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RESEARCH

The Hidden Cost of Coping Strategies on Mental Health

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Abstract
Economic and health shocks are known to affect young people's mental health, but evidence on the mediating role of coping strategies, particularly in low- and middle-income countries, remains limited. We investigate this relationship specifically on depression and anxiety in individuals aged 19–26 across Ethiopia, India, Peru, and Vietnam. Using data from the Young Lives longitudinal study and employing Generalized Structural Equation Modelling, we show that: financial stress directly increases anxiety and depression among young people; depression is further aggravated when respondents seek help from family and friends or incur debt from third parties; conversely, assistance from the government and NGOs, as well as direct changes in consumption behaviour, do not increase anxiety or depression. These results suggest that strengthening formal support systems and reducing reliance on informal or debt-based coping could help mitigate mental health risks for young people facing shocks.

Keywords Mental health · Shocks · Anxiety · Depression · Structural equation modelling · Mediation analysis

JEL Classification Codes: I10 · H51 · H31 · D10

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Introduction

A substantial body of research has underscored that mental-health problems worsen during periods of economic crisis (Uutela, 2010; Wahlbeck & McDaid, 2012). Ridley et al. (2020) highlight the causal relationship between poverty and mental health issues, demonstrating that economic insecurity significantly increases the prevalence of depression and anxiety. These effects are particularly pronounced among young adults, who face heightened risks due to unstable employment and inadequate coping mechanisms (Strandh et al., 2014; Bartelink et al., 2020).

Young people are particularly vulnerable to economic shocks because they are more likely to face higher rates of unemployment, limited savings, and restricted access to formal financial services, making them less able to smooth consumption during downturns (Bell & Blanchflower, 2011). Early-life economic adversity is also known to produce enduring psychological 'scarring,' with unemployment and financial strain in youth having disproportionately strong and persistent effects on mental health (Clark et al., 2001).

Those who experience unemployment and income loss have a significantly greater risk of mental health problems, such as depression, suicidal thoughts and substance dependence, than their unaffected counterparts (Artazcoz et al., 2004; McKee-Ryan et al., 2005; Virgolino et al., 2022; Picchio & Ubaldi, 2024). In addition to unemployment, job insecurity (Kawohl & Nordt, 2020; Laanani et al., 2015), lower earnings and greater debt (Coope et al., 2015), and personal financial crises (Fowler et al., 2015) have been shown to lead to mental-health problems. These effects are particularly severe for groups that were already economically and psychologically vulnerable (Stevenson & Wakefield, 2021). Analyses carried out after the 2008 global financial crisis show that countries with strong social safety nets experienced smaller recession-related drops in population mental health (Stuckler et al., 2009; Wahlbeck & McDaid, 2012).

Health and economic shocks place considerable strain on resource-constrained families. In many developing countries, this strain is intensified by underdeveloped financial markets characterised by inadequate savings and insurance, limited retirement planning, outstanding loans and under-diversified investments that limit financial resilience (Goyal et al., 2021).

A number of contributions have underlined the significant decline in mental health worldwide due to various economic and health shocks as a result of the COVID-19 pandemic, marked by increased anxiety, depression, and psychological distress (some examples among many are Blix et al., 2021, Cheng et al., 2021, Fluharty et al., 2021, and Wright et al., 2021). In the developing world, Pothisiri and Manalang Vicerra (2021) show that the majority of people aged 60 or over in Thailand experienced psychological distress, with employment loss, inadequate income and debt incursion all contributing to lower psychological well-being.

A large proportion of the global population had to deal with a sharp transition to new ways of life due to social distancing orders (Peltz et al., 2020), with adolescents and the young being shown to be particularly at risk. Wu et al. (2021) report that the prevalence of psychological distress in the U.S. rose from 11% in 2019 to over 40% in 2020; in particular, the prevalence rates of anxiety and depression in the younger

age groups are twice as high as those for older adults (whose prevalence of anxiety was 20% and depression 17%). In Germany, Rauschenberg et al. (2021) find that 38% of individuals aged 16–25 met the criteria for moderate or severe psychological distress during the lockdown of May 2020.

The most-relevant contribution for our analysis here is Porter et al. (2021), who use the same data as ours to analyse the impact of the pandemic on the anxiety and depression of young people in the Global South. They find that the reported symptoms are consistent with at least mild anxiety or depression, as measured by the Generalized Anxiety Disorder-7 (≥ 5) or the Patient Health Questionnaire-8 (≥ 5) scales, in Ethiopia, India, Vietnam and Peru. Anxiety is higher for those who suffered from economic adversity in Ethiopia, Vietnam and Peru.

Households in developing countries employ a variety of strategies to cope with worsening finances due to economic and health shocks. Some are offered income support by the government or non-governmental organizations (NGOs) (Gentilini et al., 2020); others receive assistance from family and friends (de Weerdt & Dercon, 2006); some borrow money and/or increase their indebtedness by delaying repayments or buying on credit (Collins et al., 2009). Additionally, households may run down their savings, sell their assets, change jobs, migrate, or reduce their consumption (Morduch, 1995). Dercon (2002) finds that households primarily rely on such informal mechanisms due to limited access to formal safety nets. However, these strategies are often insufficient, leading to significant welfare losses and increased vulnerability, underscoring the need for improved social protection programs to better support households in managing shocks (Dercon, 2002; Collins et al., 2009; Egger et al., 2021).

Foundational psychological theories posit that coping is the primary mechanism through which stress affects mental health (Lazarus & Folkman, 1984), and maladaptive responses such as avoidance and behavioural disengagement consistently predict higher levels of anxiety and depression (Carver et al., 1989; Holahan et al., 2005). Evidence from low-income settings further shows that coping strategies that erode future security, such as selling productive assets or taking on socially costly debt, substantially worsen psychological distress (Haushofer & Shapiro, 2016; Lund et al., 2010). Social coping mechanisms also have complex effects: while supportive networks can be protective (Taylor & Stanton, 2007), borrowing from kin can generate shame and perceived failure, both of which are powerful contributors to depression (Kawachi & Berkman, 2001; Walker, 2014). Research on humanitarian and health crises similarly shows that when coping strategies are ineffective or exhausted, feelings of helplessness and hopelessness increase sharply, heightening the risk of common mental disorders (Folkman & Moskowitz, 2004; Tol et al., 2011).

The mental-health impact of economic downturns can be attenuated by policy measures that go beyond mental health alone, such as proactive labour-market interventions, family support and community programs, social protection, and debt-relief programs. Over the course of the COVID-19 crisis, the policy tracker of the IMF has provided an excellent and regularly updated summary of the key government economic responses in 197 countries.[1]

[1] See https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19.

Governments in developing countries, however, often lack the fiscal capacity to make substantial transfers to large parts of their population over long periods. As a result, households are forced to take their own measures to cope with economic distress. Bringing together evidence from nine developing countries, Egger et al. (2021) note that household coping strategies and government assistance were insufficient to sustain households' pre-crisis living standards, resulting in widespread food insecurity and dire economic conditions.

There is only a scant literature on the link between the different coping mechanisms that households use and their mental health.[2] We here contribute by providing a first set of results on the mediating role that the different coping strategies played regarding anxiety and depression.

Utilising a unique longitudinal data from four low- and middle-income countries (Ethiopia, India, Peru, and Vietnam), we examine whether different coping mechanisms mitigate or exacerbate the negative financial impacts of significant health and economic shocks. Specifically, we ask: (1) how do economic shocks affect anxiety and depression among young people, and (2) to what extent do distinct coping strategies mediate this relationship? Based on the theoretical channels linking shocks, coping, and mental health, we expect that coping responses involving asset depletion or indebtedness will be associated with worse mental-health outcomes, whereas strategies based on consumption adjustments or institutional assistance will have neutral or protective effects.

This study is particularly timely against the backdrop of the COVID-19 pandemic which has had a wide variety of effects on individuals' lives around the world. Many of these are related to the socio-economic shock experienced by households, encompassing both income losses—such as job loss, business closures, fluctuations in prices of goods, and the death or illness of income earners—and increased expenditures due to worsened health, changes in prices of goods, and adaptations to remote work.

Our study aims to contribute to the understanding of how various coping strategies can effectively buffer the adverse financial effects of crises on mental well-being. By doing so, we seek to provide insights that can inform policies and interventions aimed at promoting resilience and psychological well-being in times of crisis.

Our study offers several unique contributions to the literature. First, using cohort data from the Young Lives longitudinal survey across Ethiopia, India, Peru, and Vietnam, we provide robust insights into coping strategies and their impacts on mental health across diverse developing country contexts. This dataset enables us to examine variations in coping mechanisms amidst diverse socio-economic and cultural settings, providing nuanced understanding beyond single-country studies.

Second, our focus on mental health is particularly significant in developing countries where this area is often overlooked in public health discussions and policy. By highlighting the substantial mental health challenges exacerbated by economic and health shocks, our study underscores the need to address these issues as integral components of social protection strategies.

[2] Lalani et al. (2023) apply the same approach of this study (Structural Equation Modelling) but to investigate the relationships between older people's coping and life satisfaction during the pandemic.

Third, we fill a notable gap in the literature regarding the adverse impacts of coping strategies on mental health of the young, which remains understudied, especially in developing country contexts where households rely heavily on informal coping mechanisms. By highlighting how different coping strategies can both alleviate and exacerbate mental health outcomes during crises, our findings offer critical insights for designing effective interventions and policies aimed at enhancing psychological well-being in vulnerable populations.

