

Regional Science Inquiry

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The articles published in RSI Journal are in accordance with the approving dates by the anonymous reviewers.

Regional Science Inquiry, Vol. XVI, (1), 2024

Editorial Note

In the first semester of 2024, the Regional Science Inquiry Journal (RSIJ), the scientific journal published under the aegis of the Hellenic Association of Regional Scientists, launches the first issue (1) of its sixteenth volume (Vol. XVI) since the first day it was published.

Being an international, open-access, and peer-reviewed journal, RSIJ publishes research on various topics related to the broad and multidisciplinary field of Regional Science. The journal aims to freely promote the academic dialogue in Regional Science worldwide and to serve scientific research under solid quality standards in empirical, methodological, and theoretical contribution. RSIJ provides a platform for scholars, researchers, policymakers, and practitioners to share their research and insights into regional development and its various dimensions.

In this semester, the current issue (RSIJ, Vol. XVI, (1), 2024) includes six (6) papers, which were carefully selected from a large pool of submissions so that to comply with the high journal's standards. These papers deal with modern and interesting topics of Regional Science research, such as the spatial attractiveness of creativity and entrepreneurship's location (Batabyal and Yoo, 2024); labor opportunities in the bioenergy market (Ferro et al., 2024); developmental dynamics based on goods and services taxation (Bharat Haldankar and Patkar, 2024); social inequalities (Krupavicius et al., 2024); environmental, social, and governance factors in the local level (Sepetis et al., 2024); and tourism development in low-density rural spaces based on environmental awareness and promotion (Teixeira et al., 2024). This issue, the RSIJ has the merit to promote the academic dialogue with important aspects in regional science inquiry. For instance, decision-making by regional authorities has a major impact on development and the quality of life of residents. The analysis of the optimal provision of public goods and the encouragement of business activity constitute important research topics (Polyzos, 2019, 2023), where an interesting relevant discussion is addressed in this issue. Further, the sustainable use of natural resources and pathways to sustainable development suggest major priorities for regions and regional communities (Polyzos, 2019). Analysis of the impact of agricultural and agro-tourism activity on the environment may be insightful towards this direction (Pe'Er et al., 2019; Sdrolias et al., 2022), where an interesting relevant discussion is also addressed in this issue. In addition, social cohesion and the management of social inequalities are important issues for all levels of spatial organization (Leonardi, 2006; Fratesi and Wislade, 2017; Iammarino et al., 2019). A relevant discussion is also applicable to this RSIJ issue. Finally, the development of effective intergovernmental structures (Rodriguez-Pose and Di Cataldo, 2015) and the promotion of participatory decision-making are essential for the sustainable development of regions. The RSIJ reader can also find a relevant discussion in this RSIJ issue.

In brief, the first paper, titled "USING ENTERPRISE ZONES TO ATTRACT THE CREATIVE CLASS: SOME THEORETICAL ISSUES", authored by Amitrajeet A. BATASYAL and Seung Jick YOO studies a decision-making problem concerning a regional authority (RA) that uses enterprise zones to attract members of the creative and entrepreneurs class. The enterprise zones provide a local public good (LPG) L to entrepreneurs who become members. The paper computes first the utility-maximizing number of entrepreneurs N to attract and the optimal provision level of the LPG. Second, if the LPG L is chosen optimally, then, given N , the paper determines an expression for the entrepreneur's utility. Third, it calculates how much an entrepreneur would be willing to pay to become a member of an enterprise zone and then it discusses the potential existence of an efficient and revenue-neutral equilibrium. Finally, the paper comments on some theoretical difficulties stemming from the twin facts that the number of enterprise zones created and the number of entrepreneurs attracted to these zones have to be integers.

The second paper, titled "MEASURING GROSS EMPLOYMENT GENERATION POSSIBILITIES IN THE BIOGAS VALUE CHAIN IN SOUTHERN BRAZIL", authored by Gustavo FERRO, M. Priscila RAMOS, and Carlos A. ROMERO, studies the current and potential production and gross employment in the biogas value chain in three southern states in Brazil (Paraná, Santa Catarina, and Rio Grande do Sul). The paper provides a twofold approach: first, an input-output methodology to focus on the problem of disparate or nonexistent sectoral information, both in monetary and physical units; second, the quantitative results of output and gross job creation derived from shocks at the regional level. The authors calibrate input-output matrices of the three states with compatibilized sector entries, opening new ones for those not included in official statistics (derived from specific surveys). Once the baseline has been established, the analysis considers three scenarios: demand-pull that achieves full capacity utilization, supply push that addresses new investments in the sector assuming guaranteed demand, and full utilization of substrates supply for biogas production.

Employment multipliers are in line with literature on comparative activities found elsewhere in the world. The findings of the paper support the hypothesis of the relatively high labor intensity in the biogas industry.

The third paper, titled “REGIONAL DYNAMICS AND STATE-LEVEL PERFORMANCE IN INDIA’S INDIRECT TAX SCENARIO: EXPLORING GOODS AND SERVICES TAX (GST) REVENUE JOURNEY”, authored by Gajanan BHARAT HALDANKAR and Santosh PATKAR, studies Goods and Services Tax (GST) implemented in India from 2017 as a new indirect tax law intended to simplify and consolidate the previous tax system. The analysis applies to secondary data of GST revenue from all 28 States and 8 Union Territories (UTs), grouped into six regions. The results of the analysis demonstrate the States/UTs that excel in terms of GST collection in their designated regions and those that demonstrated exceptional performance in collecting GST revenue within their regions. Additionally, the study reveals an upward trend in GST revenue performance across all regions of India particularly in the Western region. It also indicates that certain States/UTs and regions are not performing up to expectations when considering their population size. The paper provides insights into tax departments to researchers and policymakers, empowering them to develop strategies that can boost the region-wise GST revenue collection and help promote the economic growth of the country.

