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Measuring Social Sustainability

A Multidimensional Approach

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Abstract

While the concept of social sustainability is growing in salience, there is little consensus on how to measure it. This lack of an accepted measure makes it harder to monitor progress toward sustainable development goals, honor political commitments to leave no one behind, and design effective social development and protection programs. This study proposes an original measure of social sustainability and its associated fragilities in the form of multidimensional social gaps. The measure is anchored conceptually in the new social sustainability in development framework and applied empirically using a counting approach. The study calls this metric the Social Sustainability Index. It was piloted in Peru and South Africa, country contexts with low levels of trust, deep social tensions, and stark inequality. The measure comprises four dimensions—inclusion, resilience, social cohesion, and process legitimacy—measured by 16 indicators. The study finds that roughly two-thirds of the population in Peru and South Africa experience overlapping social gaps in the space of social sustainability. On average, these populations exhibit intensity rates of 47 and 53 percent, respectively, equivalent to experiencing multiple social gaps in seven and eight indicators. Women and ethnic minorities are disproportionally fragile. Weak process legitimacy is the main driver of multidimensional social gaps in both countries. In South Africa, low satisfaction with the way corruption is fought and deficits in government effectiveness are the principal indicators driving multidimensional social gaps. In Peru, inequality before the law and deficits in government effectiveness are the two indicators contributing the most to overall gaps in social sustainability. These findings call for strategies to boost accountability and inclusion beyond access to markets, services, and social benefits.

1. Introduction

Scholars, policy makers and the public around the world are paying increasing attention to social sustainability as social, economic and environmental crises mount and intersect. The number of the extremely poor grew from 648 million to 719 million globally during the COVID-19 pandemic, reversing decades-long declines in income poverty (World Bank 2022). The fallout from the pandemic has driven the largest increase in global inequality since the Second World War (Yonzan et al. 2022). Interpersonal trust is at its lowest since measurement started in the 1980s and social unrest is rising globally (ACLED 2022). Yet in contrast to monetary poverty or income inequality, social sustainability lacks a consensus empirical measure. This limits its broader adoption as a concept, monitoring, and the effectiveness of policies designed to tackle it. Without such a measure, international and national institutions cannot effectively monitor progress towards sustainable development goals, design effective social development and protection programs, or honor their political commitments to leave no one behind. Addressing deteriorating levels of social sustainability effectively requires precise estimates and agreed-upon methodologies, drawing on sources available across different country contexts that can be monitored frequently.

This paper addresses this gap by proposing an original measure of social sustainability and its associated fragilities in the form of multidimensional social gaps. This measure is conceptually embedded in a framework recently developed by Barron et al (2023) and empirically anchored in the Counting Approach Methodology (Alkire and Foster 2011). The proposed measure provides an estimate of the incidence (number of individuals) and intensity (number of indicators) of simultaneous social gaps experienced by citizens in a given country in the dimensions of inclusion, resilience, social cohesion, and process legitimacy. This metric complements existing measures of national (and subnational) poverty, inequality, human capital and human development. Second, the proposed measure can be disaggregated to capture multiple social gaps across specific vulnerable groups and quantify the contribution of each dimension (and indicator) to the observed levels of social sustainability in a society. Our measuring framework thus captures the incidence, depth and composition of multidimensional social gaps in the space of social sustainability; precisely quantifies the main drivers of multidimensional social gaps; and identifies the most-excluded population groups that is, those that fail to satisfy minimum levels of inclusion, cohesion, resilience and legitimacy, and their gaps with other groups. These insights are relevant not only for measurement and monitoring, but also for policy making.

We provide a proof of concept for our proposed measure in two countries, Peru and South Africa. They are good candidates for piloting our measure: they are highly unequal countries, with long-standing social tensions, low levels of trust, and a history of protracted, intergenerational vulnerabilities associated with ethnicity and race. Both countries also collect data that integrate multiple social dimensions, allowing us to assess social sustainability from a multidimensional angle. As such, Peru and South Africa provide ample context for the analysis of complex, multiple and intersecting social vulnerabilities.

The paper is organized as follows. Section 2 presents the conceptual and measurement framework of social sustainability used in this paper. Section 3 describes the methodology of our proposed measure. Section 4 illustrates the construction of our new Social Sustainability Index in practice. Section 5 applies the proposed index in Peru and South Africa. Section 6 concludes, reflecting on the relevance of these results for policy design, and pathways to overcome the limitations of the proposed measure.

2. Conceptual and Measurement Framework of Social Sustainability[1]

The social sustainability literature spans multiple decades across academic and professional disciplines, with diverse applications, definitions, and connotations across the public and private sectors and the global, national, and local levels.[2] The initial literature on sustainability often treated the social pillar as secondary to or subsumed within environmental and economic sustainability.[3] A more contemporary view is that no pillar can be understood in isolation and that all three must be considered relationally (World Bank 2013, Ballet Bazin, and Mahieu 2020).

Specific to social sustainability, this concept was initially defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). At other times, social sustainability has been equated with social inclusion (World Bank, 2013b). It has also been described as some combination of community and national dynamics, contemporary and intergenerational equity, social justice, voice, inclusion, participation, and citizenship (Giddings, Hopwood and O'Brien, 2002; McKenzie, 2004; Cuthill, 2010; Dempsey et al, 2011; Bostrom, 2012; Eizenberg and Jabareen, 2017; Ballet, Bazin and Mahieu, 2020). The complexity of social sustainability in terms of its components, interactions and goals has often led to unworkably long lists of attributes. In fact, the list of features employed in the literature is long and open-ended. Dempsey et al. (2011) proposed a list of 27 elements, whereas Weingaertner and Moberg (2014) identified 17 dimensions.

Despite the absence of a consensus around the concept or measurement of social sustainability, there is sufficient common ground to discard some elements and include others in our proposed framework. Ballet, Bazin and Mahieu (2020) identify just three recurring aspects of social sustainability in the literature: social cohesion (coherence in the attitudes and behaviors of members of a given society), equity (lack of inequalities), and safety (protection from economic shocks). They also show that each of these components is closely connected with environmental sustainability. Littig and Griessler (2005) define social sustainability as interactions between individuals and related institutional arrangements. Those links help satisfy an extended set of human needs and fulfill the normative claims of social justice, human dignity and participation. World Bank (2005) provides a conceptually similar definition of socially sustainable development. According to the World Bank, development is socially sustainable when it promotes inclusive, resilient, cohesive and accountable institutions. More recently, Barron et al (2023) construct a social sustainability framework out of components spanning inclusion, resilience, social cohesion and process legitimacy.

Barron et al (2023), arguably provide the definition and conceptual framework for social sustainability that is more rigorously grounded in the existing academic literature but that are also aligned with the key objectives, strategic priorities, and operational frameworks common in international development. Their definition is the following:

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[1] This section draws from Barron et al (2023), Cuesta et al (2022).

[2] See, for instance, Åhman (2013); Barron et al (2023); Boström (2012); Boyer et al. (2016); Colantonio (2007, 2009); Eizenberg and Jabareen (2017); Griessler and Littig (2005); James et al. (2013); Koning (2001); McKenzie (2004); Sachs (1999).

[3] See, for instance, Daly (1996); Sachs (1999); Kunz (2006); Locke and Dearden (2005); Partridge (2005); Vifell and Soneryd (2012).

Social sustainability is when all people feel part of the development process and believe that they and their descendants will benefit from it. Socially sustainable communities and societies are willing and able to work together to overcome challenges, deliver public goods, and allocate scarce resources in ways that are perceived as legitimate and fair by all so that all people may thrive over time. (Barron et al 2023: 30)

This definition highlights four critical components of social sustainability: social cohesion, inclusion, resilience, and process legitimacy. A cohesive society has a shared purpose and high levels of trust, allowing communities and groups to work together toward a common good, respond to challenges, and drive real solutions and sustainable compromises. An inclusive society is one where all people have access to markets and services as well as political, social, and cultural spaces, which allows all members of society to thrive. A resilient society has the ability, capacity, and flexibility to avoid conflicts (including inter-personal violence) and to withstand, bounce back from, or absorb the impacts of exogenous shocks over time. Process legitimacy captures the processes by which policies or programs are designed and implemented within the context of existing norms and values, such that the decisions made and carried out are considered fair, credible, and acceptable by all members and groups of a given community or society.

Barron et al.'s (2023) definition of social inclusion aligns closely with World Bank (2005, 2013b) and Das and Espinoza (2019) and shares commonalities with the definitions presented in Ballet, Bazin and Mahieu (2020). While similar Barron et al (2023) differ from Ballet et al (2020) in the following: i) they use social inclusion rather than equity; ii)focus on equal access to economic, political, civic and physical spaces instead of inequalities; iii)employ resilience instead of safety so that the framework can capture readiness to all kind of shocks; and iv) add empowerment to social cohesion, agency and participation. A particular feature of Barron et al (2023) is their inclusion of process legitimacy, feature emphasized by Pawlowski (2008) and Dempsey et al (2011) as necessary to maintain social sustainability.

As such, Barron et al.'s (2023) definitions and framework unite the social sustainability literature emphases on connected communities, well-being for all, durability or resilience over time, and meaningful participation and engagement, and a strong social contract within an intertemporal horizon (each emphasized in works by Dempsey et al. 2011, Pierson 2002; Ratcliffe 2000). Durability and resilience focus on the stability and security of communities over time. Some literature characterizes these principles as safety, resembling but going further than resilience by emphasizing reduced vulnerability before shocks occur (Adger 2000). Meaningful participation and engagement reinforce the importance of connected and cohesive communities, underscoring the value of a strong social contract.

Figure 1 shows how Barron et al.'s (2023) components interact. Despite the framework's simplicity, the interactions it portrays are, in practice, highly complex, nonlinear, and context-dependent, reflecting the rich dynamics at play in all communities and societies. The framework functions within a conceptual space known as the "policy arena": the institutions and forums where public resources are allocated and decisions are made among individuals, government, and stakeholder groups through debate, negotiation, and compromise, with ample potential for disagreement, tensions, or even conflict (World Bank 2017). Expanding access to the policy arena, especially for marginal and vulnerable groups, as well as sharing information and building in feedback loops and other social accountability measures, are important for resolving tensions.

Figure 1: An integrated conceptual framework of social sustainability
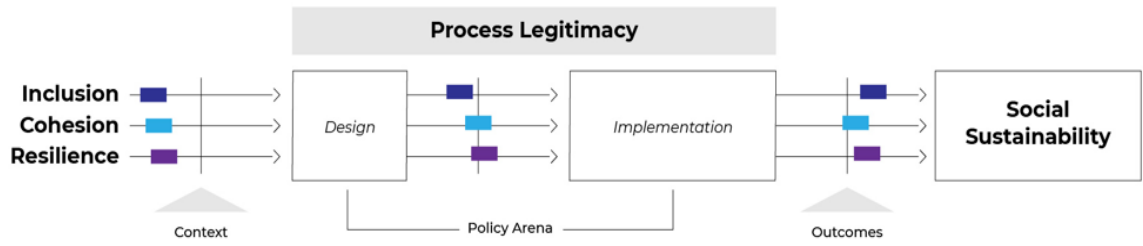
Source: Barron *et al* (2023)

Barron et al.'s (2023) framework, while holistic, addresses the operational measurement of social sustainability by dimension only. The framework thus leaves an important gap in the social sustainability literature regarding its measurement across dimensions. In effect, the growing body of conceptual work has not led to a consensus on an operational measure of social sustainability. The reasons for this include the concept's intrinsic intangibility, multidimensionality, dynamic characteristics and context-dependency (Cuesta et al 2022). As a result, there are numerous efforts to measure specific components of social sustainability individually, but to the best of our knowledge there is no single one that covers all in a single measure. Recent reviews on the measurement of social exclusion can be found in Cuesta, Lopez-Noval and Niño-Zarazua (2022); on social cohesion in Ballet, Bazin, and Mahieu (2020) and Chatterjee, Gassier and Myint (2023); on resilience in Marzi et al (2019); and on process legitimacy in Levi (2019 and 2022).

In this paper, we address a significant gap in the measurement of social sustainability. Our approach involves a comprehensive assessment of existing measures and variables on one hand, and the development of an aggregate metric for social sustainability across dimensions on the other. To initiate this process, we conducted a thorough review of indicators and metrics corresponding to the four dimensions outlined in Barron et al.'s (2023) social sustainability framework.

Table 1 presents a detailed comparison, encompassing the definitions of these dimensions, the ideal variables necessary to capture their key aspects, existing indicators found in the literature, and the indicators proposed in our study (detailed further in section 3).

Several critical aspects in Barron et al.'s (2023) framework are well addressed by existing literature. For instance, variables related to interpersonal and institutional trust, as well as indicators measuring collaborative problem-solving within communities (integral to social cohesion) are readily available. Similarly, indicators assessing access to various spaces, such as market, services, political, civic, and digital domains (defining social inclusion), are well-documented. Additionally, indicators reflecting the outcomes of resilience, such as the extent of food insecurity, are also present in the literature.

However, some dimensions are only partially or indirectly captured. For instance, indicators related to assets, savings, multiple sources of incomes, and coping strategies during shocks, although relevant for resilience, lack precise links on their specific utilization in addressing different types of shocks. Addressing the common good, a crucial aspect of social cohesion, is challenging due to its subjective and contested nature. Hence, we prioritize safety and non-discrimination as essential goals applicable to societies and communities universally.

Furthermore, existing indicators mainly focus on social norms related to gender, overlooking issues concerning discrimination of minorities and the integration of displaced populations. To bridge this gap, we advocate for a broader approach, encompassing various forms of discrimination and social integration in our assessment.

Additionally, there are indicators for which suitable metrics are yet to be established. These include variables associated with thriving, dignity, interventions tailored to conflict prevention, and perceptions of fairness regarding specific policies, programs, or issues. To address these gaps, socioeconomic status and the ability to express acceptance or dissent concerning policies through individual and collective voices, accountability, and participation could serve as valuable indicators.

Table 1: From Concepts to Indicators of Social Sustainability

Definition	Key issues to be captured	Ideal measurement	Measures available in the literature	Proposed measure
A cohesive society has a shared purpose and high levels of trust, allowing communities and groups to work together toward a common good, respond to challenges, and drive real solutions and sustainable compromises	Shared purpose, common good	Measure contains sufficiently relevant common goals that resonate across large shares of population, instead of narrow, partizan aims	Work on issues relevant to the community; sign a petition; participate in demostrations; vote to elect representatives	Share of population that feels insecure in the neighborhood; share of people that have ever felt unsafe from crime in their community; share of population that was victim of a crime; share of population for which racist behavior is frequent in their neighborhood
	Trust	Trust understood as interpersonal trust but also trust in authories and institutions	Interpersonal trust, trust in government, police, Congress, judiciary, and other relevant institutions	Share of population that say most people can be trusted; Share of population that would not like to have "homosexual" neighbors Share of population that has confidence in government; share of population that has confidence in the Police
	Work togethet	Cooperation, participation in groups, whether organized formally or not.	Member of clubs or organizations; active participants in clubs or organizations of diverse nature	Share of population that participates in voluntary associations or community groups.
An inclusive society is one where all people have access to markets and services as well as political, social, and cultural spaces, which allows all members of society to thrive.	Access to all kind of spaces, that is, markets, services, political, social, culutral	Access to a wide range of markets (labor, financial, land), services (heath, eduation, social protection), political spaces (voting, political parties, local authority positions), social (in the sense of physical, that is, streets, neighborhoods), cultural (including internet, digital), ideally with some notion of quality, such as for example, access to decent jobs, access to credit in not abusive conditions, quality education, good digital content, or access to streets safely and without fear	Access to labor markets, financial resources, ownership of land, access to education, healthcare when needed, coverage of social protection programs, benefiting from public or private transfers, possession of ID and/or birth certificates, perception of safety in the community, access to internet. Only a few of these variables contain some notion of quality, such as assistance vs contributory pensions or transfers, private vs public education, access to bank account vs credit card. piped water vs latrine, while others do not (eg access to quality content in internet).	**Access to Markets**: labor force participation rate; unemployment rate; self-employment rate; **Access to Financial Services**: share of population with a bank account; **Access to Basic Public Services**: share of households with access to improved water; access to adequate sanitation; access to electricity; internet connection at home; **Access to Human Capital Services**: primary enrolment rate; secondary enrolement rate; share of households with health insurance.
	Everyone, no exceptions	No gaps across individuals due to considerations of age, gender, ethnicity, disability, displacement, SOGI considerations	Questions are typically aged appropriate, eg, labor access only at individuals at working age. There are however gaps in terms of ethnicity and disability (self reported in the case of ethnicity and issues of functionality not always capturing impairing disability), while little or nothing on irregular migration and SOGI-- making it difficult to unpack by those groups	n/a
	Thrive	Notion of inclusion beyond survival and escaping poverty towards capturing each individual potential	Possible to capture subjective wellbeing, happiness, satisfaction and perceptions or projections of past, current and future living standards, as well as monetary poverty, but not trully the concept of dignity	n/a

Table 1: From Concepts to Indicators of Social Sustainability (continued)

Definition	Key issues to be captured	Ideal measurement	Measures available in the literature	Proposed measure
A resilient society has the ability, capacity, and flexibility to avoid conflicts (including inter-personal violence) and to withstand, bounce back from, or absorb the impacts of exogenous shocks over time	Ability, capacity and flexibility to avoid coflict	Resilience captures efforts dedicated to keep peace, avoid conflict, keep crime and insecurity, or victimization perceptions low, which could be approached with questions about perceptions and satisfaction with specific policies or programs by government, judiciary or legislative powers, as well as police, among others.	There are typically variables that capture satisfaction with policies, goverments and, depending on context, CSO or international organizations, but usually not referring to peacekeeping activities, conflict prevention, or crime policies. The questions are therefore unable to specifially refer to these aspects	n/a
	Withstand, bounce back and absorb impacs of shocks over time	Variables capturing the availability of resources and strategies to cope with different types of shocks (savings, migration, selling of assets, transfers, and so forth)	Most surveys will ask for individual and household coping strategies as a specific module, asking for both idiosincratic shocks as well as systematic shocks. Strategies also asked for positive as well as negative coping strategies (for example, hazardous work or dropping children out of school).	Share of households with computer, mobile phone, washing machine, motorcycle; Received domestic remittances in the past year; share of households with several sources of incomes
		Variables reflecting the outcomes of preventive and coping strategies like experiences of food insecurity, mortality/morbidity, forced displacement as the result of the shock	Food insecurity is typically asked and depending on the shock, for example, COVID, issues of mortality and morbidity. Displacement is also typically asked although unclear whether voluntary or forced, or rather, preventive or coping strategies.	Share of population that has gone without enough food
Process legitimacy captures the processes by which policies or programs are designed and implemented within the context of existing norms and values, such that the decisions made and carried out are considered fair, credible, and acceptable by all members and groups of a given community or society.	Acceptance of processes, decisions and outcomes regardless of specific benefits to an indiivdual or group. Acceptance is based fundamentally on the notion of being fair	Individuals are asked for specific policies, programs, or outcomes, not whether they are satisfied or trust those responsible for them, but whether they feel they are fair. Crtically, it should refer to specific outcomes or policies and not simply a broad acceptance of an authority	Generally speaking there are no variables asking for perceptions of fairness, except for some rare questions on whether the individual think the distribution of incomes is fair. This is more of an outcome resulting from many policies than a particular policy itself. More frequently, there are indicators about the general satisfaction with government effectiveness or, in some cases, with some sectoral disaggregation, although much more rare.	**Voice**: Share of people who voted in most recent national elections; share of population that thinks they have freedom of speech; **Accountability**: World Governance Indicators; **Citizen engagement**: World Governance Indicators.
	Legitimacy is anchored on current norms and values so policies are carried out in a concrete context	Indicators of legitimacy capture the social norms and values that defines a particular society in a given time	Indicators avaialble typically capture gendered norms and values such as gender discrimination, and much less norms related to other vulnerable groups such as (integration of) migrants and displaced populations, (discrimination of) ethnic, religious or sexual minorities	**Social norms**: Share of people who agrees is a problem if women have more income than men; when jobs are scare, men should have more rights than women; share of women who are chief wage earner in the household;

Source: Own elaboration

3. A New Methodology to Measure Social Sustainability Multidimensionally

To measure social sustainability multidimensionally, we revisit and repurpose the Counting Approach to multidimensional poverty measurement, proposed by Alkire and Foster (2011) and Alkire *et. al.* (2015). This approach offers an assessment that captures overlapping social gaps across dimensions and indicators. As in the Counting Approach, our method similarly consists of two steps: identifying those who experience multiple social gaps and aggregating their status into a synthetic index. The identification step examines social gaps unidimensionally (by indicator/dimension) and multidimensionally (across indicators/dimensions). To do so it uses two forms of thresholds: a set of thresholds per dimension or indicator (denoted by vector $\boldsymbol{z}$[4]), and a threshold across dimensions (denoted by k). The unidimensional assessment contrasts the achievements per indicator with the corresponding thresholds. As such, a person is considered to experience a social gap in an indicator if she falls below a certain cut-off. The multidimensional assessment goes one step further and examines the joint social gaps experienced by a person, by comparing the number of social gaps (score) he experiences with a cross-dimensional cut-off, that represents the societal tolerance of multiple social gaps (number of weighted indicators) that a person can experience simultaneously.

More formally, to describe the identification process, consider a population of N individuals with attainments in D dimensions/indicators. This information is represented by $\boldsymbol{X}$, an achievement matrix of size $N \times D$. A typical element of this matrix is $x_{ij} (\in \mathbb{R}_{\geq 0})$, which denotes the attainment of the ith individual in dimension/indicator j. Let z_j and w_j denote the social-gap threshold and weight specific to indicator j, respectively.[5] Thus, a person is deemed to experience a social gap in indicator j if: $x_{ij} < z_j$. The count of social gaps experienced by a person at the same time is computed by weighting the social gaps, such that: $w_j \in \mathbb{R}_+$ and $\sum_{j=1}^{D} w_j = D$. Hence the weighted number of social gaps experienced by individual i is: $c_i = \sum_{j=1}^{D} g_{ij}$, where $g_{ij} = w_j e_{ij}$ denotes the weighted social-gap in indicator j, and $e_{ij} = 1$ if $x_{ij} < z_j$, and 0 otherwise. For a given cross-dimensional threshold $k \in [0, D]$, a person experiences multiple social gaps if $c_i \geq k$. This is represented by the multidimensional identification function $\rho_i(k)$ that takes a value of 1 if $c_i \geq k$, and 0 otherwise. Figure 2 presents the sequence of steps required for identifying those who experience social gaps multidimensionally. First, we select the achievement set an individual is going to be assessed against. Thresholds for each of those achievements are then selected, below which an individual is identified as experiencing a social gap from that achievement (unidimensional social gaps). Next, each of the dimensions and indicators the individual is found to experience social gaps from are weighted, counted and aggregated. The aggregation leads to a score of social gaps which is contrasted with a cross-dimensional threshold that determines whether the individual is regarded as experiencing social gaps multidimensionally. This is reflected by the identification function.

The aggregation step then synthesizes each person's status of multidimensional social gaps into an index. The Social Sustainability Index (SSI) is defined as:

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[4] Vectors and matrices are denoted by bold lower- and upper-case letters, respectively.
[5] From a vector of social-gaps thresholds, $\boldsymbol{z}: (z_1, \dots, z_j, \dots, z_D)$ and a vector of weights, $\boldsymbol{w}: (w_1, \dots, w_j, \dots, w_D)$.

$$SSI = \frac{1}{ND} \left[\sum_{i=1}^{N} \sum_{j=1}^{D} \rho_i g_{ij} \right] \tag{1}$$

$SSI \in [0,1]$ can be written as the product of incidence (H), that is, the proportion of people who are below the cross-dimensional cut-off, and intensity (A) rates, that is, the average share of social gaps, as: $SSI = H \times A,$

where:
$H = \frac{1}{N} [\sum_{i=1}^{N} \rho_i] = \frac{q}{N}$; $A = \frac{1}{Dq} [\sum_{i=1}^{N} c_i \forall \rho_i = 1]$, and q is the number of people who experience social gaps multidimensionally.

SSI can be decomposed by population group and broken down by indicator (c.f. Alkire and Foster, 2011). These two properties are key for policy design, targeting, and monitoring and evaluation as they make it possible to identify the population groups experiencing the greatest levels of simultaneous social gaps, as well as those dimensions or indicators that drive social sustainability gaps multidimensionally.

Figure 2: Steps in the Identification of the Multidimensional Excluded Population
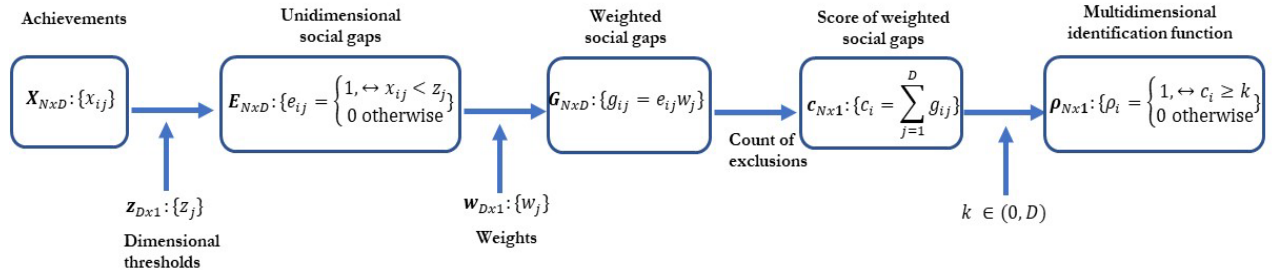
Note: Vectors and matrices are denoted by bold lower- and upper-case letters, respectively, with the subindices denoting their size.

Figure 3 provides an intuitive representation of the proposed index. Several indicators characterize the key dimensions of social sustainability multidimensionally. Assume for illustration there are four generically called "E", "C", "R" and "L", with each of them measured by four indicators. Each indicator is represented by a box. The size of the box denotes the maximum achievement a person can have in the indicator, while the colored area denotes the person's actual achievement, and the dashed line denotes the threshold that determines whether the person experiences a social gap in that indicator. After selecting a given cross-dimensional threshold (1/3, 1/2, and 3/4 in our graphical example) and the weighting of each indicator and dimension (assumed to have equal weights, for simplicity) the individual's number of social gaps are counted. If exceeding that threshold—for example, 1/3 of the total indicators—the person is identified as experiencing social gaps multidimensionally. Note that the same person might be considered as experiencing multiply social gaps under a certain cross-dimensional threshold but not under another (as shown in the example).

4. Constructing the Social Sustainability Index

The construction of our Social Sustainability Index using a Counting Approach entails several normative considerations. Critical among them are the following: choice of dimensions and

indicators; choice of deprivation thresholds per indicator; choice of weights to reflect the importance of each indicator/dimension; and choice of cross-dimensional cut-off. This section focuses on the first of these aspects: selection of dimensions and indicators.

Figure 3: Counting those who experience social gaps multidimensionally: Intuitive Representation by Cross-dimensional Threshold
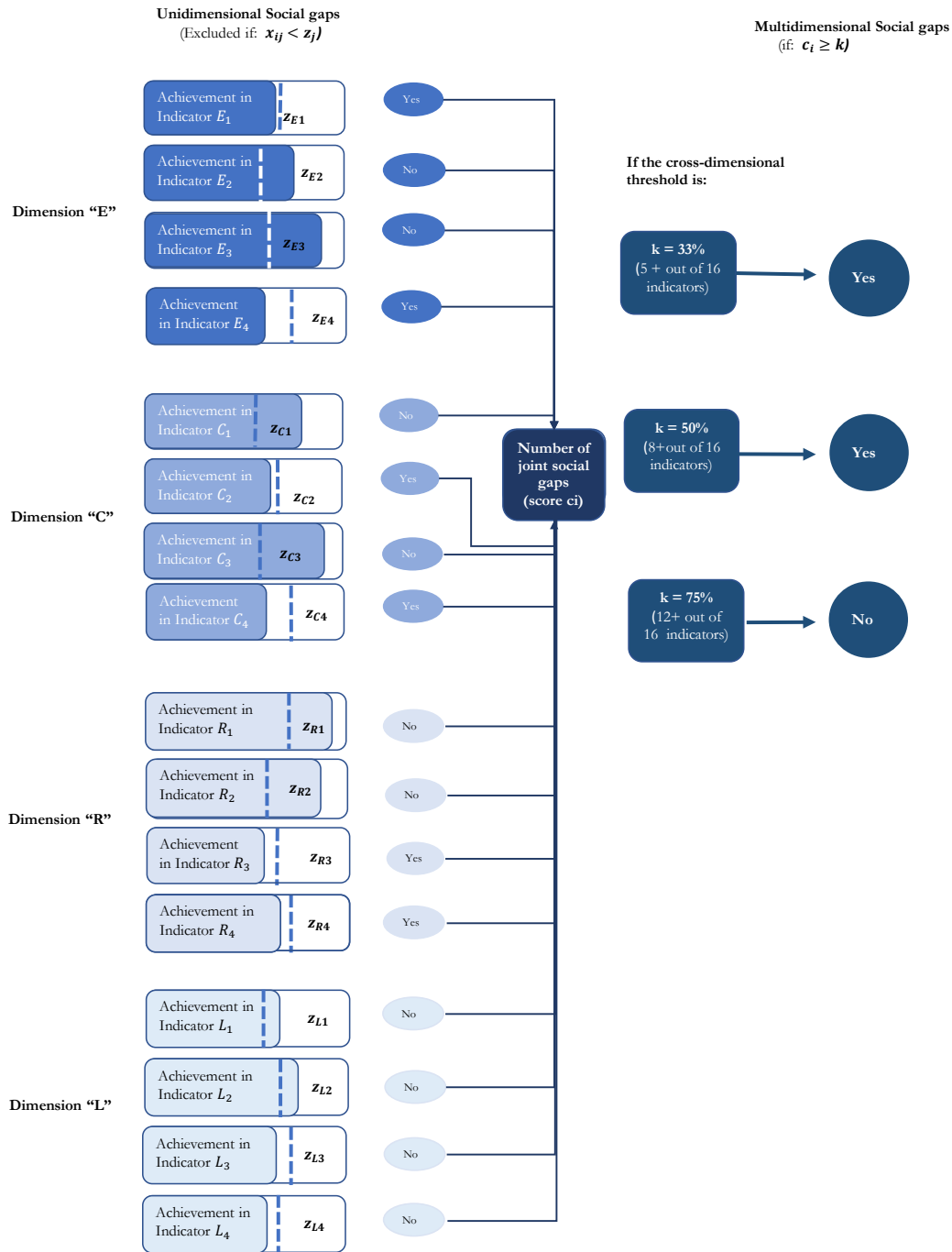
Source: authors. Note: Components "E", "C", "R" and "L" are generic names capturing any possible dimension of social sustainability. In our proposed measure, we use inclusion, social cohesion, resilience and process legitimacy. The size of the box denotes the maximum achievement a person can have in an indicator, the colored area denotes the person's achievement, and the dashed line denotes the indicator threshold.