The remainder of the paper is organized as follows. Section 2 outlines the theoretical framework while Sect. 3 contains our empirical analysis by describing the variables and the estimation methods. Section 4 then discusses the empirical results. Section 5 draws some policy implications and Sect. 6 concludes.

Theoretical Framework

Economic and health shocks pose a threat to household welfare in resource-constrained settings where formal financial insurance is absent. In such contexts, households rely on informal coping strategies such as selling assets, borrowing from social networks, or seeking external aid. While a substantial literature in development economics has examined the economic effectiveness of these strategies (Morduch, 1995; Dercon, 2002; Townsend, 1994; Udry, 1994), there is less theoretical work on why different coping strategies produce different psychological outcomes.

This section outlines a theoretical framework to explain these differential effects. We draw on established theories in household economics, the economics of subjective wellbeing, and psychological models of stress to explain how coping responses during economic and health shocks generate differential mental health outcomes. Across these literatures, the central mechanism is that coping strategies carry psychological costs arising from their implications for future security, social standing, and personal autonomy.

In the life cycle and permanent-income frameworks (Modigliani & Brumberg, 1954; Friedman, 1957; Deaton, 1992), households attempt to smooth consumption over time by relying on savings, credit, or insurance when facing adverse shocks. In settings where these formal mechanisms are limited or absent, households face tighter liquidity constraints, and shocks translate more directly into reductions in consumption or into coping responses that compromise future consumption paths. A reduced ability to smooth consumption increases exposure to uncertainty and volatility, contributing to psychological stress.

The concept of economic insecurity provides a further theoretical basis for this mechanism. Economic insecurity, defined as the perceived or anticipated risk of future economic loss, is recognised as a distinct dimension of wellbeing, not reducible to current income or consumption (Bossert & D'Ambrosio, 2009, 2024; Bossert et al., 2023). Shocks increase insecurity by weakening households' buffers and raising the probability that future needs cannot be met. Coping strategies themselves may worsen insecurity: drawing down assets, incurring debt, or relying on unstable informal transfers can increase exposure to future shortfalls. The anticipation of these risks forms a channel through which shocks affect current psychological outcomes.

Insights from the economics of subjective wellbeing reinforce this pathway. This literature shows that wellbeing depends not only on income but also on insecurity, volatility, and especially on losses (Kahneman & Tversky, 1979; Kahneman et al., 2006). Because losses loom larger than equivalent gains, coping strategies that involve salient losses, whether of assets, social standing, or autonomy, may exert disproportionate psychological effects relative to their economic magnitude. Empirical evidence shows that income losses, unemployment, and deteriorations in economic conditions systematically reduce life satisfaction, even after controlling for material living standards (Easterlin, 1974; Clark & Oswald, 1994; Winkelmann & Winkelmann, 1998). Moreover, subjective wellbeing responds strongly to relative losses and adverse comparisons (Clark & Oswald, 1996; Luttmer, 2005), amplifying the psychological consequences of shocks.

Psychological theories explain how these economic processes translate into anxiety and depression. In the transactional model of stress (Lazarus & Folkman, 1984), stress arises when individuals appraise demands as exceeding their coping resources. Pearlin's stress process model (Pearlin et al., 1981) emphasises how chronic stressors and reduced feelings of control contribute to psychological distress. Economic shocks increase the demands individuals face, while coping strategies that limit future options, increase indebtedness, or reduce autonomy weaken their ability to respond. Mental health deteriorates when these demands exceed available coping resources.

Taken together, these theoretical perspectives imply that economic shocks affect mental health through well-defined mechanisms: by reducing households' ability to smooth consumption, increasing economic insecurity, and generating losses that loom large in subjective wellbeing. Coping strategies are central in this process because they modify these mechanisms in different ways. Strategies that involve asset depletion, private borrowing, or reliance on family and friends can increase insecurity, heighten exposure to future shortfalls, and intensify the psychological impact of losses. By contrast, adjustments that do not create new obligations or that provide stable external support are less likely to worsen insecurity. This framework yields clear, testable predictions for our SEM: economic shocks worsen anxiety and depression directly, but also indirectly through their influence on coping strategies, with strategies that increase insecurity (e.g. debt, family) aggravating mental health outcomes and those that do not (e.g. aid) having weaker or no adverse effects.

Methods

The Dataset

The Young Lives Project is a unique longitudinal study of poverty and inequality documenting the lives of 12,000 children in Ethiopia, India (Andhra Pradesh and Telangana), Peru and Vietnam. In each country, the Young Lives (henceforth YL) surveys track 3,000 children in two cohorts. The younger cohort consists of 2,000 children who were born between January 2001 and May 2002, and the older cohort

approximately 1,000 children from each country born in The survey started in 2002, and five rounds had been completed by 2016. Attrition in the survey is remarkably low, and 4199-95. over 91% of the original sample took part in the fifth round in 2016.

In early 2020, the 'Young Lives at Work: COVID-19 Phone Surveys' were launched to investigate the short- and medium-term impact of the pandemic on the health, well-being, labour-market transition and education trajectories of YL respondents (who were now aged 19 and 26). To date, five phone surveys have been carried out, and data from the first three of these rounds is publicly available.

The objective of the survey is not only to collect individual information to describe living and mental-health conditions during COVID-19, but also document the most-important events and changes that have negatively affected the household's economic situation since the start of the pandemic and highlight the various coping mechanisms that households have adopted.

The countries included in the Young Lives study - Peru, India (Telangana and Andhra Pradesh), Ethiopia, and Vietnam - experienced the COVID-19 pandemic with varying severity, stringency of containment measures, and economic impacts. Peru had one of the highest COVID-19 death rates globally, which overwhelmed its healthcare system and led to significant mortality rates per capita.[3] Ethiopia faced a moderate impact with a relatively lower death rate, but the pandemic still posed a serious threat due to the country's pre-existing economic challenges and healthcare constraints. In India, the pandemic's severity varied greatly by region, but it resulted in substantial healthcare strain and high mortality, particularly during the peak of the second wave. Vietnam, on the other hand, managed to keep the death toll relatively low through early interventions, strict quarantine measures, and effective contact tracing (Harris et al., 2021; Kumar et al., 2020; Tran et al., 2020).

In terms of containment measures, Peru implemented strict lockdowns early in the pandemic, which, despite their rigor, did not prevent a worsening outbreak. India also imposed stringent lockdowns, which led to significant economic and social disruptions. Ethiopia's response included school closure, movement restrictions and social distancing measures, though these were less stringent compared to Peru and India. Vietnam's approach, characterized by early and aggressive containment measures, including widespread testing and contact tracing, proved highly effective in limiting the spread of the virus (Porter et al., 2021; Porter et al., 2022).

Despite these differences, all four countries experienced significant economic downturns due to lockdowns and restrictions. Peru faced one of the deepest contractions due to stringent lockdowns and reliance on the informal economy (Varona & Gonzales, 2021). Ethiopia's economic progress was disrupted, leading to increased unemployment and inflation (Harris et al., 2021). India saw a sharp GDP decline affecting urban employment and economic activities (Kumar et al., 2020). Vietnam sustained a relatively better economic position due to swift recovery measures and successful containment efforts, allowing quicker resumption of economic activities (Tran et al., 2020).

[3] Johns Hopkins University School of Medicine, Coronavirus Resource Center. Mortality Analyses: Cases and Mortality by Country. Available online: https://coronavirus.jhu.edu/data/mortality (accessed on 15 July 2024).

Households in the four countries also adopted various coping mechanisms, such as borrowing money and relying on social networks, with the effectiveness and mental health implications of these strategies varying by country (Porter et al., 2022). Understanding these contextual differences is crucial for interpreting our findings on the impact of coping strategies on mental health during the pandemic shock.

The data we use here come from the second and third phone waves in order to allow sufficient time to have elapsed to observe any effect of government support. The second Phone Survey call was conducted between August and October 2020, and the third call between November and December 2020. The pandemic's progression in YL countries was slower than in Europe, and as such it would be difficult to identify responsive government policies during the first half of 2020 (at the time of the first phone wave). To address concerns about common-method variance, all of the coping-strategy variables come from the second wave of the YL phone survey and the mood-disorder information from the third.

Mental Health Outcomes and COVID-19–Related Socioeconomic Shocks

Mental health is measured along two dimensions: anxiety and depression. Anxiety is assessed using the Generalized Anxiety Disorder scale (GAD-7), a seven-item instrument measuring the frequency of core anxiety symptoms over the previous two weeks (Spitzer et al., 2006). Each item is scored on a four-point scale ranging from 0 ("not at all") to 3 ("nearly every day"), yielding a total score between 0 and 21, with higher values indicating greater symptom severity.

Depression is measured using the Patient Health Questionnaire (PHQ-8), an eight-item scale based on DSM-IV diagnostic criteria (Kroenke et al., 2009). Items are scored on the same 0–3 scale, producing a total score between 0 and 24. Both instruments are widely used in population-based mental health research, including in low- and middle-income country settings. As noted in Porter et al. (2021), these two scales have been adapted for use in phone surveys. In particular, participants were first asked whether they were alone in the room and, if not, whether they could find a quiet space and/or make sure their phone speaker was off. Second, respondents were asked whether each GAD-7 and PHQ-8 item had been observed (Yes/No) over the past 14 days, and if 'Yes' at which frequency (1. Less than half the days, 2. More than half the days, 3. Nearly every day). GAD-7 scores of 5–9, 10–14 and 15 or over correspond to mild, moderate and severe anxiety, respectively; equally PHQ-8 scores of 5–9, 10–14 and 15 or over correspond to mild, moderate and severe depression, respectively.