The fourth paper, titled “PERCEIVED AND DESIRED IMAGES OF SOCIETY: HOW (UN)EQUAL IS SOCIETY?”, authored by Algis KRUPAVIČIUS, Ligita ŠARKUTĖ, Armand KRASNIQI, and Christos Ap. LADIAS, investigates imagined – perceived, and desired – types of society building on comparative analysis applied to 23 countries that participated in social inequality studies of the International Social Survey Programme (ISSP) in 2009 and 2019. The research focuses on examining the gap between the assessment of perceived and desired types of society; the perceived images of society related to different macro socioeconomic and political conditions; and individual assessments influenced by socio-demographic and attitudinal characteristics. The paper applies a cross-national comparison of images of society and provides insights into the linkage of this concept to human and social capital; well-being; and subjective identities. The results show that contemporary societies are perceived as socially unequal in most countries; however, the majority of the population still expects to live in more just societies in the future.

The fifth paper, titled “GLAMPING IN LOW-DENSITY TERRITORIES: THE CASE OF SANTO ALEIXO DA REASTAURAÇÃO”, authored by Fernando José Calado e Silva Nunes TEIXEIRA, Susana Soares Pinheiro Vieira PESCADA, Filipos RUXHO, Carolina PALMA, and Fejzulla BEHA, examines a new concept of tourist activity, Glamping, whose mission is to promote territories in a sustainable and socially appealing way, where the articulation of natural heritage with tourism seeks to contribute to making territories and rural spaces more charming. The study investigates the extent to which investment in enriching the tourist accommodation provides added value for the local development of an Alentejo village (Portugal), building on a strategic analysis of a tourist project in rural areas, to formulate recommendations with intervention proposals to support its implementation. The study inquires about the strategic challenges and associated objectives, actors, conflicts, and alliances around these objectives, using relevant semi-structured strategic analyses. The results highlight the need to contribute to more sustainable tourism, aiming at the preservation and conservation of all natural and cultural heritage; and to create new jobs, revealing the Local Development Association as the most influential actor, and the Social Center among the less dependent actors (which, being a local institution, is largely unaffected by the influences of the actors involved). The study provides insights into the formulation of strategic recommendations for an economic and social feasibility study and the creation of partnerships and alliances among local and regional actors.

The sixth paper, titled “ESG INTEGRATION IN EVALUATING AND FINANCING LOCAL GOVERNMENT: A NEW PROSPECTS FOR LOCAL GOVERNMENTS AND MODERN SOCIETIES”, authored by Anastasios SEPETIS, Dimitrios TSIRIGOTIS, Ioannis NIKOLAOU, and Yannis MANIATIS, attempts to capture the perspective of Environmental, Social, and Governance (ESG) factors in the financial markets of the Local Government through the critical overview of the relevant theoretical background and the existing successful practices. It faces the challenge of finding the optimal ratio between economic growth, socially fair development, and the preservation of natural resources. Urban sustainability derived from ESG factors can provide a more comprehensive approach to the above equation by challenging the central authority to establish appropriate rules and approve good practices and the markets to further insist on sustainable investments. To perform comprehensive research on the synergies of ESG criteria in the Local Government, the paper applies a systematic literature review’s guidelines. A further purpose of this paper is to shape an ESG integration model for Greek local authorities by utilizing the existing literature.

Last but not least, the seventh paper, titled “CATALYZING ECONOMIC AND ENVIRONMENTAL INSIGHTS: APPLICATIONS OF IMPLAN’S ENVIRONMENTALLY EXTENDED INPUT-OUTPUT (EEIO) MODELING FOR ENERGY PRODUCTION SCENARIOS”, authored by Tuyen PHAM, G. Jason JOLLEY, Paul VALENTINE, and Joshua C. HALL, employs

IMPLAN, a proprietary input-output (I-O) software to assess the economic ramifications of diverse interventions on the local economy, comparing coal vs. solar production scenarios in the Ohio (USA) case study. The purpose of the paper is to illustrate the seamless integration of Environmentally Extended Input-Output (EEIO) modeling with traditional I-O modeling, showcasing its enhanced capabilities for evaluating economic and environmental impacts. In the case of Ohio, the analysis finds that the state's plans, to increase solar energy capacity and decrease coal energy capacity, have a net positive impact on its economy when considering both economic and environmental aspects.

All these interesting works are available on the next pages of the RSIJ intending to promote the academic dialogue in Regional Science. Overall, the Editor in Chief, Prof. Christos Ap. Ladias, the Editorial Board, and the signatory of this Editorial Note welcome the reader to the multidisciplinary journey of Regional Science Inquiry that the current issue promises on its following pages.

On behalf of the Editor-in-Chief and Editorial Board,
Dimitrios Tsiotas, Ph.D.,
 Assistant Professor – RSI J.