As discussed above, the literature on sustainability contains a wide range of concepts and definitions of its numerous social dimensions, among which social sustainability is often considered. Commonly discussed outcomes associated with inclusion include equity, intra- and intergenerational well-being, quality of life, and the satisfaction of basic needs (see Barron et al 2023 for a recent review). Other analyses emphasize instead processes, including social interaction, interconnectedness, social integration, and participation; as well as alternative outcomes such as freedom, safety and security, and access to basic infrastructure and services as part of an integrated concept of social sustainability (see Littig and Griessler 2005; Cuthill 2010; Dempsey *et al.* 2011; Boström 2012; Purvis, Mao, and Robinson 2019; Ballet, Bazin and Mahieu, 2020).

While extensive lists of outcomes and processes help to establish the complexity and multidimensional nature of social sustainability, they are less useful in delivering a definition that can be understood, agreed upon, and operationalized. There is, however, some convergence and overlap in the literature encompassing a narrower set of outcomes and processes as discussed in the previous section and summarized in Table 1. Building on this evidence, we conducted a systematic review of available data sources to identify the dimensions and indicators widely used in empirical studies of social sustainability. We find that the construction of social exclusion metrics typically follows measurement frameworks that cluster dimensions to conceptualize one specific construct (Table 2). As such, it finds that access to markets, services and political, civic, cultural and physical spaces are grouped to conceptualize social inclusion (World Bank 2013, Das and Espinoza 2020). Absorptive, adaptive, and transformative capacities are used to conceptualize resilience (Walker *et al* 2004, DFID 2011, IPCC 2012, Oxfam 2017).[6] Meanwhile empowerment, voice, agency, citizen engagement, and social accountability are grouped in one concept, namely, process legitimacy (e.g., Kabeer 1999, Fox 2007, Joshi 2008, IFPRI 2020, IDS 2020). This synthesis illustrates, both the indicators often used in terms of their global coverage, and the possibility to be unpacked by vulnerable groups and populations. This snapshot of indicators, though not comprehensive, first confirms that there are numerous indicators available from a relatively small amount of reputable data sources. Second, it shows that indicators notably vary in terms of their country coverage. This is partly a reflection of their methodologies: experts' opinion-based sources usually have a global coverage with frequent updates, while household surveys vary in the data collected and may be realized far less frequently. Disaggregation-wise, there are also trade-offs: data based on expert opinion is national in scope and is often not designed to explore subnational, inter- and intragroup heterogeneity, including among vulnerable groups. Other sources like household surveys can unpack results across groups and location, although the extent to which those disaggregations are considered in the sample design to provide statistically significant results varies from source to source.

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[6] *Absorptive capacity* is the capacity to take intentional protective action and adopt coping strategies to bounce back after a shock, ensuring stability as it limits the negative impact of shocks. *Adaptive capacity* is the capacity to make intentional incremental adjustments in anticipation of or response to change, to create more flexibility in the future. *Transformative capacity* is the capacity to make intentional change to stop or reduce the causes of risk, vulnerability and ensure a more equitable sharing of risk. It is about fundamental changes in the structural causes and aggravators of vulnerability and risk.

Table 2: A Systematic Review of Dimensions and Indicators Used in the Analysis of Social Sustainability

Dimensions and Indicators	Number of Countries	Group that the indicator can be disaggregated by:						Source
		Age	Area: urban/rural	Gender	Disability	Ethnicity	Religion	
Social Inclusion								
Access to Labour Markets								
Labor force participation rate	105	X	X	X				GMD
Unemployment rate (%)	104	X	X	X				GMD
Self-employed	71	X	X	X				GMD
Access to Financial Services								
Share of population with a bank account	34	X	X	X	X	X		Afrobarometer
Access to Basic Public Services								
Share of households with access to improved water	130	X	X	X				GMD
Share of households without access to adequate sanitation	129	X	X	X				GMD
Share of households with access to electricity	93	X	X	X				GMD
Internet connection at home	45	X	X	X				GMD
Access to Human Capital Services								
Primary enrollment rate	100	X	X	X				GMD
Secondary enrollment rate	104	X	X	X				GMD
Share of households with health insurance	24	X	X	X				GMD
Resilience								
Share of households with computer	93	X	X	X				GMD
Share of households with mobile	87	X	X	X				GMD
Share of households with washing machine	57	X	X	X				GMD
Share of households with car or motorcycle	67/57	X	X	X				GMD
Received domestic remittances in the past year	34	X	X	X	X	X	X	Barometer
Share of population that saved any money during past year	85	X	X	X		X	X	Barometers/WVS
Share of population that has gone without enough food	110	X	X	X		X	X	Barometers/WVS
Share of households with several sources of income	105	X	X	X				GMD
Social Cohesion/Capital								
Share of population that feels in insecure in their neighborhood	85	X	X	X		X	X	WVS
Share of population that have somewhat often felt unsafe from crime in their own home	75	X	X	X		X	X	WVS
Share of population that was victim of a crime	82	X	X	X		X	X	Barometers/WVS
Share of population for which racist behavior is frequent in their neighborhood	74	X	X	X		X	X	WVS
Share of population that participates in voluntary associations or community groups	43	X	X	X	X	X	X	Barometers/WVS
Share of population that says that most people can be trusted	86	X	X	X		X	X	Barometers/WVS
Share of population that mentions they would NOT like to have as neighbors: "Homosexuals"	73	X	X	X		X	X	WVS
Share of population that has confidence in the government	84	X	X	X		X	X	Barometers/WVS
Share of population that has confidence in the police	85	X	X	X		X	X	Barometers/WVS
Process Legitimacy								
Voice and Agency								
Share of population that disagrees it is a problem if women have more income than husband	75	X	X	X		X	X	WVS
Share of population that disagrees when jobs are scarce: men should have more right to a job than women	76	X	X	X		X	X	WVS
Share of women respondents that are the chief wage earner in your house	18	X	X	X		X	X	Barometers/WVS
Share of population who voted in the most recent national elections	106	X	X	X	X	X	X	Barometers/WVS
Share of population that attended a demonstration or protest	102	X	X	X	X	X	X	Barometers/WVS
Share of population that thinks they have freedom of speech	42	X	X	X	X	X	X	Barometers
Social accountability								
Voice and accountability	204			National level				WGI
Government effectiveness	209			National level				WGI
Rule of law	209			National level				WGI
Control of corruption	209			National level				WGI
Citizen engagement				National level				
Civil society participation (0-10)	137			National level				BTI
Civil rights (0-10)	137			National level				BTI
Civil society participation index	179			National level				VDEM
CSO women's participation	179			National level				VDEM

5. Application to Peru and South Africa

We now present an empirical application of our measure of social sustainability in the context of Peru and South Africa. These two countries are good candidates for piloting an appraisal of social sustainability and its related fragilities in the form of multiple social gaps: both are upper middle-income economies, with high levels of income poverty (30 and 57 percent, respectively). South Africa is meanwhile the most unequal country in the world—with race playing a significant role—while Peru is one of the most unequal countries in Latin America, itself a highly unequal region. Poverty in Peru is disproportionally high among Indigenous peoples (Busso and Messina 2020, IMF 2020). Discrimination, lack of societal cohesion (including extreme hostility towards immigrants), regular episodes of social unrest, and lack of accountability are notorious features of both countries (World Bank 2018, 2022a).

To assess social sustainability multidimensionally, we use Peru's 2019 National Household Survey (ENAHO) and South Africa's 2018 Social Attitudes Survey (SASAS). Both are nationally representative at the department and province levels, respectively. SASAS uses face-to-face, three-stage-stratification data collection to gather information on relevant demographic, behavioral and attitudinal characteristics of a representative sample of 3,500 adult individuals aged 16 and older in households spread across the country's nine provinces.[7] The 2018 survey collects information on democracy and governance, intergroup relations, education, crime and security, poverty, the labor market, household characteristics and assets. The ENAHO likewise uses face-to-face interviews and a probabilistic three-stage sampling method to collect information on personal and household characteristics of all household members and their living conditions. While its primary aim has been to monitor the evolution of monetary poverty, ENAHO has become a key source of information for wider policy uses. The 2019 survey, which encompassed 23,347 households, included data collection modules on citizen participation, governance, democracy, transparency, discrimination, perception of insecurity, and access to justice.[8] As such, SASAS and ENAHO provide a unique, long-term account of the speed and direction of changes in the underlying public perceptions, values and social fabric of South Africa and Peru, making them an ideal tool to inform policy-making focused on enhancing social sustainability and reducing fragilities of exclusion.

Our empirical application seeks a common denominator consistent with all the reported dimensions across both surveys and proposes to assess social sustainability across four dimensional pillars: inclusion, resilience, social cohesion, and legitimacy. We opt for inclusion, instead of equity, to analyze equal access to economic, political, civic, and physical spaces. Inclusion thus refers to the process of creating opportunities for all people and addressing deep systemic inequalities. It involves improving the ability of all people to access basic services like running water, human capital services like schools, and markets (including the labor market) regardless of their personal or community characteristics. We select resilience and social cohesion, , to capture readiness for all kinds of shocks while accounting for the strength of inter-personal relationships and the broader sense of solidarity among members of a society. Resilience thus refers to the ability of communities and groups in both fragile and nonfragile environments to cope with shocks such as climate change, pandemics,

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[7] Small area layers (SALs) were used as primary sampling units, from urban formal, urban informal, rural formal and rural informal settlements.

[8] The modules on opinions and perceptions are collected on adults aged 18 years or older.

interpersonal violence, and conflict. Social cohesion captures shared purpose and high levels of trust, the ability of communities and groups to work together toward a common good, respond to challenges, and drive real solutions and sustainable compromises. Lastly, we opt for process legitimacy to capture empowerment, voice and accountability, as well as, aspects of trust, citizen participation, democracy, and corruption. Process legitimacy can thus be understood as expanding vulnerable groups' voices and influence. This increased voice helps them shape development solutions, influence public policy, and foster accountable service delivery (Table 3).

These four dimensions are operationalized through 16 indicators.[9] Inclusion considers metrics capturing access to labor markets, basic services, and human capital services. Resilience is measured by indicators denoting asset ownership, quality of housing, public assistance (government transfers) and capacity for saving. These indicators are consistent with those frequently used by the literature on resilience to natural disasters (see Kusumati et al 2014; and Marzi et al 2019). They emphasize both exposure to hazards and the ability to resist, absorb, accommodate, and quickly recover from them. Social cohesion considers indicators denoting confidence in government, experience of discrimination, perception of safety, and being a victim of crime. Process legitimacy consists of indicators denoting civil participation, satisfaction with democracy, government effectiveness, and faith in anti-corruption measures. All indicators are equally weighted across dimensions. Table 2 describes the thresholds that identify a person as excluded, following the criteria set out in the sustainable development goals.

5.1. Profiles of social sustainability

In what follows we describe the experience and extent of multidimensional social gaps in Peru and South Africa. Of particular interest is the appraisal of profiles by location and vulnerable group. Table 4 reports the profiling of multidimensional exclusion in these two countries for a cross-dimensional threshold of 33 percent (experiencing multiple social gaps in 4 indicators or more).[10] South Africa shows a higher Social Sustainability Index of 0.34, compared to 0.31 in Peru, explained by a 2-percentage point incidence gap (67 percent compared to 65 percent in Peru), and a 6-percentage point intensity gap (53 percent in South Africa, and 47 percent in Peru). This means that, on average, people in South Africa who experience multiple social gaps do so in eight indicators simultaneously, and in Peru in seven indicators.

However, this pattern is not uniform across vulnerable populations or locations within each country. By gender, we find that women vis-à-vis men in South Africa fare worse in their experiences of social gaps compared to women vis-à-vis men in Peru: something reflected by a 12-percentage point gap in social-gap rates in South Africa, and a 4-percentage point gap in Peru (Table 4). By ethnicity, Indigenous from the Amazonian regions (referred to as other indigenous) Quechuas and Aymaras in Peru and Black South Africans are especially fragile compared to non-native populations and Whites, respectively.[11] Yet the incidence gap between Black South Africans and White populations reaches 43 percentage points: far greater than any of the incidence gaps across ethnic groups in Peru (Table

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9 For a discussion on the selection of indicators using statistical methods, see Ballon (2023).

10 For robustness purposes, we have also analyzed profiles of multidimensional exclusion for cross dimensional thresholds of 50 percent of joint exclusions. These are reported in section 4.3. The results presented here are robust to the choice of cross-dimensional threshold.

11 The ENAHO survey uses the main native language spoken by respondents as the criteria for ethnic classification. The survey includes the following groups: Aymara, Quechua, other Indigenous (Ashaninka, Awajún, Bora y Shipibo-Konibo) and Non-Native (Spanish, Portuguese, other foreign language).

4). By location, we observe a greater heterogeneity within South African provinces compared to the different departments in Peru. Western Cape has the lowest incidence and intensity rates for both South Africa and Peru, where not even Lima, the capital, comes close. Lima instead reports

Table 3: Normative Considerations

Dimension		Indicator[a]	Peru	South Africa
			Excluded if the person…	Excluded if the person…
Social Inclusion	Access to labour markets	Quality of employment	is unemployed or informally employed	is employed part-time or less
	Access to basic services	Access to water, sanitation, electricity & internet	has two or fewer than two services at home	has two or less out of four services at home
	Access to human capital services	Level of education	does not have complete secondary education	does not have complete secondary education
		Medical attention	did not get medical attention when ill	has inadequate access to health care
Resilience		Quality of housing	lives in a household that has inadequate floor/roof/walls [b]	lives with inadequate housing conditions
		Possession of assets	is in the bottom third of the asset ownership distribution	is in the bottom third of the asset ownership distribution
		Public assistance	receives public assistance (in-kind and cash transfers from government)	receives public assistance (in-kind and cash transfers from government)
		Capacity for saving	is not able to make savings out of income	is not able to make savings out of income
Social Cohesion		Confidence in government institutions	lives in a household where at least one member has low confidence in government institutions	distrusts the national government
		Experience of discrimination	lives in a household where at least one member has been discriminated against	feels they are in a group that is discriminated against
		Perception of safety	thinks security is a main issue	feels unsafe most of the days
		Victim of crime	lives in a household where at least one member has been victim of a crime in the past year	lives in a household where at least one member has experienced burglary or assault in the past 5 years
Process Legitimacy	Agency and voice	Civil participation	lives in a household where no member has participated in a group, organization and/or association	has not participated in march, and/or contacted traditional leader and/or government official
	Social accountability	Satisfaction with democracy	lives in a household where at least one member thinks democracy is not working in Peru	is dissatisfied with the way democracy is working in South Africa
		Government effectiveness	lives in a household where at least one member thinks the government is performing poorly	is dissatisfied with the local government basic service provision in the neighborhood
		Equality before the law (PE)/ Satisfaction with the way corruption is combatted (SA)	lives in a household where at least one member thinks there is no equality before the law in society	is dissatisfied with the way corruption is combatted in their neighborhood

(a) All indicators are equally weighted within a dimension. Each indicator has a weight of 1/16 or 6.25% .
(b) Inadequate floor/walls/roof is defined per the SDG guidelines. Assets includes all durables listed in the survey of each country (i.e TV, radio, washing machine, refrigerator, fan, stove). Possession of assets is measured as a score that counts the number of assets that a person owns.

similar rates of social-gaps to Gauteng in South Africa. The incidence of multidimensional social gaps in South Africa ranges from 46 to 82 percent and its intensity from 45 to 56 percent. In Peru this spread is narrower for incidence (56-81 percent) and for intensity (44-50 percent). Puno in Peru and North West in South Africa are the regional units with highest social-gap rates (Figure 4).

Table 4: Social Sustainability Index (SSI), Incidence (H) and Intensity (A)[12]

Panel A: Peru

Metric [a]	National	Gender			Ethnicity						
		Male	Female	T-test [b]	Quechua	T-test [b]	Aymara	T-test [b]	Other Indigenous	T-test [b]	Non-Native
Incidence rate (H)	67%	65%	69%	***	80%	***	83%	***	92%	***	63%
	(0.05)	(0.06)	(0.05)		(0.05)		(0.06)		(0.02)		(0.05)
Intensity rate (A)	47%	47%	47%	***	49%	***	51%	***	50%	***	46%
	(0.01)	(0.01)	(0.01)		(0.01)		(0.01)		(0.01)		(0.01)
Social Sustainability index (SSI)	0.31	0.31	0.32	***	0.39	***	0.42	***	0.46	***	0.29
	(0.03)	(0.03)	(0.03)		(0.03)		(0.04)		(0.02)		(0.03)

(a) For each metric we report the point estimate and its standard errors(in parentheses).

(b) To assess difference between groups we perfomed t-tests. The baseline category for ethnicity is non-native. ***, **, * denote statistically significant differences between groups at 1%, 5% and 10% levels respectively. n.s denotes non-statistical significance.

Panel B: South Africa

Metric [a]	National	Gender			Ethnicity						
		Male	Female	T-test [b]	Black African	T-test [b]	Coloured	T-test [b]	Indian	T-test [b]	White
Incidence rate (H)	65%	58%	70%	***	72%	***	51%	***	42%	***	29%
	(0.02)	(0.02)	(0.02)		(0.02)		(0.04)		(0.02)		(0.04)
Intensity rate (A)	53%	51%	54%	***	54%	***	49%	***	46%	n.s.	45%
	(0.01)	(0.01)	(0.01)		(0.01)		(0.01)		(0.01)		(0.02)
Social Sustainability index (SSI)	0.34	0.3	0.37	***	0.39	***	0.25	***	0.19	***	0.13
	(0.01)	(0.01)	(0.01)		(0.01)		(0.02)		(0.01)		(0.02)

(a) For each metric we report the point estimate and its standard errors(in parentheses).

(b) To assess difference between groups we perfomed t-tests. The baseline category for ethnicity is white. ***, **, * denote statistically significant differences between groups at 1%, 5% and 10% levels respectively. n.s denotes non-statistical significance.
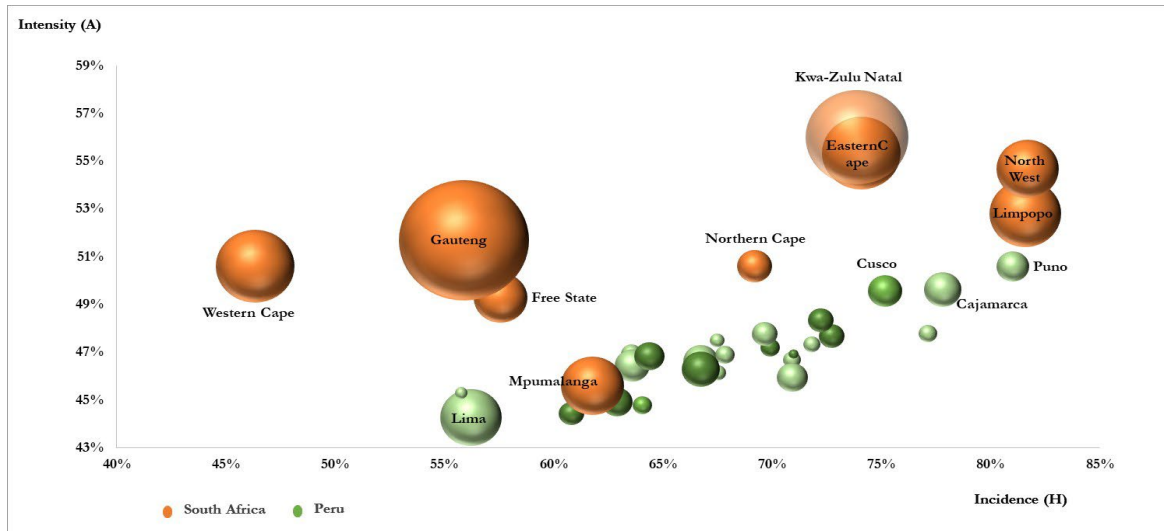
5.2. Drivers of multidimensional social gaps

Here we describe the composition of multidimensional social gaps. Understanding which indicators (or dimensions) contribute most to overall gaps in social sustainability can provide the basis for policy design aiming at alleviating the negative experiences of those who suffer multiple social gaps. Figure 5 presents the composition for both countries. Overall, we see in both countries that multidimensional social gaps are consistently driven by weak process legitimacy. This single dimension explains 40 percent of the overall social gaps in Peru, and 30 percent in South Africa. Limited social inclusion contributes 30 percent in Peru, while resilience accounts for 27 percent in South Africa. Within dimensions, low satisfaction with the way corruption is fought in South Africa, and inequality before the law in Peru, are the principal indicators driving multidimensional gaps in

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[12] Results correspond to a 33% cross-dimensional threshold of joint exclusions.

social sustainability, followed by deficits in government effectiveness in both countries. These compositions are also consistent across ethnic groups in both countries (Figure 6).
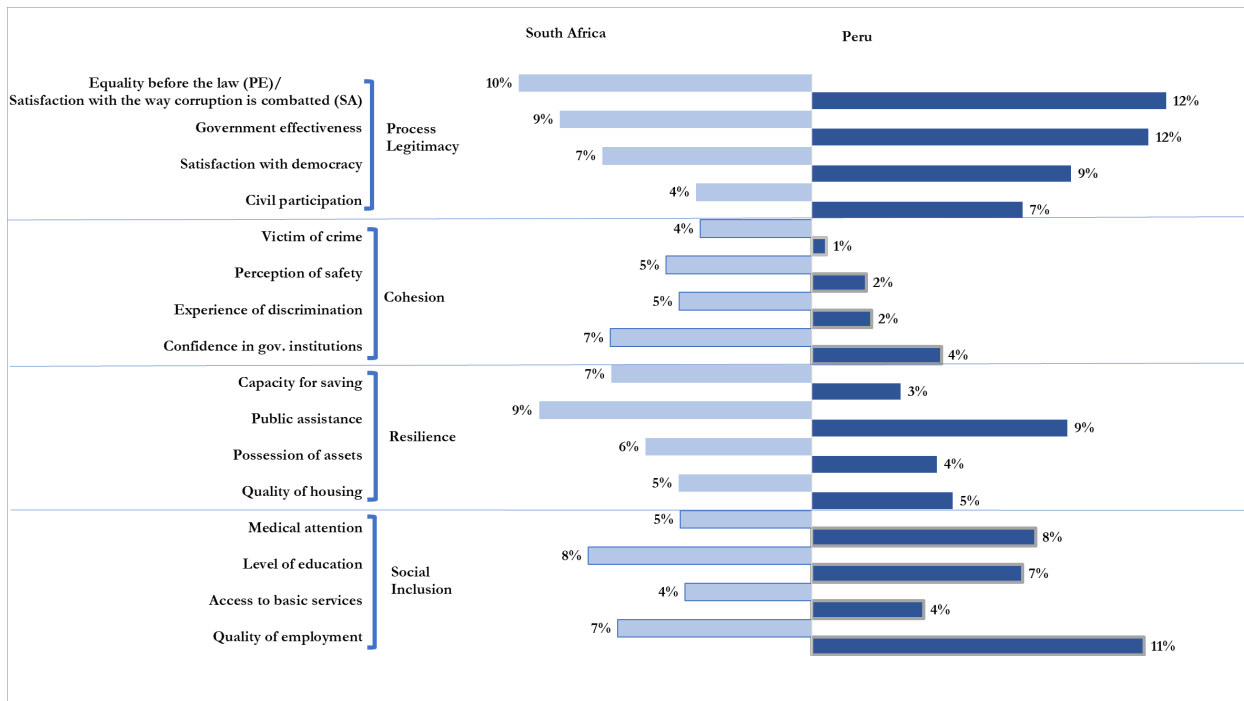
Figure 4: Social Sustainability Index (SSI), Incidence (H) and Intensity (A) by Location in Peru and South Africa

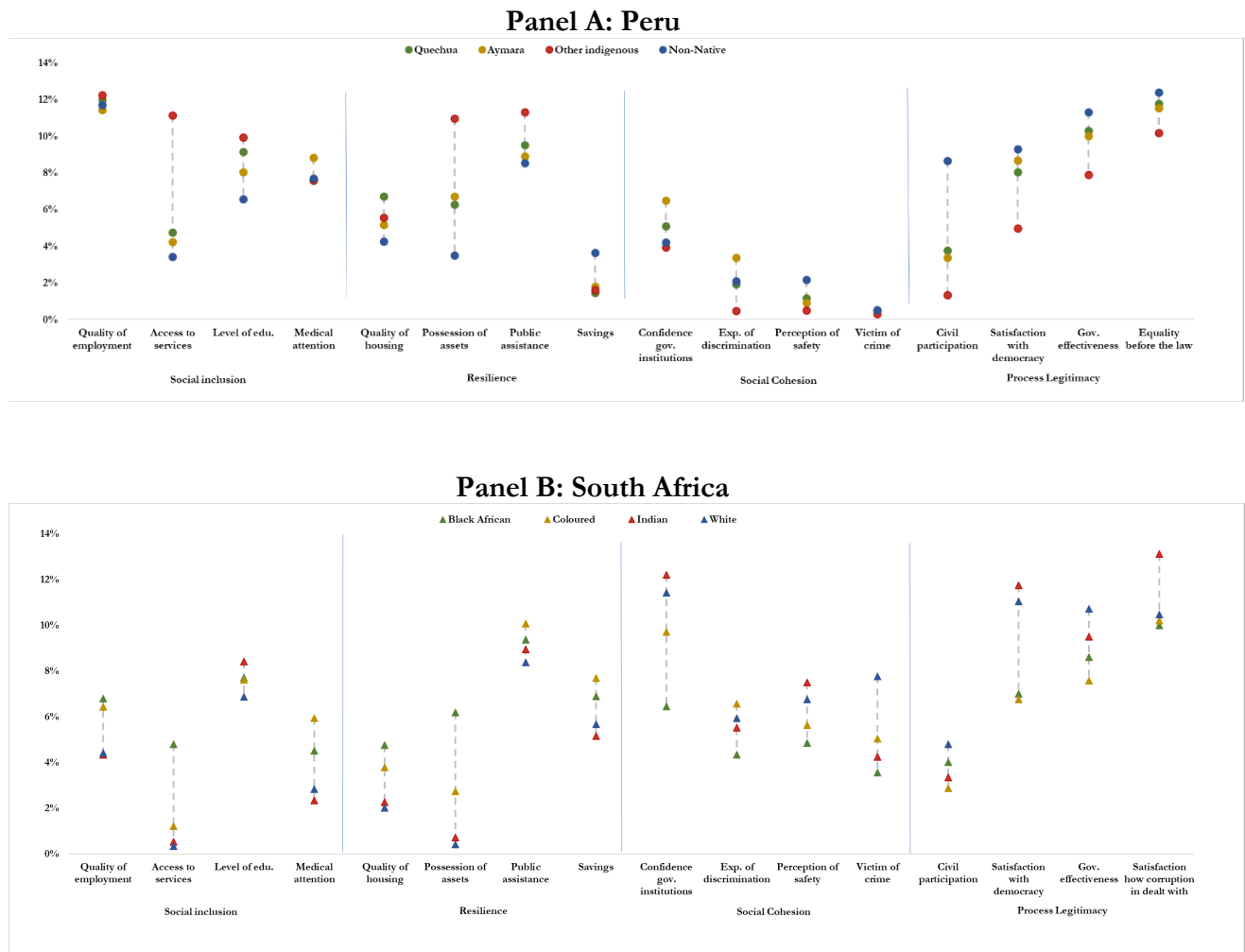Note: Size of the bubble denotes population size.

Source: authors

Figure 5: Composition of Social Sustainability Index, National Rates

Source: authors

18

Figure 6: Composition of Multidimensional Social Gaps, by Vulnerable Group

Panel A: Peru

Panel B: South Africa

Source: authors

5.3. Reliability and robustness analysis

To conclude the empirical application, we performed reliability and robustness analyses. The reliability analysis aims to assess the accuracy of the 16 indicators used for constructing the SSI. To do so we applied factor analysis and analyzed the factor loadings of each indicator per dimension, as well as the value of the resulting Cronbach Alpha coefficient. We find that each of the four indicators used to measure each dimension are statistically significant and are positively correlated with its respective dimension (construct), this is reflected in high values of Cronbach Alpha coefficient that are above 0.8 in both countries, confirming the accuracy of the indicators used to measure each dimension (Table 5 and Appendix V).

