the number of rigorous tests such models must pass and our data failing in a number of these, the dynamic panel approach is not considered the preferred specification. Despite this, the results of the dynamic panel model also point to there being some degree of positive relationship between social capital as measured by trust and health status and therefore act to potentially reinforce the previous results.

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<sup>17</sup> This is in contrast to fixed effects within transformations, which subtract the average of *all* observations values from the current value, and first-differencing, which subtracts the previous value from the current value.



**TABLE A. 7: SYSTEM-GMM ESTIMATES OF EFFECTS OF TRUST ON SELF-REPORTED OVERALL HEALTH STATUS**

Variables	Self-reported total health					
	Generalized trust			Localized trust		
	Model (G.1)	Model (G.2)	Model (G.3)	Model (L.1)	Model (L.2)	Model (L.3)
Lagged poor health	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Lagged fair health	1.056*** (0.0803)	0.261*** (0.0807)	0.364*** (0.0855)	1.088*** (0.08)	0.263*** (0.079)	0.367*** (0.084)
Lagged good health	1.149*** (0.0789)	0.311*** (0.0814)	0.416*** (0.0866)	1.182*** (0.078)	0.307*** (0.080)	0.415*** (0.085)
Lagged very good health	1.172*** (0.0802)	0.311*** (0.0840)	0.417*** (0.0891)	1.202*** (0.080)	0.299*** (0.083)	0.408*** (0.087)
Lagged excellent health	1.183*** (0.0807)	0.328*** (0.0851)	0.435*** (0.0901)	0.149** (0.062)	0.316*** (0.084)	0.426*** (0.088)
Low trust	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Medium Trust	0.214*** (0.0676)	0.0735 (0.0717)	0.104 (0.0725)	0.095*** (0.0207)	0.036* (0.0213)	0.044** (0.021)
High trust	0.122** (0.0581)	-0.0405 (0.0632)	-0.0381 (0.0637)	0.051** (0.022)	-0.019 (0.023)	-0.012 (0.023)
Covariates	N	Y	Y	N	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Limiting GMM IVs to 2 lags	N	N	Y	N	N	Y
F-statistic	52110.5	25385.0	25579.5	52,612	25,337	25,574
Number of instruments	46	64	40	46	64	40
Observations	51892	47320	47320	52536	47940	47940

**Notes:** \*/\*\*/\*\* indicate statistical significance at the 10%/5%/1% level, respectively. Cluster robust standard errors are given in parentheses. Due to missing in a number of covariates, we replaced missing with the median value of the variable and included a dummy variable indicating missing control before estimating the models. Therefore, the coefficients on these imputed covariates are not displayed because they should not be interpreted. The reason for the slight change in observations when including covariates is that we did not use imputation for total household income, which we included as a covariate.



## About the Health Systems Strengthening Accelerator

The Health Systems Strengthening Accelerator (Accelerator) is a global initiative funded by the United States Agency for International Development, with co-funding from the Bill & Melinda Gates Foundation. Its goal is to partner with countries to build resilient, high-performing health systems that respond to persistent and emerging health challenges that disproportionately impact vulnerable populations. The Accelerator contributes to USAID's strategy for achieving improved health equity, quality, and resource optimization by helping countries apply a whole-of-systems lens to intractable health systems issues, connecting local innovation and global knowledge, strengthening local ownership and processes, and building the institutional architecture needed to ensure lasting change.

The Accelerator systematically learns and shares new knowledge about building sustainable, country-led institutions for iterative health systems strengthening that ultimately help countries and development partners develop new strategies, partnership models, and approaches.

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