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Articles

USING ENTERPRISE ZONES TO ATTRACT THE CREATIVE CLASS: SOME THEORETICAL ISSUES

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Abstract

We study decision-making by a regional authority (RA) that uses enterprise zones to attract members of the creative class---referred to as entrepreneurs---to its region. The enterprise zones provide a local public good (LPG) L to entrepreneurs who become members. First, we compute the utility maximizing number of entrepreneurs N to attract and the optimal provision level of the LPG. Second, if the LPG L is chosen optimally, then, given N , we determine an expression for the utility of an entrepreneur. Third, we calculate how much an entrepreneur would be willing to pay to become a member of an enterprise zone and then discuss the potential existence of an efficient and revenue-neutral equilibrium. Finally, we comment on some theoretical difficulties stemming from the twin facts that the number of enterprise zones created and the number of entrepreneurs attracted to these zones have to be integers.

Keywords: Creative Class, Enterprise Zone, Entrepreneur, Local Public Good, Membership

JEL classification: R11, R58

1. Introduction

The prominent American poet and writer Maya Angelou once said that “You can’t use up creativity. The more you use, the more you have.” The urbanist Richard Florida would probably agree with this assertion. We say this because in his numerous writings about creative individuals and creativity---see Florida (2002, 2003, 2005, 2008, 2014)---Florida has pointed out to students of regional economic growth and development the importance of first comprehending the “more you use, the more you have” effects of creativity and then putting in place policies that will attract different kinds of creative individuals who, we are told, frequently like to live and work together.

Put differently, cities and regions need to do all they can to attract and retain members of what Florida calls the *creative class*. The creative class “consists of people who add economic value through their creativity” (Florida, 2002, p. 68). Specifically, this class is made up of specialists such as attorneys, information technology professionals, medical doctors, scientists, university professors, and, noticeably, bohemians such as artists, musicians, and sculptors.

We do not disagree with Florida’s key policy prescription stated above. That said, we focus on two questions that follow naturally once one acknowledges Florida’s point about the primacy of the creative class for the economic vibrancy of regions. The first question is: “What specifically might a regional authority (RA) do to attract the creative class to its region?” Since attracting the creative class is generally a costly undertaking for cities, the second question is: “How many members of the creative class should a RA seek to attract?”

As far as the first question is concerned, research by Buettner and Janeba (2016), Batabyal and Beladi (2019), Batabyal *et al.* (2019), and Batabyal and Yoo (2020a, 2020b) shows that

local public goods (LPGs)² such as museums, educational institutions, theatres, and high-quality local infrastructure can be used by a RA to carry out the “attract” task.³ With regard to the second question, under the assumption that a city authority acts like a “monopolist” interested in maximizing the total benefit to its city, Batabyal (2020) has determined the number of creative class members to attract to its city and the amount of a LPG to provide so that this total benefit is maximized.

These findings notwithstanding, regional authorities (RAs) are also able to use place-based policies⁴ such as enterprise zones⁵ to attract members of the creative class to their regions. For instance, Kolko and Neumark (2010) study enterprise zones in California and report that although these zones have not increased overall employment, they have had a positive impact on employment in those zones where managers conducted a lot of marketing and outreach activities. Zhang (2015) uses shift-share analysis and shows that the Louisville, Kentucky enterprise zone program greatly expanded the growth of manufacturing and service activities. Briant *et al.* (2015) focus on the French enterprise zone program and contend that even though this program created more jobs in spatially integrated neighborhoods, its impact on local wages was only visible in the more isolated neighborhoods. Finally, Walsh (2018) points out that the St. Paul, Minnesota Creative Enterprise Zone has been very successful in drawing in and retaining potters, playwrights, builders, and brewpubs.

The four studies discussed above are representative of the existing literature on enterprise zones in the sense that virtually all such studies about the efficacy of enterprise zones as an economic development policy are either based on case studies or on empirical analysis. To the best of our knowledge, there are *no* theoretical studies about the effectiveness of enterprise zones in attracting the creative class to a particular region. Therefore, our objective in this paper is to use a simple model and shed light on some theoretical difficulties that arise when studying the usefulness of enterprise zones in attracting the creative class to a specific region.

The remainder of this paper is arranged as follows: Section 2.1 describes our stylized model that is adapted from Scotchmer (1985) and that focuses on the interaction between an enterprise zone creating regional authority (RA) and members of the creative class who we refer to as entrepreneurs. Section 2.2 computes the utility maximizing number of entrepreneurs N to attract and the optimal provision level of the LPG L . If L is chosen optimally, then, given N , section 2.3 determines an expression for the utility of an entrepreneur. Given the section 2.3 utility for an entrepreneur, section 2.4 calculates how much an entrepreneur would be willing to pay to become a member of an enterprise zone and then discusses the potential existence of an efficient and revenue-neutral equilibrium. Section 2.5 comments on some theoretical difficulties that arise from the twin facts that the number of enterprise zones created and the number of entrepreneurs attracted to these zones have to be integers. Finally, section 3 concludes and then suggests two ways in which the research delineated in this paper might be extended.

2

See Hindriks and Myles (2013, chapter 7) for a textbook exposition of LPGs.

3 For a discussion of related matters, see Hansen and Nedomysl (2009), Richardson (2009), and Audretsch and Belitski (2013).

4 Place-based policies refer to governmental efforts to enhance the economic performance of particular areas within their jurisdiction. Go to <https://www.brookings.edu/multi-chapter-report/place-based-policies-for-shared-economic-growth/> for additional details. Accessed on 11 January 2021.

5 An enterprise zone is a geographic area that has been granted special tax breaks, regulatory exemptions, or other public assistance in order to promote economic development. Go to <https://www.investopedia.com/terms/e/enterprise-zone.asp> for more details. Accessed on 11 January 2021.