Table 5: Reliability Analysis

Cronbach Alpha Coefficient

	Peru		South Africa	
Dimension	Average interitem covariance	Alpha	Average interitem covariance	Alpha
Social Inclusion	0.08	0.87	0.03	0.81
Resilience	0.08	0.85	0.04	0.80
Social Cohesion	0.02	0.83	0.02	0.85
Process Legitimacy	0.05	0.79	0.02	0.88

Factor analysis: loadings

Dimension	Indicators	Peru	South Africa
Social Inclusion	Quality of employment	0.17*** (0)	0.35*** (0)
	Access to water, sanitation, electricity & internet	0.78*** (0)	0.6*** (0)
	Level of education	0.76*** (0)	0.46*** (0)
	Medical attention	0.71*** (0)	0.58*** (0)
Resilience	Quality of housing	0.79*** (0)	0.69*** (0)
	Posession of assets	-0.05*** (0)	0.79*** (0)
	Public assistance	0.86*** (0)	0.39*** (0)
	Capacity for saving	0.53*** (0)	0.47*** (0)
Social Cohesion	Confidence in government institutions	0.52*** (0.01)	0.66*** (0)
	Experience of discrimination	-0.19*** (0.01)	0.12*** (0.01)
	Perception of safety	0.19*** (0.01)	0.35*** (0)
	Victim of crime	0.12*** (0.01)	0.16*** (0.01)
Process Legitimacy	Civil participation	0.56*** (0)	0.08*** (0.01)
	Satisfaction with democracy	0.42*** (0.01)	0.74*** (0)
	Government effectiveness	0.7*** (0.01)	0.52*** (0)
	Equality before the law (PE) / Satisfaction with the way corruption is combatted	0.27*** (0.01)	0.52*** (0)
Number of observations		45881	2885
Log-likelihood		-966870.93	-61074.971
LR test of model vs. Saturated		32107.30***	5222.04***

The robustness analysis aims to assess the sensitivity of results to changes in parameters. We consider four scenarios: i) changes in the cross-dimensional threshold, ii) changes in the definition of indicators, iii) changes in weights, and iv) changes in the number of indicators per dimension, and analyze the changes using dominance analysis and rank correlation.

Scenario 1: Changes in the cross-dimensional threshold

Figure 7 reports the incidence, intensity, and social sustainability rates for each possible cutoff point in Peru and South Africa. As expected, incidence rates decrease, intensity rates increase, and the Social Sustainability Index decreases as cutoff points become more stringent. That is, the higher is the number of indicators required to identify a person as experiencing multiple social gaps, the lower the incidence, while its intensity will increase. The robustness analysis also shows that such changes are not linear. In Peru, incidence declines slowly for cutoff points lower than 40 percent, declines more markedly up to a 60 percent cutoff point, and then stabilizes regardless of increases in cutoff points (Figure 7, panel A). Intensity in Peru also follows a nonlinear pattern. It increases slowly up to the 45 percent cutoff point to then increase markedly across the rest of the cutoff points. The resulting Social Sustainability Index rates in Peru follow a nonlinear pattern as

well. Those patterns are similar in South Africa, confirming that greater metrics result from more stringent cross-dimensional cut-offs.

Figure 7: Robustness Curves
Incidence, Intensity and SSI rates for Varying Cross-Dimensional Thresholds
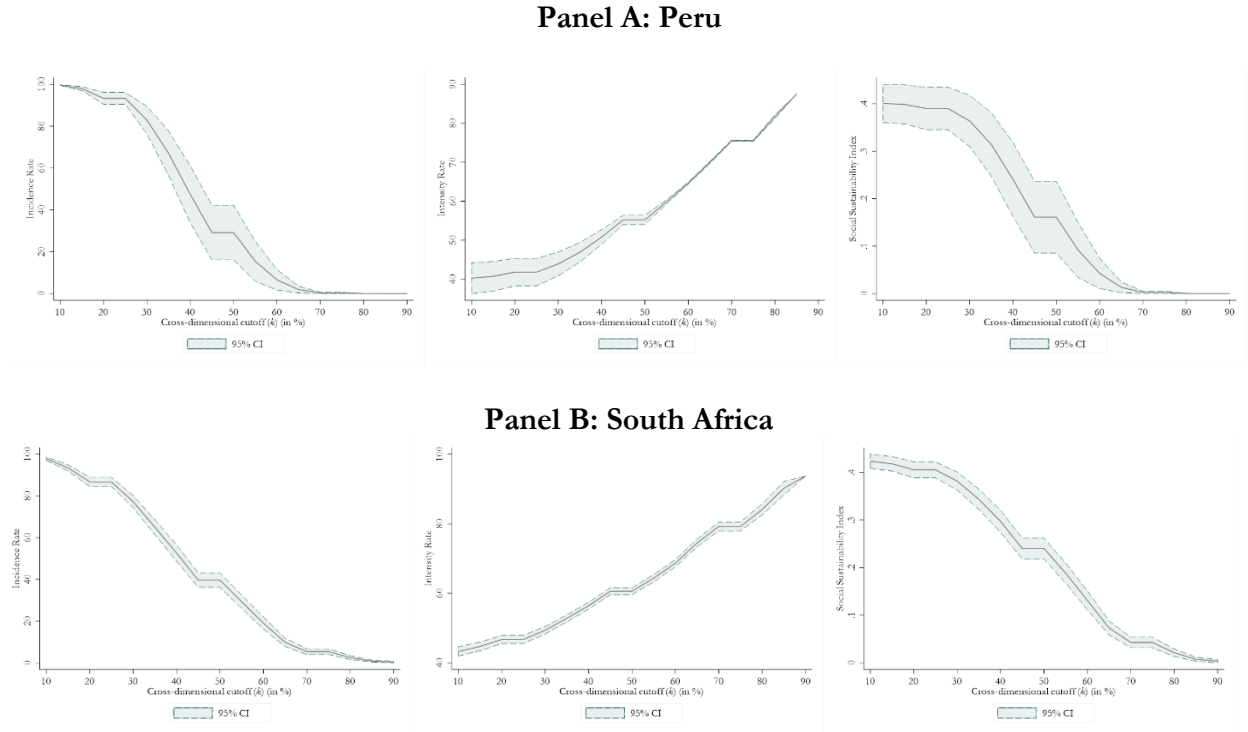
Panel A: Peru

Panel B: South Africa

Note: Solid lines denote point estimates, and dashed lines denote 95 percent confidence intervals.

When these curves are unpacked by gender or ethnicity, the nonlinearity remains. Figures 8 and 9 confirm these findings[13] for gender and ethnicity, respectively.[14] The curves also confirm the gender gaps found with a cross-dimensional threshold of 33 percent, with prominent gender gaps in South Africa but not in Peru. Similarly, the curves reaffirm the ethnic disparities in Peru and South Africa, with Indigenous groups and Black populations faring much worse in terms of exclusion vis-à-vis non-native or White groups respectively.

Finally, we also performed robustness analysis for the composition of multidimensional poverty using a 50 percent cross-dimensional threshold. The results are reported in Appendix III and confirm the main driver of exclusion reported using the 33 percent threshold: process legitimacy.

Figure 8: Robustness Curves, by Gender
Incidence, Intensity and SSI rates for Varying Cross-Dimensional Thresholds
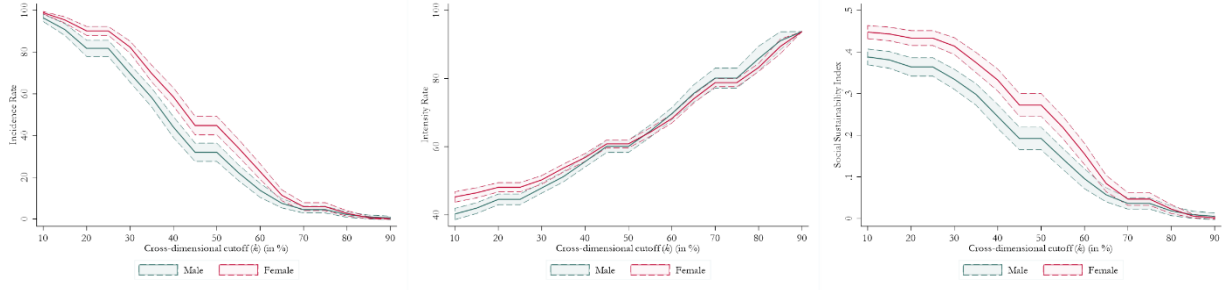**Panel A: Peru**

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[13] Appendix II provides detailed metrics for a cutoff point of 50 percent, as well as the distribution of the exclusion score where we observe that beyond a cutoff point of 60 percent there is almost no exclusion.
[14] Figure 9 reports the robustness curves for Indigenous vs non-native groups in Peru, and Black vs White groups in South Africa. The curves for the remaining groups are reported in Appendix IV.
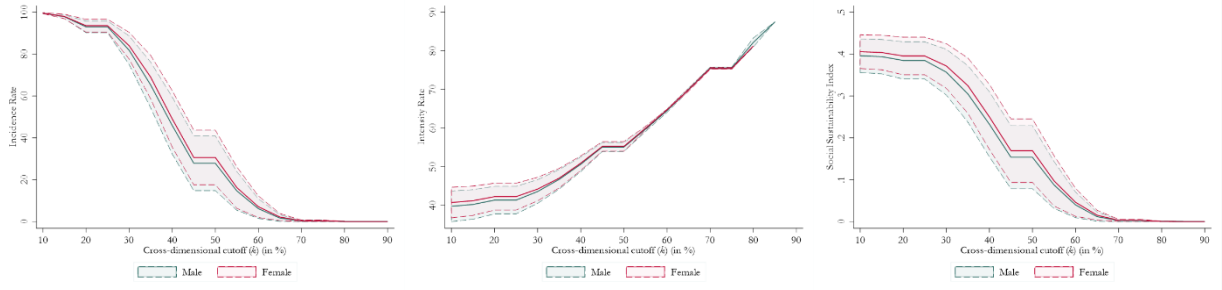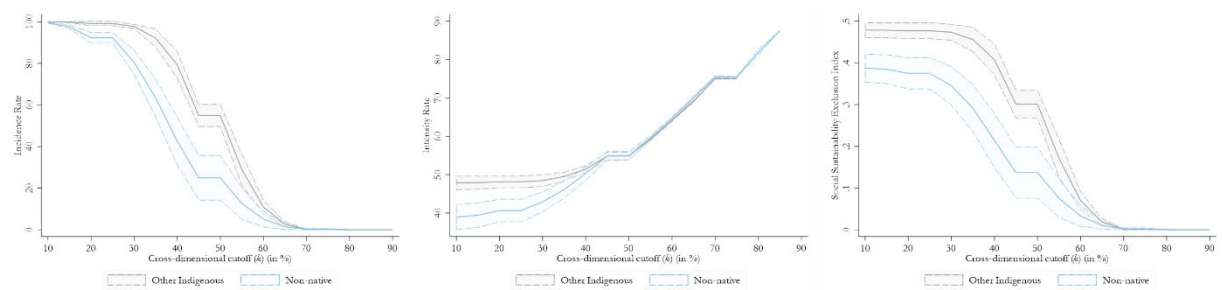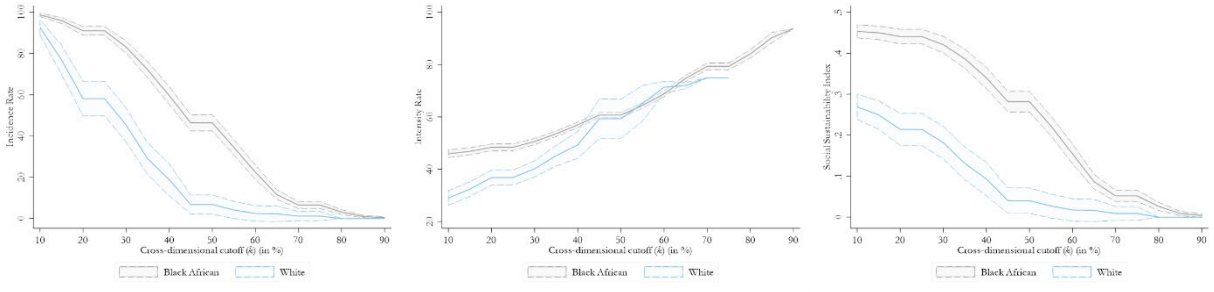
Panel B: South Africa

Note: Solid lines denote point estimates, and dashed lines denote 95 percent confidence intervals.

Figure 9: Robustness Curves, by Ethnicity
Incidence, Intensity and SSI rates for Varying Cross-Dimensional Thresholds
Panel A: Peru

Panel B: South Africa

Note: Solid lines denote point estimates, and dashed lines denote 95 percent confidence intervals.
Source: authors

Scenarios 2 to 4: Changes in the definitions of indicators, weights and number of indicators per dimension

Table 6 and Appendix VI report the rank correlation and dominance analysis results for changes in the definition of indicators, weights and number of indicators of indicators per dimension. We see that the profiling of results reported previously are robust to changes in each of these three parameters in both countries as indicated by the values of the Spearman and Kendall tau-b coefficients of 0.8 or greater. Dominance analysis shows full dominance for changes in the definition of the indicator in Peru, and partial dominance for changes in weights and number of indicators per dimension in both countries. This result is expected as dominance is a very stringent criteria for assessing robustness as it requires to conclude on the basis of the entire domain for each metric.

Table 6: Scenarios of Sensitivity Analysis

Panel A: Peru

	Scenario	Rank correlation (k=33%)			Dominance	
		H	A	M0	Partial	Full
Change in the definition of indicators	Indicator considered "Level of education". Baseline is complete secondary education. Alternative is complete primary education.	0.98***	0.98***	0.99***		X
Changes in weights: 1 dimension gets 40% all others 20%	Weight of Social Inclusion 40%, all others 20%.	0.93***	0.95***	0.96***	X	
	Weight of Resilience 40%, all others 20%.	0.92***	0.85***	0.9***	X	
	Weight of Social Cohesion 40%, all others 20%.	0.85***	0.65***	0.85***	X	
	Weight of Process Legitimacy 40%, all others 20%.	0.24	0.35*	0.29	X	
Changes in the number of indicators per dimension. We drop one indicator at a time: from 4 to 3 indicators.	Quality of employment dropped; weights reassigned from 1/16 to 1/12.	0.94***	0.97***	0.98***	X	
	Access to water, sanitation, electricity & internet dropped; weights reassigned from 1/16 to 1/12.	0.91***	0.89***	0.95***	X	
	Level of education dropped; weights reassigned from 1/16 to 1/12.	0.95***	0.93***	0.98***	X	
	Medical attention dropped; weights reassigned from 1/16 to 1/12.	0.93***	0.98***	0.96***	X	
	Quality of housing dropped; weights reassigned from 1/16 to 1/12.	0.95***	0.77***	0.98***	X	
	Possession of assets dropped; weights reassigned from 1/16 to 1/12.	0.93***	0.82***	0.97***	X	
	Public assistance dropped; weights reassigned from 1/16 to 1/12.	0.89***	0.93***	0.94***	X	
	Capacity for saving dropped; weights reassigned from 1/16 to 1/12.	0.92***	0.86***	0.94***	X	
	Confidence in government institutions dropped; weights reassigned from 1/16 to 1/12.	0.96***	0.94***	0.97***	X	
	Experience of discrimination dropped; weights reassigned from 1/16 to 1/12.	0.96***	0.98***	0.97***	X	
	Perception of safety dropped; weights reassigned from 1/16 to 1/12.	0.95***	0.98***	0.97***	X	
	Victim of crime dropped; weights reassigned from 1/16 to 1/12.	0.94***	0.98***	0.97***	X	
	Civil participation dropped; weights reassigned from 1/16 to 1/12.	0.94***	0.92***	0.93***	X	
	Satisfaction with democracy dropped; weights reassigned from 1/16 to 1/12.	0.95***	0.9***	0.95***	X	
	Government effectiveness dropped; weights reassigned from 1/16 to 1/12.	0.95***	0.91***	0.96***	X	
	Equality before the law dropped; weights reassigned from 1/16 to 1/12.	0.96***	0.88***	0.95***	X	

[1]Statistical significance levels: *p<0.1, **p<0.05, ***p<0.01. Spearman's rank correlation coefficients are used throughout.

Panel B: South Africa

Scenario		Rank correlation (k=33%)			Dominance	
		H	A	M0	Partial	Full
Change in the definition of indicators	Indicator considered "Level of education". Baseline is complete secondary education. Alternative is complete primary education.	0.93***	1***	0.97***	X	
Changes in weights: 1 dimension gets 40% all others 20%	Weight of Social Inclusion 40%, all others 20%.	0.98***	0.9***	0.93***	X	
	Weight of Resilience 40%, all others 20%.	0.97***	0.95***	0.93***	X	
	Weight of Social Cohesion 40%, all others 20%.	0.85***	0.98***	0.97***	X	
	Weight of Process Legitimacy 40%, all others 20%.	0.95***	0.93***	0.98***	X	
Changes in the number of indicators per dimension. We drop one indicator at a time: from 4 to 3 indicators.	Quality of employment dropped; weights reassigned from 1/16 to 1/12.	0.98***	0.98***	0.97***	X	
	Access to water, sanitation, electricity & internet dropped; weights reassigned from 1/16 to 1/12.	0.97***	0.92***	0.95***	X	
	Level of education dropped; weights reassigned from 1/16 to 1/12.	0.97***	1***	0.95***	X	
	Medical attention dropped; weights reassigned from 1/16 to 1/12.	0.97***	0.93***	0.93***	X	
	Quality of housing dropped; weights reassigned from 1/16 to 1/12.	0.92***	0.97***	0.93***	X	
	Possession of assets dropped; weights reassigned from 1/16 to 1/12.	0.92***	0.93***	1***	X	
	Public assistance dropped; weights reassigned from 1/16 to 1/12.	0.97***	1***	0.98***	X	
	Capacity for saving dropped; weights reassigned from 1/16 to 1/12.	0.97***	0.97***	0.92***	X	
	Confidence in government institutions dropped; weights reassigned from 1/16 to 1/12.	0.97***	0.98***	0.98***	X	
	Experience of discrimination dropped; weights reassigned from 1/16 to 1/12.	0.92***	0.93***	0.98***	X	
	Perception of safety dropped; weights reassigned from 1/16 to 1/12.	0.97***	0.95***	0.98***	X	
	Victim of crime dropped; weights reassigned from 1/16 to 1/12.	0.97***	0.92***	0.98***	X	
	Civil participation dropped; weights reassigned from 1/16 to 1/12.	0.92***	0.95***	0.98***	X	
	Satisfaction with democracy dropped; weights reassigned from 1/16 to 1/12.	0.92***	0.98***	0.93***	X	
	Government effectiveness dropped; weights reassigned from 1/16 to 1/12.	0.93***	0.92***	0.98***	X	
	Equality before the law dropped; weights reassigned from 1/16 to 1/12.	1***	1***	0.98***	X	

[1]Statistical significance levels: *p<0.1, **p<0.05, ***p<0.01. Spearman's rank correlation coefficients are used throughout.

6. Discussion and Conclusions

Our multidimensional assessment of social sustainability in Peru and South Africa shows that on average 67 percent and 65 percent of the Peruvian and South African population, respectively, experience overlapping social gaps—defined as experiencing gaps in least a third of the social dimensions considered. These rates are much higher than their official income poverty rates of 30 and 57 percent, respectively.[15] These people experience an intensity rate of 47 percent in Peru and 53 percent in South Africa, equivalent to 7 and 8 indicators, respectively. Women are especially affected in South Africa, but much less so in Peru. Ethnic populations experience greater levels of social gaps in both countries. Geographically, we find that South African provinces show greater disparities compared to departments in Peru. Our analysis also shows that these findings are robust to changes in the cross-dimensional threshold, confirming patterns of multiple social gaps by gender and ethnicity as well as the drivers found with the 33 percent threshold.

Our measurement approach has several limitations. First, current microdata sources at the individual and household levels fail to provide rich evidence for all of the dimensions of social sustainability. While most household surveys provide a comprehensive diagnostic of access to markets and services, they fail to simultaneously capture issues of trust, satisfaction, participation, and accountability; South Africa and Peru are rare exceptions where comprehensive datasets are collected. Hence, even though the mechanics of constructing the index are replicable across countries, the choice of indicators and the composition of the Social Sustainability Index will inevitably vary based on data availability. Second, some of the most vulnerable population groups remain virtually invisible to household surveys. This is notoriously the case of LGBTI people and irregular migrants. Other disadvantaged population groups in terms of race, ethnicity or disability are more frequently identified in standard household surveys, but their sampling is typically not designed to be statistically representative. Addressing such challenges requires huge efforts in harmonizing national household surveys worldwide; expanding the number and scope of questions typically collected by censuses; and improving sampling methods for household surveys.

Yet challenges in defining social sustainability do not automatically mean that measuring multiple social gaps is impossible. Moves towards more inclusive and harmonized data are already underway. Some examples include the Integrated Public Use Microdata Series managed by the Minnesota Population Center; the development of disability statistics suitable for census and national surveys by the Washington Group; efforts by the World Bank's Global Monitoring Database to produce comparable poverty statistics worldwide; or the Inclusive Data Charter sponsored by the UN. Similar methodological challenges have been overcome in the past: witness systems that monitor global food prices and warn of acute food insecurity; the internationally agreed system of national accounts; definitions and measurement of decent work; or international statistics on crime and justice. Clearly, greater and better-coordinated efforts are still needed before we can measure social sustainability at a granular level and on a global scale. But both previous and current experiences offer lessons about the value of concerted action, arriving at technical agreements, operationalizing monitoring, and using data for effective policy making.

In the meantime, national estimates of multidimensional social sustainability and its fragilities in the form of social gaps, as produced here for South Africa and Peru, still provide impactful findings for policy makers. Threats to social sustainability are driven primarily by process legitimacy in both countries. These results not only confirm the multidimensional nature of social sustainability, but also the need for intervention packages separate from other policies related to poverty reduction,

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[15] Official reports in Peru come from INEI (2022) and in South Africa from STATSSA (2022).

consumption smoothing or human capital accumulation. For example, policies aimed at alleviating poverty might overlook the non-poor who are nevertheless multiply excluded. Such groups can be large: 21 and 57 percent of the entire population in South Africa and Peru, respectively, are non-monetarily poor yet experiencing social gaps multidimensionally. While some interventions might reduce poverty and social gaps simultaneously (such as broadening access to labor, financial and land markets and the coverage and quality of basic services), others will not do so automatically or to the same extent.

For example, cash or in-kind transfers proven to successfully increase consumption and smooth its volatility among the extremely poor will probably be less effective in reducing multiple social gaps due to lack of voice. Conversely, improving access to political, civic, physical and digital spaces might reduce social gaps and improve social sustainability without necessarily reducing monetary poverty immediately. Making political institutions more familiar and closer to citizens, reducing the bureaucratic costs of participation in civic or political events, or strengthening crime prevention might all boost political and civic participation, help control corruption and increase vulnerable groups' empowerment, while not directly leading to an immediate reduction in monetary poverty.

Moreover, our findings underscore that distinctive intervention packages are needed to address distinctive sources of social sustainability While some drivers of eroding social sustainability—such as discriminatory laws, social norms, weak institutions, and recurrent crises—may be familiar to all excluded groups, some excluded populations might disproportionally suffer from different dominant drivers. For example, exclusion due to GBV or forced displacement requires a package of interventions that might not prove effective in tackling exclusion due to long-term unemployment, or lack of access to health or financial services. Well-designed residence permits might be a powerful policy instrument for integrating refugees: as suggested by proponents of full residence permits for Venezuelan migrants in Colombia (Bahar, Ibañez, and Rozo 2021). Yet when addressing the exclusion of vulnerable groups from political spaces, quotas might be more effective: as argued by advocates of Canada's 50-30 Challenge to ensure gender parity and at least 30 percent representation of under-represented groups in senior management positions (Government of Canada 2023). Put simply, the mantra of "one size does not fit all" should guide the design of policies to combat multidimensional social gaps in all its forms: a diversity and complexity that can be revealed by a multidimensional, rigorous, adaptable and widely applicable Social Sustainability Index.

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Appendices

Appendix I.1: Social Sustainability Index, Incidence and Intensity rates
Cross-dimensional Cutoff at 50%

Panel A: Peru

Metric[a]	National	Gender			Ethnicity						
		Male	Female	T-test[b]	Quechua	T-test[b]	Aymara	T-test[b]	Indigenous	T-test[b]	Non-Native
Incidence rate (H)	29%	28%	31%	***	43%	***	51%	***	55%	***	25%
	(0.07)	(0.07)	(0.07)		(0.07)		(0.09)		(0.03)		(0.05)
Intensity rate (A)	55%	55%	55%	n.s.	56%	***	58%	***	55%	n.s.	55%
	(0.01)	(0.01)	(0.01)		(0.01)		(0.01)		(0.01)		(0.01)
Social Sustainability index (SSI)	0.16	0.15	0.17	***	0.24	***	0.29	***	0.3	***	0.14
	(0.04)	(0.04)	(0.04)		(0.04)		(0.05)		(0.02)		(0.03)

(a) For each metric we report the point estimate and its standard errors(in parentheses).

(b) To assess difference between groups we perfomed t-tests. The baseline category for ethnicity is non-native. ***, **, * denote statistically significant differences between groups at 1%, 5% and 10% levels respectively. n.s denotes non-statistical significance.

Panel B: South Africa

Metric[a]	National	Gender			Ethnicity						
		Male	Female	T-test[b]	Black African	T-test[b]	Coloured	T-test[b]	Indian	T-test[b]	White
Incidence rate (H)	40%	32%	45%	***	46%	***	24%	***	15%	***	7%
	(0.02)	(0.02)	(0.02)		(0.02)		(0.04)		(0.02)		(0.02)
Intensity rate (A)	61%	60%	61%	n.s.	61%	***	59%	***	56%	***	59%
	(0)	(0.01)	(0.01)		(0.01)		(0.01)		(0.01)		(0.04)
Social Sustainability index (SSI)	0.24	0.19	0.27	***	0.28	***	0.14	***	0.08	***	0.04
	(0.01)	(0.01)	(0.01)		(0.01)		(0.02)		(0.01)		(0.02)

(a) For each metric we report the point estimate and its standard errors(in parentheses).

(b) To assess difference between groups we perfomed t-tests. The baseline category for ethnicity is white. ***, **, * denote statistically significant differences between groups at 1%, 5% and 10% levels respectively. n.s denotes non-statistical significance.

