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Financial Sustainability and Sustainable Development in Local Governments: Empirical Insights

Marco Bisogno^a , Beatriz Cuadrado-Ballesteros^b , Francesca Manes-Rossi^c 
and Noemi Peña-Miguel^d 

^aDepartment of Management & Innovation Systems, University of Salerno, Italy; ^bFaculty of Economics and Business & Multidisciplinary Institute for Enterprise, University of Salamanca, Campus Unamuno, Spain; ^cDepartment of Economics, Management, Institutions, University of Naples Federico II, Italy; ^dFaculty of Economics and Business, University of the Basque Country, Bilbao, Spain

ABSTRACT

This study investigated *if* and *how* financial sustainability affects the ability of local governments to meet the 17 Sustainable Development Goals (SDGs) established by the United Nations. Two samples consisting of Italian and Spanish local governments were analyzed for the analysis. These municipalities were selected, as they provide many essential services largely linked with several SDGs. Findings show that local governments with better financial conditions devote more effort to achieving the SDGs connected with the biosphere, as well as social and economic development. Our results can stimulate politicians and managers to fight against tax evasion to increase their resources.

KEYWORDS

Sustainable development goals; financial sustainability; Italy; Spain; local government

1. Introduction

Local governments (LGs) are responsible for ensuring the environmental, social, and economic development of their communities. Their strategies, programs, plans, and actions can move people toward a better future. They can create the conditions and partnerships with companies and non-governmental organizations to develop common efforts for sustainable local growth (McDermott et al., 2019), mobilizing citizens and local stakeholders. The responsibilities of LGs extend beyond the provision of local infrastructure and local services to include an obligation to deliver more holistic approaches to the well-being of their communities (Dollery et al., 2014). However, to do so, LGs must identify financial, material, and human resources to be invested in improving public services toward a more sustainable production model (Guarini et al., 2022). Concretely, this means that both politicians and managers have to manage sustainable growth without neglecting financial equilibrium (Caruana et al., 2019) and weaving strategies to achieve sustainability.

Studies touching upon LGs' strategies to achieve sustainable growth are all but new in public financial management and public administration

literature (Fiorino, 2010; Hartmuth et al., 2008; Hoffman & Jennings, 2015; Tonami & Mori, 2007). The lesson that emerged is that the sustainability of future growth and well-being of an LG should go hand in hand with good environmental, social and governance (ESG) practices (Armstrong and Li, 2022). The 2030 Agenda and its Sustainable Development Goals (SDGs) have provided a clear and understandable framework, leading academics to consider how to localize the SDGs (Ansell et al., 2022; Bebbington & Unerman, 2018) and analyze their impact on ESG issues. More specifically, research in accounting is calling for more in-depth studies on the role public sector accounting plays in supporting politicians' and managers' efforts to ensure a better future for their citizens and organizations (Guarini et al., 2021; Kaur & Lodhia, 2019).

This research aims to answer this call by empirically investigating the relationship between the 17 SDGs (grouped in homogeneous categories as in Obrecht et al., 2021) and financial sustainability in the context of LGs.

A few previous studies have considered the relationship between sustainability disclosure and financial sustainability (Benito et al., 2023; Rodríguez-Bolívar et al., 2016). However, there is a lack of research investigating the relationship between financial sustainability and the implementation of strategies addressing sustainable growth. This research aims to contribute to the current literature, filling the gap.

To this end, financial and non-financial data were collected on two paired samples of Italian and Spanish LGs, and equations were estimated to test the relationship between financial sustainability and the SDGs, including political and socioeconomic factors as control variables. Our results highlight that when financial sustainability dominates, LGs obtain better results in terms of the biosphere as well as social and economic development. These findings can help politicians and managers identify the mechanisms that promote sustainable growth in their communities and implement performance measurement systems supporting their strategies and actions. Furthermore, this research contributes to the emerging literature investigating the role accounting measures play in achieving the UN 2030 Agenda.

The article is organized as follows. The next section summarizes how the concept of sustainable development emerged, particularly at the local level. [Section 3](#) provides a review of the literature on the financial sustainability of LGs, while [section 4](#) introduces the research hypothesis. [Section 5](#) explains the methodology used in the empirical analysis, providing details on how the samples were created, and the models and variables were tested. [Section 6](#) presents the results. [Section 7](#) closes with a discussion of the results, highlighting the theoretical and practical implications of the research, as well as explaining some limitations and outlining possible paths for future research.

2. Sustainable development goals at the local level

In 1972, The Club of Rome¹ underlined the importance of sustainability for economic growth (Alaimo & Maggino, 2020). It was pointed out that a continued widespread increase in global population growth trends, industrialization, pollution, and food production would lead to resource depletion, and the limits of growth on this planet would be reached sometime in the next 100 years (Meadows et al., 1972). The idea of development based exclusively on economic growth and technological progress was intrinsically erroneous if it did not consider the scarcity of resources. This idea, together with the need for intergenerational equity, was emphasized by the Brundtland Commission, whose report (known as *Our Common Future*) interpreted sustainable development as development that succeeds in meeting the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). Accordingly, development should be considered a multidimensional concept, including economic, social, and environmental aspects (Guillen-Royo et al., 2017; Sachs, 2015; United Nations General Assembly, 2015). This idea was expanded at the 2015 UN General Assembly with the 2030 Agenda, where 17 SDGs were defined and adopted by 193 countries. Table 1 lists the 17 SDGs.

Each SDG covers a specific aspect of sustainable development, but most of them are interrelated. One of the most used grouping criteria is called the SDG ‘Wedding cake’, which adopts an integrated view of social, economic, and ecological development. This model conceptualizes the interconnections between SDGs and the dimensions of sustainability, by showing the biosphere as the foundation of economies and societies (Obrecht et al., 2021). Figure 1 represents such a conceptualization that groups the 17 SDGs as follows:

- *Biosphere*: including SDG6, SDG13, SDG14, and SDG15.
- *Society*: including SDG1, SDG2, SDG3, SDG4, SDG5, SDG7, SDG11, and SDG16.
- *Economy*: including SDG8, SDG9, SDG10, and SDG12.
- *Partnership*: including only SDG17.