Formally, for individual i, $Anxiety_i = \sum_{m=1}^{7} GAD\_m_i$ and Depression as $Depress_i = \sum_{n=1}^{8} PHQ\_n_i$. For descriptive purposes, we report the distribution of anxiety, depression, and health and economic shocks in the four sample countries (Ethiopia, India, Peru, and Vietnam): 15.5% of survey respondents have had at least mild anxiety (i.e. $Anxiety_i \geq 1$), with significant variation across countries: from 4.8% in Vietnam to 31.5% in Peru. Equally, 14.2% of the young respondents had had depression symptoms in the two weeks prior to the survey (i.e. $Depress_i \geq 1$). The lowest incidence of depression is found in Vietnam (6.3%) and the highest in Peru (26.8%).

We define health and economic shocks as sudden adverse events associated with the COVID-19 pandemic that reduce household income, disrupt livelihood activities, or generate unexpected expenditures, consistent with standard definitions in the development economics literature. Exposure to the pandemic shock is summarized by an additive index, $CovEff_i = \sum_{M=1}^{12} covidM_i$ where each component corresponds to a specific adverse event experienced since March 2020 (e.g., job loss, business closure, food price increases, new health expenses).

Table 1 reports the distribution of anxiety, depression, and individual shock components across Ethiopia, India, Peru, and Vietnam.

Table 1 Anxiety, depression, and adverse events by country

Anxiety (Var. GAD-7)	Ethiopia	India	Peru	Vietnam	Total
None	77.4	91.6	68.5	95.2	84.5
Mild anxiety	18.3	7.2	23.2	4.0	12.2
Moderate anxiety	4.1	1.1	6.4	0.7	2.8
Severe anxiety	0.3	0.1	1.9	0.1	0.5
Number of observations	***2096***	***2751***	***1929***	***2496***	***9272***
Depression (Var. PHQ-8)					
None	80.7	91.2	73.6	93.7	85.8
Mild depression	16.9	7.7	20.5	5.1	11.7
Moderate depression	2.1	1.0	5.0	1.0	2.1
Severe depression	0.2	0.1	1.3	0.2	0.4
Number of observations	***2095***	***2750***	***1929***	***2496***	***9270***
COVID-19 induced shocks (Vars. covid1-covid12) Has any of the following events affected your household since March 13th 2020?					
Job loss	30.9	40.3	61.8	20.2	37.3
Some household members not received payment since March 2020	8.0	18.1	20.0	3.7	12.2
Nonfarm business closure	10.6	20.9	20.7	7.3	14.2
Less work, less or no clients in a nonfarm family business	24.1	19.5	26.1	26.7	24.4
Disruption of farming, livestock, fishing activities, and supply chain	3.0	23.7	15.5	5.2	11.2
Increase in price of farming/business inputs	24.8	43.5	17.8	3.0	21.5
Fall in the price of farming/business output	2.3	38.8	16.8	7.0	15.5
Increase in price of major food items consumed	65.7	92.6	84.0	6.3	61.7
Illness, injury, or death of income earning member of household.	7.5	14.4	18.2	0.7	9.9
Theft/looting of cash and other property	1.5	0.5	3.3	0.0	1.2
New health expenses	10.2	55.6	29.2	6.6	26.1
New expenses: e.g., expenses required by the employer to continue working: buying a laptop, hire internet, etc.	16.9	1.1	10.7	1.2	7.2
% of survey respondents have experienced any of the shocks (Number of observations)	***80.1 (2417)***	***98.3 (2754)***	***97.3 (2055)***	***57.9 (2519)***	***83.1 (9745)***

India' refers to the Indian States of Telangana and Andhra Pradesh

Coping Strategies and Control Variables

Coping strategies are defined as intentional actions undertaken by households to manage economic strain following adverse shocks, including adjustments in consumption, labour supply, asset use, borrowing, and reliance on social or institutional support. To reduce model dimensionality while preserving economic interpretation, we classify individual coping responses into four conceptually distinct categories: (1) Self coping ($D_{ig}^{S} \equiv Self_{ig}$) includes deliberate behavioural responses such as reducing food consumption, taking on additional income-generating activities, switching jobs, running down savings, selling assets, or migrating. These actions are widely documented as purposeful coping mechanisms in low-income settings with limited formal insurance (Dercon, 2002; Morduch, 1995), rather than passive consequences of shocks. (2) Debt coping ($D_{ig}^{D} \equiv Debt_{ig}$) denotes strategies that increase financial liabilities, including formal or informal borrowing, delayed payments, or advance sales; (3) Family coping ($D_{ig}^{F} \equiv Family_{ig}$) accounts for reliance on informal social networks, including assistance from relatives and friends and (4) Institutional coping ($D_{ig}^{I} \equiv Inst_{ig}$) that indicates receipt of support from formal or semi-formal institutions, including government programs and non-governmental organizations. These variables are constructed using information from the '*Recent life history and Economic changes*' section of the second wave of the phone survey, where YL respondents are asked to list the different negative consequences they have faced recently and how they 'coped' with these hardships.[4] This classification draws on established economic and psychological perspectives on coping as deliberate behavioural responses to stressors (Lazarus & Folkman, 1984; Carver et al., 1989). Each coping domain is represented by a binary indicator ($copeM_i$) equal to one if the respondent used at least one strategy in that category, and zero otherwise. This approach captures coping portfolios rather than isolated actions, which is appropriate in contexts where multiple strategies are often combined.

Table 2 reports the prevalence of individual coping strategies and aggregated coping domains by country.

Given that anxiety and depression are multifactorial outcomes, and that coping responses are jointly shaped by individual constraints and the opportunity set, we include a common vector of controls (X'_{ig}) in both the coping (mediator) equations and the mental-health outcome equations. This serves two related purposes. First, it reduces the scope for omitted variable bias in the estimated association between COVID-19 shocks, coping strategies, and mental health by conditioning on observable characteristics that plausibly affect both (i) exposure and vulnerability to shocks and (ii)

[4] Given that these questions are only asked to individuals who have experienced negative shocks, i.e. they are conditional on having experienced a negative shock, the missing values in these indicators indicate that the respondent has not received assistance from third parties or has not modified his/her behaviour because he/she did not face any negative consequences from COVID-19. As a result, the missing values in these indicators are not really missing but indicate that the respondent has not applied any strategies to cope with hardship because there were no adversities to face.

Table 2 Means of coping with the pandemic's negative effects (%)

$copeM_i$	Coping strategies	Ethiopia	India	Peru	Vietnam	Total
1	Sale of assets	11.9	0.7	0.9	0.3	4.2
2	Engaged in additional income-generating act.	7.6	5.3	6	2.1	6.4
3	Reduced food consumption	14.1	5.6	6.4	13.5	12.8
4	Relied on savings	32.4	62	50	6.4	46.2
5	Migrated	0.2	0.3	1	0	0.4
6	Switched to another job	7.3	3	5.1	3.5	5.9
	Self	***45.3***	***67.6***	***59.7***	***21.4***	***47.3***
7	Took a loan from a financial institution	1.1	3.7	1.5	0.9	2.3
8	Credited purchases	5.9	6.5	0.6	0.6	4.4
9	Delayed payments	0.4	4.2	1.2	0.4	2.0
10	Sold harvest in advance	3.6	0.8	1	0.2	1.7
11	Took an advance payment from the employer	0.1	3.6	0.1	0.1	1.3
12	Took any other type of informal loans	3.5	29.7	1.5	1.2	12.0
	Debt	***13.3***	***40.7***	***5.5***	***3.1***	***16.1***
13	Received assistance from friends and family	6.5	22.5	18.7	2.9	15.6
	Family	***6.5***	***22.5***	***18.7***	***2.9***	***12.2***
14	Received assistance from NGO	0.4	2.8	0.1	0.2	1.2
15	Received assistance from Government	1.3	55.4	30.5	0.6	27.4
	Inst	***1.7***	***56.8***	***30.5***	***0.8***	***22.0***
	Sample size	***2,467***	***2,760***	***2,106***	***3,001***	***10,334***

The coping-strategy dummies are 1 if the respondent used at least one of the strategies in that category and zero otherwise

the propensity to activate specific coping domains. Second, it improves cross-country comparability in the multi-group setting by accounting for compositional differences in demographics and socioeconomic conditions across samples. Specifically, X'_{ig} vector includes: respondent's age (*Age*);[5] gender (*Female*); place of residence (*Rural*); pre-pandemic household economic status (*EconSt*) and housing quality (*HouseQ*) as proxies for long-run socioeconomic position, which may jointly influence both the severity of material deprivation following shocks and the feasibility of self-insurance strategies; enrolment in full-time education (*EduEnr*), while internet access (*Internet*, based on smartphone and/or home web access) proxies for information and connectivity that can affect both coping opportunities (e.g., access to assistance or remote work) and psychological well-being. In the empirical implementation, country heterogeneity is handled through the multi-group specification (grouped by country), so that intercepts and slope parameters are allowed to differ across countries rather than being absorbed by country dummies. Accordingly, the role of 'country effects' is captured by estimating the full system separately by group, with subsequent tests imposing equality constraints only when supported by the data. Descriptive statistics for all variables used in the analysis are reported in Appendix A.