Appendix I.2: Distribution of the Exclusion Score

Panel A: Peru
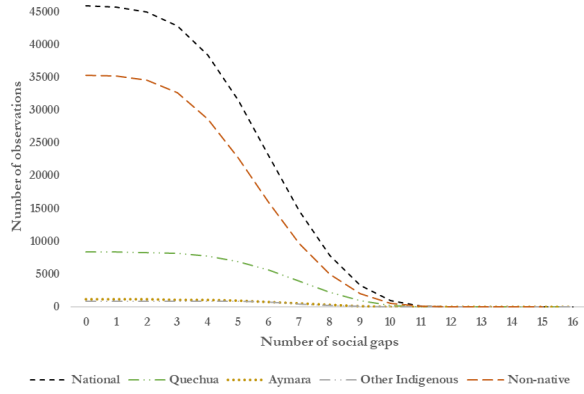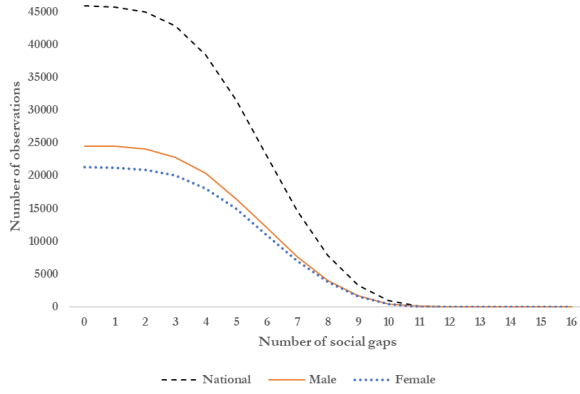
Panel B: South Africa
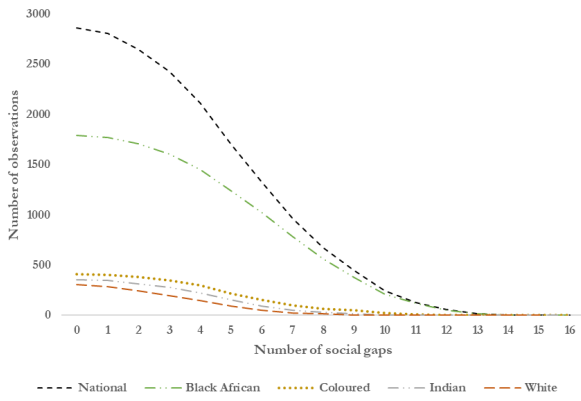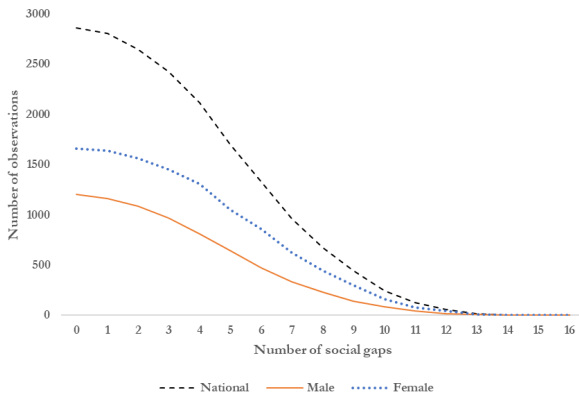
Appendix II : Composition of Multidimensional Social-Gaps

Panel A: Peru
A.1: Cross-dimensional cutoff at 33%

	Group	Indicators															
		Quality of employment	Access to basic services	Level of education	Medical attention	Quality of housing	Possession of assets	Public assistance	Capacity for saving	Confidence on government institutions	Experience of discrimination	Perception of safety	Victim of crime	Civil participation	Satisfaction with democracy	Government effectiveness	Equality before the law
National		11.8%	3.9%	7.2%	7.7%	4.9%	4.3%	8.8%	3.1%	4.5%	2.1%	1.9%	0.5%	7.3%	8.9%	11%	12.2%
		(0.1%)	(1.2%)	(0.9%)	(0.2%)	(1.4%)	(1.4%)	(0.8%)	(0.4%)	(0.2%)	(0.5%)	(0.6%)	(0.1%)	(1.7%)	(0.9%)	(0.8%)	(0.5%)
Gender	Male	11.5%	4.1%	6.7%	7.9%	5%	4.5%	8.7%	3.1%	4.5%	2%	1.9%	0.5%	7.2%	9%	11%	12.3%
		(0.2%)	(1.2%)	(0.9%)	(0.2%)	(1.4%)	(1.4%)	(0.8%)	(0.4%)	(0.2%)	(0.4%)	(0.6%)	(0.1%)	(1.7%)	(1%)	(0.8%)	(0.5%)
	Female	12%	3.6%	7.8%	7.5%	4.7%	4.2%	8.9%	3.1%	4.4%	2.2%	1.9%	0.5%	7.3%	8.8%	11%	12.1%
		(0.1%)	(1.1%)	(0.9%)	(0.2%)	(1.4%)	(1.4%)	(0.8%)	(0.4%)	(0.2%)	(0.5%)	(0.6%)	(0.1%)	(1.6%)	(0.9%)	(0.7%)	(0.5%)
Ethnicity	Quechua	12%	4.8%	9.2%	7.6%	6.7%	6.3%	9.5%	1.5%	5.1%	1.9%	1.2%	0.5%	3.8%	8%	10.3%	11.8%
		(0.1%)	(1.3%)	(0.3%)	(0.3%)	(1.3%)	(1.2%)	(0.6%)	(0.3%)	(0.4%)	(0.4%)	(0.5%)	(0.1%)	(1.5%)	(0.8%)	(0.6%)	(0.4%)
	Aymara	11.4%	4.2%	8.1%	8.8%	5.2%	6.7%	8.9%	1.8%	6.5%	3.4%	0.9%	0.5%	3.4%	8.7%	10%	11.5%
		(0.2%)	(1.4%)	(0.3%)	(0.3%)	(1.7%)	(1.1%)	(0.5%)	(0.5%)	(0.4%)	(0.2%)	(0.4%)	(0.2%)	(1.7%)	(0.5%)	(0.5%)	(0.4%)
	Other Indigenous	12.3%	11.1%	9.9%	7.6%	5.6%	11%	11.3%	1.6%	3.9%	0.5%	0.5%	0.3%	1.3%	5%	7.9%	10.2%
		(0.2%)	(0.5%)	(0.4%)	(0.3%)	(0.5%)	(0.6%)	(0.1%)	(0.5%)	(0.4%)	(0.1%)	(0.2%)	(0.2%)	(0.5%)	(0.2%)	(0.2%)	(0.1%)
	Non-native	11.7%	3.4%	6.6%	7.7%	4.3%	3.5%	8.5%	3.7%	4.2%	2.1%	2.2%	0.5%	8.7%	9.3%	11.3%	12.4%
		(0.1%)	(1%)	(0.9%)	(0.2%)	(1.2%)	(1.2%)	(0.8%)	(0.3%)	(0.2%)	(0.5%)	(0.6%)	(0.1%)	(1.4%)	(0.9%)	(0.7%)	(0.5%)

A.2: Cross-dimensional cutoff at 50%

	Group	Indicators															
		Quality of employment	Access to basic services	Level of education	Medical attention	Quality of housing	Possession of assets	Public assistance	Capacity for saving	Confidence on government institutions	Experience of discrimination	Perception of safety	Victim of crime	Civil participation	Satisfaction with democracy	Government effectiveness	Equality before the law
National		10.9%	5.2%	8.2%	7.9%	6.4%	6%	8.9%	3.1%	4.9%	2.2%	1.5%	0.5%	5.7%	8%	9.8%	10.7%
		(0%)	(1.1%)	(0.6%)	(0.1%)	(1.2%)	(1.3%)	(0.4%)	(0.5%)	(0.2%)	(0.6%)	(0.5%)	(0.1%)	(1.4%)	(0.6%)	(0.4%)	(0.2%)
Gender	Male	10.8%	5.5%	7.8%	8%	6.4%	6.2%	8.8%	3.1%	4.9%	2%	1.5%	0.5%	5.7%	8.1%	9.8%	10.8%
		(0.1%)	(1.1%)	(0.6%)	(0.1%)	(1.1%)	(1.2%)	(0.5%)	(0.5%)	(0.2%)	(0.5%)	(0.5%)	(0.1%)	(1.5%)	(0.6%)	(0.4%)	(0.2%)
	Female	11%	4.9%	8.6%	7.7%	6.3%	5.7%	9.1%	3.2%	4.8%	2.4%	1.5%	0.5%	5.8%	8%	9.8%	10.7%
		(0%)	(1.1%)	(0.6%)	(0.2%)	(1.2%)	(1.3%)	(0.3%)	(0.5%)	(0.2%)	(0.6%)	(0.4%)	(0.1%)	(1.4%)	(0.6%)	(0.4%)	(0.2%)
Ethnicity	Quechua	11%	5.9%	9.2%	8.1%	7.5%	7.3%	9.2%	1.5%	5.4%	2.1%	1%	0.5%	3.1%	7.8%	9.7%	10.7%
		(0.1%)	(1.2%)	(0.3%)	(0.1%)	(1.1%)	(1%)	(0.5%)	(0.4%)	(0.4%)	(0.5%)	(0.4%)	(0.1%)	(1.3%)	(0.4%)	(0.4%)	(0.2%)
	Aymara	10.7%	5.1%	8.2%	8.7%	6.2%	7.7%	8.8%	1.8%	7.1%	3.5%	0.6%	0.4%	2.6%	8.4%	9.6%	10.4%
		(0.1%)	(1.2%)	(0.1%)	(0.4%)	(1.6%)	(1%)	(0.3%)	(0.5%)	(0.4%)	(0.3%)	(0.3%)	(0.1%)	(1.5%)	(0.4%)	(0.4%)	(0.2%)
	Other Indigenous	11.2%	10.5%	9.6%	7.7%	5.7%	10.2%	10.7%	1.8%	4.8%	0.6%	0.4%	0.3%	1.4%	6%	8.8%	10.3%
		(0.1%)	(0.3%)	(0.3%)	(0.1%)	(0.6%)	(0.5%)	(0.1%)	(0.5%)	(0.5%)	(0.2%)	(0.1%)	(0.2%)	(0.4%)	(0.1%)	(0.4%)	(0.3%)
	Non-native	10.9%	4.8%	7.8%	7.8%	5.9%	5.2%	8.8%	3.9%	4.5%	2.2%	1.8%	0.6%	7.1%	8.2%	9.9%	10.8%
		(0%)	(1%)	(0.6%)	(0.2%)	(1.2%)	(1.3%)	(0.4%)	(0.4%)	(0.3%)	(0.6%)	(0.5%)	(0.1%)	(1.2%)	(0.7%)	(0.4%)	(0.2%)

Panel B: South Africa
B.1: Cross-dimensional cutoff at 33%

	Group	Quality of employment	Access to basic services	Level of education	Medical attention	Quality of housing	Possession of assets	Public assistance	Capacity for saving	Confidence on government institutions	Experience of discrimination	Perception of safety	Victim of crime	Civil participation	Satisfaction with democracy	Government effectiveness	Satisfaction with the way corruption is combatted
	National	6.7%	4.4%	7.7%	4.5%	4.6%	5.7%	9.4%	6.9%	6.9%	4.6%	5%	3.8%	4%	7.2%	8.7%	10.1%
		(0.2%)	(0.3%)	(0.2%)	(0.2%)	(0.2%)	(0.3%)	(0.2%)	(0.3%)	(0.2%)	(0.2%)	(0.3%)	(0.3%)	(0.2%)	(0.2%)	(0.2%)	(0.2%)
Gender	Male	6.2%	4.1%	7.3%	4.7%	4.7%	5.2%	8.7%	6.6%	7.3%	5.4%	4.7%	3.6%	4.7%	7.3%	8.9%	10.4%
		(0.4%)	(0.4%)	(0.3%)	(0.3%)	(0.3%)	(0.4%)	(0.3%)	(0.4%)	(0.4%)	(0.3%)	(0.3%)	(0.4%)	(0.4%)	(0.3%)	(0.3%)	(0.3%)
	Female	6.9%	4.5%	7.9%	4.4%	4.5%	6%	9.7%	7.1%	6.7%	4.1%	5.2%	3.9%	3.6%	7.1%	8.5%	9.9%
		(0.2%)	(0.3%)	(0.2%)	(0.3%)	(0.3%)	(0.3%)	(0.2%)	(0.3%)	(0.3%)	(0.3%)	(0.3%)	(0.3%)	(0.3%)	(0.2%)	(0.2%)	(0.2%)
Ethnicity	Black African	6.8%	4.8%	7.7%	4.5%	4.8%	6.2%	9.4%	6.9%	6.5%	4.4%	4.9%	3.6%	4%	7%	8.6%	10%
		(0.2%)	(0.3%)	(0.2%)	(0.2%)	(0.2%)	(0.3%)	(0.2%)	(0.3%)	(0.2%)	(0.2%)	(0.3%)	(0.3%)	(0.2%)	(0.2%)	(0.2%)	(0.2%)
	Coloured	6.4%	1.2%	7.6%	5.9%	3.8%	2.7%	10.1%	7.7%	9.7%	6.6%	5.6%	5.1%	2.9%	6.8%	7.6%	10.2%
		(0.8%)	(0.4%)	(0.7%)	(0.7%)	(0.7%)	(0.5%)	(0.5%)	(0.6%)	(0.6%)	(0.6%)	(0.7%)	(0.8%)	(0.5%)	(0.7%)	(0.5%)	(0.6%)
	Indian	4.3%	0.5%	8.4%	2.4%	2.3%	0.7%	9%	5.2%	12.2%	5.5%	7.5%	4.3%	3.3%	11.8%	9.5%	13.1%
		(0.5%)	(0.2%)	(0.6%)	(0.4%)	(0.4%)	(0.2%)	(0.5%)	(0.5%)	(0.4%)	(0.5%)	(0.5%)	(0.5%)	(0.5%)	(0.4%)	(0.5%)	(0.3%)
	White	4.4%	0.3%	6.9%	2.8%	2%	0.4%	8.4%	5.7%	11.4%	5.9%	6.8%	7.8%	4.8%	11%	10.7%	10.5%
		(0.8%)	(0.3%)	(1.2%)	(0.7%)	(0.8%)	(0.3%)	(1.1%)	(1.2%)	(1.1%)	(1%)	(1.1%)	(1%)	(1.4%)	(0.7%)	(0.8%)	(1%)

B.2: Cross-dimensional cutoff – 50%

	Group	Quality of employment	Access to basic services	Level of education	Medical attention	Quality of housing	Possession of assets	Public assistance	Capacity for saving	Confidence on government institutions	Experience of discrimination	Perception of safety	Victim of crime	Civil participation	Satisfaction with democracy	Government effectiveness	Satisfaction with the way corruption is combatted
	National	6.8%	4.7%	7.1%	4.8%	5.2%	6.2%	8.7%	7.1%	6.8%	4.4%	5%	3.6%	4.2%	7.5%	8.5%	9.4%
		(0.2%)	(0.3%)	(0.2%)	(0.2%)	(0.2%)	(0.3%)	(0.2%)	(0.3%)	(0.3%)	(0.3%)	(0.3%)	(0.2%)	(0.3%)	(0.2%)	(0.2%)	(0.1%)
Gender	Male	6.2%	4.6%	6.7%	5.2%	5.4%	5.7%	8.1%	6.7%	7%	5.3%	4.9%	3.5%	4.9%	7.5%	8.9%	9.4%
		(0.4%)	(0.5%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.3%)	(0.2%)
	Female	7.1%	4.8%	7.4%	4.6%	5.1%	6.5%	9%	7.2%	6.7%	4%	5%	3.7%	3.8%	7.4%	8.3%	9.4%
		(0.3%)	(0.4%)	(0.3%)	(0.3%)	(0.3%)	(0.4%)	(0.2%)	(0.3%)	(0.3%)	(0.3%)	(0.4%)	(0.3%)	(0.3%)	(0.3%)	(0.3%)	(0.2%)
Ethnicity	Black African	6.8%	5%	7.1%	4.8%	5.2%	6.5%	8.7%	7%	6.6%	4.3%	4.8%	3.5%	4.2%	7.4%	8.5%	9.4%
		(0.2%)	(0.4%)	(0.2%)	(0.3%)	(0.3%)	(0.3%)	(0.2%)	(0.3%)	(0.3%)	(0.3%)	(0.3%)	(0.2%)	(0.3%)	(0.2%)	(0.2%)	(0.2%)
	Coloured	5.9%	1.2%	7.2%	5.4%	5.1%	3.1%	9.3%	8.5%	8.3%	5.9%	6.8%	5.1%	3.3%	7.1%	8.6%	9%
		(1.1%)	(0.5%)	(0.8%)	(1%)	(1%)	(0.7%)	(0.5%)	(0.5%)	(0.6%)	(0.9%)	(0.7%)	(1%)	(0.9%)	(0.9%)	(0.5%)	(0.5%)
	Indian	4.8%	0.4%	7.9%	2.9%	2.9%	0.8%	9.1%	6%	10.1%	6.2%	8.9%	5.4%	4.5%	10.1%	8.9%	11.2%
		(0.7%)	(0.2%)	(0.7%)	(0.7%)	(0.7%)	(0.4%)	(0.6%)	(0.8%)	(0.4%)	(0.7%)	(0.6%)	(0.8%)	(0.8%)	(0.5%)	(0.6%)	(0.2%)
	White	6.9%	0.8%	8.3%	4%	5.2%	1%	7.7%	7.2%	10.3%	5.1%	7.1%	7.5%	2.3%	9%	8%	9.6%
		(0.8%)	(0.8%)	(0.8%)	(0.9%)	(1.3%)	(0.9%)	(1%)	(1.1%)	(0.6%)	(1%)	(1.2%)	(1%)	(1.3%)	(0.8%)	(1%)	(0.8%)

Panel A: Peru

4

| Dimension	Indicator	Quechua [a] 33% Est./SE	T-test	Quechua 50% Est./SE	T-test	Quechua 75% Est./SE	T-test	Aymara [a] 33% Est./SE	T-test	Aymara 50% Est./SE	T-test	Aymara 75% Est./SE	T-test	Other Indigenous [a] 33% Est./SE	T-test	Other Indigenous 50% Est./SE	T-test	Other Indigenous 75% Est./SE	T-test	Non-Native 33% Est./SE	Non-Native 50% Est./SE	Non-Native 75% Est./SE
Social Inclusion — Access to labour markets	Quality of employment	12% (0.1%)	***	11% (0.1%)	***	8.3% (0%)	***	11.4% (0.2%)	***	10.7% (0.1%)	***	8.2% (0.1%)	***	12.3% (0.2%)	***	11.2% (0.1%)	***	8.3% (0%)	***	11.7% (0.1%)	10.9% (0%)	8.2% (0.1%)
Social Inclusion — Access to basic services	Access to basic services	4.8% (1.3%)	***	5.9% (1.2%)	***	5.8% (1.2%)	***	4.2% (1.4%)	***	5.1% (1.2%)	***	6% (1.4%)	***	11.1% (0.5%)	***	10.5% (0.3%)	***	8.3% (0%)	***	3.4% (1%)	4.8% (1%)	7.4% (0.2%)
Social Inclusion — Access to human capital services	Level of education	9.2% (0.3%)	***	9.2% (0.3%)	***	8.1% (0.1%)	***	8.1% (0.3%)	***	8.2% (0.1%)	***	6.5% (0.3%)	***	9.9% (0.4%)	***	9.6% (0.3%)	***	8.3% (0%)	***	6.6% (0.9%)	7.8% (0.6%)	7.9% (0.2%)
Social Inclusion — Access to human capital services	Medical attention	7.6% (0.3%)	***	8.1% (0.1%)	***	8.2% (0.1%)	***	8.8% (0.3%)	***	8.7% (0.4%)	***	6.5% (1.2%)	***	7.6% (0.3%)	***	7.7% (0.1%)	**	8.3% (0%)	***	7.7% (0.2%)	7.8% (0.2%)	7.4% (0.2%)
Resilience	Quality of housing	6.7% (1.3%)	***	7.5% (1.1%)	***	8% (0.3%)	***	5.2% (1.7%)	***	6.2% (1.6%)	***	7.8% (0.4%)	***	5.6% (0.5%)	***	5.7% (0.6%)	***	8.3% (0%)	***	4.3% (1.2%)	5.9% (1.2%)	7.2% (0.6%)
Resilience	Possession of assets	6.3% (1.2%)	***	7.3% (1%)	***	7% (1.2%)	***	6.7% (1.1%)	***	7.7% (1%)	***	8% (0.3%)	***	11% (0.6%)	***	10.2% (0.5%)	***	8.3% (0%)	***	3.5% (1.2%)	5.2% (1.3%)	7.8% (0.2%)
Resilience	Public assistance	9.5% (0.6%)	***	9.2% (0.5%)	***	7.8% (0.5%)	***	8.9% (0.5%)	***	8.8% (0.3%)	***	8% (0.1%)	***	11.3% (0.1%)	***	10.7% (0.1%)	***	8.3% (0%)	***	8.5% (0.8%)	8.8% (0.4%)	7.6% (0.2%)
Resilience	Capacity for saving	1.5% (0.3%)	***	1.5% (0.4%)	***	3.8% (0.8%)	***	1.8% (0.5%)	***	1.8% (0.5%)	***	3.8% (0.7%)	***	1.6% (0.5%)	***	1.8% (0.5%)	***	8.3% (0%)	***	3.7% (0.3%)	3.9% (0.4%)	5.6% (0.4%)
Social Cohesion	Confidence on government institutions	5.1% (0.4%)	***	5.4% (0.4%)	***	8.1% (0.1%)	***	6.5% (0.4%)	***	7.1% (0.4%)	***	8.2% (0.1%)	***	3.9% (0.4%)	***	4.8% (0.5%)	***	8.3% (0%)	***	4.2% (0.2%)	4.5% (0.3%)	5.1% (1%)
Social Cohesion	Experience of discrimination	1.9% (0.4%)	***	2.1% (0.5%)	***	4.6% (0.6%)	***	3.4% (0.2%)	***	3.5% (0.3%)	***	7.4% (0.3%)	***	0.5% (0.1%)	***	0.6% (0.2%)	***	0% (0%)	***	2.1% (0.5%)	2.2% (0.6%)	3.8% (0.6%)
Social Cohesion	Perception of safety	1.2% (0.5%)	***	1% (0.4%)	***	2.1% (1.6%)	***	0.9% (0.4%)	***	0.6% (0.3%)	***	1% (0.7%)	***	0.5% (0.2%)	***	0.4% (0.1%)	***	0% (0%)	***	2.2% (0.6%)	1.8% (0.5%)	1.5% (0.5%)
Social Cohesion	Victim of crime	0.5% (0.1%)	***	0.5% (0.1%)	***	1.6% (1.1%)	***	0.5% (0.2%)	***	0.4% (0.1%)	***	2.4% (1%)	***	0.3% (0.2%)	***	0.3% (0.2%)	***	0% (0%)	***	0.5% (0.1%)	0.6% (0.1%)	0.6% (0.2%)
Process Legitimacy — Agency and voice	Civil participation	3.8% (1.5%)	***	3.1% (1.3%)	***	3.5% (1%)	***	3.4% (1.7%)	***	2.6% (1.5%)	***	3.4% (1.2%)	***	1.3% (0.5%)	***	1.4% (0.4%)	***	0% (0%)	***	8.7% (1.4%)	7.1% (1.2%)	6.6% (0.4%)
Process Legitimacy — Social accountability	Satisfaction with democracy	8% (0.8%)	***	7.8% (0.4%)	***	7.6% (0.4%)	***	8.7% (0.5%)	***	8.4% (0.4%)	***	8.2% (0.1%)	***	5% (0.2%)	***	6% (0.1%)	***	8.3% (0%)	***	9.3% (0.9%)	8.2% (0.7%)	7% (0.5%)
Process Legitimacy — Social accountability	Government effectiveness	10.3% (0.6%)	***	9.7% (0.4%)	***	8.1% (0.1%)	***	10% (0.5%)	***	9.6% (0.4%)	***	6.4% (1.2%)	***	7.9% (0.2%)	***	8.8% (0.4%)	***	8.3% (0%)	***	11.3% (0.7%)	9.9% (0.4%)	8.2% (0.1%)
Process Legitimacy — Social accountability	Equality before the law	11.8% (0.4%)	***	10.7% (0.2%)	***	7.2% (1.2%)	***	11.5% (0.4%)	***	10.4% (0.2%)	***	8.2% (0.1%)	***	10.2% (0.1%)	***	10.3% (0.3%)	***	8.3% (0%)	***	12.4% (0.5%)	10.8% (0.2%)	8.1% (0.1%)

(a) To assess difference between groups we perfomed t-tests. The baseline category for ethnicity is non-native. ***, **, * denote statistically significant differences between groups at 1%, 5% and 10% levels respectively. n.s denotes non-statistical significance.

Panel B: South Africa

Dimension	Indicator	Black African [a] 33% Est./SE	T-test	50% Est./SE	T-test	75% Est./SE	T-test	Coloured [a] 33% Est./SE	T-test	50% Est./SE	T-test	75% Est./SE	T-test	Indian [a] 33% Est./SE	T-test	50% Est./SE	T-test	75% Est./SE*	T-test	White 33% Est./SE	50% Est./SE	75% Est./SE
Social Inclusion — Access to labour markets	Quality of employment	6.8% (0.2%)	***	6.8% (0.2%)	n.s.	5.3% (0.4%)	***	6.4% (0.8%)	***	5.9% (1.1%)	***	6.3% (0.9%)	***	4.3% (0.5%)	***	4.8% (0.7%)	***	0% (0%)	n.d.	4.4% (0.8%)	6.9% (0.8%)	8.3% (0%)
Social Inclusion — Access to basic services	Access to basic services	4.8% (0.3%)	***	5% (0.4%)	***	6.2% (0.4%)	***	1.2% (0.4%)	***	1.2% (0.5%)	***	4.8% (2.1%)	***	0.5% (0.2%)	***	0.4% (0.2%)	***	0% (0%)	n.d.	0.3% (0.3%)	0.8% (0.8%)	0% (0%)
Social Inclusion — Access to human capital services	Level of education	7.7% (0.2%)	***	7.1% (0.2%)	***	6.6% (0.4%)	***	7.6% (0.7%)	***	7.2% (0.8%)	***	6.3% (0.9%)	***	8.4% (0.6%)	***	7.9% (0.7%)	***	0% (0%)	n.d.	6.9% (1.2%)	8.3% (0.8%)	8.3% (0%)
Social Inclusion — Access to human capital services	Medical attention	4.5% (0.2%)	***	4.8% (0.3%)	***	5.7% (0.4%)	***	5.9% (0.7%)	***	5.4% (1%)	***	7.9% (0.3%)	***	2.4% (0.4%)	***	2.9% (0.7%)	***	0% (0%)	n.d.	2.8% (0.7%)	4% (0.9%)	8.3% (0%)
Resilience	Quality of housing	4.8% (0.2%)	***	5.2% (0.3%)	n.s.	6.4% (0.3%)	***	3.8% (0.7%)	***	5.1% (1%)	n.s.	7.9% (0.3%)	***	2.3% (0.4%)	***	2.9% (0.7%)	***	0% (0%)	n.d.	2% (0.8%)	5.2% (1.3%)	8.3% (0%)
Resilience	Possession of assets	6.2% (0.3%)	***	6.5% (0.3%)	***	7% (0.3%)	***	2.7% (0.5%)	***	3.1% (0.7%)	***	7.9% (0.3%)	***	0.7% (0.2%)	***	0.8% (0.4%)	***	0% (0%)	n.d.	0.4% (0.3%)	1% (0.9%)	0% (0%)
Resilience	Public assistance	9.4% (0.2%)	***	8.7% (0.2%)	***	7.3% (0.2%)	***	10.1% (0.5%)	***	9.3% (0.5%)	***	7.9% (0.3%)	***	9% (0.5%)	**	9.1% (0.6%)	***	0% (0%)	n.d.	8.4% (1.1%)	7.7% (1%)	8.3% (0%)
Resilience	Capacity for saving	6.9% (0.3%)	***	7% (0.3%)	***	7% (0.2%)	***	7.7% (0.6%)	***	8.5% (0.5%)	***	5.9% (1.6%)	***	5.2% (0.5%)	***	6% (0.8%)	***	0% (0%)	n.d.	5.7% (1.2%)	7.2% (1.1%)	8.3% (0%)
Social Cohesion	Confidence on government institutions	6.5% (0.2%)	***	6.6% (0.3%)	***	6.8% (0.3%)	***	9.7% (0.6%)	***	8.3% (0.6%)	***	7.9% (0.3%)	***	12.2% (0.4%)	***	10.1% (0.4%)	***	0% (0%)	n.d.	11.4% (1.1%)	10.3% (0.6%)	8.3% (0%)
Social Cohesion	Experience of discrimination	4.4% (0.2%)	***	4.3% (0.3%)	***	4.7% (0.4%)	***	6.6% (0.6%)	***	5.9% (0.9%)	***	3.5% (1.7%)	***	5.5% (0.5%)	***	6.2% (0.7%)	***	0% (0%)	n.d.	5.9% (1%)	5.1% (1%)	0% (0%)
Social Cohesion	Perception of safety	4.9% (0.3%)	***	4.8% (0.3%)	***	5.9% (0.4%)	***	5.6% (0.7%)	***	6.8% (0.7%)	***	4.7% (1.4%)	***	7.5% (0.5%)	***	8.9% (0.6%)	***	0% (0%)	n.d.	6.8% (1.1%)	7.1% (1.2%)	8.3% (0%)
Social Cohesion	Victim of crime	3.6% (0.3%)	***	3.5% (0.2%)	***	4% (0.4%)	***	5.1% (0.8%)	***	5.1% (1%)	***	2.8% (1.8%)	***	4.3% (0.5%)	***	5.4% (0.8%)	***	0% (0%)	n.d.	7.8% (1%)	7.5% (1%)	8.3% (0%)
Process Legitimacy — Agency and voice	Civil participation	4% (0.2%)	***	4.2% (0.3%)	***	5% (0.5%)	***	2.9% (0.5%)	***	3.3% (0.9%)	***	2.8% (1.8%)	***	3.3% (0.5%)	***	4.5% (0.8%)	***	0% (0%)	n.d.	4.8% (1.4%)	2.3% (1.3%)	0% (0%)
Process Legitimacy — Social accountability	Satisfaction with democracy	7% (0.2%)	***	7.4% (0.2%)	***	7.2% (0.3%)	***	6.8% (0.7%)	***	7.1% (0.9%)	***	7.9% (0.3%)	***	11.8% (0.4%)	***	10.1% (0.5%)	***	0% (0%)	n.d.	11% (0.7%)	9% (0.8%)	8.3% (0%)
Process Legitimacy — Social accountability	Government effectiveness	8.6% (0.2%)	***	8.5% (0.2%)	***	7.3% (0.2%)	***	7.6% (0.5%)	***	8.6% (0.5%)	***	7.9% (0.3%)	***	9.5% (0.5%)	***	8.9% (0.6%)	***	0% (0%)	n.d.	10.7% (0.8%)	8% (1%)	8.3% (0%)
Process Legitimacy — Social accountability	Satisfaction with the way corruption is combatted	10% (0.2%)	***	9.4% (0.2%)	***	7.6% (0.1%)	***	10.2% (0.6%)	***	9% (0.5%)	***	7.9% (0.3%)	***	13.1% (0.3%)	***	11.2% (0.2%)	***	0% (0%)	n.d.	10.5% (1%)	9.6% (0.8%)	8.3% (0%)

(a) To assess difference between groups we perfomed t-tests. The baseline category for ethnicity is white. ***, **, * denote statistically significant differences between groups at 1%, 5% and 10% levels respectively. n.s denotes non-statistical significance.

