Quality & Quantity
https://doi.org/10.1007/s11135-025-02286-5

Horizontal subsidiarity is not social capital: theoretical reflections and a proposal of measurement

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Accepted: 2 July 2025

Abstract
This paper conceptualises and measures horizontal subsidiarity as a key factor of social sustainability, showing its irreducibility to social capital and proposing a formative measurement model to assess it and its connection to socio-economic development. The measurement model is instantiated on Italian regional data for different years. The results reveal a distinct variability in the level of horizontal subsidiarity across regions and a significant impact on social well-being indicators. Horizontal subsidiarity thus emerges as the channel through which social capital generates the common good. Finally, the study emphasises the need for more detailed and granular data to better understand, measure, and model horizontal subsidiarity and its relationship to social and economic development.

Keywords Composite indicator · Horizontal subsidiarity · Italian regional statistics · Social capital · Socio-economic development · Socio-economic sustainability

1 Introduction

The expression ‘principle of subsidiarity’ refers to a general criterion of social organisation, which aims at balancing the power of the state and the role and autonomy of intermediate societies, valorising the initiative of people, respecting the freedom and the dignity of the human person, and upholding their right to association as a key to the promotion of the common good (Fattore and Vittadini 2021). The principle embodies the idea that the health

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Published online: 23 July 2025

of a society mostly depends on the empowerment of individuals acting together through social groupings and associations, fostering a tendency towards solving problems at the local level, owing to the vitality of mediating structures in society (Vischer 2001). Introduced in the European Union (EU) by the 1992 Maastricht Treaty, subsidiarity 'is a principle of locating governance at the lowest possible level—that closest to the individuals and groups affected by the rules and decisions adopted and enforced' (Slaughter 2004: 30). In this context, multi-level governance (MLG) serves as the policy-making framework that enacts the subsidiarity principle (Milio 2014). MLG implies the distribution of decision-making power across multiple government levels, in contrast to state-centric governance (Hooghe and Marks 2001, 2003), and is embodied (Dąbrowski 2014) in the principle of partnership, which demands close collaboration across supernational, national, and subnational government levels (vertical partnership), along with the involvement of a variety of public, private, and societal actors (horizontal partnership). The partnership principle fosters increased interaction and cooperation not only between policy actors across different levels, but also among government institutions and non-governmental actors in policy implementation, allowing strategies and programmes to be adapted to territorial specificities (Dąbrowski et al. 2014; Dąbrowski 2013, 2014). In this perspective, two main forms of subsidiarity may be considered: 'vertical subsidiarity' (VS), addressing the distribution of powers across different levels of the public sphere, and 'horizontal subsidiarity' (HS), pertaining to the sharing of competences and initiatives between public and private actors, promoting and supporting communities, civil society, and market organisations to act and take responsibility in various domains (Colombo 2004; Urbinati 2018). Here, we are interested in the horizontal perspective, although the meaning of VS has progressively shifted towards the comprehensive idea of *active subsidiarity* (Lopatka 2019), which calls for closer cooperation between institutions and local and regional authorities throughout the entire policy-making process, fostering a more inclusive and effective governance system and making it increasingly difficult to draw a sharp line between the two dimensions of the principle. While VS has been widely studied, much less explored is the role of HS in social development, although its positive impact on societies is often acknowledged. The lack of empirical and statistical studies on HS is partly due to the tendency to overlook the distinction between it and social capital (SC), confounding the conceptualisation and the measurement of the former with those of the latter. Despite its socio-economic centrality, HS is therefore mostly addressed in theoretical terms, overlooking the crucial problem of its empirical assessment. The paper contributes to filling this gap, developing a first attempt to evaluate HS at a regional level in Italy, where subsidiarity was introduced in 2000, with the reform of the Constitution and its Title V. This defined the powers and prerogatives of the central State, Regions, Provinces, and Municipalities (Urbinati 2018), transferring competences from higher to lower government levels (Milio 2014). Interestingly, in terms of state-society relations, Italy is classified by Esping-Andersen (1990: 3) under the conservative or corporatist regime, with a welfare state where social benefits and rights are closely linked to employment status and class, and which significantly relies on familial support. The Italian welfare state is marked by significant legal obligations for family members to support one another, reducing the state's role in providing care services (Esping-Andersen 1999). Italy has a universal healthcare system, with significant regional quality disparities exacerbated by decentralisation and, despite recent reforms aiming to modernise its welfare state, it still faces significant regional disparities and difficulties in fully achieving an equitable welfare system.

The paper provides three main contributions to the literature. First, it discusses and makes precise the notion of HS, highlighting its relationship and distinction from SC.

Second, it proposes a composite indicator to operationalise and measure HS. Finally, it explores the association between HS and some social development indicators (namely, Employment Rate, Avoidable Mortality, and Risk of Poverty).

The paper is structured as follows. Section 2 discusses the concepts of SC and HS, emphasising their affinities and differences. Section 3 introduces the four conceptual pillars of HS. Section 4 presents the elementary indicators used in the construction of the pillar indicators. Section 5 introduces the Adjusted Mazziotta-Pareto methodology for building composite indicators. Section 6 computes the HS composite indicators for Italian regions. Section 7 investigates the link between HS and social development. Section 8 concludes and suggests future research directions.

2 Social capital and horizontal subsidiarity: affinities, interconnections and substantial differences

In this section, we discuss the relation between SC and HS, demonstrate that the latter is irreducible to the former, and set the stage for the subsequent analytic developments.