2. The Theoretical Framework

2.1. Preliminaries

Batabyal and Yoo (2020b) rightly point out that the creative class, in general, is composed of an assortment of specialists such as attorneys, bankers, medical doctors, sculptors, university professors, and is therefore heterogeneous. That said, a RA that is looking to bring members of the creative class together is generally *not* looking to bring together every possible type of member. In other words, a region like the greater New York City area is more likely to be interested in attracting bankers and, in contrast, a region like the greater Los Angeles area is probably more interested in drawing in film industry professionals. Therefore, to focus the subsequent discussion, we suppose that a RA is looking to attract a particular *subset* of members of the creative class such as bankers or information technology professionals. Because these members are either all bankers or all information technology professionals, and so and so forth, we can think of this subset as a *homogeneous* set of individuals. In the remainder of this paper and as noted in section 1, we refer to this homogeneous set of individuals as entrepreneurs.

Now, consider a region with a suitable RA. There are two goods in this region's economy; a private good X and a LPG L . There are a total of N possible entrepreneurs that the RA is interested in attracting to its region and each of these N possible entrepreneurs has income I . To perform this "attract" function, the RA creates enterprise zones that provide the LPG L . The cost of providing this LPG is given by $C(L) = L$. The Creative Enterprise Zone in St. Paul, Minnesota---see Walsh (2018)---is an example of the kind of enterprise zone we have in mind.⁶

The preferences of an entrepreneur are given by the utility function $U(\cdot)$ where

$$U = X + 5 \log(L) - N. \quad (1)$$

Equation (1) tells us that an entrepreneur's utility is increasing in both his private good and LPG consumption and decreasing in the number of other entrepreneurs that are attracted by our RA to set up shop in one or more of the enterprise zones in the region under study. With this description of the theoretical framework out of the way, our next task is to compute the utility maximizing number of entrepreneurs N to attract and the optimal provision level of the LPG L .

2.2. Utility maximizing number of entrepreneurs and LPG provision

We know that each of the entrepreneurs that the RA is interested in attracting to its region has income I . Therefore, it is reasonable to suppose that each entrepreneur contributes L/N towards the provision of the LPG and that he spends the remaining amount $I - L/N$ on the consumption of the private good X . As such, our RA knows that every entrepreneur's optimization problem is to solve

$$\max_{\{L,N\}} U = I - \frac{L}{N} + 5 \log(L) - N. \quad (2)$$

The first-order necessary conditions for the above maximization problem are

$$\frac{\partial U}{\partial L} = \frac{5}{L} - \frac{1}{N} = 0 \quad (3)$$

and

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Similar enterprise zones designed to attract the creative class have also been used in Staunton, Virginia. Go to <https://www.stauntonbusiness.com/home/showdocument?id=2169> for more details. Accessed on 8 January 2021.

$$\frac{\partial U}{\partial N} = \frac{L}{N^2} - 1 = 0. \quad (4)$$

It is straightforward to confirm that the second-order sufficiency conditions are satisfied. Simplifying equations (3) and (4), we get

$$L = 5N = N^2 \Rightarrow N^* = 5 \text{ and } L^* = 25. \quad (5)$$

In words, equation (5) tells us that when our RA seeks to attract entrepreneurs to its region by focusing on the maximization of their utility, it is optimal to attract 5 entrepreneurs and the optimal level at which the LPG ought to be provided is 25 units. Now suppose that the LPG provision level is selected optimally. Then, given N , we wish to determine an expression for the utility of an entrepreneur.

2.3. Entrepreneurial utility

We begin by substituting $L = N^2$ from equation (5) into the utility function in equation (2). This gives us the expression for the utility of an entrepreneur in terms of N or the total possible number of entrepreneurs that the RA is interested in attracting to its region. Making the above substitution, we get

$$U = I + 10 \log(N) - 2N. \quad (6)$$

Equation (6) tell us two things. First and as expected, an individual entrepreneur's utility is increasing in his income. Second, this same individual entrepreneur's utility rises as more entrepreneurs are attracted to the region under study but too many entrepreneurs also give rise to disutility.

Now, to illustrate the working of our model as far as the creation of enterprise zones is concerned, suppose that the total number of potentially attractable entrepreneurs or $N = 18$. Then, some thought ought to convince the reader that there are three cases to analyze as far as the *number* of enterprise zones that ought to be created by our RA is concerned. Specifically, this RA can create (i) three enterprise zones with $N = 6$, or (ii) four enterprise zones with $N = 4.5$, or (iii) five enterprise zones with $N = 3.6$.

Using equation (6), the utility to an individual entrepreneur from the creation of three (U_3), four (U_4), and five (U_5) enterprise zones is given by

$$U_3 = I + 10 \log(6) - 12 = I + 5.92, \quad (7)$$

$$U_4 = I + 10 \log(4.5) - 9 = I + 6.04, \quad (8)$$

and

$$U_5 = I + 10 \log(3.6) - 7.2 = I + 5.61. \quad (9)$$

Inspecting equations (7) through (9), it is clear that an entrepreneur's utility is highest when *four* enterprise zones are created and hence creating four enterprise zones is the *efficient* course of action for our RA. When this decision is made, the corresponding provision level of the LPG is given by $L = 5N = 22.5$.