Appendix IV: Robustness Curves, by Ethnicity

Panel A: Peru
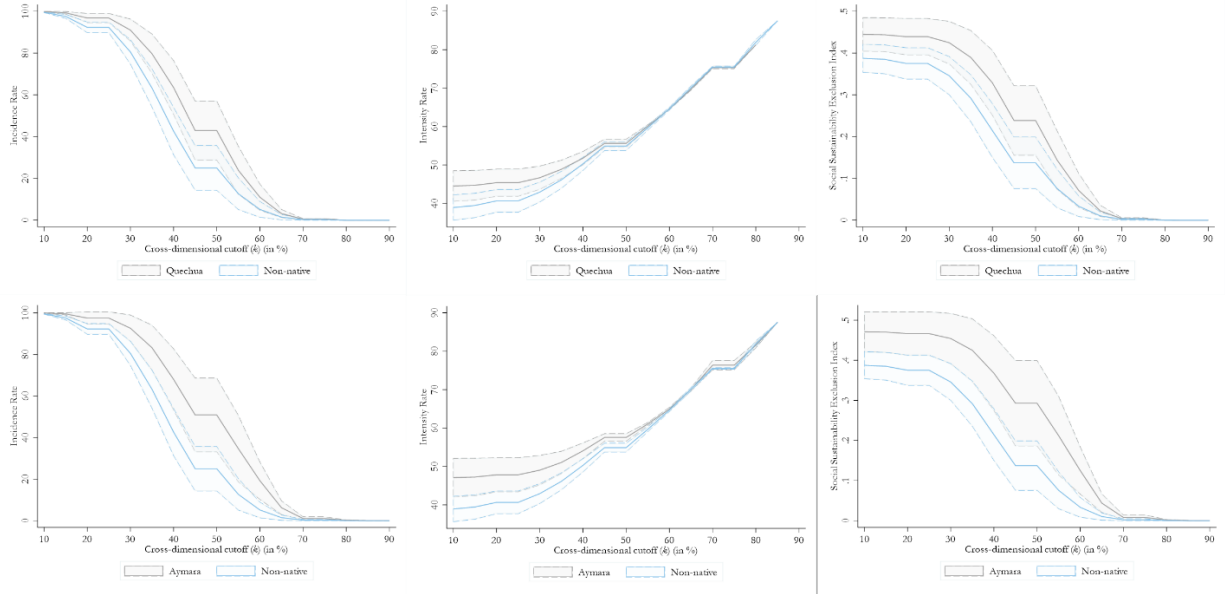
Panel B: South Africa
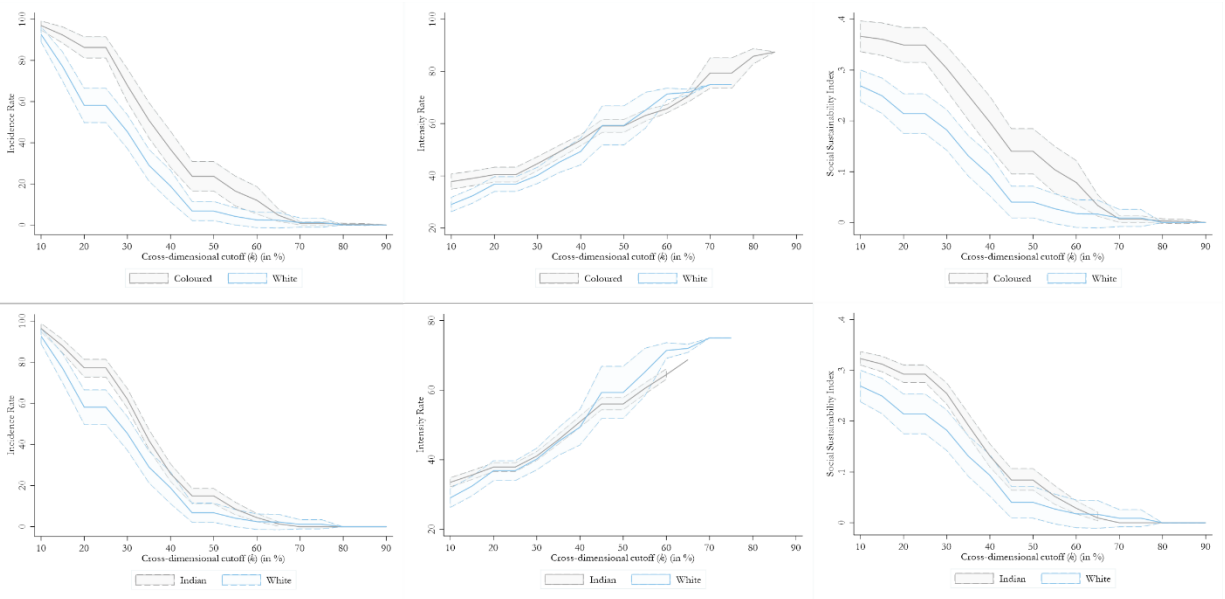
Note: Solid lines denote point estimates, and dashed lines denote 95 percent confidence intervals.

Appendix V: Factor Analysis
A. Reliability Analysis Cronbach Alpha Coefficient

Dimension	Indicator	Peru				South Africa			
		Item-test correlation	Item-rest correlation	Average interitem covariance	Alpha	Item-test correlation	Item-rest correlation	Average interitem covariance	Alpha
Social Inclusion	Quality of employment	0.46	0.28	0.13	0.97	0.59	0.34	0.04	0.73
	Access to water, sanitation, electricity & internet	0.95	0.89	0.06	0.76	0.82	0.61	0.02	0.58
	Level of education	0.95	0.89	0.06	0.76	0.79	0.58	0.03	0.60
	Medical attention	0.95	0.89	0.06	0.76	0.72	0.48	0.03	0.66
	Test scale			0.08	0.87			0.03	0.81
Resilience	Quality of housing	0.96	0.91	0.05	0.71	0.78	0.60	0.04	0.75
	Posession of assets	0.43	0.23	0.14	0.95	0.89	0.76	0.03	0.66
	Public assistance	0.96	0.91	0.05	0.71	0.69	0.47	0.05	0.81
	Capacity for saving	0.88	0.78	0.07	0.77	0.79	0.63	0.04	0.74
	Test scale			0.08	0.85			0.04	0.80
Social Cohesion	Confidence in government institutions	0.72	0.38	0.01	0.39	0.58	0.19	0.02	0.60
	Experience of discrimination	0.56	0.23	0.02	0.52	0.53	0.20	0.02	0.58
	Perception of safety	0.66	0.34	0.02	0.43	0.70	0.45	0.01	0.39
	Victim of crime	0.62	0.31	0.02	0.46	0.79	0.54	0.01	0.28
	Test scale			0.02	0.83			0.02	0.85
Process Legitimacy	Civil participation	0.83	0.69	0.04	0.69	0.59	0.30	0.03	0.71
	Satisfaction with democracy	0.71	0.52	0.05	0.77	0.78	0.54	0.02	0.55
	Government effectiveness	0.88	0.76	0.04	0.64	0.64	0.38	0.03	0.66
	Equality before the law (PE) / Satisfaction with the way corruption is combatted	0.72	0.45	0.05	0.82	0.83	0.64	0.01	0.48
	Test scale			0.05	0.79			0.02	0.88

B. Confirmatory Factor Analysis

Dimension	Indicators	Peru						South Africa					
		Coef.	OIM Std. Err.	z	P>|z|	[95 Conf. Interval]		Coef.	OIM Std. Err.	z	P>|z|	[95 Conf. Interval]	
Social Inclusion	Quality of employment	0.17	0.00	35.70	0	0.16	0.18	0.35	0.00	85.29	0	0.34	0.36
	Access to water, sanitation, electricity & internet	0.78	0.00	328.51	0	0.78	0.79	0.60	0.00	160.76	0	0.59	0.60
	Level of education	0.76	0.00	304.53	0	0.76	0.77	0.46	0.00	118.11	0	0.45	0.47
	Medical attention	0.71	0.00	254.83	0	0.70	0.71	0.58	0.00	151.97	0	0.57	0.59
Resilience	Quality of housing	0.79	0.00	351.92	0	0.78	0.79	0.69	0.00	220.52	0	0.68	0.70
	Posession of assets	-0.05	0.00	-10.46	0	-0.06	-0.04	0.79	0.00	286.56	0	0.79	0.80
	Public assistance	0.86	0.00	472.34	0	0.86	0.86	0.39	0.00	91.28	0	0.38	0.40
	Capacity for saving	0.53	0.00	141.79	0	0.52	0.54	0.47	0.00	115.16	0	0.46	0.48
Social Cohesion	Confidence in government institutions	0.52	0.01	57.60	0	0.50	0.54	0.66	0.00	140.47	0	0.65	0.66
	Experience of discrimination	-0.19	0.01	-24.82	0	-0.20	-0.17	0.12	0.01	22.33	0	0.11	0.13
	Perception of safety	0.19	0.01	25.38	0	0.17	0.20	0.35	0.00	71.28	0	0.34	0.36
	Victim of crime	0.12	0.01	19.60	0	0.11	0.14	0.16	0.01	28.54	0	0.15	0.17
Process Legitimacy	Civil participation	0.56	0.00	112.90	0	0.55	0.57	0.08	0.01	15.29	0	0.07	0.09
	Satisfaction with democracy	0.42	0.01	80.01	0	0.41	0.43	0.74	0.00	219.13	0	0.73	0.75
	Government effectiveness	0.70	0.01	123.54	0	0.69	0.71	0.52	0.00	119.48	0	0.51	0.53
	Equality before the law (PE) / Satisfaction with the way corruption is combatted	0.27	0.01	41.73	0	0.26	0.28	0.52	0.00	125.68	0	0.51	0.53
Number of observations				45881						2885			
Log-likelihood				-966870.93						-61074.971			
LR test of model vs. Saturated				32107.30***						52220.4***			

Appendix VI: Sensitivity Analysis
A. Sensitivity Analysis: Change in the definition of indicators.

A1. Change in the definition of "Level of education" indicator. Baseline scenario: Excluded if the person does not have completed <u>secondary</u> education. Alternative scenario: Excluded if the person does not have completed <u>primary</u> education

Peru

A1.1. FOSD: Counting Vector
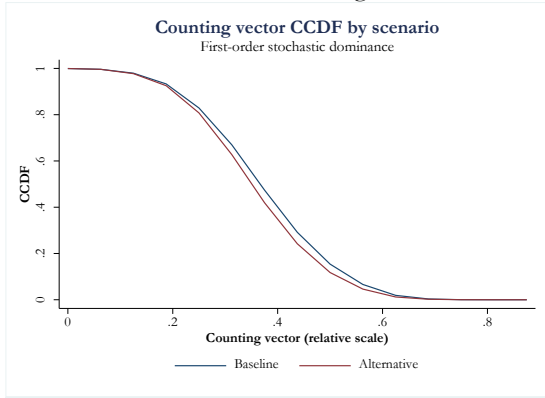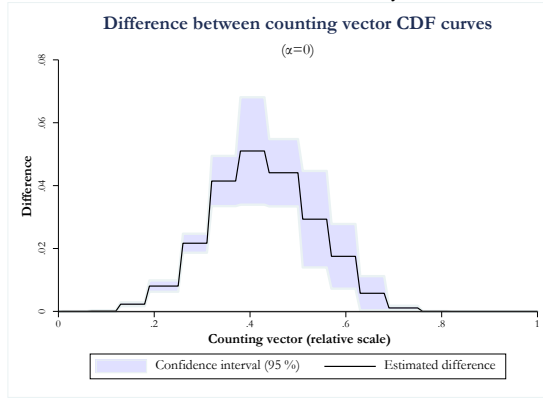
Counting vector CCDF by scenario
First-order stochastic dominance

A1.2. Dominance Analysis

Difference between counting vector CDF curves
(α=0)

A1.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
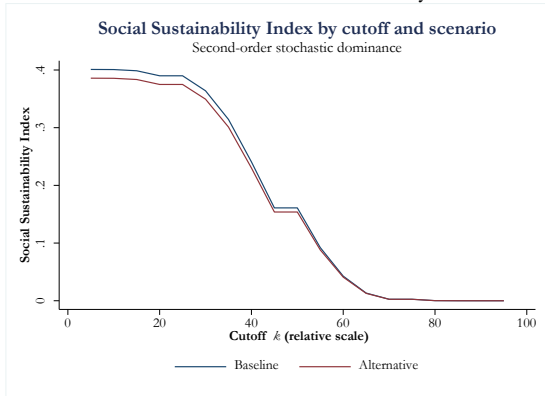
A1.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.98***	0.98***	0.96***
	Kendall tau-b	0.89***	0.92***	0.85***
A	Spearman	0.98***	0.98***	0.89***
	Kendall tau-b	0.92***	0.91***	0.81***
M0	Spearman	0.99***	0.98***	0.96***
	Kendall tau-b	0.94***	0.92***	0.85***

***p<0.01, **p<0.05, *p<0.1

South Africa

A1.1. FOSD: Counting Vector
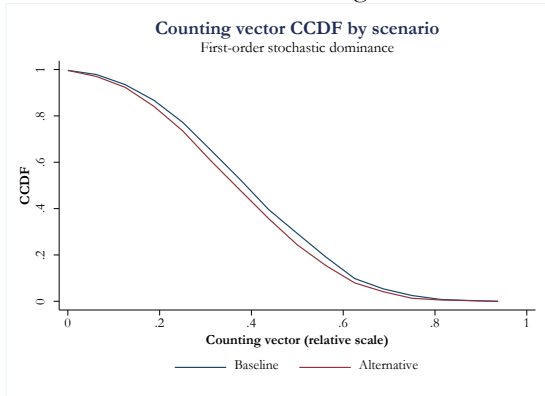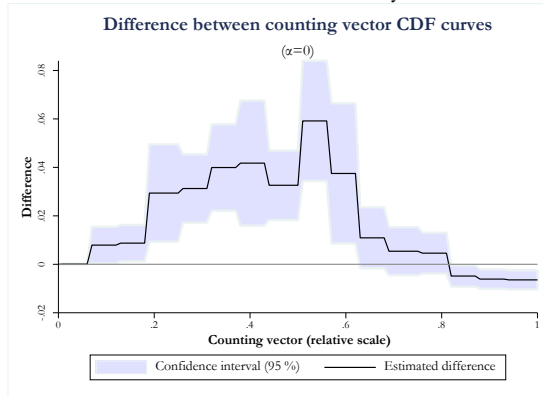
Counting vector CCDF by scenario
First-order stochastic dominance

A1.2. Dominance Analysis

Difference between counting vector CDF curves
(α=0)

A1.3. SOSD: Social Sustainability Index

A1.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
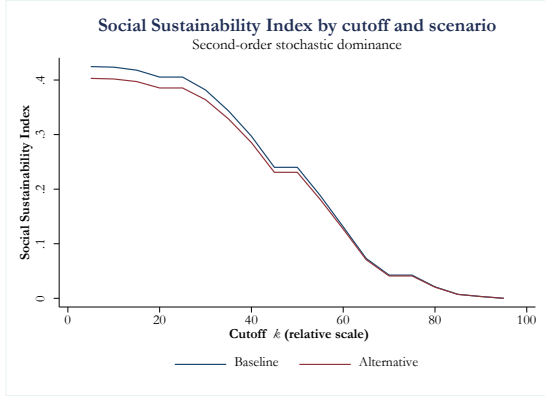
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.93***	0.93***	0.92***
	Kendall tau-b	0.83***	0.83***	0.78***
A	Spearman	1***	0.87***	0.88***
	Kendall tau-b	1***	0.72***	0.7**
M0	Spearman	0.97***	0.98***	0.92***
	Kendall tau-b	0.89***	0.94***	0.78***

***p<0.01, **p<0.05, *p<0.1

B. Sensitivity Analysis: Changes in weights.

B1. Change in the weights assigned to each dimension. Baseline scenario: Evenly distributed weights across all indicators (25% each). Alternative scenario: Skewed weighting scheme in favor of the Social Inclusion dimension (40% for Social Inclusion, and 20% for the rest of dimensions).
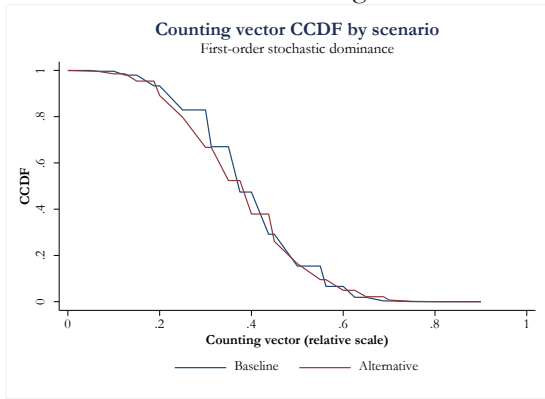
Peru

B1.1. FOSD: Counting Vector

B1.2. Dominance Analysis
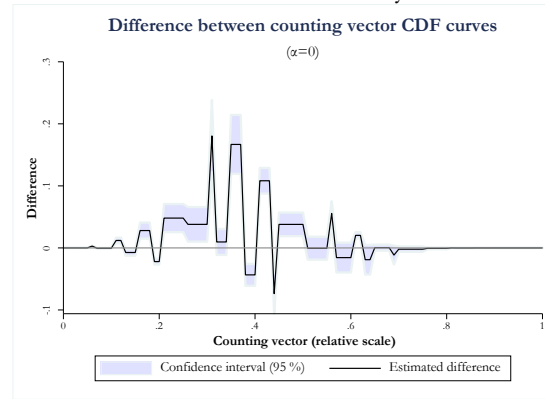
B1.3. SOSD: Social Sustainability Index
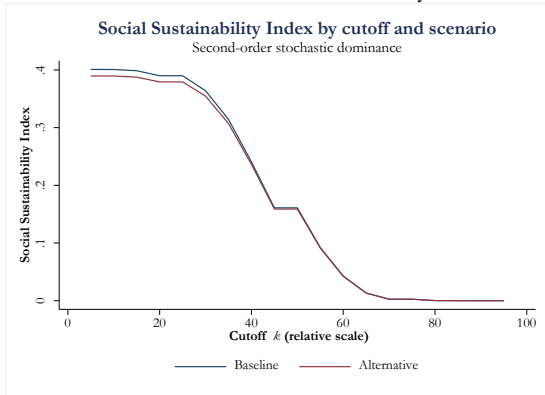
B1.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.93***	0.96***	0.77***
	Kendall tau-b	0.79***	0.84***	0.57***
A	Spearman	0.95***	0.88***	0.65***
	Kendall tau-b	0.84***	0.75***	0.52***
M0	Spearman	0.96***	0.95***	0.77***
	Kendall tau-b	0.85***	0.83***	0.56***

***p<0.01, **p<0.05, *p<0.1

South Africa

B1.1. FOSD: Counting Vector
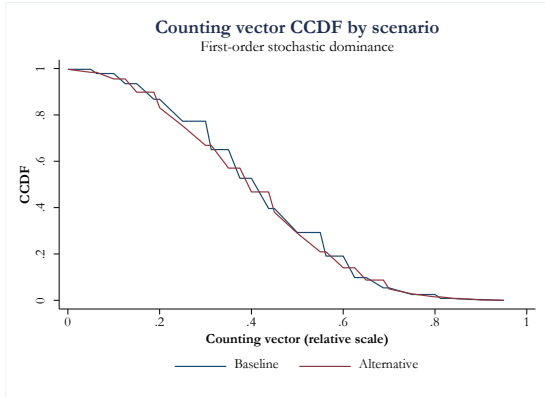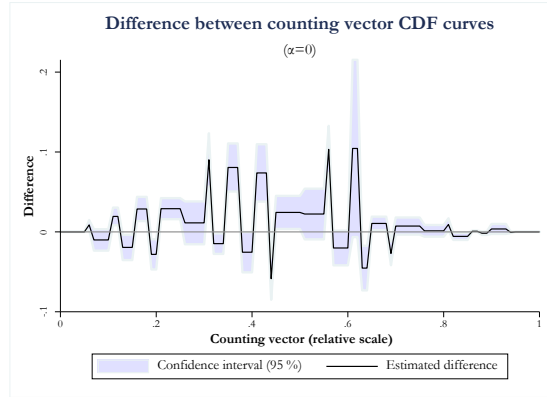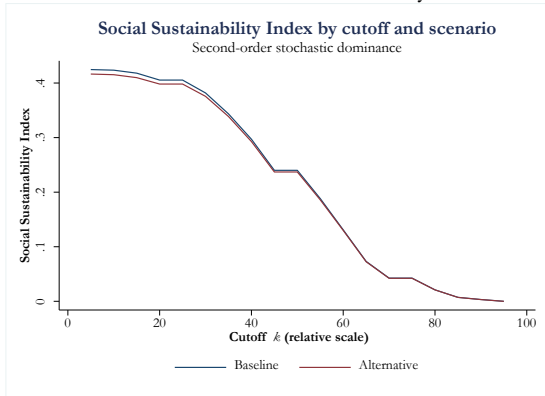
B1.2. Dominance Analysis

B1.3. SOSD: Social Sustainability Index

B1.4. Rank correlations

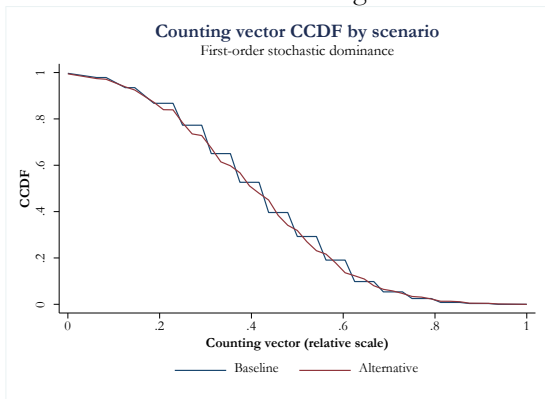| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.98***	0.95***	0.93***
	Kendall tau-b	0.94***	0.89***	0.83***
A	Spearman	0.9***	0.52	0.98***
	Kendall tau-b	0.78***	0.39	0.94***
M0	Spearman	0.93***	0.97***	0.93***
	Kendall tau-b	0.83***	0.89***	0.83***

***p<0.01, **p<0.05, *p<0.1

B2. Change in the weights assigned to each dimension. Baseline scenario: Evenly distributed weights across all indicators (25% each). Alternative scenario: Skewed weighting scheme in favor of the Resilience dimension (40% for Resilience, and 20% for the rest of dimensions).
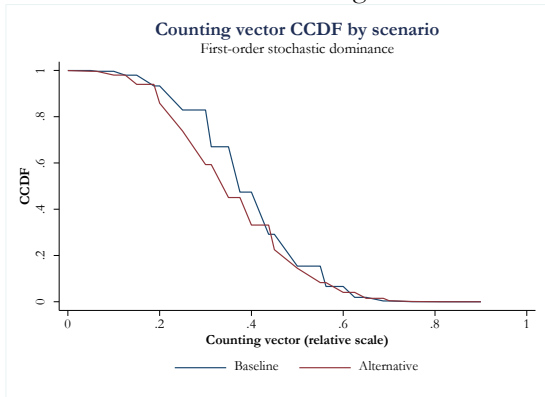
Peru

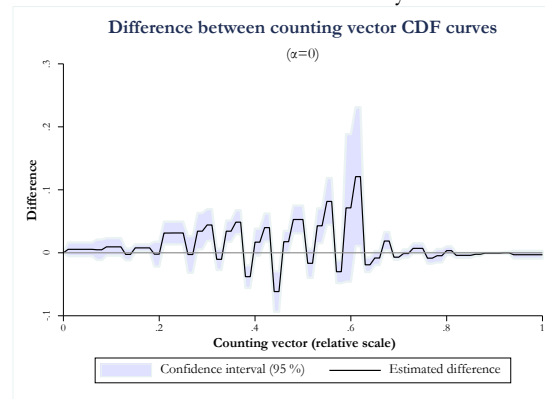B2.1. FOSD: Counting Vector

B2.2. Dominance Analysis

B2.3. SOSD: Social Sustainability Index
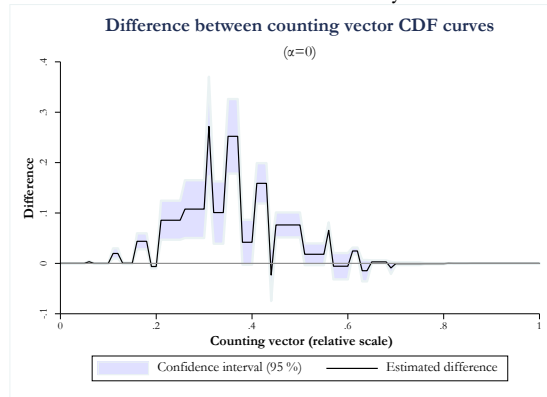
B2.4. Rank correlations
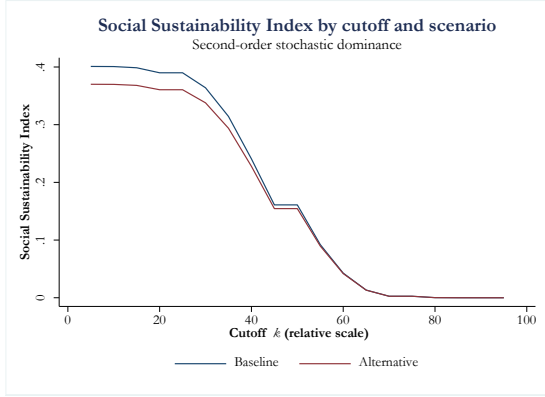
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.92***	0.89***	0.91***
	Kendall tau-b	0.78***	0.75***	0.77***
A	Spearman	0.85***	0.87***	0.76***
	Kendall tau-b	0.69***	0.72***	0.64***
M0	Spearman	0.9***	0.9***	0.91***
	Kendall tau-b	0.76***	0.77***	0.76***

***p<0.01, **p<0.05, *p<0.1

South Africa

B2.1. FOSD: Counting Vector
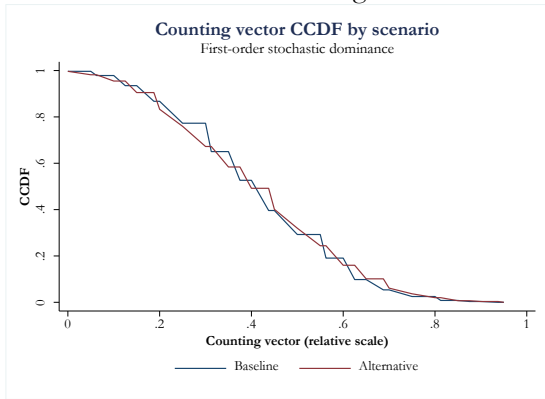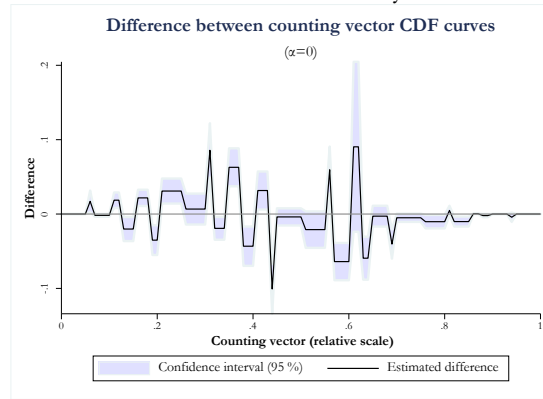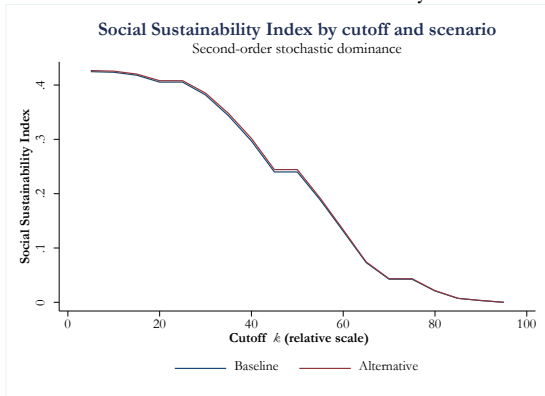
B2.2. Dominance Analysis

B2.3. SOSD: Social Sustainability Index

B2.4. Rank correlations

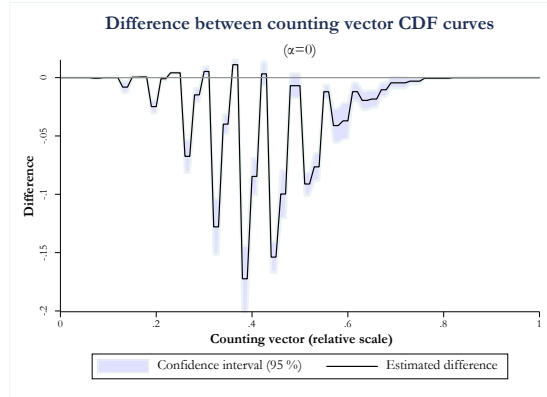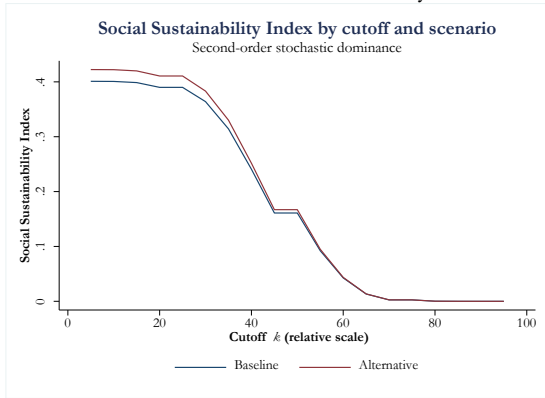| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	0.97***	0.9***
	Kendall tau-b	0.89***	0.89***	0.72***
A	Spearman	0.95***	0.92***	0.68**
	Kendall tau-b	0.89***	0.78***	0.56**
M0	Spearman	0.93***	0.93***	0.9***
	Kendall tau-b	0.83***	0.83***	0.72***

***p<0.01, **p<0.05, *p<0.1

B3. Change in the weights assigned to each dimension. Baseline scenario: Evenly distributed weights across all indicators (25% each). Alternative scenario: Skewed weighting scheme in favor of the Social Cohesion dimension (40% for Social Cohesion, and 20% for the rest of dimensions).