2.1 Social capital

The Oxford Dictionary defines SC as 'the networks of relationships among people who live and work in a particular society, enabling that society to function effectively.' According to Putnam, SC is tied to 'connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them' (Putnam 2000: 19), with families as 'the most fundamental form of social capital' (Putnam 1995: 65). Putnam (2000) also states that SC encompasses the value of social connections, the trust among people and the social norms that promote cooperation and collective action. SC is often seen as a valuable resource for communities, facilitating the coordination of collective action, contributing to the well-being of individuals and societies (Coleman 1988), and promoting civic engagement (Morrow 1999). According to Bowles and Gintis (2002), SC refers to trust, but also to a willingness to live by the norms of one's own community. Islam et al. (2006) consider SC as an output of social relationships arising from reciprocal exchanges between members involved in social associations or networks, and recognised as a public good, generating positive externalities and facilitating cooperation towards common goals. The core idea of SC is thus straightforward: 'society is better when people trust and feel connected to each other, actively participate in their communities' social and civic institutions, and spend time with friends and neighbours' (Leyden and Goldberg 2015: 40). Simply put, a community rich in stocks of SC is supposed to be more likely to have effective civic institutions, to maintain law and order, and, hence, to prosper (Lochner et al. 1999). Indeed, it is acknowledged that SC plays an important role (Fukuyama 2002; Fafchamps 2006) in promoting social development, enhancing qualitative changes that help societies improve quality-of-life dimensions, without any special emphasis on monetary growth (Cleveland and Jacobs 1999). Communities with high SC are more likely to have better health outcomes, higher levels of educational attainment and employment rate, less poverty, less environmental degradation, and fewer avoidable deaths. This is because SC promotes cooperation, mutual support and a sense of shared responsibility, helping create a more cohesive and cooperative society. Thus, SC can be seen as a key asset of sustainable social development,

having positive impacts at all levels of society, even enhancing the performance of economic organisations and companies (Brown-Graham 2020).

In summary, the 'keywords' of SC can be identified in: (i) *Relationships*, as SC is built on interpersonal relationships and social networks that allow individuals and groups to interact and exchange resources; (ii) *Trust*, as SC enables cooperation and reduces transaction costs; (iii) *Reciprocity*, as SC increases the capability for individuals and groups to exchange favours and support each other; (iv) *Shared norms and values*, as SC supports expectations and behavioural standards within a community or society.

2.2 Horizontal subsidiarity

HS can be synthetically defined as the criterion according to which intermediate societies have the right to perform social functions, and the state must support them and favour their action, without taking upon their competencies and functions. According to Bifulco (2016), HS should be able to valorise local actors, such as third-sector organisations and individual citizens. It has its foundation in a 'relational' conception of the common good, according to which a good is 'common' because only together can it be recognised, generated, and enjoyed (Donati 2009). The good thus resides within the solidarity relationships that connect the subjects and through which it is generated. The common good is 'the whole *conditions* of social life that allow groups, as well as the single members, to completely and quickly reach their own perfection' (Pope Paul VI, 1965, *Gaudium et Spes*: 26). It is thus indivisible, and only together it is possible to generate it and safeguard its effectiveness. The common good is a responsibility of individuals and of the state, but also of the intermediate social bodies that play a key role in its generation. To pursue it, an action system needs means and rules and HS is a way to supply such means, moving resources to support and help others without making them passive. The common good is, in fact, an emergent consequence of the combined actions of subsidiarity and solidarity, operating through social forms (Donati 2009). In such a relational configuration, the third sector and the fourth sector (informal networks and families) play a central role, being moved by free giving and reciprocity and can fully express their potential when not treated as residual subjects, just needing aid, rules, and control by the state and the market. Society is no longer pyramidal or hierarchical but reticular and autopoietic in its structures and in its morphogenetic processes, becoming a so-called relational society (Donati 2009).

Assuming a socio-economic perspective, which mainly emerges through the action of the third sector. Urbinati (2018) defines HS as a modality through which social and economic realities (individuals, communities, businesses, and local state administrations) coordinate their actions in relation to their specific objectives (e.g., to carry out services, like school or healthcare), generating good practices and standards that bind people together and consolidate their cooperation. HS is then tightly connected to the dynamism of the intermediate bodies and social aggregations, where relational people aggregate for ideal, religious, economic, social, solidaristic, and cultural reasons. These aggregations, non-profit companies that reinvest their profits to finance their own social and economic activities (Salamon and Sokolowski 2004), enable people to build social and economic activities as supportive responses to needs and to actively participate in building the common good (Urbinati 2018). Third sector activities are characterised by greater flexibility and adaptability in decision-making processes, as different contexts may require different solutions (Salamon 2014), and by the ability to self-organise and evolve along with the emergence of new personal and social needs. They have

the fundamental function of fighting against inequalities and serving as a driving force for social development, cooperating with other intermediate bodies and institutions in building the common good. As stated by Rajan (2019), HS is linked to the presence of structured and organised local communities that modify the actions of the global market and public authorities for the benefit of the population. This allows for greater local autonomy and decision-making capacity. Local communities bring many benefits and 'less divisions when ethnic identities are expressed at the community level, rather than at the national level; greater social participation in community institutions; a greater sense of self-determination on the part of ordinary citizens; stronger local ties that allow neighbours to fill gaps in formal support structures; greater space for political and economic experimentation' (Rajan 2019: 327). Therefore, local communities make it possible to rebalance the relationship between maximising profit and maximising value, using the real competition of the markets against the oligopolies of large economic organisations and companies.

Noticeable is the assonance of this HS approach with the 'economics of well-being' of the Nobel Prize winner Kenneth Arrow (1951). Arrow demonstrates that the maximisation of individual utility, if sought in absolute terms, is incompatible with the maximisation of the common good. A reconciliation between the rational choices of the individual and the interests of society is possible if groups of people give up part of their absolute individual utility to agree based on so-called *socialising desires*, generating a healthy market and a democratic regime. As Millon-Delsol (1992) states, the idea of HS implies a redefinition of the relationship between the state and citizens, not in the institutional sphere, but in that of action to be taken in view of the general interest. In fact, socialising desires anthropologically ground the concept of HS and are at the heart of political and economic actions generating the common good. Therefore, HS is much more than a social practice: it is an organic conception of society and government that corrects the bipolar single citizen/state paradigm that underpins modern democratic citizenship (Urbinati 2018), reconciling the ends of individuals with the ends of the social body to which they belong.