[5] The Young Lives follows two cohorts of children born in 1994–1995 (who are 25–26 years old at the time of surveys we analyse here) and 2000–2001(18–19 years old). About 90% of sample are in these two age pairs (and the other 10% are distributed around these two modes of age distribution).

Econometric Strategy: Generalized Structural Equation Model

We estimate a simultaneous multi-equation generalized structural equation model (GSEM) to identify the mechanisms through which COVID-19–related shocks affect youth mental health. The model jointly determines coping responses and mental health outcomes within an integrated framework that accommodates both mediation and moderation. The model is 'generalized' because coping strategies are observed binary variables modelled using logistic links, while anxiety and depression are continuous outcomes. Anxiety and depression are allowed to have correlated disturbances to account for unobserved factors jointly affecting both outcomes (e.g. biological, genetic, and psychological traits).

To capture cross-country heterogeneity, the model is estimated in a multi-group setting, with all structural parameters initially allowed to vary freely across the four countries. This structure allows COVID-19 shocks to affect mental health directly, indirectly through coping strategies (mediating mechanisms), and conditionally through interactions between shocks and coping strategies (moderation). Because moderation is explicitly modelled, mediated effects are conditional rather than constant, and are therefore interpreted as mediating mechanisms rather than unconditional indirect effects.

Figure 1 presents the path diagram of the widest (unrestricted) model specification (model I). As is common in this kind of visual representation of SEM models, the observable variables are represented by rectangles, the errors by circles and the arrows represent the effect of one variable on the other.

Model selection follows a structured sequence of nested multi-group GSEM. We start from an unrestricted multi-group specification (Model I) that includes all theoretically motivated direct, mediating, and moderating relationships among coping strategies and mental-health outcomes, allowing for full parameter heterogeneity across countries.

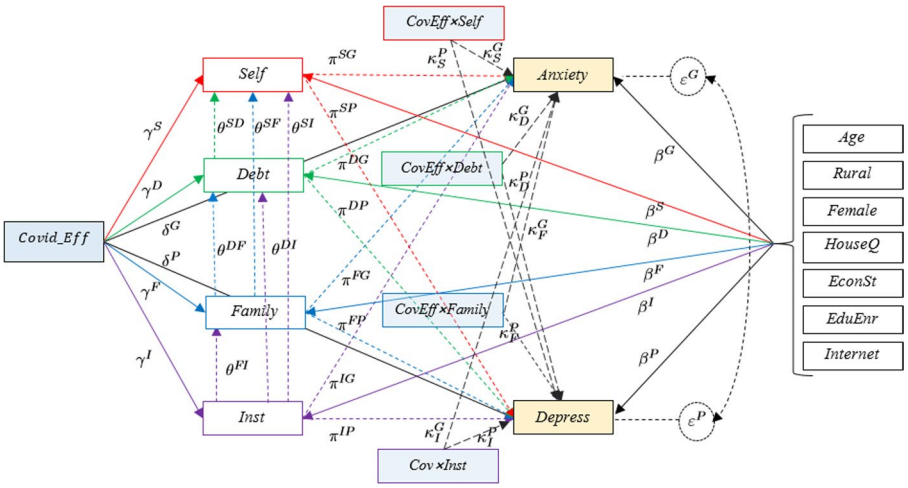

Fig. 1 Path Diagram (Model I)

In a first step, we evaluate all 24 admissible non-recursive permutations of the four coping strategies (i.e. D_{ig}^{m} : institutional support, self-coping, family support, and debt-based coping) while maintaining a fixed causal ordering within each specification. Models are compared using log-likelihood values, Akaike and Bayesian information criteria (AIC and BIC), and likelihood-ratio tests relative to a null model without inter-coping links. This step identifies a unique dominant ordering in terms of overall goodness of fit. The selected configuration implies a hierarchical structure of coping responses: institutional support depends only on exogenous characteristics and shock exposure $D_{ig}^{I} = f\left(X_{ig}, C_{ig}\right)$; family-based coping depends on institutional support $D_{ig}^{F} = f\left(X_{ig}, C_{ig}, D_{ig}^{I}\right)$; debt-based coping depends on both institutional and family support $D_{ig}^{D} = f\left(X_{ig}, C_{ig}, D_{ig}^{I}, D_{ig}^{F}\right)$; and self-based coping depends on all other coping domains $D_{ig}^{S} = f\left(X_{ig}, C_{ig}, D_{ig}^{I}, D_{ig}^{F}, D_{ig}^{D}\right)$. Importantly, the selected coping structure is also economically intuitive. Institutional support reflects access to formal assistance governed by eligibility rules and supply-side constraints and is therefore plausibly exogenous to other household coping responses. Family-based support is often activated in conjunction with, or following, institutional assistance, while borrowing decisions typically occur once other sources of support have been mobilized. Self-based coping, which encompasses internal household adjustments such as reducing consumption, increasing labour supply, or drawing down assets, represents the most flexible and residual response and is therefore conditioned on the availability of external support and credit options. This ordering is retained as the baseline structure in all subsequent stages of the analysis (we define this specification as Model II).

The selected specification can therefore be summarized by the following system of structural equations, which formalizes the joint determination of coping strategies and mental-health outcomes within the multi-group GSEM framework.

Let $g \in$ {1 (Ethiopia), 2(India), 3(Peru), 4(Vietnam)} index countries (groups) and *i* individuals. Define: $C_{ig} \equiv CovEff_{ig}$; X_{ig} as the vector of demographic, socioeconomic controls (age, rural residence, gender, housing quality, pre-pandemic economic status, education enrolment, and internet access); $Y_{ig}^{A} \equiv Anxiety_{ig}$; $Y_{ig}^{D} \equiv Depress_{ig}$.

The following four coping strategies (mediators) are modelled using logistic regressions.

Institutional coping $\left(D_{ig}^{I}\right)$:

$$Pr\left(D_{ig}^{I} = 1 | X_{ig}, C_{ig}\right) = \Lambda\left(\alpha_{g}^{I} + \gamma_{g}^{I} C_{ig} + X_{ig}' \beta_{ig}^{I}\right) \tag{1}$$

Self coping $\left(D_{ig}^{S}\right)$:

$$\begin{aligned} &Pr\left(D_{ig}^{S} = 1 | X_{ig}, C_{ig}, D_{ig}^{I}, D_{ig}^{F}, D_{ig}^{D}\right) \\ &= \Lambda\left(\alpha_{g}^{S} + \gamma_{g}^{S} C_{ig} + X_{ig}' \beta_{ig}^{S} + \theta_{g}^{SI} D_{ig}^{I} + \theta_{g}^{SF} D_{ig}^{F} + \theta_{g}^{SD} D_{ig}^{D}\right) \end{aligned} \tag{2}$$

Family coping $\left(D_{ig}^{F}\right)$:

$$\begin{aligned} &Pr\left(D_{ig}^{F}=1|\, X_{ig}, C_{ig}, D_{ig}^{I}\right) \\ &=\Lambda\left(\alpha_{g}^{F}+\gamma_{g}^{F} C_{ig}+X_{ig}^{\prime} \beta_{ig}^{F}+\theta_{g}^{FI} D_{ig}^{I}\right) \end{aligned} \tag{3}$$

Debt coping $\left(D_{ig}^{D}\right)$:

$$\begin{aligned} &Pr\left(D_{ig}^{D}=1|\, X_{ig}, C_{ig}, D_{ig}^{I}, D_{ig}^{F}\right) \\ &=\Lambda\left(\alpha_{g}^{D}+\gamma_{g}^{D} C_{ig}+X_{ig}^{\prime} \beta_{ig}^{D}+\theta_{g}^{DI} D_{ig}^{I}+\theta_{g}^{DF} D_{ig}^{F}\right) \end{aligned} \tag{4}$$

where $\Lambda\ (.)$is the logistic cumulative distribution function.

Mental health outcomes are modelled as linear functions of shocks, coping strategies, and their interactions.

Anxiety $\left(Y_{ig}^{G}\right)$:

$$\begin{aligned} &Y_{ig}^{G}=\alpha_{g}^{G}+\delta_{g}^{G} C_{ig}+\sum_{m \epsilon\{S.D.I,F\}} \pi_{m,g}^{G} D_{ig}^{m} \\ &+\sum_{m \epsilon\{S.D.I,F\}} \kappa_{m,g}^{G}\left(C_{ig} \times D_{ig}^{m}\right)+X_{ig}^{\prime} \beta_{ig}^{G}+\epsilon_{ig}^{G} \end{aligned} \tag{5}$$

Depression $\left(Y_{ig}^{P}\right)$:

$$\begin{aligned} &Y_{ig}^{P}=\alpha_{g}^{P}+\delta_{g}^{P} C_{ig}+\sum_{m \epsilon\{S.D.I,F\}} \pi_{m,g}^{P} D_{ig}^{m} \\ &+\sum_{m \epsilon\{S.D.I,F\}} \kappa_{m,g}^{P}\left(C_{ig} \times D_{ig}^{m}\right)+X_{ig}^{\prime} \beta_{ig}^{P}+\epsilon_{ig}^{P} \end{aligned} \tag{6}$$

With correlated residuals across the two mental health outcomes $Cov\left(\epsilon_{ig}^{G}, \epsilon_{ig}^{P}\right) \neq 0$.