Peru

B3.1. FOSD: Counting Vector   B3.2. Dominance Analysis
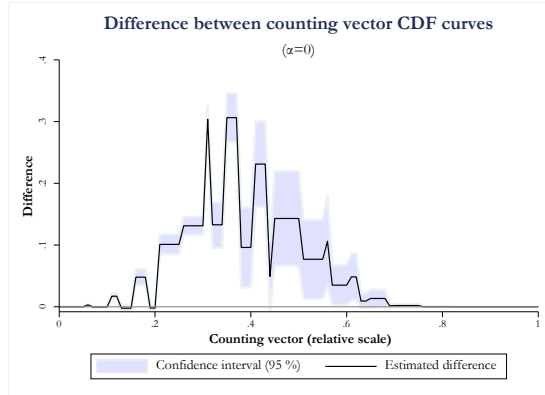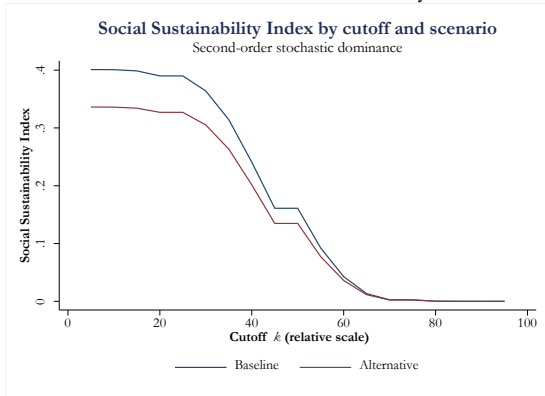
Counting vector CCDF by scenario
First-order stochastic dominance

B3.3. SOSD: Social Sustainability Index

Difference between counting vector CDF curves
($\alpha=0$)

B3.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.85***	0.71***	0.55***
	Kendall tau-b	0.67***	0.54***	0.45***
A	Spearman	0.65***	0.62***	0.72***
	Kendall tau-b	0.49***	0.44***	0.63***
M0	Spearman	0.85***	0.72***	0.56***
	Kendall tau-b	0.67***	0.54***	0.46***

***p<0.01, **p<0.05, *p<0.1
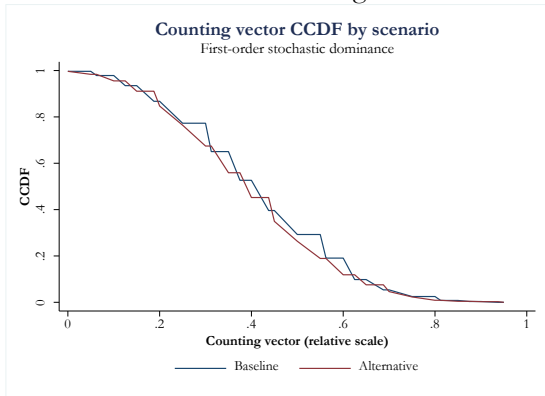
South Africa

B3.1. FOSD: Counting Vector

B3.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
($\alpha=0$)

B3.3. SOSD: Social Sustainability Index

B3.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
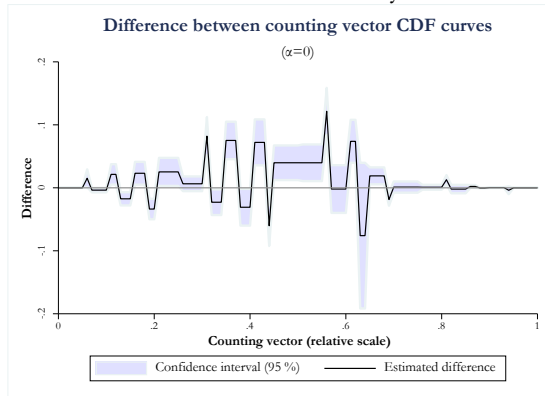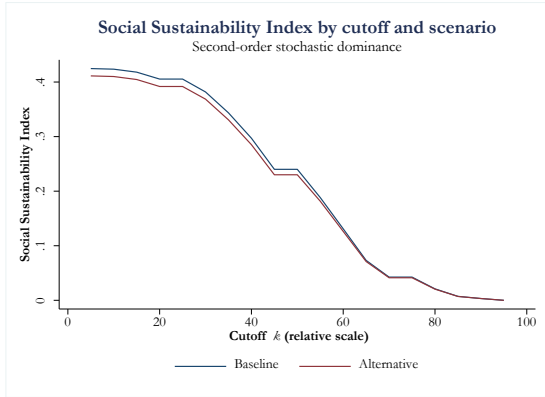
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.85***	0.87***	0.77**
	Kendall tau-b	0.72***	0.67**	0.61**
A	Spearman	0.98***	0.85***	0.58*
	Kendall tau-b	0.94***	0.67**	0.5*
M0	Spearman	0.97***	0.88***	0.77**
	Kendall tau-b	0.89***	0.72***	0.61**

***p<0.01, **p<0.05, *p<0.1

B4. Change in the weights assigned to each dimension. Baseline scenario: Evenly distributed weights across all indicators (25% each). Alternative scenario: Skewed weighting scheme in favor of the Process Legitimacy dimension (40% for Process Legitimacy, and 20% for the rest of dimensions).
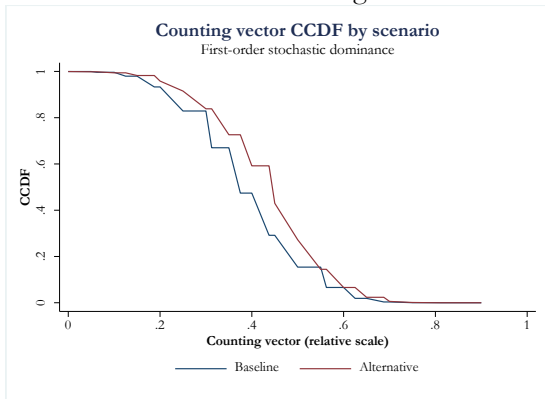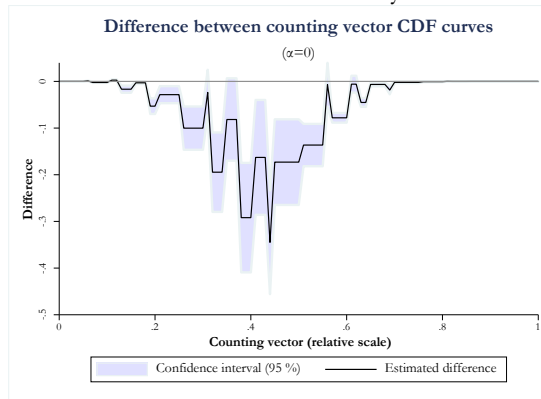
Peru

B4.1. FOSD: Counting Vector

B4.2. Dominance Analysis

B4.3. SOSD: Social Sustainability Index
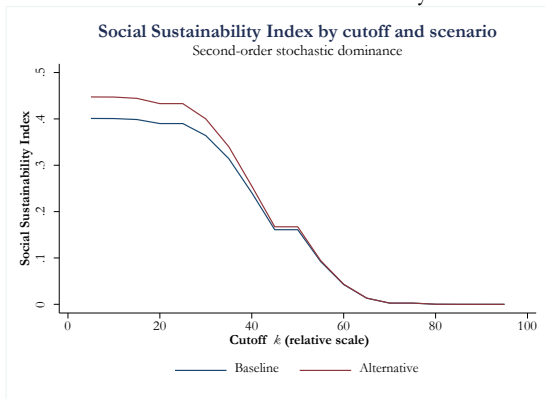
B4.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.24	0.25	0.8***
	Kendall tau-b	0.18	0.18	0.63***
A	Spearman	0.35*	0.76***	0.7***
	Kendall tau-b	0.23	0.57***	0.57***
M0	Spearman	0.29	0.28	0.8***
	Kendall tau-b	0.19	0.21	0.63***

***p<0.01, **p<0.05, *p<0.1

South Africa

B4.1. FOSD: Counting Vector
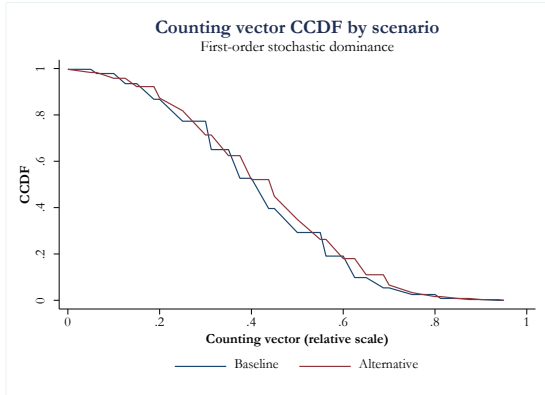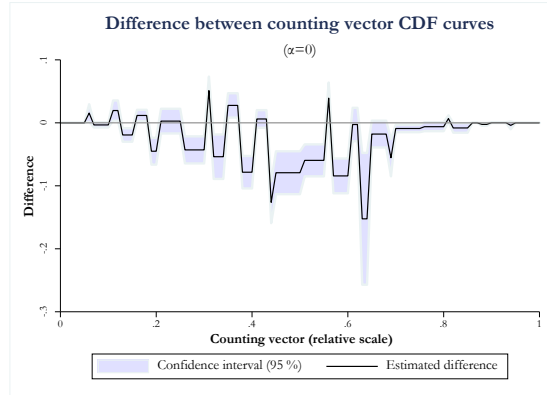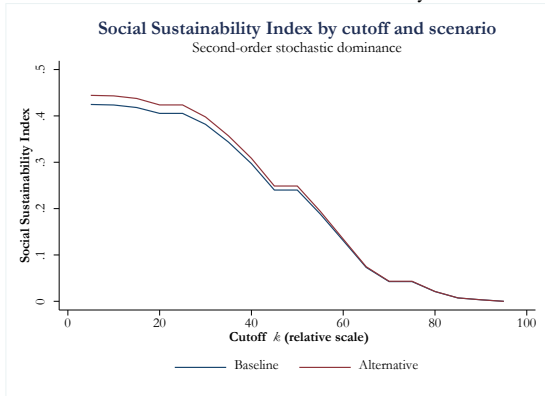
B4.2. Dominance Analysis

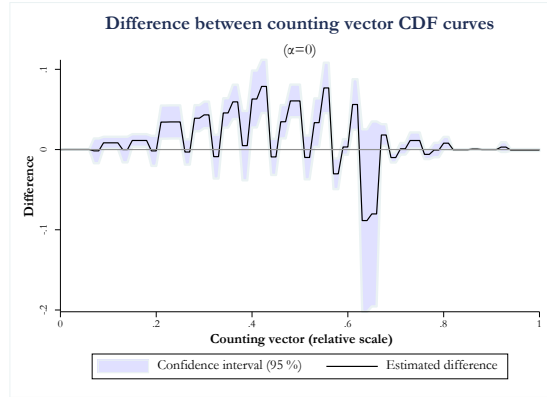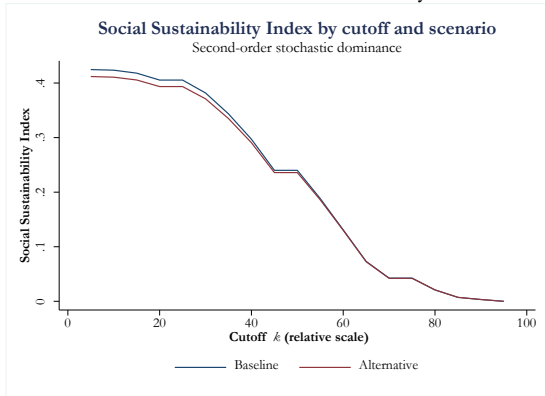**B4.3. SOSD: Social Sustainability Index**

B4.4. Rank correlations

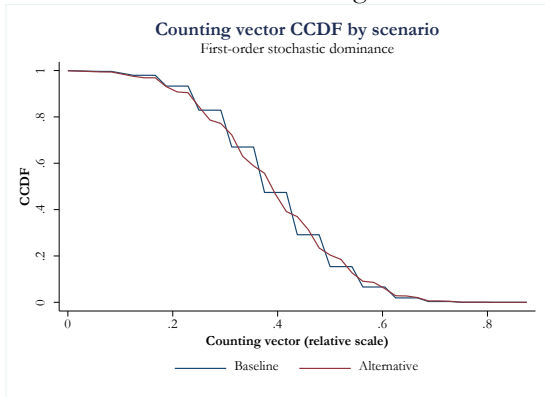| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.95***	1***	0.98***
	Kendall tau-b	0.83***	1***	0.94***
A	Spearman	0.93***	0.97***	0.65*
	Kendall tau-b	0.83***	0.89***	0.5*
M0	Spearman	0.98***	0.98***	0.98***
	Kendall tau-b	0.94***	0.94***	0.94***

***p<0.01, **p<0.05, *p<0.1

C. Sensitivity Analysis: Number of indicators per dimension, 3 instead of 4.

C1. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Quality of employment indicator removed (weights within the Social Inclusion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

**C1.1. FOSD: Counting Vector**
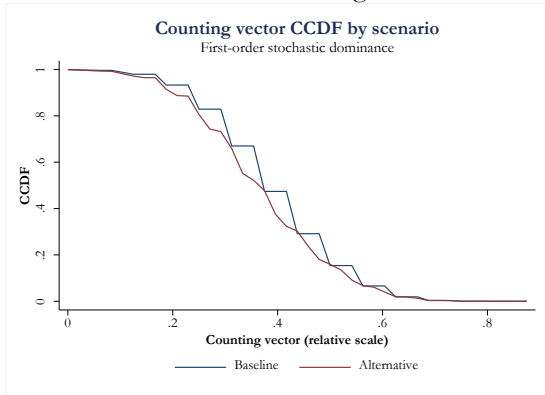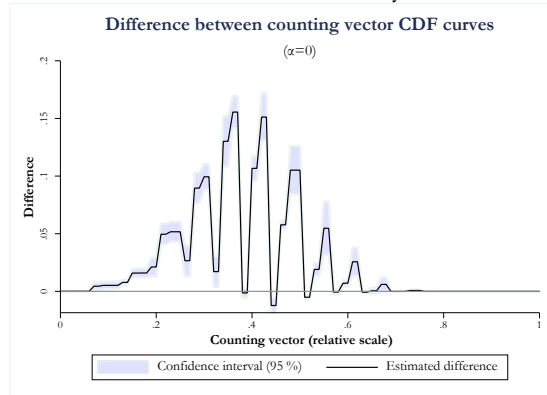
C1.2. Dominance Analysis

C1.3. SOSD: Social Sustainability Index

C1.4. Rank correlations
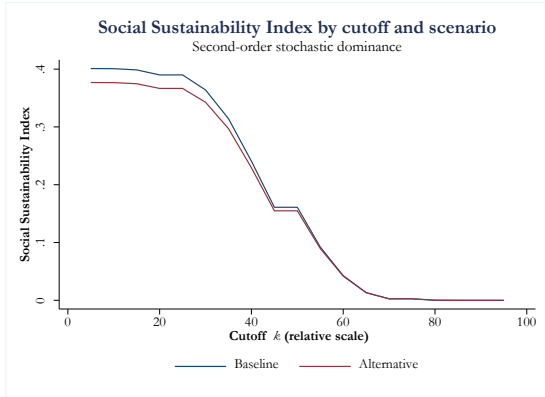
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.94***	0.96***	0.95***
	Kendall tau-b	0.79***	0.84***	0.84***
A	Spearman	0.97***	0.88***	0.92***
	Kendall tau-b	0.89***	0.75***	0.86***
M0	Spearman	0.98***	0.96***	0.95***
	Kendall tau-b	0.89***	0.87***	0.84***

***p<0.01, **p<0.05, *p<0.1

South Africa

C1.1. FOSD: Counting Vector
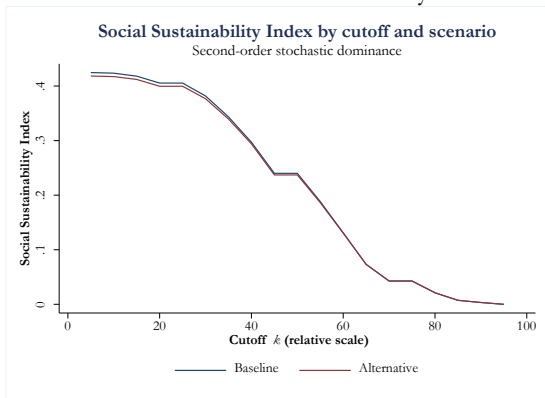
C1.2. Dominance Analysis

C1.3. SOSD: Social Sustainability Index

C1.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.98***	0.92***	0.92***
	Kendall tau-b	0.94***	0.78***	0.78***
A	Spearman	0.98***	0.73**	0.77**
	Kendall tau-b	0.94***	0.56**	0.61**
M0	Spearman	0.97***	0.9***	0.92***
	Kendall tau-b	0.89***	0.72***	0.78***

***p<0.01, **p<0.05, *p<0.1

C2. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Access to water, sanitation, electricity & internet indicator removed (weights within the Social Inclusion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

C2.1. FOSD: Counting Vector

C2.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

C2.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C2.4. Rank correlations

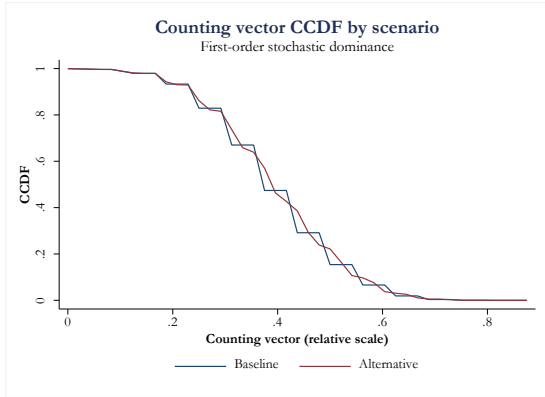| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.91***	0.92***	0.96***
	Kendall tau-b	0.77***	0.79***	0.86***
A	Spearman	0.89***	0.81***	0.72***
	Kendall tau-b	0.77***	0.59***	0.6***
M0	Spearman	0.95***	0.92***	0.96***
	Kendall tau-b	0.85***	0.79***	0.84***

***p<0.01, **p<0.05, *p<0.1
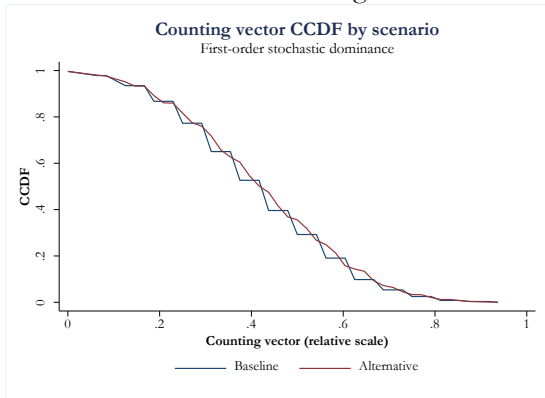
South Africa

C2.1. FOSD: Counting Vector

C2.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C2.3. SOSD: Social Sustainability Index

C2.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
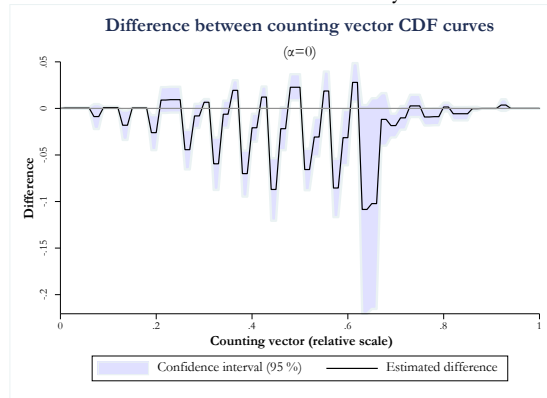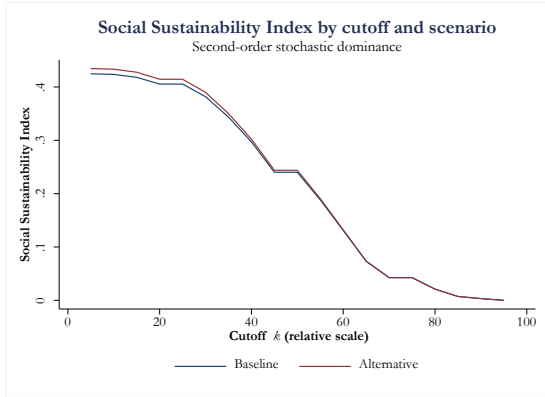
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	0.93***	0.93***
	Kendall tau-b	0.89***	0.83***	0.83***
A	Spearman	0.92***	0.8***	0.87***
	Kendall tau-b	0.78***	0.67**	0.72***
M0	Spearman	0.95***	0.93***	0.93***
	Kendall tau-b	0.89***	0.83***	0.83***

***p<0.01, **p<0.05, *p<0.1

C3. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Level of education indicator removed (weights within the Social Inclusion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

C3.1. FOSD: Counting Vector

C3.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C3.3. SOSD: Social Sustainability Index

C3.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
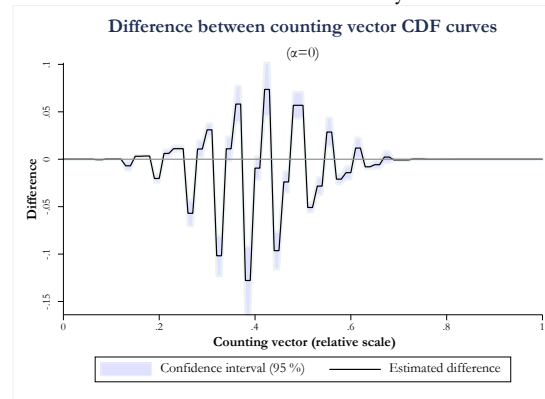
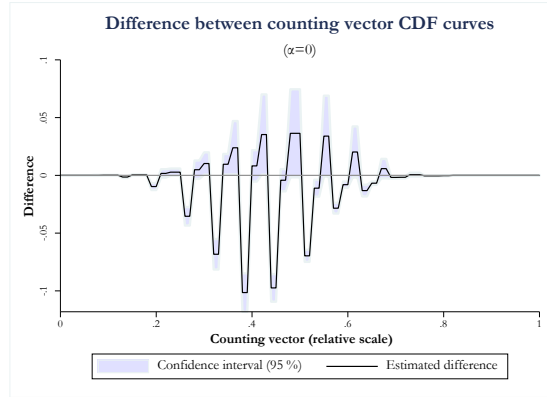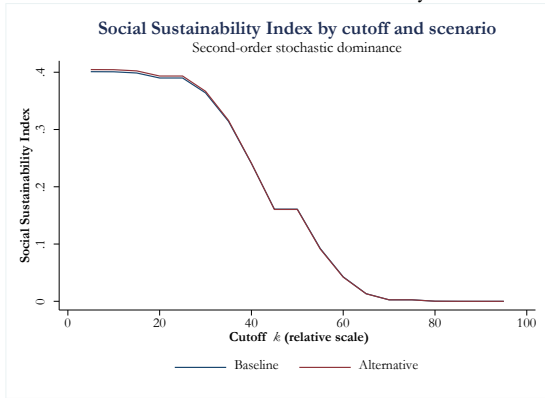| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.95***	0.95***	0.88***
	Kendall tau-b	0.81***	0.82***	0.75***
A	Spearman	0.93***	0.83***	0.86***
	Kendall tau-b	0.81***	0.65***	0.76***
M0	Spearman	0.98***	0.96***	0.88***
	Kendall tau-b	0.89***	0.86***	0.74***

***p<0.01, **p<0.05, *p<0.1

South Africa

C3.1. FOSD: Counting Vector
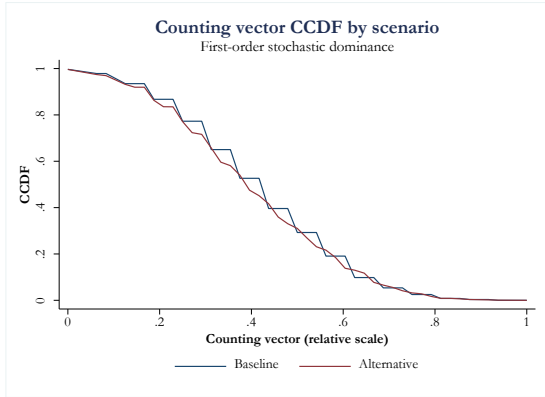
C3.2. Dominance Analysis

C3.3. SOSD: Social Sustainability Index

C3.4. Rank correlations

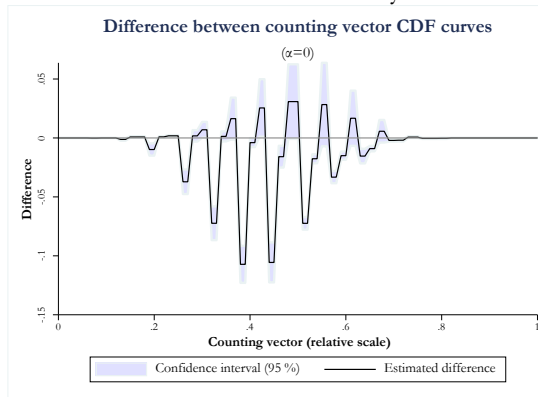| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	0.92***	0.93***
	Kendall tau-b	0.89***	0.78***	0.83***
A	Spearman	1***	0.95***	0.98***
	Kendall tau-b	1***	0.89***	0.94***
M0	Spearman	0.95***	0.95***	0.93***
	Kendall tau-b	0.89***	0.89***	0.83***

***p<0.01, **p<0.05, *p<0.1

C4. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Medical attention indicator removed (weights within the Social Inclusion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

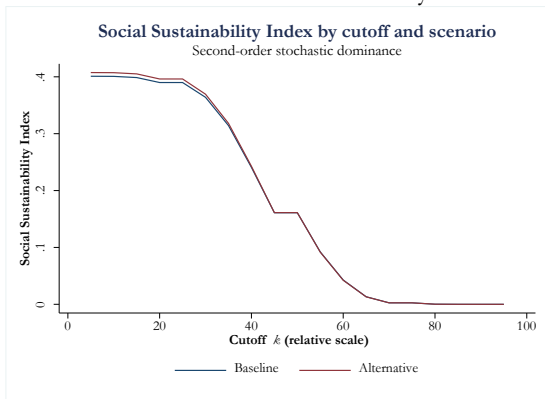**C4.1. FOSD: Counting Vector**
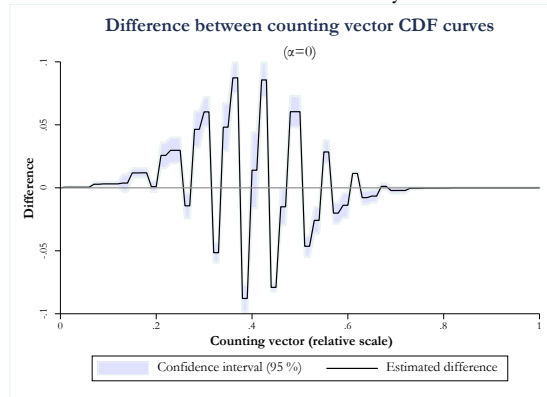
C4.2. Dominance Analysis

C4.3. SOSD: Social Sustainability Index

C4.4. Rank correlations
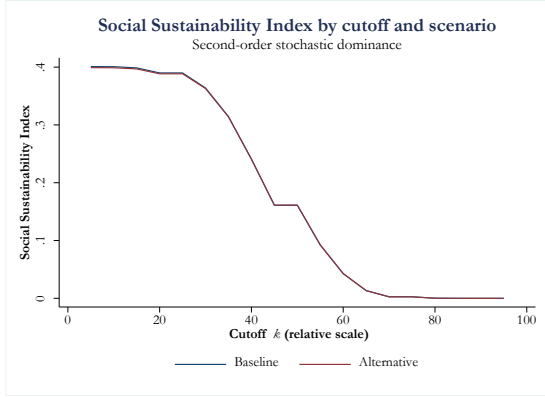
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.93***	0.95***	0.93***
	Kendall tau-b	0.79***	0.83***	0.8***
A	Spearman	0.98***	0.87***	0.83***
	Kendall tau-b	0.91***	0.71***	0.72***
M0	Spearman	0.96***	0.98***	0.94***
	Kendall tau-b	0.84***	0.89***	0.81***

***p<0.01, **p<0.05, *p<0.1

South Africa

C4.1. FOSD: Counting Vector
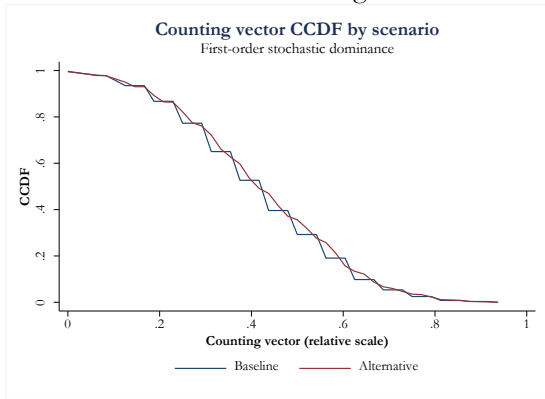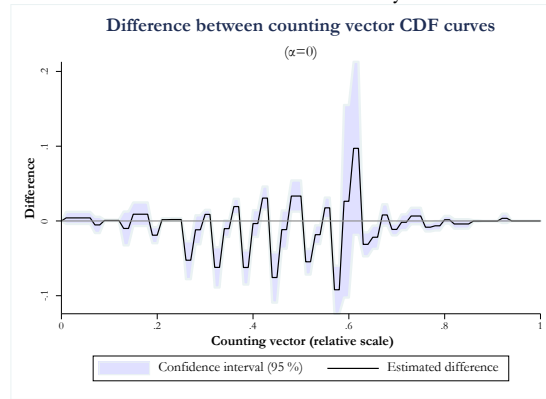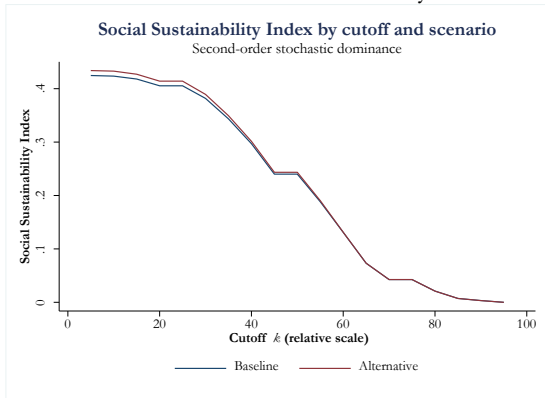
C4.2. Dominance Analysis