HS thus emerges as a key asset for social sustainability, understood as the capacity of a society to continuously generate and regenerate the common good. As made clear by Elinor Ostrom (1990: (1) with regard to the long-term economic sustainability of natural resource management: '[…] neither the state nor the market is uniformly successful in enabling individuals to sustain long-term, productive use of natural resource systems.' Ostrom (1990) seeks to move beyond the long-standing debate, which sees the public wriggling against the private, the state against the market, and envisages a third way connected to the role of HS and to the need for establishing new institutions, created and governed directly by the citizens themselves, with the task of managing the 'commons.' Ostrom (1990) challenged traditional models that propose state intervention or privatisation as the only viable solutions for managing common-pool resources (CPRs). She argued that focusing solely on private ownership or centralised regulation overlooks the potential for successful communal management. Ostrom provided empirical evidence showing that local and self-organised institutions can effectively govern shared resources through collective actions. She emphasised the importance of context-specific solutions, considering local conditions and the community's capacity for self-governance. Ostrom also identified key principles for effective CPR management, including clearly defined boundaries, locally tailored rules, collective decision-making, and graduated sanctions for those who violate the rules. Similarly, Rajan (2019) argued that viewing economics purely through the state-market lens is short-sighted, as markets are deeply intertwined with social relationships. Accordingly, Rajan proposed a new approach to reconsidering the connection between the market and

civil society, advocating for a renewed focus on strengthening and empowering local communities as a remedy to rising despair and social unrest.

In more general terms, people and communities are better able to govern themselves and their affairs than a distant, centralised authority. In the context of HS, decision-making and responsibilities are decentralised and delegated to lower-level authorities or bodies within the same level of government. *Decentralisation*, proximity to the issue, *empowerment* of individuals and local communities, and *flexibility* of decision-making processes are the 'keywords' of HS as 'an organic conception of society and government that proves capable of projecting a new meaning of citizenship, one that is not connected to the authorizing individual subject—the citizen as the depository of the basic legitimating power through her or his right to suffrage—but to a package of functions and rights that persons acquire when entertaining a direct relationship with the administration' (Urbinati 2018: 205).

2.3 Substantial differences

Although SC and HS may seem similar concepts, there are fundamental differences. SC primarily focuses on social networks and the bonds between individuals, which facilitate cooperation (Putnam et al. 1993). HS focuses on civil society institutions and their ability to play a parallel or complementary governance role alongside the state. Moreover, SC aims to strengthen relationships between individuals and groups with the goal of promoting trust and cooperation (Putnam et al. 1993). HS has a more explicitly institutional objective: it seeks to define a distribution of responsibilities between civil society, the market, and the state (Ostrom 1990). SC mainly operates at the micro or meso level, as it pertains to the functioning of social networks within local communities, while HS can also operate at the macro level, as it requires an institutional framework that supports the autonomy of civil society in providing public goods (Ostrom 1990).

Based on these theoretical characteristics, the present paper assumes that SC is an essential component of HS, which builds on it but also requires institutional arrangements, engagement in horizontal associations, and collective actions (Ostrom 1990). Moreover, as remarked by Putnam et al. (1993), 'Voluntary cooperation (like rotating credit associations) depends on social capital' (177). The literal interpretation suggests that SC promotes, but does not equate to, volunteering. For this reason, the present paper distinguishes SC from the more active concept of HS. In this regard, our approach aligns more closely with the work by Knack and Keefer (1997), who used trust and civic norms as the primary indicators of SC. Knack and Keefer also explored the role of associational activity, such as participation in formal groups. However, their study found that memberships in formal associations did not strongly correlate with trust or improved economic outcomes. This challenged Putnam's earlier assertion that group memberships foster SC, thus reinforcing the rationale to avoid including associational activity as a key measure of SC.

In summary, SC and HS are clearly distinct concepts. Although both relate to social relationships and collaboration, they operate at different levels and have distinct implications for community development and governance. SC facilitates the growth of interpersonal and social trust and thus of subsidiarity; however, it is neither a mandatory nor a sufficient condition for it. When there are influential figures in the intermediate bodies, that urge the other components not to close in on themselves but to trust the members of the intermediary bodies to which they belong and the basic structures of society and the state, third sector activity can be relevant even if social capital is not high. Analogously, third sector activity and decentralised decision-making may emerge even in the absence

of strong social networks, through the initiative of people with strong personalities and charisma.

3 The pillars of horizontal subsidiarity

The previous discussion leads to the definition of four conceptual pillars behind HS and to the identification of four corresponding sets of indicators, later aggregated into composites. The first two pillars—*Interpersonal trust* and *Social trust*—refer to the foundational and anthropological aspects of HS, namely the relational character of people:

1. *Interpersonal trust*, capturing the trust in relationships with family members, friends, and those who live and cooperate in intermediate bodies. Interpersonal trust is the condition for intermediate bodies to act in society, through social and economic activities. It generates greater control of people over their own lives and resources, making them aware of their own potential without depending on the consent of others.
2. *Social trust*, capturing trust in the social and political order in which individuals move. Social trust reflects the desires and aspirations of people and the intermediate bodies they belong to and it provides evidence that people do not simply want to deal with their reality in corporate terms, closed and hostile to other realities, but wish to build the common good together, as suggested by Arrow's socialising desires. In the HS perspective, the consequence of social trust is the desire to participate from below in decision-making processes, therefore leading to the sharing of power between multiple actors and local governance structures, rather than concentrating it in the hands of a few.

The first two pillars overlap with some dimensions of SC, which is the background of subsidiarity, and which is also increased by subsidiarity itself, in a positive feedback loop. Therefore, these pillars can be interpreted both from the perspective of SC, as they describe the relational characteristics of people, and from the perspective of HS, as they form the dynamism of intermediate bodies.

The third and fourth HS pillars, namely *Third sector activity* and *Decentralised decision-making*, refer to the way HS emerges at the socio-economic level, as a channel through which the first two pillars turn into the generation of the common good:

3. *Third sector activity*, capturing the manifestation of HS at the level of the action of social bodies and their presence in the social fabric. The existence of a flourishing third sector brings into society innovation, flexibility, and adaptability, all of which are key elements of HS.
4. *Decentralised decision-making*, a key aspect of **s**ubsidiary decision-making processes, because HS prescribes decisions to be made by the actors closest to the issue at hand, rather than by a central authority. HS gives communities and individuals greater control over their own lives and resources, 'decentralising' the way these (e.g., knowledge, expertise, financial assets) are exploited and employed in decision-making processes.