Finally, when four enterprise zones are created and the optimal LPG provision level is $L = 22.5$, using $C(L) = L$, the net revenue R_n to an enterprise zone is given by

$$R_n = 4.5F - 22.5, \quad (10)$$

where F is the fee that an entrepreneur is willing to pay to join any one of the created enterprise zones. If we want the created enterprise zones to break even financially or, put

differently, the decision to create four enterprise zones to be revenue-neutral then we set $R_n = 0$ in equation (10) and this tells us that

$$4.5F - 22.5 = 0 \Rightarrow F = 5. \quad (11)$$

In words, the revenue-neutral fee that ought to be charged to entrepreneurs equals $F = 5$. Next, given the maximal entrepreneurial utility in equation (8), we first calculate how much an entrepreneur would be willing to pay to obtain this level of utility and become a member of an enterprise zone and then discuss the potential existence of an efficient and revenue-neutral equilibrium.

2.4. Is an efficient and revenue-neutral equilibrium possible?

Rewriting the maximand in equation (2), we obtain

$$X = U - 5 \log(L) + N. \quad (12)$$

We know from the analysis in section 2.3 that when our RA creates four enterprise zones, we have

$$N = 4.5, L = 22.5, \text{ and } U = I + 5 \log(22.5) - 9.5. \quad (13)$$

Therefore, using equation (12), the willingness to pay that we seek is given by

$$F = I - X = 9.5 - 5 \log(22.5) + 5 \log(L) - N. \quad (14)$$

Using equation (14), the net revenue function for an enterprise zone is

$$R_n = NF - L = N\{9.5 - 5 \log(22.5) + 5 \log(L) - N\} - L. \quad (15)$$

Maximizing the net revenue function in equation (15) with respect to the LPG L gives us $L = 5N$. Using this last expression, the first-order necessary condition for an optimum for N can be written as

$$9.5 - 5 \log(22.5) + 5 \log(5N) - 2N = 0. \quad (16)$$

Solving the above equation for N gives us $N^* = 5.026$. Therefore, it follows that $L^* = 5N^* = 25.13$, and that $F^* = 5.026$. Using these three values for N , F , and L , we can write an expression for the net revenue going to an enterprise zone. That expression is

$$R_n = N^*F^* - L^* = (5.026)^2 - 25.13 = 0.13 > 0. \quad (17)$$

Equation (17) shows that when we use an entrepreneur's willingness to pay that corresponds to the maximal utility delineated in section 2.3, the resulting optimal choices of N (5.026) and L (25.13) give rise to net revenue for an enterprise zone that is strictly *positive*. This finding leads to the following salient conclusion: Relative to the outcome in section 2.3 in which the decision to create four enterprise zones was revenue-neutral with each enterprise zone selecting $N = 4.5$, we now have a different strategy which involves choosing $N^* = 5.026$ and the enterprise zones make *positive* net revenue. Therefore, the outcome described in section 2.3 *cannot* be an equilibrium. How might we get around this negative conclusion? The final task in our paper is to address this question.

2.5. Integer issues

We now answer the above question by commenting on some theoretical difficulties that arise from the twin facts that the number of enterprise zones created and the number of entrepreneurs attracted to these zones have to be *integers* in practice.

In our modeling thus far in sections 2.1 through 2.4, we have implicitly treated the creative class subset of interest, i.e., the set we called entrepreneurs, as a very large set of individuals. Mathematically, this is tantamount to treating this set as a continuum and hence when working with a continuum, it is certainly possible to optimally select a non-integer number of entrepreneurs to set up shop in an enterprise zone. In contrast and consistent with actual practice, we treated the number of enterprise zones to be created by the RA as an integer. In other words, *de facto*, our model describes a setting in which there are *many* entrepreneurs but only a *small* number of dominant enterprise zones.

This also means that tacitly, when determining how many enterprise zones to create, the RA is behaving like a “utility taker.” This means that the RA thinks its decision-making has *no* impact on the utility attained by the homogeneous entrepreneurs. Therefore, it evaluates alternate enterprise zone creation decisions on the assumption that these decisions must yield to the entrepreneurs (the members of the enterprise zones) the same utility achieved before any decision change on its part. Put differently, in its decision-making, the RA takes the utility achieved by the entrepreneurs as *fixed*. This “utility taking” behavior on the part of the RA is what causes a discrepancy and this discrepancy is the reason for there being no revenue-neutral equilibrium. To get around this problem, it will be necessary to model a scenario in which there are a large number of both entrepreneurs and enterprise zones. When this is done, the positive net revenue described in equation (17) can be eliminated and we would then be able to study a true revenue-neutral equilibrium. This completes our discussion of some theoretical issues that arise when a RA uses enterprise zones to attract the creative class to its region.

3. Conclusions

In this paper, we analyzed decision-making by a RA that used enterprise zones to attract members of the creative class---referred to as entrepreneurs---to its region. The enterprise zones provided a LPG L to entrepreneurs who agreed to become members. First, we computed the utility maximizing number of entrepreneurs N to attract and the optimal provision level of the LPG. Second, if the LPG L was chosen optimally, then, given N , we determined an expression for the utility of an entrepreneur. Third, we calculated how much an entrepreneur would be willing to pay to become a member of an enterprise zone and then discussed the possible existence of an efficient and revenue-neutral equilibrium. Finally, we commented on some theoretical difficulties stemming from the two facts that the number of enterprise zones created and the number of entrepreneurs attracted to these zones had to be integers.

The analysis in this paper can be extended in a number of different directions. Here are two potential extensions: First, it would be interesting to model the interaction between a RA and creative class members in an intertemporal setting and to then analyze the time-paths of the optimal number of enterprise zones created and the optimal number of members that are attracted to these enterprise zones. Second, it would also be informative to partition the creative class population into different clusters and to then examine how successful a RA is in attracting these different clusters of members to its region with enterprise zones and other fiscal and people-centered policies. Studies that analyze these aspects of the underlying problem will provide additional insights into how useful enterprise zones can be in attracting creative people in general to particular regions.