C4.3. SOSD: Social Sustainability Index

C4.4. Rank correlations

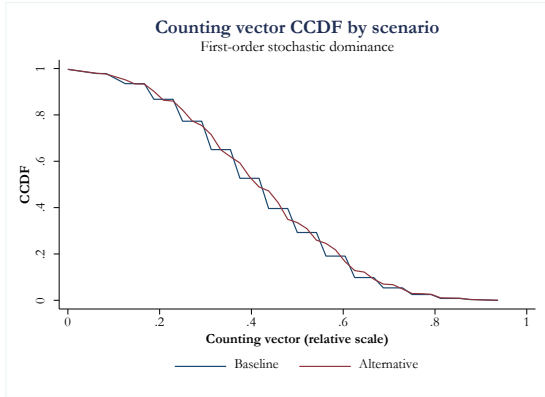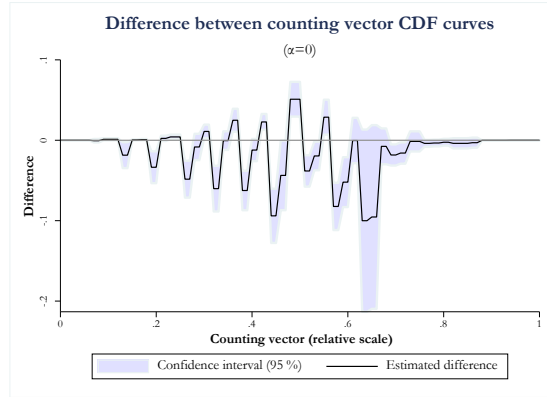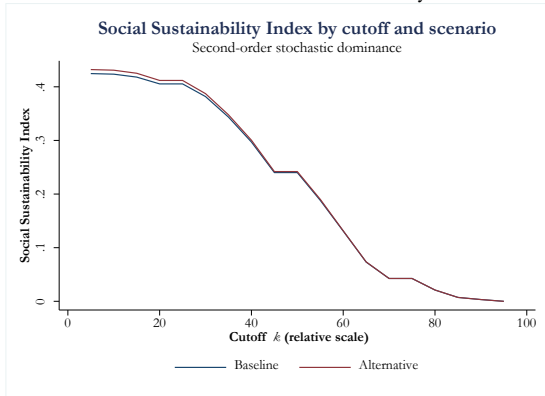| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	0.97***	0.93***
	Kendall tau-b	0.89***	0.89***	0.83***
A	Spearman	0.93***	0.9***	0.58*
	Kendall tau-b	0.83***	0.83***	0.56**
M0	Spearman	0.93***	0.98***	0.93***
	Kendall tau-b	0.83***	0.94***	0.83***

***p<0.01, **p<0.05, *p<0.1

C5. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Quality of housing indicator removed (weights within the Resilience dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

C5.1. FOSD: Counting Vector

C5.2. Dominance Analysis

C5.3. SOSD: Social Sustainability Index

C5.4. Rank correlations

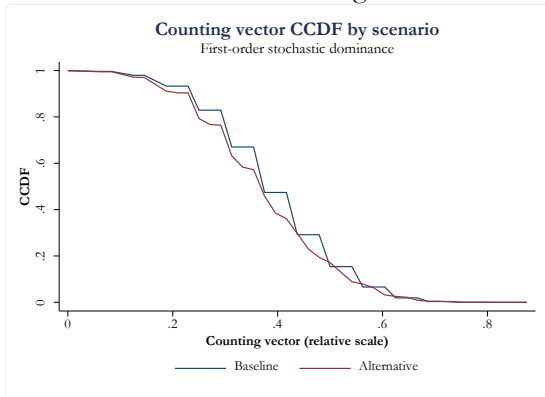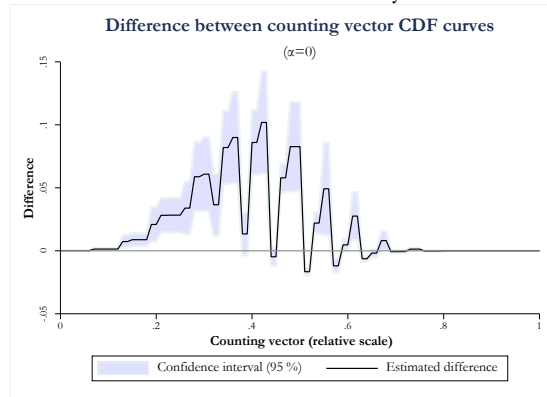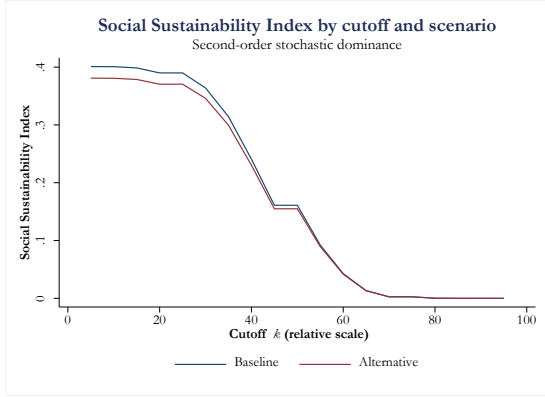| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.95***	0.82***	0.65***
	Kendall tau-b	0.81***	0.63***	0.52***
A	Spearman	0.77***	0.89***	0.71***
	Kendall tau-b	0.6***	0.71***	0.61***
M0	Spearman	0.98***	0.85***	0.64***
	Kendall tau-b	0.89***	0.68***	0.5***

***p<0.01, **p<0.05, *p<0.1
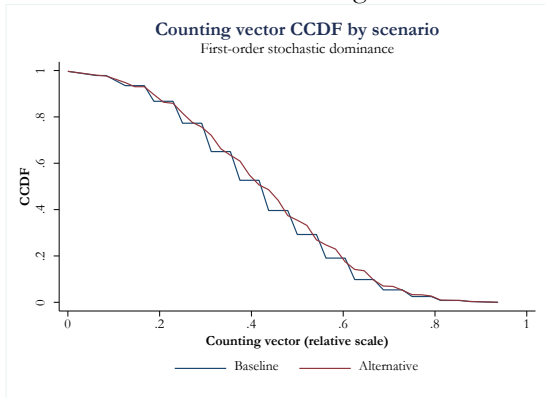
South Africa

C5.1. FOSD: Counting Vector

C5.2. Dominance Analysis

C5.3. SOSD: Social Sustainability Index

C5.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
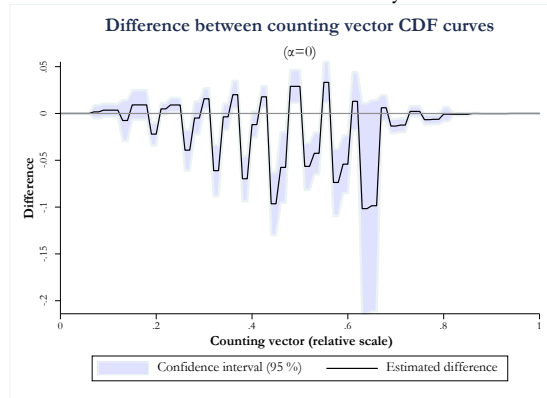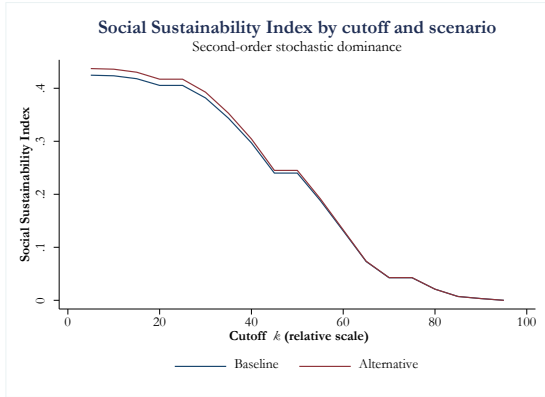
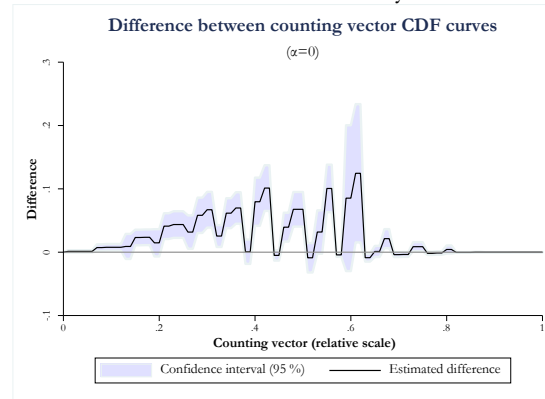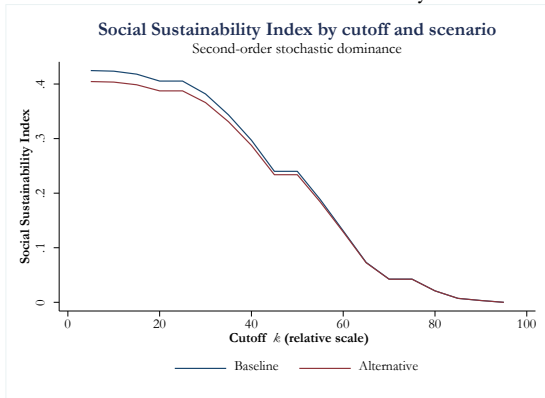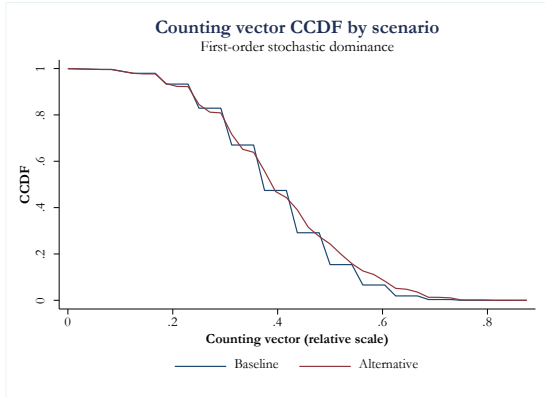| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.92***	0.92***	0.95***
	Kendall tau-b	0.78***	0.78***	0.83***
A	Spearman	0.97***	0.95***	0.9***
	Kendall tau-b	0.89***	0.89***	0.78***
M0	Spearman	0.93***	0.95***	0.95***
	Kendall tau-b	0.83***	0.89***	0.83***

***p<0.01, **p<0.05, *p<0.1

C6. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Possession of assets indicator removed (weights within the Resilience dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

C6.1. FOSD: Counting Vector

C6.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)
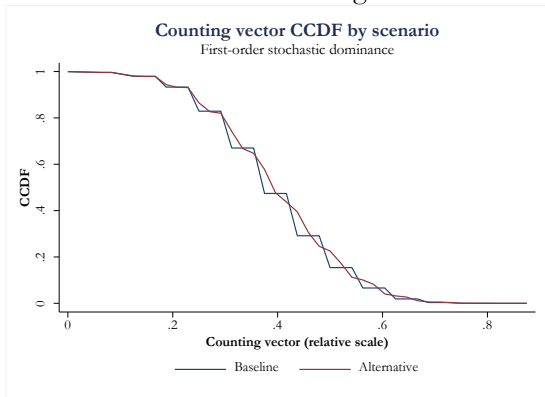
C6.3. SOSD: Social Sustainability Index

C6.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.93***	0.88***	0.67***
	Kendall tau-b	0.81***	0.73***	0.54***
A	Spearman	0.82***	0.84***	0.83***
	Kendall tau-b	0.65***	0.68***	0.76***
M0	Spearman	0.97***	0.88***	0.66***
	Kendall tau-b	0.87***	0.73***	0.53***

***p<0.01, **p<0.05, *p<0.1

South Africa

C6.1. FOSD: Counting Vector

C6.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

C6.3. SOSD: Social Sustainability Index

Difference between counting vector CDF curves
(α=0)

C6.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.92***	0.95***	1***
	Kendall tau-b	0.78***	0.89***	1***
A	Spearman	0.93***	0.8***	0.63*
	Kendall tau-b	0.83***	0.67**	0.5*
M0	Spearman	1***	0.92***	1***
	Kendall tau-b	1***	0.78***	1***

***p<0.01, **p<0.05, *p<0.1

C7. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Public assistance indicator removed (weights within the Resilience dimension were scaled from 6.25% to 8.33% so all weights add up to 1).
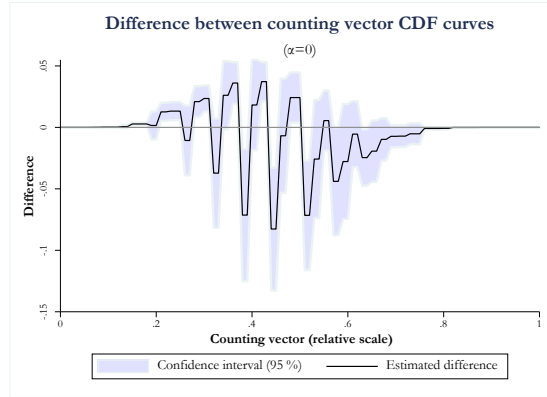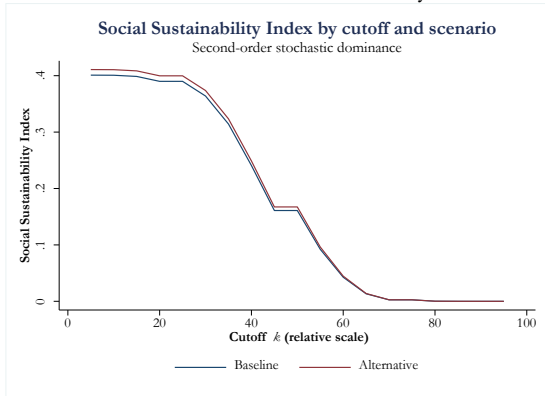
Peru

C7.1. FOSD: Counting Vector

C7.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C7.3. SOSD: Social Sustainability Index

C7.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.89***	0.92***	0.78***
	Kendall tau-b	0.73***	0.8***	0.69***
A	Spearman	0.93***	0.89***	0.78***
	Kendall tau-b	0.81***	0.72***	0.69***
M0	Spearman	0.94***	0.93***	0.78***
	Kendall tau-b	0.81***	0.81***	0.68***

***p<0.01, **p<0.05, *p<0.1

South Africa

C7.1. FOSD: Counting Vector

Counting vector CCDF by scenario
First-order stochastic dominance

C7.2. Dominance Analysis

Difference between counting vector CDF curves
(α=0)

C7.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

C7.4. Rank correlations

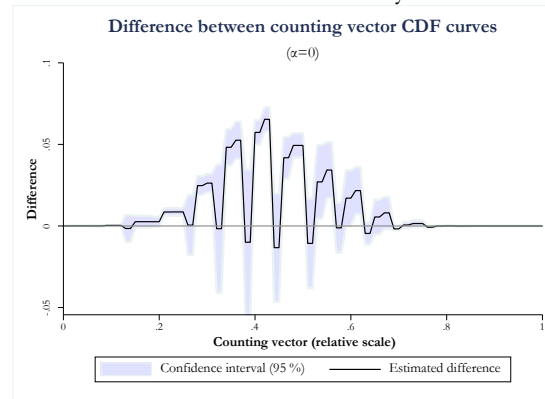| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	0.9***	1***
	Kendall tau-b	0.89***	0.72***	1***
A	Spearman	1***	0.82***	0.83***
	Kendall tau-b	1***	0.72***	0.67**
M0	Spearman	0.98***	0.93***	1***
	Kendall tau-b	0.94***	0.83***	1***

***p<0.01, **p<0.05, *p<0.1

C8. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Capacity for saving indicator removed (weights within the Resilience dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

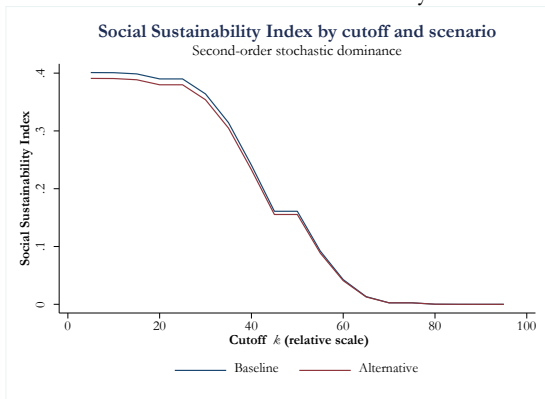C8.1. FOSD: Counting Vector   C8.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

C8.3. SOSD: Social Sustainability Index

Difference between counting vector CDF curves
($\alpha=0$)

C8.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.92***	0.91***	0.67***
	Kendall tau-b	0.77***	0.76***	0.53***
A	Spearman	0.86***	0.87***	0.67***
	Kendall tau-b	0.72***	0.71***	0.55***
M0	Spearman	0.94***	0.91***	0.67***
	Kendall tau-b	0.81***	0.76***	0.53***

***p<0.01, **p<0.05, *p<0.1
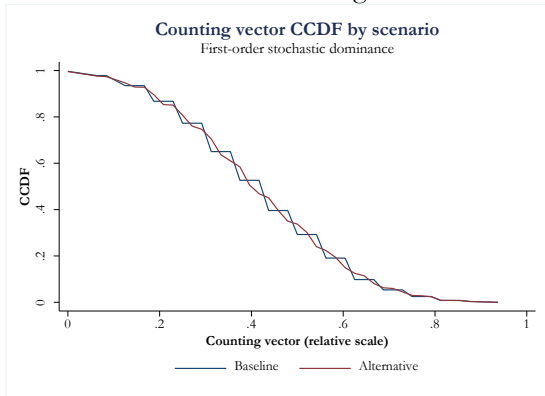
South Africa

C8.1. FOSD: Counting Vector   C8.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

C8.3. SOSD: Social Sustainability Index

Difference between counting vector CDF curves
($\alpha=0$)

C8.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
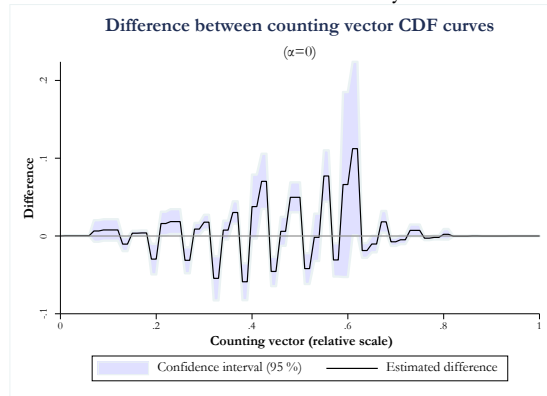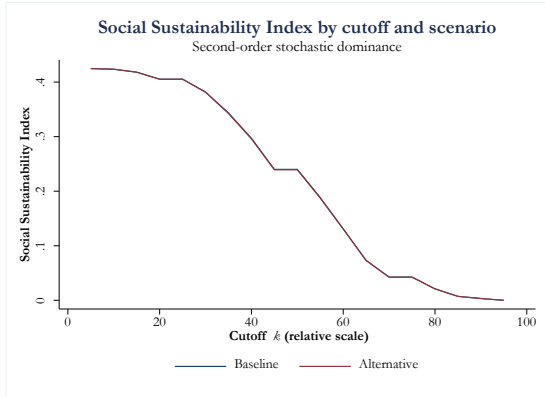
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	0.98***	0.93***
	Kendall tau-b	0.89***	0.94***	0.78***
A	Spearman	0.97***	0.8***	0.45
	Kendall tau-b	0.89***	0.61**	0.33
M0	Spearman	0.92***	0.98***	0.93***
	Kendall tau-b	0.78***	0.94***	0.78***

***p<0.01, **p<0.05, *p<0.1

C9. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Confidence in government institutions indicator removed (weights within the Social Cohesion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru
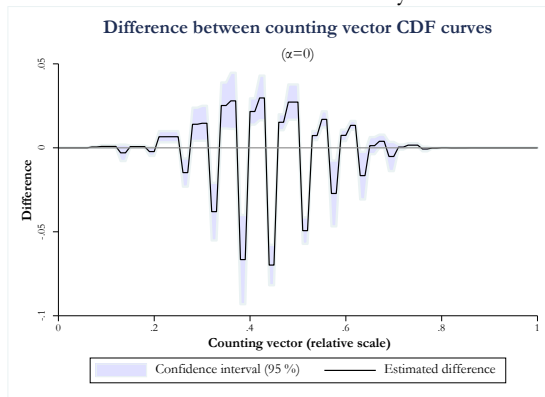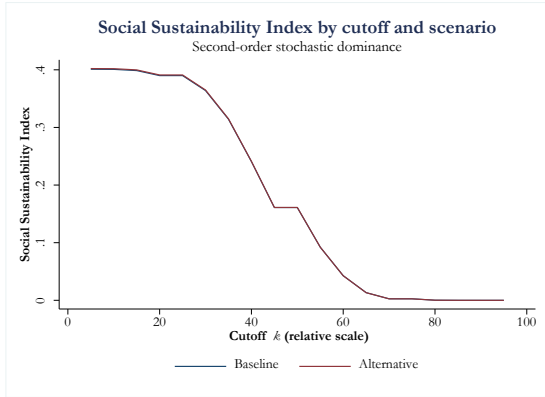
C9.1. FOSD: Counting Vector

C9.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
($\alpha=0$)
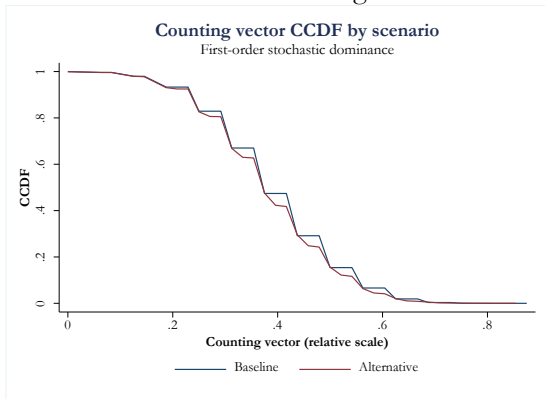
C9.3. SOSD: Social Sustainability Index

C9.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.96***	0.96***	0.78***
	Kendall tau-b	0.85***	0.87***	0.66***
A	Spearman	0.94***	0.83***	0.82***
	Kendall tau-b	0.82***	0.65***	0.7***
M0	Spearman	0.97***	0.96***	0.78***
	Kendall tau-b	0.87***	0.87***	0.66***

***p<0.01, **p<0.05, *p<0.1

South Africa

C9.1. FOSD: Counting Vector
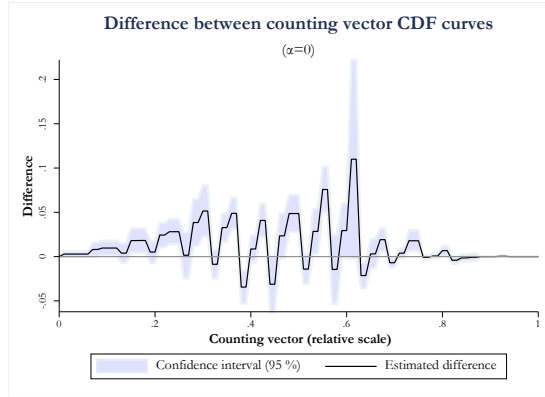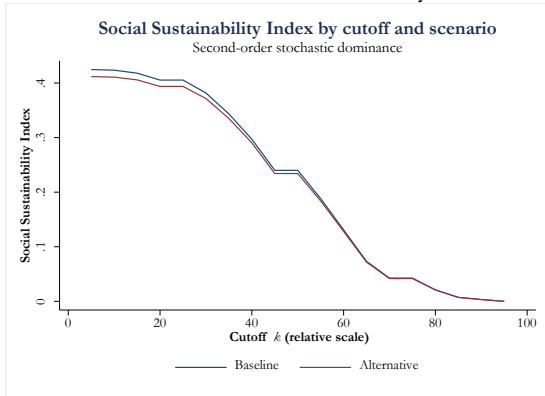
C9.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

C9.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C9.4. Rank correlations

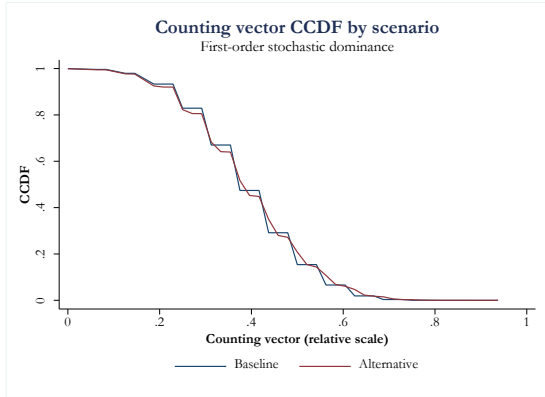| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	0.9***	1***
	Kendall tau-b	0.89***	0.78***	1***
A	Spearman	0.98***	0.95***	0.78**
	Kendall tau-b	0.94***	0.89***	0.67**
M0	Spearman	0.98***	0.92***	1***
	Kendall tau-b	0.94***	0.78***	1***

***p<0.01, **p<0.05, *p<0.1

C10. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Experience of discrimination indicator removed (weights within the Social Cohesion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

C10.1. FOSD: Counting Vector
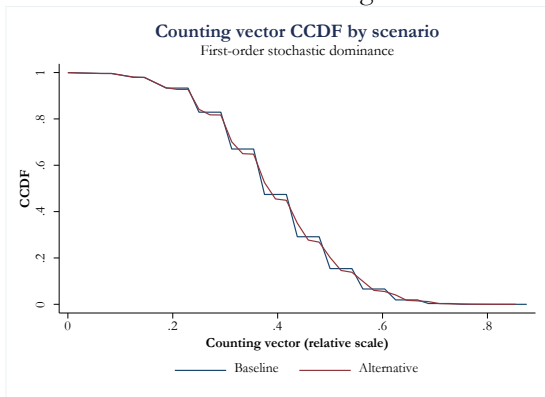
C10.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C10.3. SOSD: Social Sustainability Index

C10.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.96***	0.96***	0.95***
	Kendall tau-b	0.87***	0.86***	0.84***
A	Spearman	0.98***	0.95***	0.64***
	Kendall tau-b	0.93***	0.82***	0.52***
M0	Spearman	0.97***	0.97***	0.95***
	Kendall tau-b	0.89***	0.9***	0.84***

***p<0.01, **p<0.05, *p<0.1

South Africa

C10.1. FOSD: Counting Vector
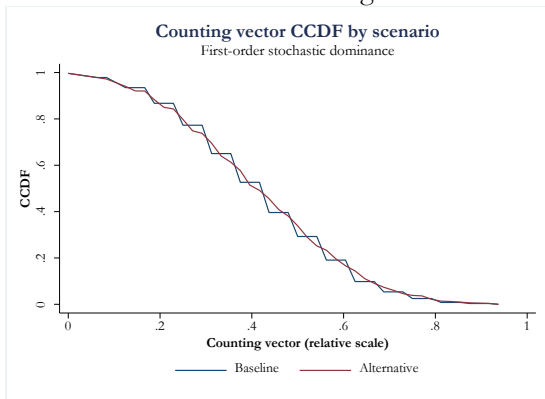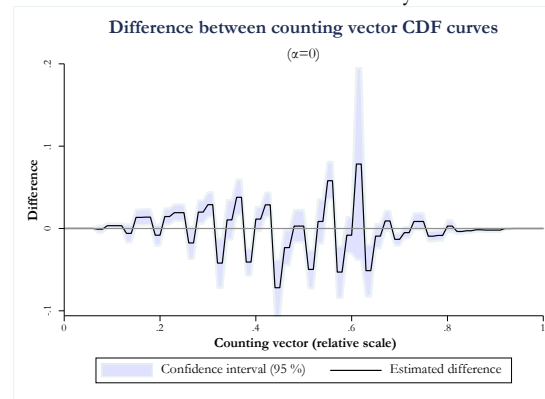
C10.2. Dominance Analysis

C10.3. SOSD: Social Sustainability Index
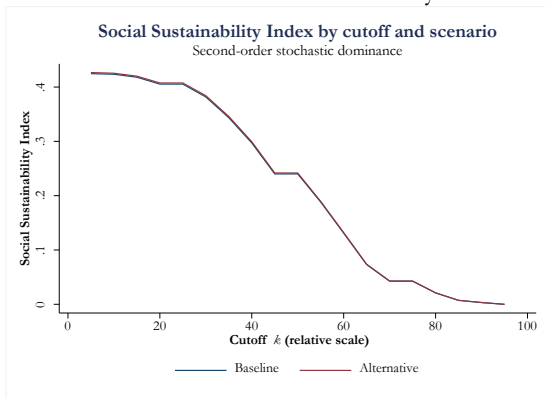
C10.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.92***	0.97***	0.95***
	Kendall tau-b	0.78***	0.89***	0.83***
A	Spearman	0.93***	0.92***	0.9***
	Kendall tau-b	0.83***	0.78***	0.72***
M0	Spearman	0.98***	0.93***	0.95***
	Kendall tau-b	0.94***	0.83***	0.83***

***p<0.01, **p<0.05, *p<0.1

C11. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Perception of safety indicator removed (weights within the Social Cohesion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).