In the next section, these pillars are associated with proper elementary indicators, selected by compromising between their ideal meaning and their practical availability, and later aggregated into four composite indicators and into the final HS indicator.

Remark. As discussed in the previous sections, HS emerges as a way of structuring the potentialities of SC into actual socio-economic processes, through the action of the third sector, within the institutional context. In this respect, cooperation between HS agents and public institutions, e.g. by co-designing policies, actions, and services, would be strong evidence of 'HS at work' and would constitute a fifth pillar of HS. Unfortunately, this kind of cooperation is at an early stage in Italy, and no data currently exist to cover this relevant facet of HS.

4 Elementary indicators for the measurement of horizontal subsidiarity

To operationalise the measurement of HS, we exploited the indicators produced by the Italian National Institute for Statistics (Istat), within the Equitable and Sustainable Well-being (BES, from the Italian 'Benessere Equo e Sostenibile') initiative. The BES report 'is an in-depth portrait of the state of the country, carefully portrayed by official statistics from the perspective of the well-being of its citizens' (Istat 2021b: 5). BES reports were created starting from the Stiglitz-Sen-Fitoussi Commission of 2009 (Stiglitz et al. 2009), Eurostat's Beyond GDP programme (Eurostat 2010), and the OECD's Better Life Index (2011).

BES indicators are a shared and articulate information source 'for measuring the degree to which policies actually produce changes in people's lives' (Istat 2021b: 5). They are based on a large set of elementary indicators, covering many facets of the country and citizens' lives: Health; Education and training; Work and life balance; Economic well-being; Social relationships; Politics and institutions; Safety; Subjective well-being; Landscape and cultural heritage; Environment; Innovation, research, and creativity; Quality of services. The analysis was conducted at the regional scale due to the lack of statistical records at the local scale (provincial and municipal levels). The selected indicators are reported in Table 1 (Istat 2021b).

Remark. By "polarity" it is meant the "direction" of the indicator with respect to the assumed evaluation perspective, of the underlying trait. For example, the unemployment rate has negative polarity when assessing economic development and has positive polarity when assessing economic underdevelopment. To be properly combined into a synthetic indicator, elementary indicators must have the same polarity, motivating the above formulas. All the elementary indicators listed in Table 1 have positive polarity. Later, when linking subsidiarity to socio-economic development, target indicators with negative polarity are also employed.

The ultimate data source for all the elementary indicators involved in both HS pillars and BES is the survey on 'Aspects of daily life' (Istat 2021a), except for data on non-profit organisations, whose source is the 'Statistical register and Census of non-profits' (Istat 2021c), and for voter turnout, whose source is the Minister of Interior (2023). Data are available for each region and the whole country, for the years 2009, 2014, 2019, and 2022.

Table 1 Elementary indicators selected for the HS measurement

Pillar	Elementary indicators
Interpersonal trust	1. *Satisfaction with family relations*: Percentage of people aged fourteen and over who are very satisfied with family relationships as a proportion of the total population aged fourteen and over (polarity: positive) 2. *Satisfaction with friends' relations*: Percentage of people aged fourteen and over who are very satisfied with relationships with friends as a proportion of the total population aged fourteen and over (polarity: positive) 3. *People to rely on*: Percentage of people aged fourteen and over who have relatives, friends, or neighbours (besides parents, children, siblings, grandparents, and nephews) they can rely on, as a proportion of the total population aged fourteen and over (polarity: positive)
Social trust	1. *Generalised trust*: Percentage of people aged fourteen and over who feel that most people are worthy of trust, as a proportion of the total population aged fourteen and over (polarity: positive) 2. *Trust in the Parliament*: Average score of trust in the Italian Parliament (on a scale from 0 to 10) reported by people aged fourteen and over (polarity: positive) 3. *Trust in judicial system*: Average score of trust in the judicial system (on a scale from 0 to 10) reported by people aged fourteen and over (polarity: positive) 4. *Trust in political parties*: Average score of trust in political parties (on a scale from 0 to 10) reported by people aged fourteen and over (polarity: positive) 5. *Trust in police and fire brigade*: Average score of trust in the police and the fire brigade (on a scale from 0 to 10) reported by people aged fourteen and over (polarity: positive)
Third sector activity	1. *Voluntary activity*: Percentage of people aged fourteen and over who have performed free activities for voluntary associations or groups in the last 12 months, as a proportion of the total population aged fourteen and over 2. *Association funding*: Percentage of people aged fourteen and over who have funded associations in the last 12 months, as a proportion of the total population aged fourteen and over (polarity: positive) 3. *Non-profit organisations*: Number of non-profit organisations per 10,000 inhabitants (polarity: positive)
Decentralised decision-making	1. *Social participation*: Percentage of people aged fourteen and over who have performed at least one social participation activity in the last 12 months, as a proportion of the total population aged fourteen and over. The activities in question are: participation in meetings of associations (cultural/recreational, ecological, civil rights, peace); participation in meetings of trade union organisations, professional or trade associations; meetings of political parties and/or performance of free activities for a party; payment of a monthly or quarterly fee for a sports club (polarity: positive) 2. *Civic and political participation*: Percentage of people aged fourteen and over who perform at least one of the activities of civic and political participation, as a proportion of the total population aged fourteen and over. The activities in question are: speaking about politics at least once a week; informing oneself of the facts of Italian politics at least once a week; attending online consultation or voting on social issues (civic) or political issues (e.g., urban planning, signing a petition) at least once in the 3 months prior to the interview; reading and posting opinions on social or political issues on the web at least once in the 3 months preceding the interview (polarity: positive) 3. *Voter turnout*: Percentage of eligible voters who cast a ballot in the last election for the European Parliament (polarity: positive)