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MEASURING GROSS EMPLOYMENT GENERATION POSSIBILITIES IN THE BIOGAS VALUE CHAIN IN SOUTHERN BRAZIL

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Abstract

Biogas is generated from substrates derived from agriculture and cattle, agroindustry (slaughterhouses, flour, and sugar mills), urban solid waste, and sewerage treatment. This study measures the current and potential production and gross employment in the biogas value chain in three southern states in Brazil (Paraná, Santa Catarina, and Rio Grande do Sul). We offer two contributions: first, an input-output methodology to focus on the problem of disparate or nonexistent sectoral information, both in monetary and physical units; second, the quantitative results of output and gross job creation derived from shocks at the regional level. We calibrate input-output matrices of the three states with compatibilized sector entries, opening new ones for those not included in official statistics (derived from specific surveys). Once the baseline has been established, we consider three scenarios: demand-pull that achieves full capacity utilization, supply push that addresses new investments in the sector assuming guaranteed demand, and full utilization of substrates supply for biogas production. Employment multipliers are in line with literature on comparative activities found elsewhere in the world. Our findings support the hypothesis of the relatively high labor intensity in the biogas industry.

Keywords: biogas, Brazil, input-output, employment

JEL classification: Q42, R15

1. Introduction

Climate change is one of the most important global concerns nowadays, and one of the key factors in understanding it is greenhouse gas (GHG) emissions. Currently, GHG emissions have reached unsustainable levels, prompting the adoption of environmental policies by several countries, and more importantly, collective action at the global level. This has generated concern and proactive interest in controlling global warming and minimizing the costs of climate change on humanity's welfare. The international community, within the framework of the United Nations, has initiated negotiations between countries (United Nations Framework Convention on Climate Change - UNFCCC), whose objectives are aligned with the international commitments of the Paris Agreement on Climate Change (an international initiative to decarbonize and hence cap global warming) and the United Nations Sustainable Development Goals (SDG) for 2030. Fossil fuels are responsible for a great share of GHG emissions, and part of the solution is its progressive replacement with renewable energies. Considering that globally 73% of GHG emissions come from the energy sector and 27% from the rest of the productive sectors (IPCC, 2023), it is essential to promote the increased use of renewable sources to reduce emissions (IPCC, 2015). The problem has several facets, one being the replacement of fossil fuels with “greener” energy generated from biomass. Biomass is defined as “the biodegradable fraction of products, waste, and residues

from biological origin from agriculture, including vegetal and animal substances, forestry, and related industries including fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial and municipal waste of biological origin” (European Biogas Association, 2020).

According to the targets in the Brazilian National Determined Contribution to Paris Agreement, the country aims to reach a 45 percent share of renewable energies in its energy matrix by 2030 (in addition to the current relatively high share of hydroelectrical energy sources in Brazil) (Fundação Getúlio Vargas, 2019).

Among the possibilities of applying biomass to produce fuels is biogas generated from anaerobic decomposition from several organic matters. Biogas and biomethane have the potential to support all aspects of the SDGs, which chart a path entirely consistent with the Paris Agreement and meet objectives related to universal energy access and cleaner air. Moreover, from the supply side, the tropical climatological characteristics of the country provide comparative advantages for biogas production in Brazil (Mariani, 2018). The three major energy conversion technology paths of biomass are 1) physical-chemical conversion (compression and crushing of vegetal matters to extract oil, later chemically transformed, yielding biofuels); 2) Thermo-chemical conversion (energy chemically stored in solid waste or timber that is converted into heat using combustion via different processes); 3) biochemical conversion (biomass transformation from biological and chemical processes, including anaerobic digestion, fermentation/distillation and hydrolysis). Anaerobic digestion consists of the biological degradation of organic material –sewage sludge, animal and vegetal by-products, household biowaste, and primary or secondary crops–, resulting from the action of several microorganisms in the absence of oxygen. The ‘bio’ aspect of biogas refers to its biological production process and renewable (biomass) origin, in opposition to ‘natural gas’ which is of fossil origin (European Biogas Association, 2020).

The arguments in favor of biogas and biomethane, which make it possible to deal with the increasing amount of organic waste produced by modern societies, lie at the intersection of fundamental challenges to meet SDGs: 1) Reducing global greenhouse gas emissions, 2) Increasing economic activity, and 3) fostering employment. The latter is of particular interest, since conventional fossil energies are industries comparatively intensive in capital, while most renewable energies, and biogas in particular, are comparatively intensive in labor. Biomass encompasses several forms of substrates, which are substances or surfaces that an organism grows and/or lives on and is supported by (European Biogas Association, 2020). Biogas can be a valuable local source of power and heat, as well as a clean cooking fuel to displace reliance on the traditional use of solid biomass in many developing countries. There are also potential co-benefits in terms of agricultural productivity (because of using the residual “digestate” from biodigesters as a fertilizer) and reducing deforestation.

Brazil has great potential for biogas production (82.6 billion m³ per year according to ABiogás, of which the current production is around 2.8 billion or 3.4 percent of the potential) due to its availability and the diversity of substrates in an extended geography. According to UNIDO (2020 b), three states in the south (stretching over 564 thousand square kilometers, or 6.6 percent of the country’s size), produced only 5 percent of their biogas potential production. UNIDO (2023) measures the current and potential production and employment in the biogas value chain in three southern states in Brazil – Paraná, Santa Catarina, and Rio Grande do Sul (hereafter PR, SC, and RS), known together as the South Region. Those states have a combined population of 30 million inhabitants and recorded a GDP of US\$ 323 billion in 2019, being the fourth, fifth, and sixth biggest states in terms of Brazilian GDP after Sao Paulo, Rio de Janeiro, and Minas Gerais.