While there are other conceptualizations, such as ‘the triple-bottom-line’ (Elkington, 2013) or the ‘5 Ps’ (UN, 2015), the ‘Wedding Cake’ framework embraces a hierarchy and asserts that building from the base up allows actors to harness operational efficiencies (Aubrecht, 2022). Furthermore, despite this model having some shortcomings, it has been used by the United Nations to promote the 17 SDGs (Winiwarter, 2020).

Even though different actors are expected to play a role in the implementation of policies, strategies, and measures to achieve sustainable

Table 1. Sustainable development goals.

	Label	Definition
	SDG1. No poverty	End poverty in all its forms everywhere
	SDG2. Zero hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
	SDG3. Good health and well-being	Ensure healthy lives and promote well-being for all at all ages
	SDG4. Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
	SDG5. Gender equality	Achieve gender equality and empower all women and girls
	SDG6. Clean water and sanitation	Ensure availability and sustainable management of water and sanitation for all
	SDG7. Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all
	SDG8. Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
	SDG9. Industry, innovation and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
	SDG10. Reduced inequalities	Reduce inequality within and among countries
	SDG11. Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient and sustainable
	SDG12. Responsible consumption and production	Ensure sustainable consumption and production patterns
	SDG13. Climate action	Take urgent action to combat climate change and its impacts
	SDG14. Life below water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
	SDG15. Life on land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
	SDG16. Peace, justice and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
	SDG17. Partnership for the goal	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

development objectives, public administrations are key players (Bebbington & Unerman, 2018; Bouckaert et al., 2016; Fiorino, 2010; Guarini et al., 2021). Most of the discussion has centered on how public-sector entities



Figure 1. SDGs wedding cake.

Source: Adapted from Obrecht et al. (2021)

can deal with climate change or how these organizations communicate their attitude toward sustainable development (Manes-Rossi et al., 2020).

However, sustainable development cannot be considered independently from the local context, as many scholars have underlined (Benito et al., 2023; Devuyt, 2000; Hartmuth et al., 2008; Hatakeyama, 2018; Kondyli, 2010; Tonami & Mori, 2007). Indeed, although the goals and targets are designed for all nations, they need to be adapted to sub-national, regional, and local contexts due to their proximity to citizens (Alaimo & Maggino, 2020), and their fundamental mission to support and improve the well-being of the community served (United Cities and Local Governments, 2021) following the adage ‘think globally, act locally’ (Bruyninckx et al., 2012; Parodi, 2015). Guarini et al. (2021) noted that more than 65% of SDGs directly concern and involve local communities. This makes the SDGs a useful framework for measuring local progress toward sustainable development with a set of priorities and targets that are meaningful to cities (Hendriks, 2018; Spitz et al., 2016) and that can be reached thanks to partnership with civil society organizations and enterprises (McDermott et al., 2019).

Before the 2030 Agenda, many local sustainability indicators were built and incorporated into local governance structures. These performance indicators were ‘the key to innovation in which people were developing new conceptual models of nature and society’ (Miller, 2005). They helped combine different modes of governing at the local level and were useful

for local governments seeking to foster sustainability transitions (Holman, 2009). They also acted as communication portals, that is, ‘shaping networks’ (Astleithner et al., 2004). They played an important role in incorporating sustainability into political culture (Holden, 2006) and promoted the culture of collaborative governance (Sirianni, 2007).

With the 2030 Agenda underway, previous research has mainly addressed theoretical issues; few studies have empirically investigated how LGs consider the SDGs while defining their strategies (Bardal et al., 2021; Benito et al., 2023; Guarini et al., 2022). These studies emphasize that the SDGs risk becoming rhetoric for politicians and managers at the local level. However, in practice, Wang et al. (2014) found that effective managers help overcome dispersed public perspectives, organizational constraints, and technical challenges in local sustainability, which can result in better organizational performance of sustainability policies. MacDonald et al. (2020) surface 11 competencies linked to sustainability management that, if developed, can result in more sustainable management of cities.

Krellenberg et al. (2019) also observed that the SDGs are not ambitious enough, and they compete or overlap with other local initiatives. Researchers have already underlined possible tensions between economic and environmental priorities that can arise in approaching sustainable development in the Anthropocene Era (Hoffman & Jennings, 2015; Jenning & Hoffman, 2021).

Accordingly, scholars (Bardal et al., 2021) have called for further research to investigate the specific meaning of the SDGs by examining factors—such as LG’s financial sustainability—that could facilitate or hinder their achievement. This would allow a holistic view of different social, environmental, and economic policies to integrate various initiatives into a single sustainable development framework (Bisogno et al., 2023).

3. The financial sustainability of local governments

Financial sustainability has been investigated from different perspectives, and several streams of research can be identified (Caruana et al., 2019). The first stream was principally focused on financial distress (Carmeli, 2007; Groves & Valente, 2003; Jones and Walker, 2007; Kleine et al., 2003), especially because of the 2008 global financial crisis (Cohen et al., 2012; Zafra-Gómez et al., 2009), which concentrated on credit ratings and solvency assessment (Manes-Rossi, 2011). Scholars proposed various models to empirically investigate financial distress in different contexts, examining the role of several LGs’ socio-economic characteristics, organizational factors and other variables. Building on this stream, subsequent studies investigated the financial condition (also called financial health) of public administrations by scrutinizing approaches to improve it (Drew & Dollery,

2014), while examining the relationship between financial condition and the quality of life of citizens (Cuadrado-Ballesteros et al., 2014) and, more generally, the quality of public services.

This approach progressively led to a further stream of the literature, which adopted a broader perspective, examining the concept of financial sustainability (Bisogno et al., 2017; Cuadrado-Ballesteros & Bisogno, 2022; Navarro-Galera et al., 2016; Rodríguez-Bolívar et al., 2014, 2016). This last stream of literature emphasizes that financial sustainability is a multifaceted concept involving several dimensions.