5 Constructing the composite indicator of horizontal subsidiarity: the adjusted Mazziotta-Pareto methodology

The measurement of multidimensional traits, like HS, poses several methodological problems, particularly regarding how to quantify their different facets and aggregate them into a final composite indicator, preserving as much information as possible (De Muro et al. 2011; Mazziotta and Pareto 2013, 2017, 2019, 2024; Saisana and Tarantola 2002; Salzman 2003). To cope with these difficulties, the typical working paradigm for building composite indicators requires addressing the following steps, which should guide researchers and limit the arbitrariness of the choices that unavoidably must be made when aggregating multidimensional data:

1. Adopt a consistent theoretical framework underpinning the trait to be measured (Diamantopoulos et al. 2008).
2. Select qualified elementary indicators based on their relevance, soundness, timeliness, accessibility, and other quality features (see Terzi et al. 2021).
3. Fix the polarity of the indicators and normalise them to assure comparability.
4. Choose a sound way to aggregate the normalised indicators into a final composite, minimising information loss.

The last step is the most critical one, the aggregation criterion having significant consequences on the final result and its interpretation. A major problem in this phase is *compensation* between the input indicators, particularly when these are non-substitutable. Compensation may flatten the final scores, reduce their discrimination and ranking power, and hinder the final interpretation. Subsidiarity is definitely a complex phenomenon, requiring a formative measurement approach. And since the selected elementary indicators are indeed non-substitutable, it is of great importance that no compensation between them exists, so excluding the use of purely linear aggregators (Mazziotta and Pareto 2019). To cope with this, the Adjusted Mazziotta-Pareto methodology is adopted here. It aggregates elementary indicators that are not fully substitutable, employing a non-linear function based on the arithmetic mean of individual scores, corrected by a 'horizontal penalty function,' penalising units with imbalanced profiles and rewarding units that, with equal means, have greater balance among their scores. The Adjusted Mazziotta-Pareto Index (AMPI) performs absolute time comparisons of the statistical units, by re-scaling elementary indicators in the range [70,130], according to two goalposts: a minimum and a maximum value, representing the range of each elementary indicator for all time periods and statistical units (Mazziotta and Pareto 2016). Formally, the development of the AMPI proceeds as follows. From the n x m (units x variables) data matrix $X=\{x_{ij}\}$, the matrix R of normalised scores r_{ij} is calculated as:

$$r_{ij} = \begin{cases} \dfrac{(x_{ij} - \text{Min}_{x_j})}{\text{Max}_{x_j} - \text{Min}_{x_j}} * 60 + 70, & \text{if the indicator polarity is positive} \\ \dfrac{\left(\text{Max}_{x_j} - x_{ij}\right)}{\text{Max}_{x_j} - \text{Min}_{x_j}} * 60 + 70, & \text{if the indicator polarity is negative} \end{cases}$$

where Min_{x_j} and Max_{x_j} are the goalposts for indicator j. Denoting Inf_{x_j} and Sup_{x_j} as the overall minimum and maximum of indicator j across all times and units, and Ref_{x_j} as the reference value for indicator j, the goalposts are defined as:

$$\begin{cases} \text{Min}_{x_j} = \text{Ref}_{x_j} - \Delta \\ \text{Max}_{x_j} = \text{Ref}_{x_j} - \Delta \end{cases}$$

where $\Delta = (\text{Sup}_{x_j} - \text{Inf}_{x_j})/2$.

AMPI values fall approximately in the range [70, 130], while 100 represents the reference value (here, the Italian average in a given year). Denoting M_{r_i}, S_{r_i} and cv_i the mean, the standard deviation, and the coefficient of variation for the normalised scores of unit *i*, the generalised form of the AMPI is then:

$$\text{AMPI}_i^{\pm} = \text{M}_{r_i} \pm (\text{S}_{r_i} * \text{cv}_i)$$

where:

$$\text{cv}_i = \frac{\text{S}_{r_i}}{\text{M}_{r_i}}$$

The '$\pm$' sign is set as negative if the composite indicator is positively related to a positive trait—for example, HS—and as positive when it is positively related to a negative trait—for example, poverty (Mazziotta and Pareto 2016). The Adjusted Mazziotta-Pareto methodology is robust and adaptable to many different contexts, particularly when it is essential to avoid compensations. The only critical step in the AMPI construction is the choice of the base/reference year in the case of time-series data. Since the penalty is based on the variability in the reference year, it is desirable for the latter to represent a stable situation, not affected by shocks that could alter the temporal analysis, hindering the detection of time trends (Mazziotta and Pareto 2016). The robustness of the AMPI over other procedures has been checked by performing an influence analysis, which aims to quantify the weight of each elementary indicator in the composite. The robustness is assessed by excluding elementary indicators one at a time, recalculating the index for each region, and comparing the implied rankings and the key features of the final score distribution. AMPI proved to be the most robust method, as it delivered the lowest coefficients of variation, in terms of mean absolute rank differences.

6 Horizontal subsidiarity in Italian regions

The selection of elementary indicators for measuring HS followed the working paradigm of the BES project, whose framework provides an innovative approach to assessing societal progress beyond GDP, offering a more comprehensive and accurate view of citizens' quality of life, including social and environmental aspects. The indicators chosen for this study belong to the theoretical definition of subsidiarity and are available in the BES framework. For each year, i.e., for 2009 (the reference year), 2014, 2019, and 2022, the pillar indicators were computed and then aggregated into the HS composite. Table 2 provides the final HS scores for Italian regions, and the whole country, over time.