In a second step, we refine the above specification by testing the joint statistical significance of mediation paths, moderation effects, and exogenous controls through country-level Wald tests. Specifically, we test whether each parameter is jointly equal to zero across all countries. Paths that fail to reject the null hypothesis of joint insignificance are excluded from the model, yielding a restricted but still heterogeneous specification that retains only empirically supported relationships. This procedure leads to the exclusion of eleven parameters that are jointly indistinguishable from zero in all countries. In particular, we find no evidence of moderation effects involving self-coping, institutional coping, or family support in the anxiety equation, as the interaction terms between the Covid shock and these coping strategies are jointly insignificant. Likewise, institutional coping does not exhibit a direct effect on anxiety once other coping domains are accounted for. On the depression side, interaction effects between the Covid shock and both self-coping and family support are also jointly insignificant. In addition, several exogenous controls are dropped from the coping equations due to lack of joint significance across countries. Internet access does not significantly affect either institutional or family-based coping, while age does not significantly predict family or debt-based coping once other socioeconomic characteristics are controlled for. Finally, enrolment in education is excluded from the depression equation, as its coefficient is jointly indistinguishable from zero across countries.

Importantly, these exclusions are formally validated by likelihood-ratio tests comparing the unrestricted and restricted models. The likelihood-ratio statistic (LR $\chi^2(48)=62.20$, $p=0.082$) fails to reject the null hypothesis that the imposed zero restrictions jointly hold, confirming that the restricted model does not entail a statistically significant loss of fit. This provides formal support for retaining the more parsimonious specification adopted in the empirical analysis (we define this specification as Model III).

In a final step, we assess whether the remaining coefficients can be constrained to be equal across countries. Equality restrictions are imposed only when Wald tests fail to reject cross-country homogeneity, and the resulting constrained model is further validated through likelihood-ratio tests against the unrestricted heterogeneous specification.

The Akaike (AIC) and Bayesian (BIC) information criteria are used to compare alternative, non-nested GSEM specifications with the same set of covariates. While the AIC (applying a weaker penalty for model complexity) slightly favors Model II, differences across models are small. By contrast, the BIC, which penalizes overparameterization more strongly, selects Model IV, indicating that the imposed cross-country constraints improve parsimony without materially reducing model fit. This conclusion is reinforced by likelihood-ratio (LR) tests comparing Models I–IV, which show that the constrained specification in Model IV provides a statistically superior fit. Overall, the results support Model IV as an appropriate balance between cross-country heterogeneity and parameter parsimony within the GSEM framework. The final model (model IV) therefore represents the most parsimonious GSEM that is statistically supported by the data, while preserving the substantive structure implied by theory.

Empirical Outcomes from the Generalized Structural Equation Framework

Table 3 reports the estimates of Eqs. (5) and (6) of three selected Model II, III and IV. Estimates of Eqs. 1–4 are reported in Appendix B.[6]

Decomposition of Effects: Mediation and Moderation of Financial Stress on Mental Health Through Coping Strategies

In this section, we decompose the total impact of the pandemic-related socioeconomic shock on the two dimensions of mental health (anxiety and depression) measured by Y_g^G and Y_g^P, respectively, at the country level g. Building on the final restricted specification of Model IV (Table 3), the total effect of the Covid shock C_g is decomposed into five distinct components that reflect the multiple transmission channels embedded in the GSEM framework.

First, direct effects (*DIR*) capture the impact of the shock on mental health outcomes net of all coping responses. These effects represent the baseline association between Covid-related shocks and mental health, holding coping behaviour constant. Formally, for country g, these components are defined as follows: $C_g \rightarrow Y_g^G = \delta_g^G$, $C_g \rightarrow Y_g^P = \delta_g^P$.

[6] All empirical analyses were conducted using Stata version 19.

Table 3 GSEM coefficients (Eqs. 5 and 6)

Model	II	III	IV	II	III	IV
Dependent Variable	Anxiety (Eq. 5)			Depression (Eq. 6)		
Age						
Ethiopia	0.238***	0.244***	0.236***	0.191***	0.198***	0.198***
	(7.88)	(9.01)	(9.35)	(7.29)	(9.18)	(9.17)
India	0.042***	0.046***	0.045***	0.021	0.03**	0.03**
	(2.64)	(3.02)	(3.15)	(1.43)	(2.37)	(2.38)
Peru	0.027	0.026	0.021	-0.032	-0.034	-0.035
	(0.91)	(0.88)	(0.70)	(-1.14)	(-1.26)	(-1.27)
Vietnam	-0.036***	-0.03***	-0.023**	-0.041***	-0.029***	-0.029***
	(-3.08)	(-2.65)	(-2.20)	(-3.11)	(-2.67)	(-2.65)
Rural						
Ethiopia	-1.201***	-1.2***	-1.179***	-0.98***	-0.989***	-0.975***
	(-7.17)	(-7.16)	(-7.47)	(-6.58)	(-6.63)	(-6.68)
India	-0.021	-0.01	-0.02	-0.01	-0.001	-0.007
	(-0.22)	(-0.11)	(-0.22)	(-0.10)	(-0.01)	(-0.07)
Peru	-0.918***	-0.936***	-0.943***	-0.692***	-0.713***	-0.712***
	(-4.45)	(-4.54)	(-4.58)	(-3.76)	(-3.88)	(-3.87)
Vietnam	-0.152**	-0.126*	-0.097	0.045	0.099	0.103
	(-2.06)	(-1.70)	(-1.32)	(0.53)	(1.20)	(1.24)
CovEff						
Ethiopia	0.266***	0.219***	0.217***	0.245***	0.167***	0.167***
	(3.40)	(3.85)	(3.83)	(4.22)	(3.63)	(3.63)
India	0.003	-0.005	-0.005	-0.138*	-0.106**	-0.106**
	(0.05)	(-0.13)	(-0.14)	(-1.73)	(-2.42)	(-2.44)
Peru	0.217**	0.14***	0.142***	0.276***	0.2***	0.2***
	(2.34)	(2.73)	(2.76)	(2.99)	(3.48)	(3.47)
Vietnam	0.185**	0.174***	0.176***	0.137*	0.151**	0.15**
	(2.22)	(2.78)	(2.82)	(1.65)	(2.14)	(2.12)
Female						
Ethiopia	-0.057	-0.053	-0.047	0.083	0.098	0.1
	(-0.42)	(-0.39)	(-0.35)	(0.70)	(0.82)	(0.84)
India	0.519***	0.521***	0.509***	0.472***	0.472***	0.466***
	(5.44)	(5.49)	(5.44)	(5.19)	(5.16)	(5.12)
Peru	1.418***	1.417***	1.426***	1.068***	1.066***	1.066***
	(8.45)	(8.43)	(8.50)	(6.68)	(6.70)	(6.70)
Vietnam	0.162**	0.158**	0.154**	0.242***	0.233***	0.233***
	(2.34)	(2.29)	(2.23)	(3.03)	(2.94)	(2.93)
EconSt						
Ethiopia	-0.198**	-0.23**	-0.237**	-0.167**	-0.206**	-0.207**
	(-2.03)	(-2.44)	(-2.54)	(-1.97)	(-2.49)	(-2.50)
India	-0.157**	-0.173**	-0.162**	-0.13*	-0.143**	-0.137**
	(-2.14)	(-2.38)	(-2.25)	(-1.94)	(-2.12)	(-2.04)
Peru	-0.062	-0.051	-0.053	0.059	0.075	0.07
	(-0.41)	(-0.34)	(-0.36)	(0.43)	(0.55)	(0.52)
Vietnam	-0.291***	-0.296***	-0.311***	-0.221*	-0.226*	-0.233*
	(-2.60)	(-2.68)	(-2.84)	(-1.66)	(-1.72)	(-1.77)
HouseQ						

Table 3 (continued)

Model	II	III	IV	II	III	IV
Dependent Variable	Anxiety (Eq. 5)			Depression (Eq. 6)		
Ethiopia	-1.915***	-1.967***	-2.011***	-1.593***	-1.629***	-1.643***
	(-4.56)	(-4.67)	(-4.83)	(-4.30)	(-4.45)	(-4.50)
India	0.723***	0.611**	0.634**	0.54*	0.478*	0.49*
	(2.63)	(2.26)	(2.34)	(1.95)	(1.74)	(1.79)
Peru	-1.395	-1.425	-1.396	-0.789	-0.773	-0.788
	(-1.31)	(-1.34)	(-1.32)	(-0.80)	(-0.78)	(-0.80)
Vietnam	-0.756**	-0.764**	-0.834***	-0.922***	-0.974***	-1.011***
	(-2.45)	(-2.49)	(-2.71)	(-2.59)	(-2.75)	(-2.81)
EduEnr						
Ethiopia	-0.027	-0.052	-0.141***	0.015		
	(-0.15)	(-0.46)	(-3.17)	(0.09)		
India	-0.187*	-0.116	-0.141***	-0.119		
	(-1.95)	(-1.47)	(-3.17)	(-1.23)		
Peru	0.066	-0.002	-0.141***	0.094		
	(0.37)	(-0.02)	(-3.17)	(0.54)		
Vietnam	-0.318***	-0.239***	-0.141***	-0.164		
	(-3.77)	(-3.49)	(-3.17)	(-1.63)		
Internet						
Ethiopia	-0.322**	-0.302*	-0.24**	-0.24*	-0.214	-0.183
	(-2.01)	(-1.90)	(-2.41)	(-1.70)	(-1.53)	(-1.54)
India	-0.126	-0.128	-0.24**	0.118	0.111	0.039
	(-0.91)	(-0.93)	(-2.41)	(0.86)	(0.82)	(0.32)
Peru	-0.459	-0.47	-0.24**	0.304	0.307	0.444*
	(-1.05)	(-1.09)	(-2.41)	(0.85)	(0.87)	(1.65)
Vietnam	-0.484	-0.497	-0.24**	-0.983*	-0.99*	-0.815
	(-1.28)	(-1.31)	(-2.41)	(-1.77)	(-1.76)	(-1.54)
Constant						
Ethiopia	-0.203	-0.055	0.174	-0.18	-0.027	-0.036
	(-0.24)	(-0.08)	(0.27)	(-0.25)	(-0.05)	(-0.07)
India	0.089	0.189	0.29	0.767	0.57	0.605
	(0.18)	(0.43)	(0.69)	(1.52)	(1.39)	(1.48)
Peru	3.784***	4.018***	3.937***	2.818**	3.01***	2.916***
	(2.95)	(3.20)	(3.21)	(2.57)	(2.77)	(2.71)
Vietnam	3.778***	3.633***	3.308***	4.139***	3.856***	3.739***
	(5.67)	(5.54)	(5.68)	(4.77)	(4.60)	(4.60)
Inst						
Ethiopia	2.345			3.915**	2.461*	2.462*
	(1.38)			(2.11)	(1.76)	(1.76)
India	0.093			-0.187	-0.275	-0.276
	(0.42)			(-0.87)	(-1.64)	(-1.64)
Peru	0.407			0.239	-0.035	-0.031
	(1.00)			(0.63)	(-0.13)	(-0.11)
Vietnam	-0.478			-1.38	-1.043**	-1.043**
	(-0.46)			(-1.56)	(-2.55)	(-2.55)
Family						
Ethiopia	0.744	-0.155	-0.161	1.112**	0.093	0.095