Even though assessing the ability to satisfy present and future obligations remains essential in both financial distress and financial sustainability, it does not consider a public-sector entity's ability to deliver services in the present without compromising its ability to do so in the future (Rodríguez-Bolívar et al., 2016). In line with this approach, the International Public Sector Accounting Standards Board (IPSASB) issued specific recommended practice guidelines in 2013 (IPSASB, 2013). These guidelines considered three dimensions to define financial sustainability: service, revenue, and debt, underlining that in addition to payment obligations, a public-sector entity is required to provide adequate services to citizens, at the same time reducing its dependence on factors that are outside the entity's control. More specifically, the service dimension refers to the quality and quantity of services provided; the revenue dimension focuses on taxes and other sources of revenue; and the debt dimension considers debt levels, also reflecting the ability of public entities to meet their financial commitments (IPSASB, 2013; Manes-Rossi et al., 2017; Qin & Luo, 2022). Furthermore, it is worth noting that a long-term horizon is necessary to take intergenerational equity into account when implementing public programs and policies (Caruana et al., 2019; Moldavanova, 2016).

To represent these dimensions, it is essential to consider several facets, which should reflect the level of government to which financial sustainability refers. For instance, if one refers to the central government level, the analysis should include macroeconomic factors, such as growth and stability (Schick, 2005), tax burdens and the ability to meet future obligations, the relationship between public expenditure and national income, and so on (Cuadrado-Ballesteros & Bisogno, 2022).

Regarding financial sustainability at the LG level, scholars have designed tools for improving LG's management of financial resources. For instance, Guzman and Ermasova (2022) evaluated distressed cities and municipalities to provide recommendations on improving their financial conditions and proposed a theory of fiscal stress behavior based on political, economic and fiscal variables. Gorina et al. (2018) proposed an action-based measure of fiscal distress using financial reports and socioeconomic environment. Therefore, scholars sought to focus more on microeconomic dimensions

to consider the proximity of this type of government to citizens. Politicians and public managers at the LG level are expected to monitor and maintain financial sustainability over time by identifying performance indicators together with clear performance targets that can have concrete implications in everyday activities (Modlin, 2010; Niemann & Hoppe, 2018) governing its drivers and risk factors, including efficiency in managing public services (Cuadrado-Ballesteros & Bisogno, 2019). This allows them to make decisions to strengthen the factors with a positive effect and mitigate the factors with adverse consequences on financial sustainability.

Decision-making processes are based on available information, which mainly derives from the organization's accounting system. Recently, several countries have innovated public-sector accounting systems by implementing accrual-based approaches. Even though scholars have raised doubts about these approaches (Lapsley et al., 2009), the shift from cash to accruals seems inevitable (Cohen et al., 2019). The key difference between cash- and accrual-based approaches lies in the timing of transaction recognition, namely, the date the cash is received or disbursed, and the date the income is earned or the expense is incurred, respectively (Tickell, 2010). Therefore, accrual-based systems provide complete information about the actual consumption of wealth and resources (regardless of whether they have resulted in a cash inflow or outflow), as well as the financial situation of the entity. This gives politicians and managers better tools to monitor the three dimensions of financial sustainability (Pina et al., 2009; Rodríguez-Bolívar et al., 2014, 2016). Both the effects of policies aimed at increasing revenue and reducing costs (revenue and service dimensions) and the financial risks and opportunities of different funding sources (debt dimension) can be evaluated.

4. Research hypothesis

The literature on SDGs mentioned in the previous sections has emphasized the crucial role played by LGs in this area. Some studies have investigated strategies and policies to implement sustainability (Echebarria et al., 2018; Emilsson & Hjelm, 2005; Keskitalo & Andersson, 2017), also pointing out the need for a holistic approach integrating social, environmental, and economic policies (Stuart et al., 2016). Indeed, performance in the public sector is, by definition, a multidimensional concept that requires a sound performance management system to support managers in achieving organizational goals. Therefore, to achieve sustainable development in the long run, economic, social, and environmental dimensions should be balanced (Guillen-Royo, et al., 2017; Sachs, 2015; United Nations General Assembly, 2015). Accordingly, the 17 goals defined by the UN can be aggregated to form different but related categories to provide a comprehensive picture

of development (Obrecht et al., 2021) and partnership, as already observed in the second section.

The financial sustainability literature has emphasized the importance of a long-term horizon to allow public-sector entities to provide adequate services to citizens without compromising intergenerational equity (Caruana et al., 2019; Moldavanova, 2016). The need for a holistic approach is also highlighted in this literature stream (Bisogno et al., 2017). To operationalize the concept of financial sustainability, this study refines the model proposed by Rodríguez-Bolívar et al. (2014, 2016). This model concentrates on adjusted income as a proxy for the revenue and service dimensions. Bearing in mind that the concept of financial sustainability also includes the debt dimension (IPSASB, 2013), our model includes a variable for this dimension.

Previous studies have investigated the determinants (drivers and risk factors) of financial sustainability, scrutinizing its relationship with other factors and variables, such as budget transparency and e-democracy (Manes-Rossi et al., 2018), population size and the dependent population, immigration, income per capita (Bisogno et al., 2017), and the role of auditors (Cohen et al., 2017). The recent study by Benito et al. (2023) examines if the level of implementation of SDGs influences LGs' finances. However, to the best of our knowledge, no studies have investigated if and to what extent positive financial conditions of an LG affect its ability to implement sustainable development policies. Accordingly, this study aims to fill this gap, contributing to the debate on SDG implementation by hypothesizing that to pursue SDGs, LGs should have the availability of adequate resources. The basic assumption is that implementing strategies and policies for social development requires ad hoc investments and the availability of financial resources, which can then facilitate the achievement of SDGs.

In the private-sector context, a similar issue has been investigated, and scholars have documented a positive relationship between social and financial performance (Barnett & Salomon, 2012; Awaysheh et al., 2020). In the public-sector context, previous studies have documented a positive impact of good financial health and the availability of adequate financial resources on the quality of life of citizens (Cuadrado-Ballesteros et al., 2014). However, recent studies (Ziolo et al., 2019) examining several European countries reveal that positive financial results often correspond with much worse environmental development. Therefore, the results of studies concerning the effect of positive financial conditions are mixed. Accordingly, even though SDGs are strictly related, the hypothesized relationship between financial sustainability and SDGs deserves to be investigated in depth to cover the different aspects of sustainable development. More specifically, this study focused on the association between financial sustainability and the four SDGs' categories identified in previous sections

(Obrecht et al., 2021), namely: biosphere (SDG6, SDG13, SDG14, and SDG15), society (SDG1, SDG2, SDG3, SDG4, SDG5, SDG7, SDG11, and SDG16), economy (SDG8, SDG9, SDG10, and SDG12), and partnership (SDG 17). Given the different effects that financial conditions may have on the various SDGs, the hypothesis investigated in this study is presented in a null form:

H0: Financial sustainability is associated with LG's achievement of the four SDGs categories (Biosphere, Society, Economy, and Partnership).