Peru

C11.1. FOSD: Counting Vector

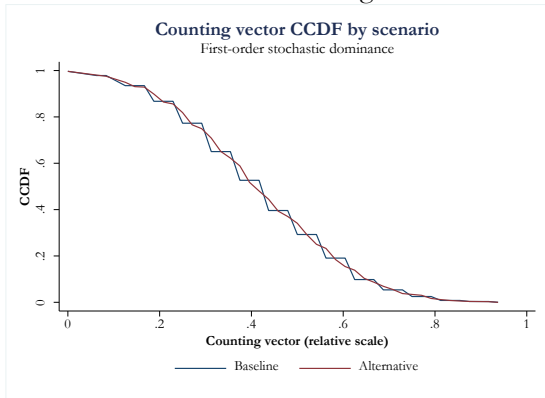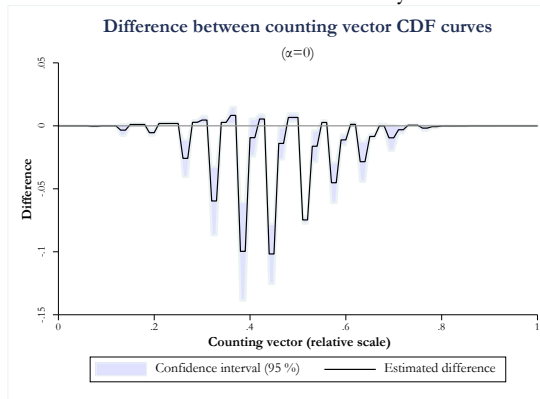### C11.2. Dominance Analysis

C11.3. SOSD: Social Sustainability Index
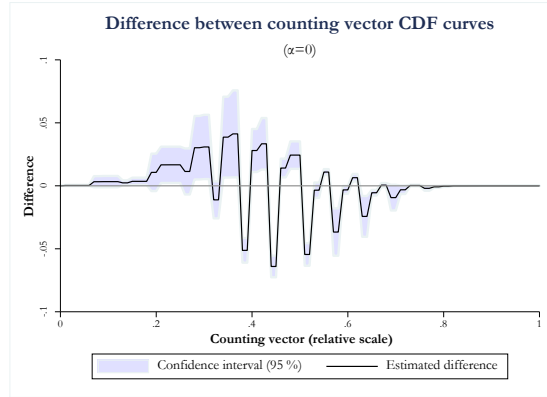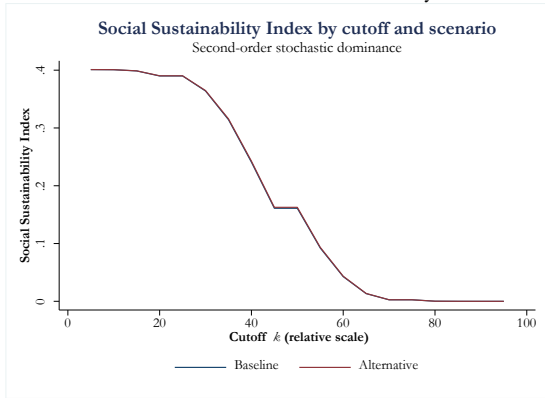
C11.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.95***	0.98***	0.98***
	Kendall tau-b	0.84***	0.91***	0.91***
A	Spearman	0.98***	0.8***	0.71***
	Kendall tau-b	0.92***	0.6***	0.59***
M0	Spearman	0.97***	0.98***	0.98***
	Kendall tau-b	0.89***	0.91***	0.9***

***p<0.01, **p<0.05, *p<0.1

South Africa

C11.1. FOSD: Counting Vector

C11.2. Dominance Analysis

C11.3. SOSD: Social Sustainability Index

C11.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
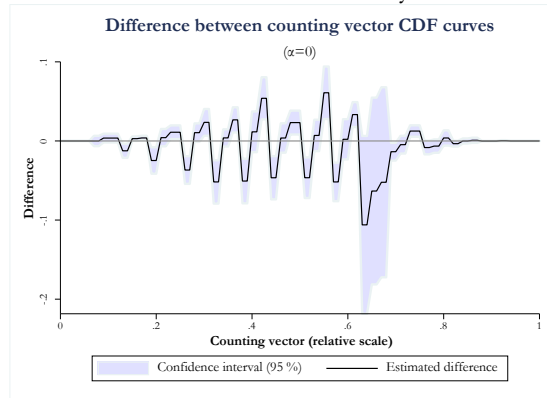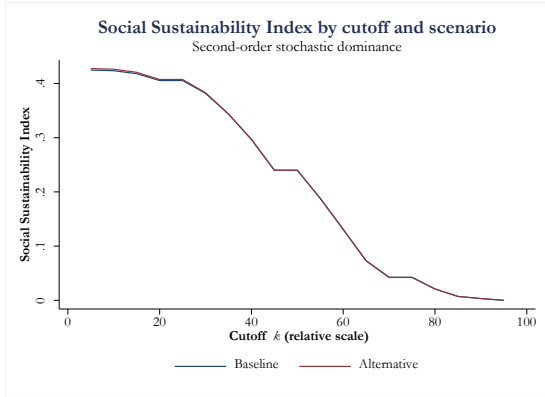
Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	1***	0.97***
	Kendall tau-b	0.89***	1***	0.89***
A	Spearman	0.95***	0.97***	0.93***
	Kendall tau-b	0.89***	0.89***	0.83***
M0	Spearman	0.98***	0.98***	0.97***
	Kendall tau-b	0.94***	0.94***	0.89***

***p<0.01, **p<0.05, *p<0.1

C12. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Victim of crime indicator removed (weights within the Social Cohesion dimension were scaled from 6.25% to 8.33% so all weights add up to 1).
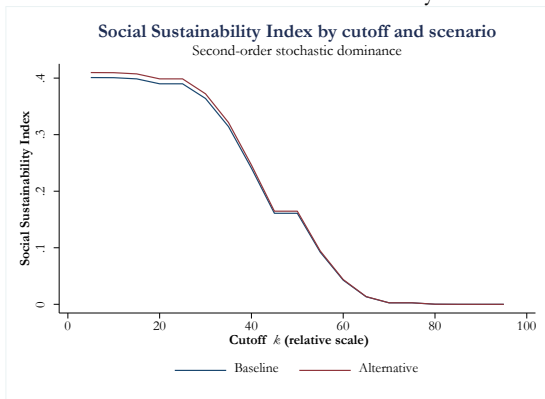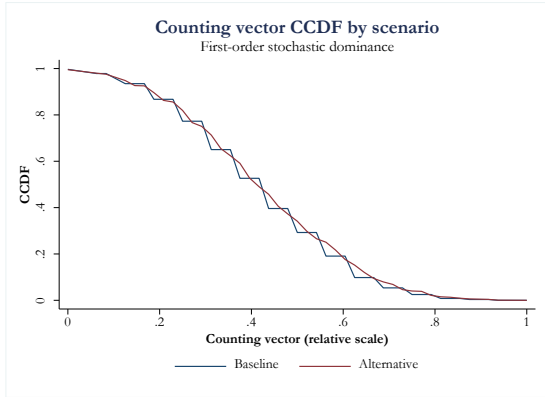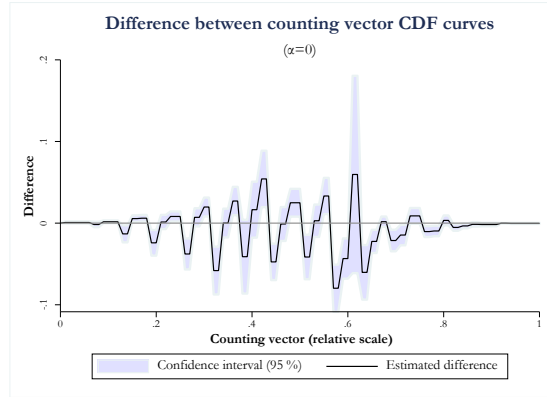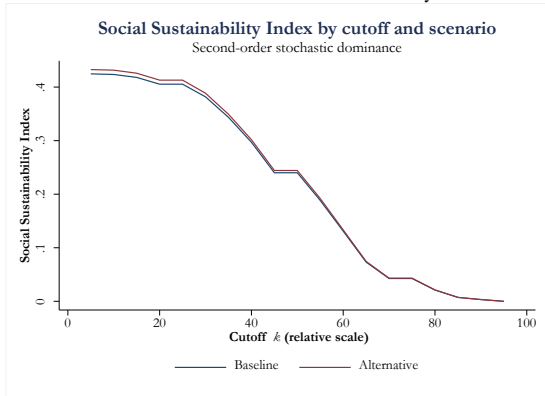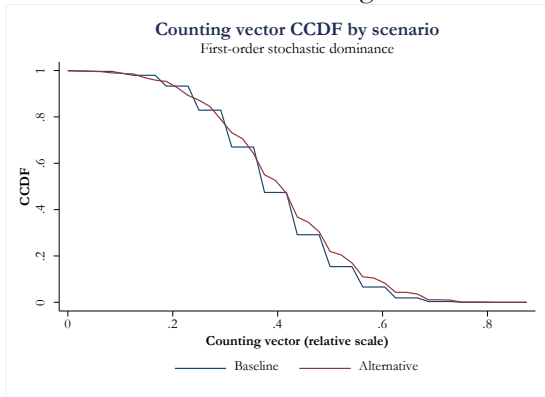
Peru

C12.1. FOSD: Counting Vector

Counting vector CCDF by scenario
First-order stochastic dominance

C12.2. Dominance Analysis

Difference between counting vector CDF curves
($\alpha=0$)

C12.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
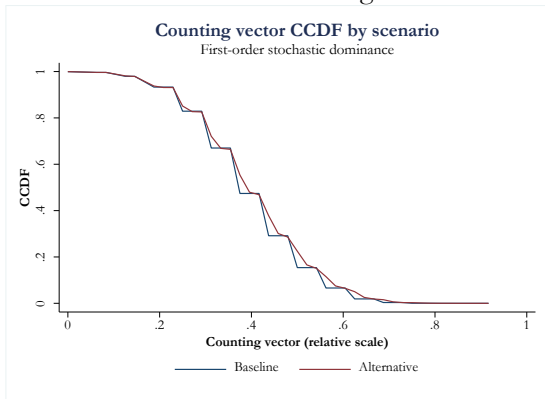
C12.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.94***	1***	0.98***
	Kendall tau-b	0.82***	0.99***	0.9***
A	Spearman	0.98***	0.86***	0.82***
	Kendall tau-b	0.9***	0.67***	0.7***
M0	Spearman	0.97***	0.99***	0.97***
	Kendall tau-b	0.89***	0.96***	0.89***

***p<0.01, **p<0.05, *p<0.1

South Africa

C12.1. FOSD: Counting Vector

C12.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

C12.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C12.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.97***	1***	0.92***
	Kendall tau-b	0.89***	1***	0.78***
A	Spearman	0.92***	0.87***	0.88***
	Kendall tau-b	0.83***	0.78***	0.72***
M0	Spearman	0.98***	1***	0.93***
	Kendall tau-b	0.94***	1***	0.83***

***p<0.01, **p<0.05, *p<0.1

C13. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Civil participation indicator removed (weights within the Process Legitimacy dimension were scaled from 6.25% to 8.33% so all weights add up to 1).
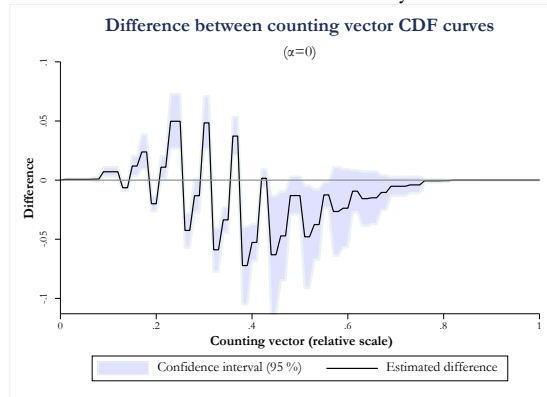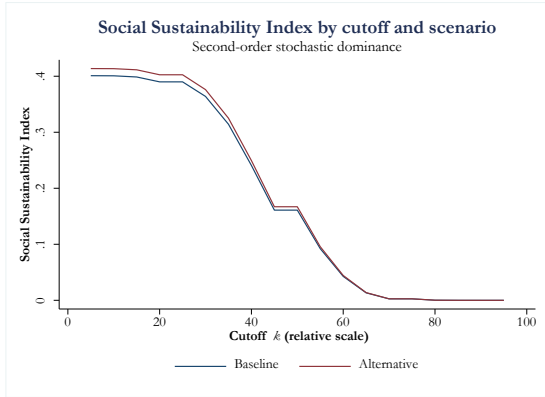
Peru

C13.1. FOSD: Counting Vector

C13.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C13.3. SOSD: Social Sustainability Index

C13.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.94***	0.92***	0.68***
	Kendall tau-b	0.81***	0.78***	0.53***
A	Spearman	0.92***	0.78***	0.74***
	Kendall tau-b	0.81***	0.63***	0.64***
M0	Spearman	0.93***	0.92***	0.68***
	Kendall tau-b	0.79***	0.77***	0.54***

***p<0.01, **p<0.05, *p<0.1

South Africa

C13.1. FOSD: Counting Vector

Counting vector CCDF by scenario
First-order stochastic dominance

C13.2. Dominance Analysis

Difference between counting vector CDF curves
(α=0)

C13.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

C13.4. Rank correlations

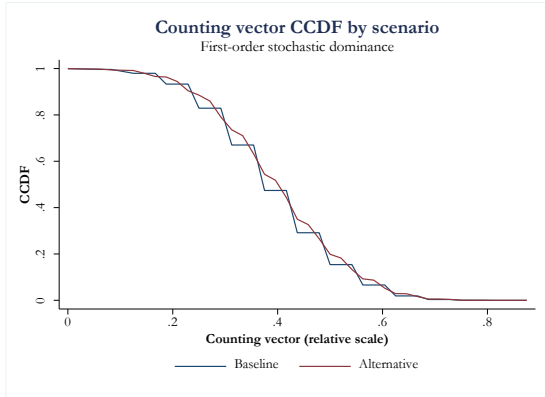| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.92***	0.98***	0.93***
	Kendall tau-b	0.78***	0.94***	0.83***
A	Spearman	0.95***	0.9***	0.93***
	Kendall tau-b	0.89***	0.78***	0.83***
M0	Spearman	0.98***	0.98***	0.98***
	Kendall tau-b	0.94***	0.94***	0.94***

***p<0.01, **p<0.05, *p<0.1

C14. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Satisfaction with democracy indicator removed (weights within the Process Legitimacy dimension were scaled from 6.25% to 8.33% so all weights add up to 1).
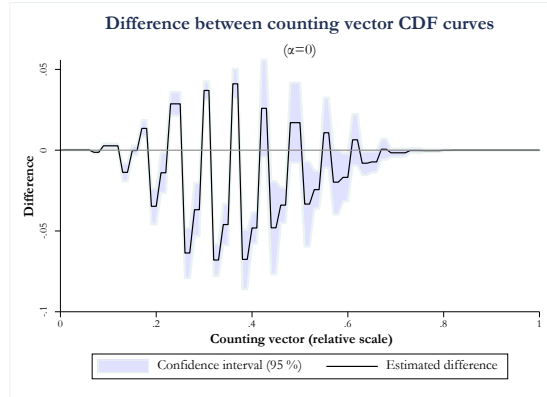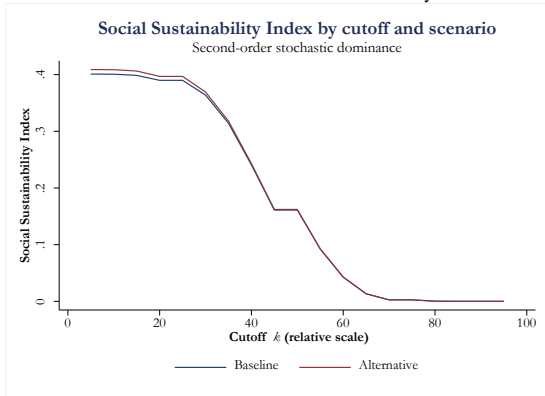
Peru

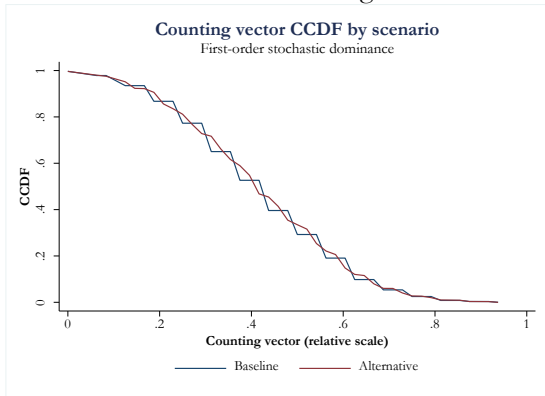### C14.1. FOSD: Counting Vector

C14.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C14.3. SOSD: Social Sustainability Index

C14.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.95***	0.87***	0.82***
	Kendall tau-b	0.84***	0.71***	0.64***
A	Spearman	0.9***	0.86***	0.8***
	Kendall tau-b	0.77***	0.71***	0.71***
M0	Spearman	0.95***	0.87***	0.81***
	Kendall tau-b	0.84***	0.73***	0.63***

***p<0.01, **p<0.05, *p<0.1

South Africa

C14.1. FOSD: Counting Vector

C14.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C14.3. SOSD: Social Sustainability Index

C14.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance
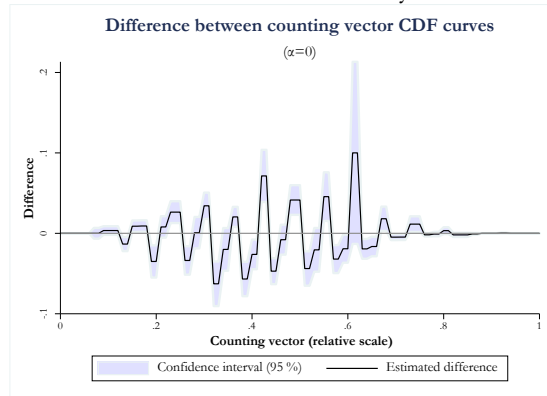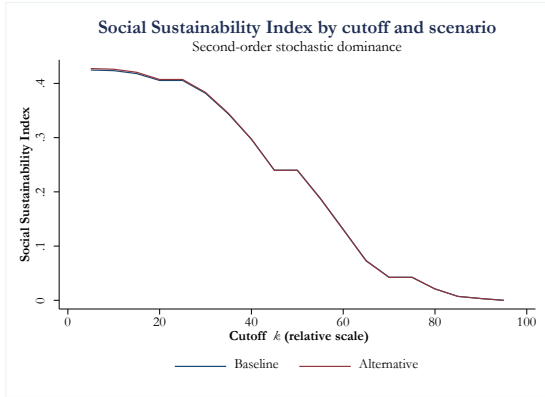
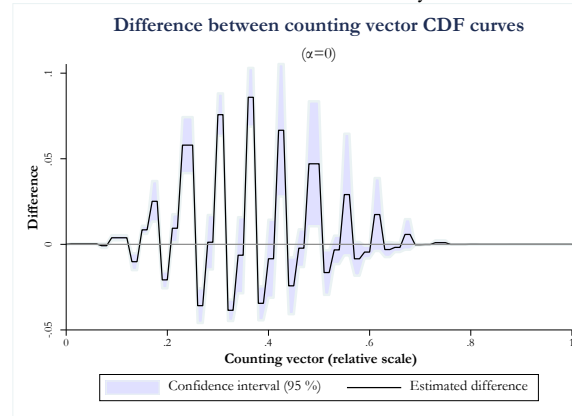| Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.92***	0.95***	0.98***
	Kendall tau-b	0.78***	0.89***	0.94***
A	Spearman	0.98***	0.93***	0.78**
	Kendall tau-b	0.94***	0.83***	0.67**
M0	Spearman	0.93***	0.93***	0.98***
	Kendall tau-b	0.83***	0.83***	0.94***

***p<0.01, **p<0.05, *p<0.1

C15. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Government effectiveness indicator removed (weights within the Process Legitimacy dimension were scaled from 6.25% to 8.33% so all weights add up to 1).
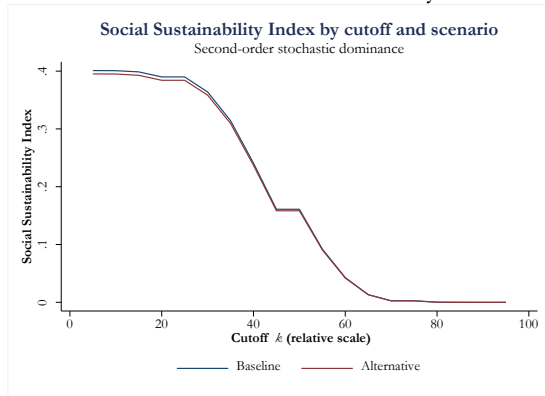
Peru

C15.1. FOSD: Counting Vector

Counting vector CCDF by scenario
First-order stochastic dominance

C15.2. Dominance Analysis

Difference between counting vector CDF curves
(α=0)

C15.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

C15.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.95***	0.82***	0.92***
	Kendall tau-b	0.83***	0.65***	0.77***
A	Spearman	0.91***	0.8***	0.93***
	Kendall tau-b	0.78***	0.64***	0.87***
M0	Spearman	0.96***	0.85***	0.93***
	Kendall tau-b	0.86***	0.71***	0.78***

***p<0.01, **p<0.05, *p<0.1

South Africa

C15.1. FOSD: Counting Vector   C15.2. Dominance Analysis
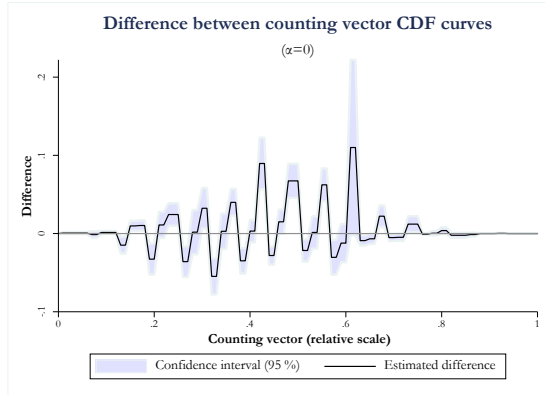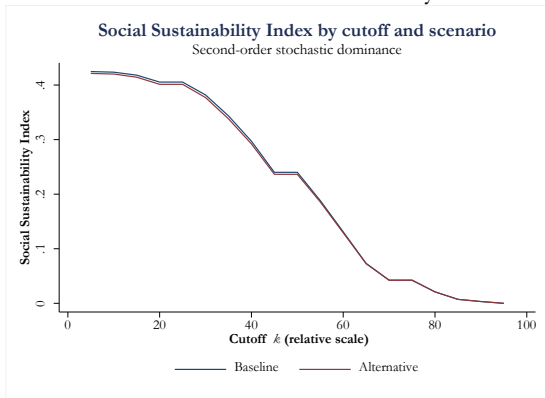
65

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

C15.3. SOSD: Social Sustainability Index

C15.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.93***	0.92***	0.97***
	Kendall tau-b	0.83***	0.78***	0.89***
A	Spearman	0.92***	0.85***	0.78**
	Kendall tau-b	0.78***	0.72***	0.67**
M0	Spearman	0.98***	0.92***	0.97***
	Kendall tau-b	0.94***	0.78***	0.89***

***p<0.01, **p<0.05, *p<0.1

C16. Change in the indicators included for each dimension, one indicator removed at a time. Baseline scenario: All indicators included. Alternative scenario: Equality before the law (Peru)/Satisfaction with the way corruption is combatted (South Africa) indicator removed (weights within the Process Legitimacy dimension were scaled from 6.25% to 8.33% so all weights add up to 1).
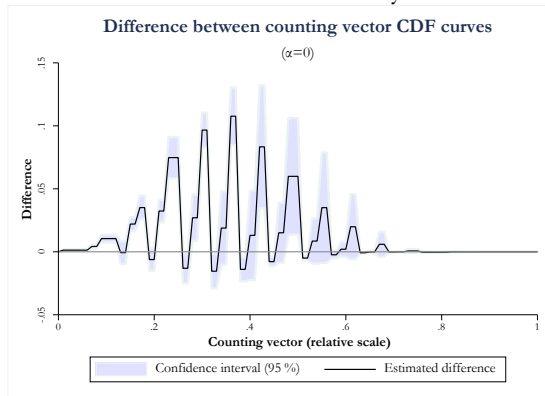
Peru

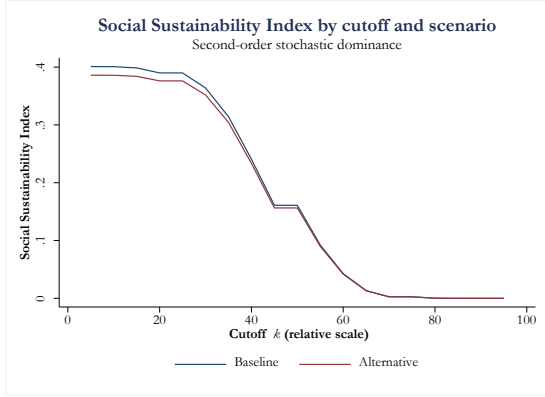A1.1. FOSD: Counting Vector

A1.2. Dominance Analysis

Counting vector CCDF by scenario
First-order stochastic dominance

Difference between counting vector CDF curves
(α=0)

A1.3. SOSD: Social Sustainability Index

A1.4. Rank correlations

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social Sustainability Index — Cutoff k (relative scale) — Baseline / Alternative

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	0.96***	0.77***	0.9***
	Kendall tau-b	0.85***	0.59***	0.75***
A	Spearman	0.88***	0.86***	0.88***
	Kendall tau-b	0.73***	0.71***	0.8***
M0	Spearman	0.95***	0.79***	0.89***
	Kendall tau-b	0.84***	0.61***	0.73***

***p<0.01, **p<0.05, *p<0.1

South Africa

C16.1. FOSD: Counting Vector
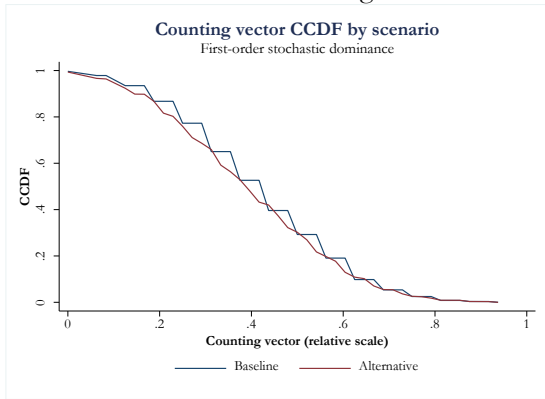
Counting vector CCDF by scenario
First-order stochastic dominance

CCDF — Counting vector (relative scale) — Baseline / Alternative

C16.2. Dominance Analysis

Difference between counting vector CDF curves
($\alpha=0$)

Difference — Counting vector (relative scale) — Confidence interval (95 %) / Estimated difference

C16.3. SOSD: Social Sustainability Index

Social Sustainability Index by cutoff and scenario
Second-order stochastic dominance

Social Sustainability Index — Cutoff k (relative scale) — Baseline / Alternative
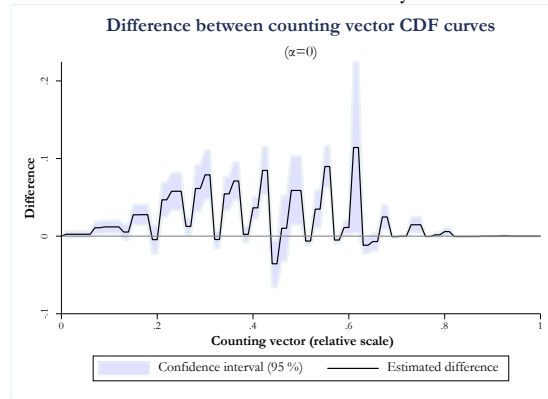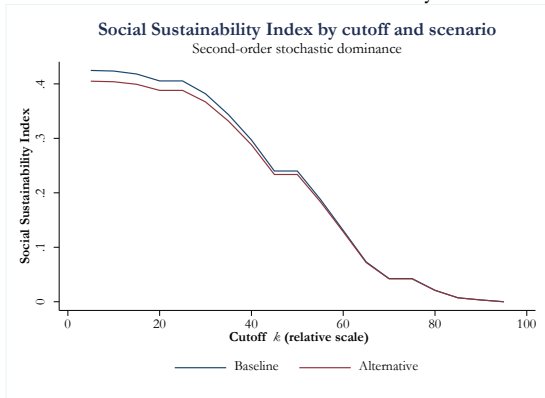
C16.4. Rank correlations

Social gaps Metrics	Rank correlation coefficient	Cutoff values		
		k = 33%	k = 50%	k = 75%
H	Spearman	1***	0.9***	0.98***
	Kendall tau-b	1***	0.72***	0.94***
A	Spearman	1***	0.87***	0.9***
	Kendall tau-b	1***	0.72***	0.78***
M0	Spearman	0.98***	0.93***	0.97***
	Kendall tau-b	0.94***	0.83***	0.89***

***p<0.01, **p<0.05, *p<0.1