Reliable statistics are crucial to diagnose the state of an economy and simulate the effects of policy interventions. The answer to the question of how much value added (or gross production value GPV) and/or employment one sector of an economy generates is usually determined using public statistics, routinely compiled, and processed by national statistical bodies. In developing countries, however, the information on output and jobs is normally limited and is not available for all periods, all meaningful sector disaggregation, or all regions. Difficulties escalate when determining production and employment in such a very specific sector as biogas, in highly specific regions, and on a very specific date. If they do exist, they have probably been updated, and if the economic structure of the jurisdictions

differs, the sectors considered in each jurisdiction are expected to vary. This is the case in Brazil's South Region.

We make two contributions. First, we deal with a method to study the problems of 1) measuring production and gross job creation, addressing the compilation of scant data and generating systematic information; 2) opening entries and periods of measurement that lack detail and scope; 3) disaggregating sectors that are not currently considered in the statistics because they are new sectors, or small ones, or have not been studied in depth, and 4) putting together coherent monetary (production) and physical units (employment and emissions), and thus connecting production increases along with gross job creation. Second, we estimate direct, indirect, and induced nexuses between production and employment to understand the gross jobs generated in the activity itself, plus all the spillovers the sector generates in the rest of the economy (to providers of inputs or services; from buyers of production).

In doing so, we calibrate an Input-Output Model for each state with the biogas sectors now included as separate activities to adequately measure production and employment. In addition, we produce simulations of interest for policymakers, focusing on production increase, and job gains of shifting partially the energy matrix from fossil to biogas production. The scenarios we propose improve the capacity utilization (from an initially important idle capacity), another that promotes expanding capacity (on the assumption of demand that fully absorbs new supply), and a third one, just to evaluate its full potential, consisting of a complete use of all available biomass in the South of Brazil to produce biogas. Each scenario can be impulse by a different policy set.

After this Introduction, Section 2 presents a literature review. Section 3 deals with the methodology. Section 4 examines the data, and introduces primary information, secondary data, and the baseline. Section 5 presents and discusses the scenario design and results and offers some sensitivity analyses. Section 6 concludes.

2. Contextual settings

2.1. Concept and technologies.

The Circularity GAP Report estimates that roughly 90 percent of the resources are not reinserted in economic activities worldwide. Biomass energies are forms of reducing the circularity gap, promoting natural capital preservation, and reducing emissions (Fundação Getúlio Vargas, 2019). One of the byproducts of biomass is biogas. Biogas is mainly composed of methane (50-75%), carbon dioxide (25-50%), steam, and other gases in low concentrations such as hydrogen sulfide, hydrogen, and nitrogen.

Biogas production helps prevent methane emissions in the atmosphere from agricultural by-products that otherwise are left to rot, such as manure. As such, biogas can play a key role in mitigating GHG emissions in agriculture, especially methane emissions – the second most important GHG after CO₂. Moreover, biogas can provide non-intermittent energy all year long, turning organic waste and residues into valuable products, allowing for nutrient recycling and energy production locally. Biogas can be used as biofuels, to generate electricity, for heating or air conditioning, and as a substitute for natural gas, steam, and bioproducts, being capable of serving a broad range of industries (ANP, 2015a; ANP, 2017).

The production process is as follows: 1) the pre-treatment of substrates; 2) anaerobic digestion in a biodigester; 3) treatment, storage, and transport of biogas, and storage, treatment, and use of digestate; 4) the use of biogas in electricity or heat generation; and production, storage, and transport of biomethane by raising the content of methane from 60 percent in biogas to 90 percent in biomethane; 5) Use of the biogas in the natural gas network, as vehicle fuel, or for industrial production (Mariani, 2019).

Anaerobic digestion can yield biogas or digestate, and biogas can also be “upgraded”. Digestate used as organic fertilizer makes it possible to reuse nutrients and it substitutes mineral fertilizers of fossil origin. Upgrading is the “*process of separating unwanted components in biogas (such as carbon dioxide) to increase the total methane share and meet natural gas standards.*” (European Biogas Association, 2020). When upgraded, biomethane (also known as renewable natural gas) is indistinguishable from natural gas and can be transported and used in the same way. Biomethane can be injected into the natural gas

network or used industrially. Biomethane can deliver the energy system benefits of natural gas while being carbon neutral. Currently around 3.5 Mtoe of biomethane are produced worldwide. Most of the production lies in European and North American markets, with some countries such as Denmark and Sweden boasting more than 10% shares of biogas/biomethane in total gas sales. Countries outside Europe and North America are catching up quickly, at disparate speeds, with the number of upgrading facilities in Brazil, China, and India tripling since 2015 (IEA, 2018).

2.2. Accounting for the biogas impact on the economy and employment

The Input-Output Analysis and Computable General Equilibrium (CGE) models are the most common tools to measure a sector's expansion impact with widespread diffusion to solve several problems, such as recalculating the sectoral structure of production, analyzing changes in employment, accounting for emission reduction, assessing the impact on the international markets, evaluating taxes and subsidy impacts, etcetera, as Brinkman et al., (2019), Garrett-Peltier (2017), Lehr et al., (2008), Pollin and Garret-Peltier (2009), Malik et al. (2014), Lester et al. (2015), and Alarcon and Ernst (2017) assert, among others.