5. Methodology

5.1. Sample

Our analysis has been performed on two samples consisting of Italian and Spanish municipalities. This choice was determined by the role that LGs play in both countries. Italian and Spanish local governments provide a large number of essential services, meaning that city governance and serving citizens are closely linked to the SDGs (even though close collaborations with higher levels of government, citizens, and private-sector entities are essential).

Data about the implementation of the SDGs in 2018 and 2020 in Italian and Spanish LGs were collected from reports available on the website www.sdgindex.org. This website provides data on all countries' SDG compliance. The reports included are tools to increase civil society's awareness about sustainability in their territories and to support local administrators in their decision-making by providing a screenshot of their cities' progress toward the 2030 Agenda targets, and they provide updated information every two years, as this time frame is considered suitable to identify changes in the milestones and issues affecting the territories (Cavalli et al., 2020).

Each report shows the degree of SDG implementation in the largest municipalities (i.e. municipalities with more than 50,000 inhabitants) in Italy (103) and Spain (103) in 2018 and 2020; therefore, our sample includes 412 observations. These reports use the methodology proposed by the Sustainable Development Solutions Network, and they are based on individual indicators representing each SDG. The Italian reports were prepared by the Fondazione Eni Enrico Mattei (Cavalli et al., 2020; Cavalli & Farnia, 2018), and the Spanish reports were prepared by the *Red Española para el Desarrollo Sostenible* (Sánchez de Madariaga et al., 2018, 2020).

Italy and Spain share many similarities. First, two cultural similarities are worth mentioning: the Family Welfare Model (León & Migliavacca, 2013) and women's increasing presence in the workforce. These social

characteristics are connected to several SDGs (e.g. 3, 5, and 10). Second, the cities in both countries face similar climate change challenges and risks, and they are making similar efforts (e.g. financial, administrative, political, technical, etc.) to implement efficient policies related to different SDGs (e.g. 13, 14, and 15), with climate planning focused on energy efficiency and promoting cleaner energy sources (De Gregorio et al., 2015). Furthermore, both countries face similar urban challenges. The main roads in Italian and Spanish cities are congested, and despite major efforts to raise awareness, there is no clear trend toward more sustainable modes of transport (European Court of Auditors, 2020). This affects the achievement of some SDGs, particularly 11 and 12.

Italy and Spain also share political and institutional frameworks that result in similar contemporary governance structures (Cohen et al., 2019). Both countries have the same production, labor, and social models (e.g. they have similar economic growth rates, high unemployment rates, skewed social spending, high levels of indebtedness, etc.) (Pérez & Rhodes, 2015). These characteristics affect compliance with SDGs 1, 2, 4, 6, 7, 8, and 9.

5.2. Models and variables

To test our hypothesis on the link between financial sustainability and sustainable development, we have established the following system of equations:

$$\begin{aligned} \mathbf{SDG}_j = & \beta_0 + \alpha_1 \text{Adj.Incomepc}_i + \alpha_2 \text{Debtpc}_i + \beta_1 \text{Taxes}_i + \beta_2 \text{Immigrants}_i \\ & + \beta_3 \text{Pop.Dependent}_i + \beta_4 \text{Incomepc}_i + \beta_5 \text{Left}_i + \beta_6 \text{Strength}_i + \varepsilon_i \end{aligned} \quad (1)$$

In each model, α and β are the parameters to be estimated, ε is the error term, and subindex i refers to each municipality in the sample.

The variable called \mathbf{SDG}_j refers to the degree of implementation of the 17 SDGs (data retrieved from www.sdgindex.org). In each report, the degree of SDG implementation is represented by a color: red stands for low implementation, orange represents medium–low implementation, yellow is for medium–high implementation, and green represents high implementation. Using this classification, we assigned a number from 1 to 4 for the lowest to the highest degree of implementation. Following the Wedding Cake framework, the 17 SDGs were classified in four categories and, accordingly, four variables were created for the analysis: *Biosphere* (SDG6, SDG13, SDG14², and SDG15); *Society* (SDG1, SDG2, SDG3, SDG4, SDG5, SDG7, SDG11, and SDG16); *Economy* (SDG8, SDG9, SDG10, and SDG12); and *Partnership* (SDG 17). As each individual SDG takes values from 1 to 4, *Biosphere* ranges from 3–12; *Society* ranges from 8–32; *Economy* ranges from 4–16; and *Partnership* ranges from 1–4. Thus, \mathbf{SDG}_j refers to each of these variables ($j = \text{Biosphere, Society, Economy, and Partnership}$).

Financial sustainability is represented by two variables, following the definition of the IPSASB (2013). The first one is adjusted income (*Adj. incomepc*), which was calculated following the approach of Rodríguez-Bolívar et al. (2014, 2016). Concretely, adjusted income refers to the total income of each entity for the financial year, excluding revenues and expenses from extraordinary activities since they are not expected to occur in the future. Extraordinary revenues are profits from non-current assets, other ordinary management income and exceptional income, including:

- Refunds: refunds of payments derived from economic expenses that have little relative importance and that, in accordance with the applicable regulations, must be allocated to the entity's income budget. Those reimbursements that are of relative importance will be recorded in the corresponding expense account by nature, except for those derived from errors produced in previous years, which will be recorded in the account 'Results from previous years'.
- Exceptional income: Profits and income of an exceptional nature and significant amount that, given their nature, should not be accounted for in other accounts as 'Sales and income by nature', or 'Income imputed to net worth'. They include, among others, those originating from those credits that were amortized due to insolvencies, those from the prescription of obligations as well as from the reversal of assets that are gotten as a subsidy, or the early reversal of assets transferred free of charge, due to noncompliance with conditions by the beneficiary.