As can be observed, HS tends to decrease from Northern to Southern and from Eastern to Western areas of the country, reflecting the historical Italian pattern of socio-economic development. HS is particularly high in the autonomous provinces of Bolzano and Trento, consistently with their history of good administrative practices. Higher levels of HS can be found in Emilia-Romagna, with its well-structured

Table 2 Regional and national HS composite indicators over time

Region	2009	2014	2019	2022
Piedmont	103.5	103.9	104.2	100.5
Valle d'Aosta	101.4	99.5	105.9	102.0
Liguria	103.2	101.8	104.3	103.4
Lombardy	105.6	101.2	103.0	101.7
Bolzano (aut. province)	116.7	115.5	115.0	113.3
Trento (aut. province)	116.0	110.8	115.4	111.3
Veneto	105.4	98.4	102.1	102.4
Friuli-Venezia Giulia	108.6	104.2	106.0	104.5
Emilia-Romagna	108.1	106.3	105.5	105.4
Tuscany	107.7	105.8	105.9	103.1
Umbria	103.6	99,9	105.4	103.1
Marche	101.5	96.6	100.2	99.1
Lazio	97.9	97.8	97.0	98.4
Abruzzo	92.2	95.2	96.9	98.1
Molise	92.5	92.9	92.1	90.3
Campania	87.4	84.6	86.9	88.6
Puglia	89.3	86.8	91.6	87.8
Basilicata	95.5	86.7	92.7	89.0
Calabria	86.1	86.7	88.9	87.5
Sicily	87.4	85.2	86.7	86.6
Sardinia	95.7	95.7	93.3	96.9
ITALY	100.0	97.3	99.0	98.2

cooperative system, Friuli-Venezia Giulia, Tuscany, and, to a slightly lower extent, in Veneto, Lombardy, and Liguria. HS is much less developed in Southern regions, particularly in Calabria, Campania, and Sicily, with Lazio somewhat in the middle. A possible explanation is that strong family ties in Southern Italy may reduce individuals' willingness to cooperate in social networks or to develop intermediate institutions between the family and the state. Moreover, Emilia-Romagna's ranking aligns with the main insights from Putnam et al. (1993), who highlighted its exemplary governance and strong civic traditions as key factors contributing to its high institutional performance. According to the scholars, Emilia-Romagna's success was largely attributed to its vibrant civic engagement, egalitarian social relations, and high levels of social capital, which contrast sharply with the clientelistic and fragmented political culture of less successful regions.

The overall temporal trend of HS levels is decreasing, possibly for two distinct reasons. First, during these years, the financial and pandemic crises strained the presence of the third sector, whose activity is also evidently linked to available private and public economic resources. Second, most of the governments between 2010 and 2020 did not promote the presence of intermediate bodies (Bassanini et al. 2021). In this respect, it is notable that Abruzzo is the only Italian region where HS is increasing.

7 Horizontal subsidiarity and social development

This section explores the link between HS and social development by statistically modelling the relationship between some key regional socio-economic indicators, namely (i) *Employment Rate* (*ER*), (ii) *Avoidable Mortality* (*AM*), and (iii) *Risk of Poverty* (*RP*), and both the HS composite and its four pillars (notice that the polarity of ER is positive, while that of AM and RP is negative). We limit ourselves to investigating and quantifying the statistical association between HS and these three social development indicators, as it is not possible, with the available data, to unveil the existence of causal relationships, although the real impact of HS on the common and societal good is the foundational hypothesis of our work. The presence of effective associations between HS and social development indicators is preliminarily suggested by the cross-regional correlations reported in Table 3 and is confirmed by the six regression models discussed below. In the first three of them, *ER*, *AM*, and *RP* are separately regressed on the HS composite, for 21 Italian territories at the NUTS 2 level, at four different time points. These social indicators have been chosen, being included in the BES framework, although others (e.g., gender inequality) were not considered, as they are not currently provided by Istat. To control for the potential confounding effects of different economic development and diverse administrative capability, the territorial *per capita GDP* and the territorial *Quality of Governance* (*QoG*; Charron et al. 2022) indicators have been added as regressors. As it is not possible to explicitly model the temporal structure of the data, because of the limited amount of available time points (and the relative temporal stability of the indicators), year effects have been inserted, also in consideration of the pandemic in the year 2022. The 'HS' regression models have the following structure:

$$target_{it} = \beta_0 + \beta_1 HS_{it} + \beta_2 GDP_{it} + \beta_3 QoG_{it} + \beta_4 D_{2014} + \beta_5 D_{2019} + \beta_6 D_{2022} + \varepsilon_{it}$$

where *target* is one of the social development indicators (*ER*, *AM*, *RP*), HS is the horizontal subsidiarity composite, *GDP* and *QoG* are the control variables, D_{2014}, D_{2019}, D_{2022} are year dummies and ε is the random component, with the standard OLS assumptions. The indexes $i = 1, \ldots, 21$ and $t = 2009, 2014, 2019, 2022$ identify the territory and the time point, for a total of $21 \times 4 = 84$ units. The 'pillars' regression models have a similar structure, with the HS composite substituted by its distinct four pillars, namely *Interpersonal trust* (*IT*), *Social trust* (*ST*), *Third sector activity* (*TSA*) and *Decentralised decision-making* (*DDM*):

$$target_{it} = \beta_0 + \beta_1 IT_{it} + \beta_2 ST_{it} + \beta_3 TSA_{it} + \beta_4 DDM_{it} + \beta_5 GDP_{it} + \beta_6 QoG_{it} + \beta_7 D_{2014} + \beta_8 D_{2019} + \beta_9 D_{2022} + \varepsilon_{it}$$

with obvious meaning of the notation.

Technical note. The data used in the models come from different sources and lack uniform temporal cadence. In particular, we used *QoG* data for the years 2010, 2013,

Table 3 Linear correlation between the regional HS composite indicator and the social development indicators for the years 2009, 2014, 2019, and 2022

Indicators	2009	2014	2019	2022
Employment rate	0.91	0.92	0.93	0.93
Avoidable mortality	−0.64	−0.68	−0.81	−0.77
Risk of poverty	−0.89	−0.87	−0.90	−0.86

2017 and 2021 (in our models associated with years 2009, 2014, 2019 and 2022). Similarly, we used the *AR* data from 2020 and the *RP* from 2021, as these indexes were unavailable for the year 2022.

Tables 4, 5, and 6 report the regression results, namely the estimated parameters, their significance level (*p*-value) and goodness-of-fit measures.