Table 3 (continued)

Model	II	III	IV	II	III	IV
Dependent Variable	Anxiety (Eq. 5)			Depression (Eq. 6)		
	(1.06)	(-0.49)	(-0.51)	(1.99)	(0.32)	(0.33)
India	0.853***	0.763***	0.761***	0.922***	0.859***	0.858***
	(2.95)	(7.01)	(6.99)	(3.22)	(7.73)	(7.72)
Peru	0.779	0.881***	0.88***	0.299	0.686***	0.687***
	(1.54)	(3.96)	(3.95)	(0.57)	(3.18)	(3.19)
Vietnam	0.335	0.725**	0.716**	1.238***	1.237***	1.234***
	(0.90)	(2.43)	(2.40)	(2.70)	(3.62)	(3.61)
Debt						
Ethiopia	1.012*	1.12**	1.116**	0.985**	1.168***	1.161***
	(1.82)	(2.14)	(2.14)	(2.30)	(2.83)	(2.82)
India	-0.489**	-0.463**	-0.463**	-0.473*	-0.431*	-0.429*
	(-2.05)	(-2.01)	(-2.01)	(-1.95)	(-1.83)	(-1.82)
Peru	0.938	0.905	0.916	-0.586	-0.615	-0.606
	(1.03)	(1.00)	(1.01)	(-0.72)	(-0.76)	(-0.75)
Vietnam	-0.788***	-0.799***	-0.769***	-0.654	-0.651	-0.643
	(-2.70)	(-2.74)	(-2.66)	(-1.59)	(-1.62)	(-1.61)
Self						
Ethiopia	0.888***	0.734***	0.73***	1.194***	0.917***	0.917***
	(3.21)	(4.53)	(4.52)	(5.05)	(6.58)	(6.58)
India	-0.099	-0.158*	-0.151	-0.343	-0.203**	-0.199**
	(-0.44)	(-1.65)	(-1.58)	(-1.43)	(-2.10)	(-2.06)
Peru	0.065	-0.162	-0.173	0.052	-0.302*	-0.304*
	(0.18)	(-0.88)	(-0.94)	(0.15)	(-1.67)	(-1.68)
Vietnam	0.305**	0.188	0.188	0.37*	0.385***	0.387***
	(2.00)	(1.64)	(1.64)	(1.80)	(2.99)	(3.00)
Self # CovEff						
Ethiopia	-0.074			-0.136		
	(-0.61)			(-1.44)		
India	-0.017			0.047		
	(-0.24)			(0.62)		
Peru	-0.074			-0.113		
	(-0.68)			(-1.03)		
Vietnam	-0.076			0.023		
	(-0.69)			(0.17)		
Family # CovEff						
Ethiopia	-0.349			-0.391***		
	(-1.63)			(-2.59)		
India	-0.033			-0.023		
	(-0.41)			(-0.29)		
Peru	0.029			0.108		
	(0.21)			(0.70)		
Vietnam	0.207			-0.001		
	(1.22)			(-0.00)		
Debt # CovEff						
Ethiopia	-0.326*	-0.373**	-0.375**	-0.311**	-0.381***	-0.379***
	(-1.92)	(-2.36)	(-2.38)	(-2.52)	(-3.27)	(-3.26)

Table 3 (continued)

Model	II	III	IV	II	III	IV
Dependent Variable	Anxiety (Eq. 5)			Depression (Eq. 6)		
India	0.196***	0.193***	0.194***	0.213***	0.203***	0.203***
	(2.84)	(2.95)	(2.95)	(3.06)	(3.04)	(3.04)
Peru	-0.064	-0.049	-0.056	0.246	0.26	0.257
	(-0.29)	(-0.22)	(-0.25)	(1.20)	(1.28)	(1.26)
Vietnam	0.315**	0.317**	0.311**	0.191	0.197	0.196
	(2.16)	(2.14)	(2.09)	(1.03)	(1.10)	(1.10)
Inst # CovEff						
Ethiopia	-0.456			-0.883	-0.603	-0.601
	(-0.67)			(-1.28)	(-1.26)	(-1.26)
India	0.012			0.113*	0.113**	0.113**
	(0.18)			(1.81)	(2.41)	(2.42)
Peru	-0.162			-0.151	-0.039	-0.039
	(-1.42)			(-1.37)	(-0.49)	(-0.49)
Vietnam	0.144			0.56	0.437	0.438
	(0.20)			(0.92)	(1.61)	(1.61)
$Cov\left(\epsilon_{ig}^{G}, \epsilon_{ig}^{P}\right)$						
	II	III	IV			
Ethiopia	5.821***	5.86***	5.861***			
	(23.44)	(23.40)	(23.41)			
India	2.839***	2.843***	2.843***			
	(13.63)	(13.69)	(13.69)			
Peru	8.968***	8.987***	8.991***			
	(18.70)	(18.65)	(18.70)			
Vietnam	1.95***	1.944***	1.947***			
	(9.40)	(9.40)	(9.41)			
Number of observations	***9616***	***9637***	***9637***			
AIC	***109,891***	***109,940***	***109,919***			
BIC	***112,157***	***111,862***	***111,605***			
LR χ^2 Test (p-value)		*III vs. II (0.082)*	*IV vs. III (0.071)*			

***, **, and *denote significance at the 1%, 5%, and 10% levels, respectively. Z-statistics based on robust standard errors are reported in parentheses. Results are reported using the following base (reference) categories for dichotomous variables: Female=0, EduEnr=0, Rural=0, and Internet=0. Accordingly, coefficients should be interpreted relative to a male youth, not enrolled in education, living in an urban area, and without access to a smartphone or home internet connection

Second, simple indirect effects (*IND*) operate through individual coping strategies (i.e. self-oriented coping, family-based support, institutional assistance, and debt-related coping) each acting as a single mediator between the shock and mental health outcomes. In symbols: $C_g \rightarrow D_g^m \rightarrow Y_g^G = \gamma_g^m \bullet \pi_{m,g}^G$, $C_g \rightarrow D_g^m \rightarrow Y_g^P = \gamma_g^m \bullet \pi_{m,g}^P$.

Third, sequential indirect effects (*SEQ_IND*) capture multi-stage transmission mechanisms in which the Covid shock first affects access to institutional support, which in turn shapes subsequent coping behaviours (self, family, or debt coping), ultimately influencing mental health. These path-

ways reflect empirically relevant complementarities and sequencing across coping strategies. Formally: $C_g \rightarrow D_g^I \rightarrow D_g^m \rightarrow Y_g^G = \gamma_g^I \bullet \theta_g^{mI} \bullet \pi_{m,g}^G$ and $C_g \rightarrow D_g^I \rightarrow D_g^m \rightarrow Y_g^P = \gamma_g^I \bullet \theta_g^{mI} \bullet \pi_{m,g}^P$.

Fourth, moderated direct effects (*MOD_DIR*) allow the marginal effect of the Covid shock on mental health to vary depending on whether specific coping strategies (i.e. debt-related or institutional coping) are activated. These effects capture interaction mechanisms whereby coping strategies condition the strength of the shock–mental health relationship rather than mediating it. In symbols: $C_g \rightarrow Y_g^G \big| D_g^m = 1 = \delta_g^G + \kappa_{m,g}^G$ and $C_g \rightarrow Y_g^P \big| D_g^m = 1 = \delta_g^P + \kappa_{m,g}^P$.

Finally, total effects (*TOT*) aggregate the direct effect, all simple indirect effects, and all admissible sequential indirect effects, providing a comprehensive measure of the overall impact of the pandemic shock on mental health. In symbols: $C_g \rightarrow Y_g^G = \delta_g^G + \sum_{m \in \{S,D,I,F\}} \gamma_g^m \bullet \pi_{m,g}^G + \sum_{m \in \{S,F,D\}} \gamma_g^I \bullet \theta_g^{mI} \bullet \pi_{m,g}^G$ o and $C_g \rightarrow Y_g^P = \delta_g^P + \sum_{m \in \{S,D,I,F\}} \gamma_g^m \bullet \pi_{m,g}^P + \sum_{m \in \{S,F,D\}} \gamma_g^I \bullet \theta_g^{mI} \bullet \pi_{m,g}^P$.