Extraordinary expenses are losses from non-current assets, other ordinary management expenses and exceptional expenses. Concretely, they include losses and expenses of an exceptional nature and significant amounts (such as sanctions and fines, those caused by floods and other accidents, fires, compensation to third parties, loss or reduction of deposits posted, etc.) that—based on their nature—should not be recorded in other accounts as 'Purchases and expenses by nature' or 'Expenses allocated to net assets'.

Revenue and expenditure are obtained from the financial statements of each LG. Rodríguez-Bolívar et al. (2014, 2016) highlight the importance of income statements to estimate financial sustainability. This is because these statements enable users to assess the capacity of the government to increase (or at least maintain) the volume of public services and resources that LGs will need to continue providing public services in the future (IFAC, 2012).

Adjusted income is the most reasonable measure of intergenerational equity levels, and so it is the most appropriate way to represent financial sustainability. However, it refers to only two of the three dimensions that the IPSASB (2013) proposed to define financial sustainability, as it is the

result of revenue and service. The third dimension is debt. Therefore, model (1) also includes the LG's level of indebtedness (*Debtpc*) in per capita terms.

In addition, each equation controls for some socioeconomic and political factors that may affect SDG implementation at the LG level. The variable *Taxes* is the ratio of LG's tax revenue over total revenue. The higher the ratio, the greater the financial independence of the LG from other resources, which implies greater autonomy to decide what to spend on or invest in. Indeed, many cities are asking for greater financial autonomy, either by increasing their capacity to collect taxes or improving their access to financial markets, in order to be able to implement SDGs (Walliser, 2018).

Immigrants is the percentage of foreigners out of the total municipal population. Anti-immigration groups have argued that migration has hampered sustainable development and environmental protection, while Neumayer (2006) evidenced the inappropriateness and ethical indefensibility of employing environmental reasons for restricting immigration to developed countries. In fact, managing international migration competently and fairly promotes a more sustainable world. Controlling for the movement of migration is key in this sample because Italy and Spain are two of the European countries that receive the most immigrants. This has been especially true in the last two decades (Sanguilinda et al., 2017).

Pop.dependent is the percentage of people under 15 and over 65 years old in the municipality. In many countries, poverty and a dearth of opportunities (especially job opportunities) constrain young people's development more than those in other age groups (Blum et al., 2019). In addition, as fertility rates decrease and countries' working-age populations grow, there is a window of opportunity for rapid economic growth, but only if social and economic policies are established in the areas of health, education, governance, and the economy (Bundy et al., 2018). Furthermore, aging populations put significant pressure on social and health systems, and inequalities and poverty may grow due to pensioners' reduced purchasing power. Therefore, these two segments of the population, with those most demanding public services, may affect SDG achievement.

De Neve and Sachs (2020) have recently highlighted the link between sustainable development and human well-being, which has been represented through different indicators. At the LG level, the most relevant indicator used to represent a population's economic development is income per capita. Thus, the analysis includes *Incomepc* as the average net income per person (in euros), and a positive link with SDGs is expected.

Finally, Equation (1) controls for two political factors: *Left* and *Strength*. The former is a dummy variable that takes the value 1 if the municipality is governed by a left-wing government and 0 otherwise. The latter refers to levels of government fragmentation. It is calculated as the ratio between the number

of councilors belonging to the party/ies in power (alone or in coalition) and the total number of councilors in the government. Bardal et al. (2021) highlight that work still needs to be done to achieve a broad commitment across parties and depolarize the debates on the SDGs. Therefore, we think it is necessary to control the political ideology and degree of fragmentation of governments because both factors can affect decision-making.

5.2.1. Technique of analysis

In Model (1) the dependent variables (*SDG_j*) take different values to represent the degree of SDG implementation, so they are multinomial and not continuous. Additionally, these values have a meaningful sequential order, that is, if a value is higher than the previous one, the degree of implementation is higher. So, these multinomial variables are called ordinal. Thus, using OLS is problematic because the main assumptions are violated when it is used with a non-interval outcome variable. Therefore, Model (1) is considered an ordered logistic regression, which is similar to a logistic regression (where the dependent variable is binomial, that is it has two outcomes: 0–1), but considering that the dependent variable has more than two outcomes (concretely, it shows four values, ranging from 1 to 4). The model is based on the principle that the only effect of combining adjoining categories in ordered categorical regression problems should be a loss of efficiency in estimating the regression parameters (McCullagh, 1980). We estimate the model by using Stata software (for further information, see Liu, 2015).

Although the sample includes 2 years (2018 and 2020), it is insufficient to use a panel data method. The use of panel data is possible if the sample covers a minimum of 5 years (Hsiao, 2007, 2022). Therefore, the model should be estimated in cross-section for each year.

6. Results

6.1. Descriptive analysis

Table 2 shows the descriptive statistics of all the variables. Focusing on the SDG indicators, the mean value of *Biosphere* was 8.81 and 8.45 in 2018 and 2020, respectively, in a range of 3–12; the mean value of *Society* was about 21.2 in both years, in a range of 8–32; the mean value of *Economy* was 9.64 in 2018 and 10.27 in 2020, in a range of 4–16; and the mean value of *Partnership* was 2.54 in 2018 and 2.69 in 2020, in a range of 1–4. Based on these results, Italian and Spanish LGs are at the halfway point in all issues; they have started including the SDGs in their political agendas and implementing policies and strategies to achieve them. However, there is room for improvement, and further efforts are needed

Table 2. Descriptive statistics.