In each of the three models, the HS composite is highly significant and with the appropriate sign (positive in the Employment Rate case and negative in the others); the R^2, in both unadjusted and adjusted version, is quite high, in all cases (0.8981, 0.7508 and 0.8011, for *ER*, *AM* and *RP* respectively). The high significance level of HS is even more remarkable considering the nature of the *Quality of Governance* indicator. This is computed as an aggregation of sub-indexes relative to *Control of corruption*, *Government effectiveness, Rule of law*, and *Voice and accountability* (Charron et al. 2024), somehow capturing 'non-HS' facets of governance, which are weakly overlapping to horizontal subsidiarity (only some overlap may exist with the *Social Trust* pillar).

Table 4 Regression results for Employment Rate (ER), regressed on HS and other variables

Target variable: ER	Estimate	*p*-value	R^2	Adjusted R^2
Intercept	−7.3965	0.4544	0.9055	0.8981
HS	0.5353	2.72e-06		
GDP	0.0005	3.46e-06		
QoG	2.7093	0.0146		
D2014	4.4714	6.74e-05		
D2019	6.7334	3.51e-08		
D2022	7.7233	5.32e-10		

Table 5 Regression results for Avoidable Mortality (AM), regressed on HS and other variables

Target variable: AM	Estimate	*p*-value	R^2	Adjusted R^2
Intercept	35.2900	6.13e-15	0.7688	0.7508
HS	−0.1685	5.13e-05		
GDP	6.397e-05	0.0880		
QoG	−0.5728	0.1580		
D2014	−2.9140	1.40e-10		
D2019	−4.6510	< 2e-15		
D2022	−4.6630	< 2e-16		

Table 6 Regression results for Risk of Poverty (RP), regressed on HS and other variables

Target variable: RP	Estimate	*p*-value	R^2	Adjusted R^2
Intercept	85.0444	1.10e-08	0.8155	0.8011
HS	−0.5942	8.34e-05		
GDP	−0.0004	0.0109		
QoG	−3.0551	0.0402		
D2014	−1.2041	0.4033		
D2019	−0.4404	0.7674		
D2022	0.6652	0.6518		

Table 7 Regression results for Employment Rate (ER), regressed on the HS pillars and other variables

Target variable: ER	Estimate	*p*-value	R^2	Adjusted R^2
Intercept	7.4580	0.2674	0.9641	0.9597
Interpersonal trust	−0.0772	0.1930		
Social trust	−0.1268	0.0350		
Third sector activity	0.0443	0.3931		
Decentralised decision-making	0.5585	< 2e-16		
GDP	4.724e-04	1.25e-10		
QoG	2.5220	0.0020		
D_{2014}	5.4200	1.10e-08		
D_{2019}	15.3500	< 2e-16		
D_{2022}	14.1000	< 2e-16		

Table 8 Regression results for Avoidable Mortality (AM), regressed on the HS pillars and other variables

Target variable: AM	Estimate	*p*-value	R^2	Adjusted R^2
Intercept	33.4400	8.6800e-15	0.8290	0.8082
Interpersonal trust	0.0595	0.0541		
Social trust	0.0265	0.3875		
Third sector activity	−0.957	0.0006		
Decentralised decision-making	−0.1371	2.7600e-08		
GDP	6.8780e-05	0.0387		
QoG	−0.1143	0.7796		
D_{2014}	−3.1170	5.2200e-10		
D_{2019}	−6.5640	< 2e-16		
D_{2022}	−6.2230	1.7700e-15		

Together with *GDP*, which accounts for the effects of diverse territorial economic levels, this nearly reveals the specificity of the HS effect on social development.

To better interpret the observed association with HS, Tables 7, 8, and 9 report the outputs of the regression models of the three social development indicators on the four pillar composites. The key observation is that, in these 'disaggregated' models, the most impactful HS pillars are *Third sector activity* and *Decentralised decision-making*. This suggests that, although trust is a boost for social development, it is the 'front-end side' of horizontal subsidiarity that proves to be the effective channel of its impact on the common good, consistently with the discussion of Sect. 2 on the irreducibility of HS to SC. Indeed, the "fluctuations" of pillars' significance (but *Decentralised decision-making*) over the three disaggregated models are partly due to the correlations and the overlapping existing between them, *GDP* and the *Quality of Government* indicator (it can be checked that the first principal component of these covariates, properly scaled, explains about 68% of the total variance), and partly to a genuine different impact of them, over the different target variables. The available data are not so powerful to allow for separating these effects. Still, they provide evidence of the impact of subsidiarity as the channel actualizing the potential of social capital.

Table 9 Regression results for Risk of Poverty (RP), regressed on the HS pillars and other variables

Target variable: RP	Estimate	*p*-value	R^2	Adjusted R^2
Intercept	70.4800	2.4600e-08	0.8899	0.8765
Interpersonal trust	0.1633	0.1048		
Social trust	0.1712	0.0906		
Third sector activity	−0.1746	0.0493		
Decentralised decision-making	−0.6101	1.7600e-12		
GDP	−3.2510e-04	0.0033		
QoG	−2.0770	0.1228		
D_{2014}	−2.082	0.1486		
D_{2019}	−10.050	7.9800e-07		
D_{2022}	−6.8580	0.0011		

In all cases, as expected, the R^2 is higher than for the first three models (0.9597, 0.8082, and 0.8765), the HS indicator being an aggregation of the four pillar indicators. Finally, the generally low significance levels and the unexpected signs of the trust indicators are likely to be due to their potential overlapping or correlation with *Quality of Governance*.

Remark. The HS indicator is a slightly non-linear composition of the four pillars indicators, but it can be reconstructed almost exactly as the following linear combination:

$$HS = 0.22IT + 0.23ST + 0.24TSA + 0.31DDM.$$

As it can be noticed, *Decentralized decision-making* has a significantly bigger weight, in the reconstruction of *HS*. The high significance level of this pillar in the disaggregated models is likely to be transferred to the HS composite, contributing to the significance of it, in the aggregated models. Importantly, however, in each of the disaggregated regressions, pillars other than *DDM* happen to be significant, suggesting that the impact of HS cannot be reduced just to decentralization.