All effects are computed as nonlinear combinations of the estimated structural parameters and inference is conducted using the delta method. For expositional clarity, Table 4 reports only effects that are statistically significant at the 5% level at the country level. Out of a total of 80 estimated effects, 30 meet this criterion.

Table 4 provides the basis for the interpretation of direct, indirect, and moderated effects of pandemic-related shocks on mental health. The decomposition of the effects reveals substantial cross-country heterogeneity in the ways socioeconomic shocks associated with the pandemic translate into anxiety and depression. Even after accounting for coping responses, direct effects remain statistically significant in Ethiopia, Peru, and Vietnam, indicating that a non-negligible share of mental distress reflects an immediate psychological response to economic stress. By contrast, the negative direct effect on depression in India suggests that, once coping mechanisms are explicitly modelled, the residual impact of the pandemic shocks is largely absorbed through behavioural and social responses rather than operating directly.

Coping strategies emerge as central transmission channels, but their roles differ sharply across contexts. In Ethiopia, self-oriented and debt-based strategies are the dominant mediators, accounting for a large share of the total effect on both anxiety and depression. This pattern is consistent with settings characterized by limited formal insurance, where individual behavioural adjustments and borrowing represent primary, yet psychologically costly, responses to economic shocks.

In India and Peru, family-based coping plays a more prominent mediating role. In these contexts, informal social networks appear to be the main buffer against economic stress, although they do not fully shield young adults from mental-health deterioration. Notably, in India, institutional support is primarily linked to mental health through sequential pathways involving increased reliance on family assistance, suggesting that formal interventions tend to be activated in response to already strained household conditions rather than preventing distress ex ante.

Vietnam exhibits a more complex configuration. While family- and self-oriented strategies are associated with higher depressive symptoms, institutional coping shows a protective indirect effect on depression, and debt-based strategies are linked to lower anxiety. This pattern is consistent with the presence of relatively stronger

Table 4 Decomposition of effects

Type	Outcome	Pathway	Country	Est.	z-stat	*p*-value	Parameter
DIR	Y_g^G	$C_g \rightarrow Y_g^G$	*Ethiopia*	0.217	3.830	0.000	δ_{Eth}^{G}
			Peru	0.142	2.756	0.006	δ_{Peru}^{G}
			Vietnam	0.176	2.817	0.005	δ_{Viet}^{G}
	Y_g^P	$C_g \rightarrow Y_g^P$	*Ethiopia*	0.167	3.625	0.000	δ_{Eth}^{P}
			India	-0.106	-2.438	0.015	δ_{India}^{P}
			Peru	0.200	3.470	0.001	δ_{Peru}^{P}
			Vietnam	0.150	2.122	0.034	δ_{Viet}^{P}
IND	Y_g^G	$C_g \rightarrow D_g^D \rightarrow Y_g^G$	*Ethiopia*	0.533	2.114	0.035	$\gamma_{Eth}^{D} \cdot \pi_{D,Eth}^{G}$
			Vietnam	-0.625	-2.607	0.009	$\gamma_{Viet}^{D} \cdot \pi_{D,Viet}^{G}$
		$C_g \rightarrow D_g^F \rightarrow Y_g^G$	*India*	0.086	3.144	0.002	$\gamma_{India}^{F} \cdot \pi_{F,India}^{G}$
			Peru	0.113	2.784	0.005	$\gamma_{Peru}^{F} \cdot \pi_{F,Peru}^{G}$
			Vietnam	0.440	2.284	0.022	$\gamma_{Viet}^{F} \cdot \pi_{F,Viet}^{G}$
		$C_g \rightarrow D_g^S \rightarrow Y_g^G$	*Ethiopia*	0.514	4.354	0.000	$\gamma_{Eth}^{S} \cdot \pi_{S,Eth}^{G}$
	Y_g^P	$C_g \rightarrow D_g^D \rightarrow Y_g^P$	*Ethiopia*	0.555	2.745	0.006	$\gamma_{Eth}^{D} \cdot \pi_{D,Eth}^{P}$
		$C_g \rightarrow D_g^F \rightarrow Y_g^P$	*India*	0.097	3.195	0.001	$\gamma_{India}^{F} \cdot \pi_{F,India}^{P}$
			Peru	0.088	2.457	0.014	$\gamma_{Peru}^{F} \cdot \pi_{F,Peru}^{P}$
			Vietnam	0.758	3.298	0.001	$\gamma_{Viet}^{F} \cdot \pi_{F,Viet}^{P}$
		$C_g \rightarrow D_g^I \rightarrow Y_g^P$	*Vietnam*	-0.328	-2.001	0.045	$\gamma_{Viet}^{I} \cdot \pi_{I,Viet}^{P}$
		$C_g \rightarrow D_g^S \rightarrow Y_g^P$	*Ethiopia*	0.646	6.119	0.000	$\gamma_{Eth}^{S} \cdot \pi_{S,Eth}^{P}$
			Vietnam	0.513	2.926	0.003	$\gamma_{Viet}^{S} \cdot \pi_{S,Viet}^{P}$
SEQ_IND	Y_g^G	$C_g \rightarrow D_g^I \rightarrow Y_g^G$	*India*	0.109	3.698	0.000	$\gamma_{India}^{I} \cdot \theta_{India}^{FI} \cdot \pi_{F,India}^{G}$
	Y_g^P	$C_g \rightarrow D_g^I \rightarrow D_g^F \rightarrow Y_g^P$	*India*	0.123	3.816	0.000	$\gamma_{India}^{I} \cdot \theta_{India}^{FI} \cdot \pi_{F,India}^{P}$

Table 4 (continued)

Type	Outcome	Pathway	Country	Est.	z-stat	*p*-value	Parameter
MOD_DIR	Y_g^G	$C_g \rightarrow Y_g^G \mid D_g^D = 1$	*India*	0.189	3.380	0.001	$\delta^{G}_{India} + \kappa^{G}_{D,India}$
			Vietnam	0.488	3.475	0.001	$\delta^{G}_{Viet} + \kappa^{G}_{D,Viet}$
	Y_g^P	$C_g \rightarrow Y_g^P \mid D_g^D = 1$	*Peru*	0.457	2.320	0.020	$\delta^{P}_{Peru} + \kappa^{P}_{D,Peru}$
			Vietnam	0.346	2.052	0.040	$\delta^{P}_{Viet} + \kappa^{P}_{D,Viet}$
		$C_g \rightarrow Y_g^P \mid D_g^I = 1$	*Peru*	0.161	2.120	0.034	$\delta^{P}_{Peru} + \kappa^{P}_{I,Peru}$
			Vietnam	0.588	2.112	0.035	$\delta^{P}_{Viet} + \kappa^{P}_{I,Viet}$
TOT	Y_g^G	$C_g \rightarrow Y_g^G$	*Ethiopia*	1.056	3.785	0.000	$\delta^{G}_{Eth} + \sum_{m \in \{S,\ D,\ I,\ F\}} \gamma^{m}_{Eth} \bullet \pi^{G}_{m,Eth} + \sum_{m \in \{S,\ F,D\}} \gamma^{I}_{Eth} \bullet \theta^{mI}_{Eth} \bullet \pi^{G}_{m,Eth}$
	Y_g^P	$C_g \rightarrow Y_g^P$	*Ethiopia*	1.526	5.066	0.000	$\delta^{G}_{Eth} + \sum_{m \in \{S,\ D,\ I,\ F\}} \gamma^{m}_{Eth} \bullet \pi^{G}_{m,Eth} + \sum_{m \in \{S,\ F,D\}} \gamma^{I}_{Eth} \bullet \theta^{mI}_{Eth} \bullet \pi^{G}_{m,Eth}$

formal support mechanisms and credit access, which may partially mitigate the psychological burden of shocks.

Moderation results further indicate that coping strategies are not uniformly protective. Debt-based and institutional coping often amplify the mental-health impact of shocks, identifying subgroups for whom these responses are associated with heightened vulnerability rather than resilience. This finding underscores that coping should not be interpreted mechanically as mitigation, but as context-dependent behaviour that may reflect the severity of underlying stress.

Finally, the total effects are largest in Ethiopia, where all channels reinforce each other, generating a substantial cumulative impact on mental health. In the remaining countries, smaller total effects reflect offsetting mechanisms across different coping strategies. For Peru, the marginally significant total effect on anxiety ($C_{Peru} \rightarrow Y^{G}_{Peru}$ is equals to 0.379; z-stat=1.736; p-value=0.083) nonetheless suggests a meaningful aggregate burden of pandemic shocks, even where individual channels partially compensate.

Overall, the results emphasize that the mental-health consequences of economic shocks depend not only on exposure but also on the structure and sequencing of coping responses, which are deeply shaped by institutional context and social organization.