Variable	Mean	Std. Dev.	Min	Max
2018				
<i>Biosphere</i>	8.8109	1.5047	4	12
<i>Society</i>	21.1862	2.5673	13	26
<i>Economy</i>	9.6368	1.6163	6	13
<i>Partnership</i>	2.5473	0.7740	1	4
<i>Adj_incomepc</i>	-0.1091	0.5823	-6.3236	0.4596
<i>Debtpc</i>	1.1376	2.4878	0.0000	33.5918
<i>Taxes</i>	0.4172	0.1112	0.0914	0.6905
<i>Immigrants</i>	9.9657	6.1859	1.11	38.78
<i>Pop_dependent</i>	35.2270	2.6554	25.82	43.25
<i>Incomepc</i>	16,730.24	5,570.48	7552	32382
<i>Left</i>	0.5049	0.5012	0	1
<i>Strength</i>	0.5670	0.1473	0.14	0.93
2020				
<i>Biosphere</i>	8.4416	1.1490	6	11
<i>Society</i>	21.2064	2.5980	12	26
<i>Economy</i>	10.2718	1.6242	6	13
<i>Partnership</i>	2.6893	0.9579	1	4
<i>Adj_incomepc</i>	-0.0795	-0.6453	8.2467	0.5618
<i>Debtpc</i>	1.0704	2.1357	0.0000	27.6556
<i>Taxes</i>	0.4226	0.1171	0.1043	0.9835
<i>Immigrants</i>	10.8659	6.6493	1.4	41.42
<i>Pop_dependent</i>	35.4186	2.6347	25.97	42.68
<i>Incomepc</i>	17,107.70	5,005.72	8335	31778
<i>Left</i>	0.4951	0.5012	0	1
<i>Strength</i>	0.5977	0.1159	0.1563	0.9286

to achieve the goals, especially in the case of *Economy*. As [Figure 2](#) illustrates, the *Economy* indicator was low in 2018, although it improved in 2020. The SDGs included in the *Society* indicator were worse in 2020; *Biosphere* also declined slightly between 2018 and 2020. However, these changes are very small, and the degree of implementation in 2020 is similar to 2018. [Figure 3](#) shows the situation in the two countries: Spain is higher than Italy in the *Society* indicator, while Italy overtakes Spain in the *Biosphere* indicator. Both countries show similar situations in the *Economy* and *Partnership* indicators.

Returning to the descriptive statistics, the mean value of *Adj_incomepc* was negative in both years, suggesting a bad financial situation. The amount of per capita debt was 1,137.6 euros and 1,070.4 euros in 2018 and 2020, respectively. Furthermore, about 42% of the total income came from local taxes in both years. The immigrant population increased slightly between 2018 and 2020, from 9.96% to 10.87%, while the proportion of the dependent population (under 15 and over 65 years old) was similar in both years; that is, around 35% of the total population. The amount of per capita income also increased, from 16,730 euros in 2018 to 17,107 euros in 2020. Regarding the political factors, we can see that around 50% of LGs were governed by left-wing governments, and most of them were governed in absolute majorities (without coalitions).

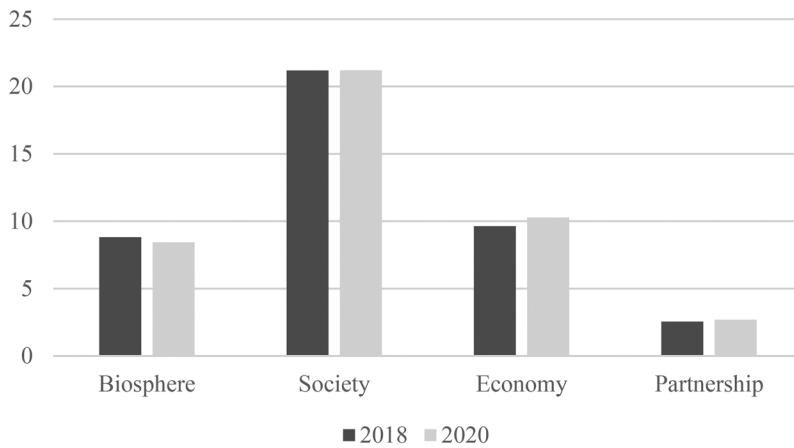


Figure 2. Evolution of SDG 2018–2020.

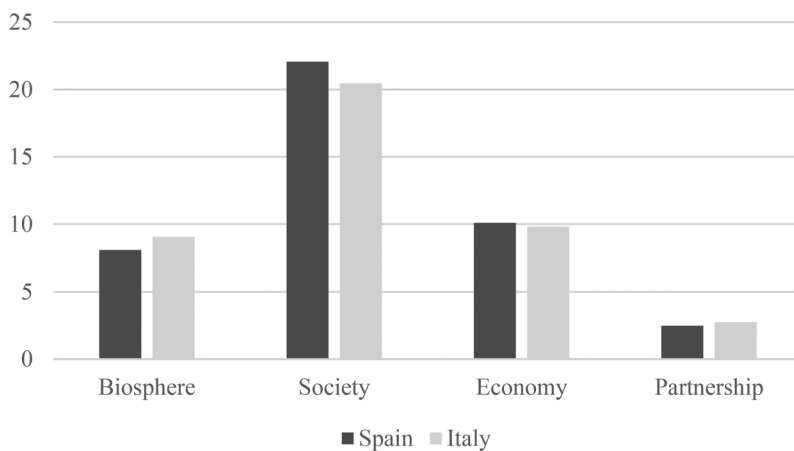


Figure 3. SDG by country.

Table 3 shows the bivariate correlation between all variables included in the model. The two independent variables representing financial sustainability (*Adj_incomepc* and *Debtpc*) are highly correlated (-0.8224 in 2018 and -0.8855 in 2020). This means that they cannot be included simultaneously in the regression model. The rest of the coefficients are not extremely high, so there are no multicollinearity problems.

6.2. Empirical analysis

Tables 4 and 5 show the results for the model in 2018 and 2020, respectively. Panel A shows the results for *Adj_Incomepc*, and Panel B includes *Debtpc*. The two variables representing LG's financial sustainability are statistically relevant in explaining the level of SDGs related to the biosphere, society, and economy, but they are not significant in explaining

Table 3. Bivariate correlations.