Also relevant are the results pertaining to the parameters capturing the effects of the years 2019 and 2022, the years affected by economic difficulties and the COVID pandemic. In most of the above models these dummies are significant and show high values, revealing that, notwithstanding the temporal contraction of HS levels (see Sect. 6), the presence of 'subsidiary' actors contributed to improving social development as widely verified in personal and collective experiences.

A methodological note. Solicited by one of the anonymous Reviewers, we provide a few comments on the modelling strategy adopted above. The Reviewer points out that (1) the elementary indicators used as covariates may be not error-free, affecting parameters estimates, and (2) that the use of *p*-values may be questionable, in an observational study like ours. We consider separately the two issues.

1. Usually, the problem of errors in the covariates appears when the attempt is to measure some entities having natural definitions and units of measure, as in the typical case of physical quantities. The situation in the social sciences is, however, often subtlety different. As well-known from the theory of measurement, most social indicators come out as ad hoc measures which somehow define what they are measuring. This is an unavoidable situation, occurring in most of socio-economic statistic, and in the attempt of measuring subsidiarity, as well. Therefore, it is not so obvious for the subsidiarity composite to be

considered as not error-free. Anyway, it is true that some of the elementary indicators used in its construction are affected by errors, let alone for the practical difficulties of gathering information from surveys or other sources. This is typical of most econometric studies, where the relationship between economic indicators is analysed, using various forms of linear models, assuming the input covariates as "true". In this respect, our choice belongs to a quite standard way of econometric modelling. In any case, and this is perhaps the most important observation as to this issue, it is known that treating as error-free covariates, when they are not, biases the parameter estimates towards 0. So, assuming our covariates to be affected by errors increases the strength of the evidence, provided by the models.

2. The role of *p*-values in observational studies, compared to experimental ones, has been discussed since a long time. Using randomized experiments is a way to limit the confounding effects of omitted variables and, as such, is a way to improve the semantics of the model, making it more reliable to interpret the meaning of the significant parameters in a valid manner. The situation is different in observational studies, where units cannot be allocated to treatments. In our case, moreover, we have all the units (Italian regions) and no sampling out of a larger population is required. In this case, as in most of econometric studies, controlling for other variables is more difficult and is usually done by inserting additional inputs in the linear model, being nevertheless aware that not all confounding effects can be removed. This is what we have done in the paper, by adding GDP per capita and the Quality of Governance indicator, to the regression models. In this setting, where regression errors may comprise both a genuine measurement error and a set of non-explicit variables driving socio-economic development (assuming the form of random noise), *p*-values are used after their intrinsic meaning, i.e. (informally stated) to assess whether the estimated effect of the covariates could be just an artefact of the sampling process (sampling of the "errors" in the data generation process). So, we use *p*-values as in most econometric studies that are observational in nature. Our models are inferential since they state that the relationship between the target variables and the input covariates is affected by a random error. Once the models are assumed as reasonable, the interpretation of the *p*-values is the usual one.

8 Conclusion

While the impact of social capital on social wealth has been acknowledged for a long time, horizontal subsidiarity has often been seen as a by-product of it, mainly confined to the space left by the inefficiencies of the state and the market. Only recently, it has come to be recognised in its own right as an asset for social sustainability, in a positive feedback relation with social capital, but clearly distinct from it. In this paper, we have (i) supported this point of view, deepening and stressing the irreducibility of horizontal subsidiarity to the broader concept of social capital, and (ii) turned it into a statistically measurable construct, on par with other widely acknowledged factors of socio-economic development, pursuing a first measurement exercise **for** Italian regions.

Four pillars forming horizontal subsidiarity have been identified (namely, *Interpersonal trust*, *Social trust*, *Third sector activity*, and *Decentralised decision-making*) and covered by four composite indicators, then aggregated into a final horizontal subsidiarity indicator. Regression models over the years 2009, 2014, 2019, and 2022 show that the latter is significantly associated with social well-being indicators such as higher employment rate, lower avoidable mortality and lower risk of poverty. Interestingly, this is mainly due to the correlations with the *Third sector activity* and *Decentralised decision-making* indicators,

showing that horizontal subsidiarity acts as a structured channel through which the potential of social capital is actually released to the social fabric.

This confirms the key role of horizontal subsidiarity and the necessity to give it a prominent role in the scientific debate on social sustainability, while also calling for increasing research on the dimensions and specificities of horizontal subsidiarity, its interconnections with social development, and the ways and shapes through which these materialise. This goes hand in hand with improving our capability to measure horizontal subsidiarity and to give it a well-established statistical status. The most urgent step in this direction is improving and extending the information base beyond the official indicators currently available and used in the measurement attempt proposed here. More temporally and spatially granular data are needed, as well as microdata collected at the level of single non-profit organisations and of households/individuals, to monitor over time the dynamics of horizontal subsidiarity and its effect on society and citizens. In this respect, surveys on the third sector should collect information on the economic volume generated by its actors, on the spatial/temporal evolution of the services they design and offer, on the individuals benefiting from them, and on the volunteering phenomenon and its positive fall back on social capital. The goal is to achieve a wider, deeper, and more exhaustive picture of the functioning of horizontal subsidiarity, enabling the statistical modelling of the link between it and socio-economic development and establishing it as a measurable and actionable asset of social and societal well-being.

Some key policy recommendations emerge from this study. First, policymakers should support and promote the expansion and continuity of the third sector, given its positive correlation with various socio-economic indicators. Additionally, as mentioned above, the lack of adequate statistical records has limited our ability to analyse data at local scales. Therefore, national and regional statistical services should prioritise data collection at the provincial and municipal levels. Gathering more granular data is essential not only for research but also for enabling local policymakers to better understand the strengths and weaknesses of their territories, thereby improving administration and fostering higher levels of socio-economic development.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11135-025-02286-5.

Author contributions All authors, and mainly Giorgio Vittadini, contributed to the study conception and design. Data collection and analysis were mainly performed by Matteo Mazziotta and Marco Fattore. The first draft of the manuscript was mainly written by Silvia Angeloni and Marco Fattore and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Funding The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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