Discussions

This study provides new evidence on how pandemic-related socioeconomic shocks affected the mental health of young adults in low- and middle-income countries. Building on Pearlin and colleagues' stress process model (Pearlin et al., 1981; Pearlin & Bierman, 2013), which conceptualizes coping resources as both mediators and moderators of the stress-distress relationship, we explicitly model the role of coping strategies as mediating and moderating mechanisms. While previous work has established that financial stress is strongly associated with anxiety and depression (Ridley et al., 2020; Stevenson & Wakefield, 2021), our results show that this relationship is not only direct but also operates through distinct behavioural and social pathways. The substantial cross-country heterogeneity we document is consistent with emerging evidence from the Young Lives longitudinal study, which found marked variation in mental health trajectories closely tied to country-specific pandemic severity, policy responses, and pre-existing institutional contexts (Porter et al., 2021, 2022). Our decomposition approach extends this work by showing that COVID-19–related shocks exert a direct effect on both anxiety and depression even after accounting for coping responses, confirming that heightened economic insecurity and exposure to loss constitute independent sources of psychological distress.

These findings are consistent with the literature on economic insecurity and subjective wellbeing, which emphasizes that uncertainty about future consumption and exposure to losses generate psychological distress over and above contemporaneous income changes (Kahneman & Tversky, 1979; Kahneman et al., 2006; Bossert & D'Ambrosio, 2009, 2024). By embedding coping strategies within a structural framework, the paper shows that shocks alter mental health not only by reducing resources but also by forcing individuals into coping responses that modify perceived security, control, and future prospects.

Debt-based coping emerges as a particularly salient channel in this respect. Systematic reviews consistently document a strong positive association between personal unsecured debt and mental health problems (Fitch et al., 2011), with the relationship remaining robust across diverse populations and measurement approaches. The social causal pathway posits that financial strain leads to psychological distress through exposure to worse living conditions, reduced coping capacity, and erosion of perceived control (Ridley et al., 2020). Our moderation results suggest an additional mechanism: the act of taking on debt to manage a crisis may itself become a source of ongoing psychological burden, particularly in settings where borrowing signals household distress rather than strategic financial management. In Ethiopia, debt-related strategies significantly mediate the effect of shocks on both anxiety and depression, consistent with evidence that indebtedness generates stress through repayment obligations, exposure to future shortfalls, and loss of financial autonomy (Ridley et al., 2020). This finding aligns with the view that borrowing under conditions of constraint constitutes a form of distress finance, converting temporary income shocks into persistent insecurity. However, the Vietnamese results indicate that debt-based coping is associated with lower anxiety, suggesting that the psychological meaning of borrowing depends on institutional and market conditions. Where credit is more predictable and less socially costly, borrowing may operate more as a smoothing device than as a source of psychological strain (Lainez, 2014). This cross-country heterogeneity refines the existing literature by showing that the mental-health burden of debt is contingent on the context in which borrowing takes place rather than being an inherent feature of indebtedness.

Family-based coping also plays an important mediating role, particularly in India and Peru. This is consistent with evidence that social networks are central to household responses to economic shocks (Castillo & Hernandez, 2023), but the positive association between reliance on family support and anxiety or depression suggests that informal transfers carry psychological costs. Theoretical and empirical work has long emphasized that dependence on kin may generate feelings of obligation, stigma, and reduced autonomy, especially for young adults in the process of establishing economic independence (Kawachi & Berkman, 2001; Walker, 2014). Our results provide quantitative support for this channel: informal support can mitigate material hardship while simultaneously being associated with poorer mental-health outcomes.

Institutional support, by contrast, does not systematically worsen mental health and in Vietnam contributes to a protective indirect effect on depression. This finding is consistent with macro-level evidence that stronger social protection systems attenuate the mental-health consequences of economic downturns (Stuckler et al., 2009; Wahlbeck & McDaid, 2012). At the micro level, institutional transfers stabilize resources without imposing the psychological costs associated with indebtedness or social obligation, thereby limiting the extent to which shocks translate into perceived insecurity.

More broadly, the results demonstrate that coping strategies are not psychologically neutral mechanisms of consumption smoothing, as implied by standard life cycle and permanent income models (Modigliani & Brumberg, 1954; Friedman, 1957; Deaton, 1992). Instead, they carry distinct psychological content through their implications

for future security, social standing, and personal autonomy. This is consistent with stress-process and transactional models of psychological distress (Pearlin et al., 1981; Lazarus & Folkman, 1984), in which mental health deteriorates when external demands exceed perceived coping resources. By explicitly modelling the joint determination of shocks, coping, and mental health, this study shows that the mental-health impact of economic crises depends not only on the magnitude of the shock but also on the structure of the coping portfolio available to young people within a given institutional and social environment.

Policy Implications

The results yield several policy-relevant insights for the design of social protection and mental-health interventions in low- and middle-income countries.

A first, overarching implication is that coping strategies cannot be interpreted as uniformly protective responses to economic shocks. Rather, they represent behavioural adjustments that may either mitigate or amplify psychological distress, depending on their nature, sequencing, and institutional context. Policies aimed at protecting mental health during large economic shocks therefore need to go beyond exposure to risk and explicitly consider how individuals cope with adversity.

Second, the analysis highlights financial vulnerability, particularly debt-based coping, as a central transmission channel linking pandemic-related shocks to mental-health deterioration. In several countries, debt not only mediates the effect of shocks on anxiety and depression but also amplifies their direct impact through moderation effects. This underscores the importance of income stabilization and debt-related policy instruments during crises. Emergency income support, repayment moratoria, and access to affordable, regulated credit can reduce reliance on psychologically costly borrowing, thereby limiting both the financial and emotional burden of shocks.

Third, institutional support plays an ambivalent but crucial role. While institutional coping is not uniformly protective, the evidence shows that its effectiveness depends on timing and interaction with other coping strategies. Sequential pathways, particularly those linking institutional assistance to family-based coping, suggest that formal support is often activated reactively, once household stress has already escalated. This points to the need for earlier and more preventive institutional interventions, designed to reach households before informal coping mechanisms with high psychological costs are triggered.

Fourth, the findings call for closer integration between economic policy and mental-health interventions. Even after accounting for coping behaviours, direct effects of economic shocks remain significant in several countries, indicating that mental distress is not fully mediated by observable coping strategies. Embedding mental-health screening, referral mechanisms, and psychosocial support within social-protection programs (such as cash transfers, employment schemes, or food assistance) can help identify vulnerable individuals early and prevent the accumulation of psychological harm.

Finally, the strong cross-country heterogeneity documented in Table 4 cautions against one-size-fits-all solutions. While general principles apply, policy effectiveness depends on institutional capacity, social norms, and existing safety nets. In contexts where self- and debt-based coping dominate, policies should prioritize financial protection and mental-health integration within poverty-reduction programs. Where family-based coping is central, complementary interventions targeting household dynamics and social stress may be more effective. Where institutional coping shows protective potential, scaling up formal support mechanisms can yield substantial mental-health gains.

Overall, the evidence suggests that protecting mental health during economic crises requires a comprehensive policy architecture that combines income support, debt management, timely institutional assistance, and accessible mental-health services. Addressing only the direct economic impact of shocks is insufficient: policymakers must also confront the hidden psychological costs embedded in certain coping responses if they aim to foster resilience and long-term well-being among young people.

Conclusions

The COVID-19 pandemic and the ensuing social restrictions and negative socio-economic consequences have disrupted young people's lives, increasing their anxiety and depression. Our study leverages the pandemic as a pertinent case to explore the broader dynamics of health and economic shocks on mental health. We provide insights into how various coping strategies can mitigate or exacerbate mental health issues during such shocks. This approach allows us to draw generalizable conclusions about the interplay between economic shocks, coping mechanisms, and mental well-being, thereby contributing to the literature on resilience and mental health in the face of diverse shocks. We hypothesize that the type of actions that individuals carry out to tackle the negative effects of this financial distress may have an additional (i.e. indirect) effect on their mental health. We analysed a sample of young people (one cohort aged 18–19 and the other 25–26) living in four developing countries (Ethiopia, India, Peru, and Vietnam) during the pandemic (June–December 2020). We employed cross-sectional methods based on Generalized Structural Equation Modelling to analyse the mediating and moderating roles of four types of coping strategies.

We find that: (a) pandemic-related financial stress is associated with a significant deterioration of mental health, with direct effects on anxiety and depression remaining sizable in most countries even after accounting for coping behaviour; (b) coping strategies represent key transmission channels, but their effects are highly heterogeneous across contexts, operating both through simple and sequential mediation mechanisms; (c) debt-based and family-based coping frequently amplify psychological distress, either by mediating the impact of shocks or by strengthening their direct effect through moderation; (d) institutional support plays an ambivalent role, which depends on its timing and interaction with other coping strategies, and can be protective only in specific institutional settings.

Overall, the results show that coping strategies commonly observed in developing countries, such as borrowing or relying on family networks, should not be interpreted as neutral or uniformly protective responses to economic hardship. While these strategies may provide short-term financial relief, they often entail substantial psychological costs, particularly when they reflect severe underlying stress or constrained access to formal safety nets. Debt exposure, in particular, emerges as a central mechanism through which economic shocks translate into anxiety and depression. At the same time, the evidence highlights that formal institutional support can attenuate mental-health deterioration when it is accessible and effective, but may fail to do so when it is activated only after households have already exhausted informal coping options.

Taken together, these findings underscore that the mental-health consequences of economic shocks depend not only on exposure, but also on the structure, sequencing, and institutional context of coping responses. Policies aimed at strengthening resilience among young people should therefore address both economic vulnerability and the psychological costs embedded in different coping strategies, rather than focusing exclusively on income losses or aggregate exposure to shocks.

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Declarations

Competing Interests The authors declare no competing interests.

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