Panel A. Year 2018								
	Adj_incomepc	Debtpc	Taxes	Immigrants	Pop_dependent	Incomepc	Left	Strength
Adj_incomepc	1							
Debtpc	-0.8224***	1						
Taxes	0.1942**	-0.1533*	1					
Immigrants	0.0657	-0.0097	0.2032**	1				
Pop_dependent	0.1641*	-0.0991	0.3193***	0.2178**	1			
Incomepc	-0.3090***	0.2141**	-0.2992***	-0.0919	-0.2519***	1		
Left	-0.0199	-0.0033	0.1689*	0.0384	0.0566	-0.0586	1	
Strength	-0.2548***	0.1591*	-0.2511***	0.0079	-0.2605***	0.2941***	-0.0497	1
Panel B. Year 2020								
	Adj_incomepc	Debtpc	Taxes	Immigrants	Pop_dependent	Incomepc	Left	Strength
Adj_incomepc	1							
Debtpc	-0.8855***	1						
Taxes	0.0556	-0.1912*	1					
Immigrants	-0.0027	-0.0405	0.1430†	1				
Pop_dependent	0.1701*	-0.1503*	0.2856***	0.2272**	1			
Incomepc	-0.2223**	0.2389***	-0.2660***	-0.1232†	-0.3305***	1		
Left	-0.0443	0.0181	0.2063**	-0.0039	0.1776*	-0.1532*	1	
Strength	-0.1642*	0.2208**	-0.2695***	-0.0236	-0.2481***	0.2899***	-0.1811**	1

Notes: †, *, **, and *** represents statistical relevance at 90, 95, 99, and 99.9%, respectively.

Table 4. Link between financial sustainability and SDG in 2018.

Panel A. Adjusted Income								
	<i>Biosphere</i>		<i>Society</i>		<i>Economy</i>		<i>Partnership</i>	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Adj_Incomepc	0.9471*	0.4316	0.3355*	0.1338	0.3667**	0.1377	0.0397	0.1415
Taxes	5.6866†	3.0025	1.2108	0.7953	-0.1459	0.7765	2.4808**	0.8507
Immigrants	-0.0339	0.0231	0.0422**	0.0152	0.0459**	0.0134	-0.0142	0.0141
Young	0.3169**	0.1208	-0.0032	0.0464	-0.0741	0.0456	-0.0851†	0.0500
Incomepc	-7.2948***	1.8156	0.2189	0.3426	0.9648**	0.3295	0.4410	0.3529
Left	-0.8546	1.3818	0.3570*	0.1542	-0.0061	0.1501	-0.0082	0.1624
Strength	3.3406	2.2446	-0.9473	0.6344	-1.0608†	0.6353	-2.4789***	0.7080
Panel B. Debt								
	<i>Biosphere</i>		<i>Society</i>		<i>Economy</i>		<i>Partnership</i>	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Debtpc	-1.1215**	0.4222	-0.0622*	0.0297	-0.0832†	0.0440	-0.0371	0.0310
Taxes	5.3863†	2.8125	1.1840	0.7904	-0.0902	0.7658	2.4943**	0.8411
Immigrants	-0.0150	0.0220	0.0462**	0.0149	0.0479***	0.0131	-0.0116	0.0138
Young	0.3146*	0.1217	-0.0188	0.0447	-0.0223	0.0297	-0.0919†	0.0481
Incomepc	-5.2505***	1.4969	0.1329	0.3376	0.8025*	0.3233	0.4934	0.3485
Left	0.3468	0.3248	0.3465*	0.1527	-0.0312	0.1481	0.0069	0.1605
Strength	4.9092*	2.1503	-1.0944†	0.6285	-1.1928†	0.6291	-2.5242***	0.7025

Notes: †, *, **, and *** represents statistical relevance at 90, 95, 99, and 99.9%, respectively. Ordered logistic model for cross-section estimation in 2018.

Table 5. Link between financial sustainability and SDG in 2020.

Panel A. Adjusted Income								
	<i>Biosphere</i>		<i>Society</i>		<i>Economy</i>		<i>Partnership</i>	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Adj_Incomepc	1.4802*	0.6220	0.0304*	0.0141	0.2046†	0.1229	0.0656	0.1274
Taxes	-0.7917	0.8453	1.9735	1.9950	0.2161	0.7810	1.7583***	0.4435
Immigrants	-0.0357	0.0224	0.0736**	0.0267	0.0265†	0.0153	0.0274†	0.0164
Young	0.1829†	0.0998	0.0576	0.0940	-0.0198	0.0570	-0.1856**	0.0639
Incomepc	0.1085	0.1248	2.2482**	0.8397	0.0679**	0.0253	0.4210	0.2895
Left	0.0742	0.2081	1.8756***	0.4730	0.2569	0.1754	0.1150	0.1879
Strength	1.7570	1.1015	-1.7435	1.4612	-3.1238**	0.9157	-2.0660*	0.9895
Panel B. Debt								
	<i>Biosphere</i>		<i>Society</i>		<i>Economy</i>		<i>Partnership</i>	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Debtpc	-2.6268†	1.5053	-0.1278*	0.0592	-0.0242†	0.0130	-0.0474	0.0381
Taxes	1.7784*	7.6488	1.0816	0.7955	0.0068	0.7637	0.0532	0.8168
Immigrants	-0.1690*	0.0765	-0.0094	0.0150	-0.0271	0.0366	0.1378	0.1416
Young	0.1431*	0.0588	0.3181	0.2918	-0.0074	0.0518	-0.2181***	0.0599
Incomepc	-7.8183†	4.2929	1.6085***	0.4614	0.0714**	0.0240	0.2165	0.8308
Left	0.3357	0.7910	0.2748	0.1738	0.2262	0.1663	0.0325	0.1784
Strength	4.5380	5.4942	-1.0411	0.9350	-3.1774***	0.9034	-2.0692*	0.9796

Notes: †, *, **, and *** represents statistical relevance at 90, 95, 99, and 99.9%, respectively. Ordered logistic model for cross-section estimation in 2020.

Partnership. More concretely, *Adj_incomepc* is positively linked to *Biosphere*, *Society* and *Economy*, while *Debtpc* is negatively linked to these three dependent variables. These findings suggest that the SDGs representing LGs' commitment to the environment, society and the economy are positively associated with financial sustainability. Our results confirm the proposed hypothesis, that is financial sustainability is essential for LGs to

pursue the SDGs, especially those related to the environmental, economic, and social issues involving essential services for local communities. *Partnership* is not related to municipal financial sustainability, probably because this SDG is not closely related to LGs' responsibilities. It is implemented by other levels of government.

Regarding control variables, *Taxes* positively affects the *Biosphere* and *Partnership* indicators, especially in 2018. This result supports the idea that cities worldwide need adequate funding and sound financial management to achieve the SDGs, as Fuo (2018) pointed out for Goal 11. Our results confirm previous studies suggesting that a poor financial base and limited autonomy are among the factors that hamper LGs' contribution to sustainable development (Nkume & Oli, 2021). In addition, *Immigrants* is positively related to *Society* and *Economy*, which highlights the importance of managing international migration competently and fairly to promote a more sustainable world (Neumayer, 2006). The proportion of young people is positively related to *Biosphere*, suggesting that the young population is more interested in environmental issues than the older one. However, the coefficient of *Young* is negative in the last equation, indicating that younger people are less interested in partnerships and international alliances between national and international organizations. Furthermore, *Incomepc* has a positive link with *Economy* in most of equations, which is in line with De Neve and Sachs (2020), but it negatively impacts on *Biosphere* in some cases. Slawinski et al. (2017) suggested that motivated by the organizational context and incentives, decision-making places too much emphasis on the economic aspect. Therefore, in certain cases, the higher the per capita income levels, the greater the pursuit of short-term economic gain, rather than thinking holistically about the future and the biosphere in particular, which undermines other SDG priorities.

Regarding the political factors, *Left* is positively related to *Society* in most of the cases, suggesting that left-wing governments tend to address social issues to a greater extent than other ideologies. However, the rest of the coefficients are not statistically relevant, which means that the SDGs are on the agenda of most political parties. The strength of the government negatively affects most of the SDGs. Mukhi and Quental (2019) touched upon the effects of perspectives SDGs governance at a societal level, suggesting that political resistance (e.g. the political power of the fossil fuel industry) or the lack of commitment toward certain SDGs (3, 7, 13, 14 and 15), with non-favorable actions toward decarbonization, can play a role at the societal level. This political resistance or the lack of commitment could be greater when the strength of the government is high.

7. Discussion and conclusions

The SDGs are challenging governments to promote plans, programs, and activities addressing sustainable development. In particular, LGs, due to their proximity to citizens, should implement joint action and innovative solutions in their territories, to reconcile tensions between economic, environmental and social development toward a more sustainable society in the Anthropocene Era (Hoffman & Jennings, 2015; Jennings & Hoffman, 2021). Consequently, politicians are called on to design strategies to achieve sustainable development, and managers should define programs and plan actions, coupled with sound performance indicators and related targets, preserving economic, social, and environmental growth (Niemann & Hoppe, 2018). They are required to balance simultaneous and sometimes contradictory demands for economically, socially, and environmentally sustainable solutions, which is a compelling leadership opportunity (Ferdig, 2007) and advance sustainability as a reform in LG (Zeemering, 2018).

Despite the increasing attention paid to the support that public financial management can offer to achieve the SDGs, there is a lack of studies investigating possible conditions that can hamper or favor LGs in this regard. Our research aims to fill this gap by investigating the relationship between financial sustainability and the SDGs. To this end, two paired samples of Italian and Spanish LGs were analyzed, including financial and non-financial data, to test this relationship empirically, also taking into consideration several social and political variables.

Our results partially confirm the hypothesis that financial sustainability is positively associated with LGs' achievement of the SDGs. In fact, better financial conditions support the achievement of the SDGs related to the Biosphere, Society and the Economy. According to the hierarchical 'Wedding Cake' framework, prioritizing the environmental goals (Biosphere) would also lay the foundation for achieving other social goals (Society), which are connected to implementing economic goals (Economy) (Aubrecht, 2022). This study intends to attract the attention of politicians and managers and stimulate their efforts in order to take care of the biosphere, which returns to social and economic improvements in the local population. In addition, a more proactive approach to attract other financial resources (e.g. European grants and specific bonds issued for new investments connected with the SDGs) can be deemed essential to trigger a positive spiral, toward the achievement of milestones connected with sustainable development.

Our research is not exempt from limitations, as we did not collect data allowing us to dig deeper into the connection between specific goals and financial conditions. Future research could be developed collecting these data. Furthermore, it would be interesting to enlarge the analysis to other countries with different social and cultural characteristics. Other qualitative research could

investigate to what extent managers in financially stable LGs work to achieve the SDGs. This new field of research deserves the attention of public financial management scholars in an attempt to contribute to achieving the SDGs.

Notes

1. The Club of Rome is a think tank comprising academics, scientists, Nobel prize winners, and heads of governments aimed at supporting global development.
2. Here, SDG 14 has been excluded because it has many missing values in our sample.

Notes on contributors

Marco Bisogno, PhD is an associate professor in accounting at the University of Salerno (Italy). He received his PhD in business administration at Naples University “Federico II” (Italy). His current research examines public-sector reforms, earnings management, and accounting standards of public-sector entities. Marco is co-chair of the XII Permanent Study Group of EGPA (European Group of Public Administration) and co-chair of the Task Force that comments on exposure drafts and consultation papers issued by the IP SASB.

Beatriz Cuadrado-Ballesteros, PhD, is an associate professor in accounting at the University of Salamanca (Spain). She received her PhD in business administration and economics at the University of Salamanca (Spain). Her current research examines public management, public-sector reforms, and accounting standards of public-sector entities. She is also interested in public financial management and local governments.

Francesca Manes-Rossi, PhD, is a professor of accounting in the Department of Economics, Management, Institutions at the University of Naples, Federico II, where she teaches and conducts research on public accounting and management, auditing, performance measurement and sustainability disclosure. She earned her PhD in International Accounting at the same university. Francesca is co-chair of the XII Permanent Study Group of EGPA (European Group of Public Administration) and a member of the Task Force that comments on exposure drafts and consultation papers issued by the IP SASB.

Noemi Peña-Miguel, PhD, is an associate professor in accounting at the University of The Basque Country (UP V/EHU), Spain. She received her PhD in business administration and economics at the UP V/EHU (Spain). Her current research examines public management, sustainability and non-financial information. She is also the director of entrepreneurship and transfer at the Campus of Biscay of the UP V/EHU.

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ORCID

Marco Bisogno  <http://orcid.org/0000-0003-3155-2919>

Beatriz Cuadrado-Ballesteros  <http://orcid.org/0000-0003-3606-2302>

Francesca Manes-Rossi  <http://orcid.org/0000-0001-9617-4379>

Noemi Peña-Miguel  <http://orcid.org/0000-0003-3259-7289>

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