The Input-Output analysis makes it possible to show how the parts of a system are affected by changes in other related parts. The measurement of socioeconomic impacts in each economy helps assess clearly and in detail all the social costs and benefits of a certain sector's expansion or reduction (Brinkman et al., 2019). For instance, Romero et al. (2023 a) contribute to understanding the effects of the increment of recycling activities on production, employment, and the environment in a developing country with a large informal labor sector, by using an enhanced input-output matrix or waste input-output matrix (WIO), within a hybrid (including monetary and physical transactions) model accounting for the recycling sectors interlinking with the rest of the economy and final consumption. In the same vein, Romero et al. (2023 b) address the problem of estimating renewable energy's impact on regional economies of developing countries, owing both to the lack of disaggregated data on these renewable energy sources at the subnational level and a method to address its share in the energy matrix.

Job creation in the renewable energy sectors is related to the control of environmental impact and sustainable projects (Lehr et al., 2008; Breitschopf et al., 2011; Garret-Peltier, 2017). Nevertheless, its statistics determination is difficult, as Rojo et al. (2020) and Stoevska and Hunter (2013) state.

The monetary values of Input-Output tables could not effectively address the allocation of jobs because the monetary values per physical unit can differ significantly in several supply chains: in fact, biogas can be produced with several substrates, on different scales, and with different intensities of labor.

3. Biogas in the South of Brazil

Brazil has no integrated structure in its biogas industry but rather it encompasses heterogeneous initiatives coming from different sectors (Fundação Getúlio Vargas, 2019). Moreover, in this country, the prevailing technology is predominately low implantation and maintenance costs, more oriented by environmental concerns than by energy production. The biogas sources come mainly from substrates of agriculture and cattle raising and their processing industries (dairy, slaughterhouses, beer brewing, flour, and sugar mills, etc.), organic solid waste, and sewerage treatment.

In 2021 CiBiogás (2021) estimated that 675 biogas plants were built in Brazil (638 were active), and the number of plants was growing swiftly (20 percent annual rates since 2015). Most plants are small (less than 1 million Nm³ capacity for biogas production, being Nm³ the quantity of gas contained in a cubic meter under normalized pressure and temperature), and roughly 80 percent of these plants produce 8 percent of all the biogas that the country provides. On the other hand, 6 percent of big plants produce 80 percent of biogas. Small plants are mainly rural cattle exploitations of porcine, bovine, and poultry, whose production of biogas is mostly devoted to electricity generation for self-consumption. Biogas can also produce electricity to be sold to the power network or produce biomethane as a substitute for

natural gas for vehicles. Biogas production is concentrated in the southeast, northeast, and southern regions (CiBiogás, 2021).

Brazil raises 1 billion poultry, more than 200 million bovines, and 38 million porcine, with combined dejections of 1 million tons per day. In 2018, 30 million bovines and 42 million were slaughtered, producing several thousand tons of residues in the process. The country is the fourth dairy world producer and on average every kilo of the final product generates 3 to 5 liters of effluent. Brazil is also the third greatest producer of beer worldwide, after China and the US, with roughly 100 million hectoliters produced annually. Beer breweries generate effluents of the order of 2 to 6 liters per liter of the final product (UNIDO, 2020 a).

Most sewage comes from domestic, industrial, agricultural, and hospital wastewater, corresponding on average to 80 percent of the total volume of drinking water consumed. Wastewater is often improperly disposed of in natural bodies of water and pollutes waterways, while a fraction in developing countries is processed at treatment plants. Most of the sewage sludge generated at wastewater treatment plants constitutes a significant fraction of the total organic matter and energy not recovered in the treatment process. Wastewater is rich in nutrients like nitrogen, phosphorus, potassium, calcium, and magnesium, and fertilizer and biogas can be generated using suitable treatment practices (Cañote et al., 2021).

Biogas production was opened by substrate into Agriculture and Cattle (BIOAGR), Slaughterhouses (BIOSLA), Flour Mills (BIOMIL), Sugar and Alcohol (BIOSUG), Beer breweries, dairy and other food processors (BIOFOO) and Solid waste and sewage treatment (BIOWAS). The surveys account for 94.3 million Nm³ biogas production for the South Region (three states) and 1,994 total employments generated. See Table 1.

Table 1: Primary data on surveyed biogas producers

Biogas Sector	Total PR	Total RS	Total SC	Total South Region
Production (Millions of Nm ³ of biogas)	76.97	6.64	7.68	94.31
Total employment	1,252 (a)	182	560	1,994
Biogas factory workers	95 (b)	26	41	162

(a) and (b) were corrected for outliers.

Source: Authors' elaboration on CiBiogás and GEF Biogás Brasil Surveys.

We then estimated the employment coefficients and expanded the sample data to include the population. Calling "L" the employment, "Nm³" the biogas production in physical units, and "GPV" the Gross Production Value in 2018 US\$, we could generate "L/Nm³" as the coefficient employment/physical production of biogas and "L/GPV" as the coefficient employment/economic value of production. We applied these coefficients from sample data to the GPV of the regional IO Matrices (see below) to compute total employment in each biogas sector.

Table 2. Expansion of surveyed data (size sample = n) in the biogas sector (size sample = N).

Biogas Sector	Companies in the Samples A	Biogas Production in Millions of Nm ³ (n) B	Biogas Production in Millions of Nm ³ (N) C	Biogas Factory Workers (n) D	Biogas Factory Worker / Millions of Nm ³ (n) E = D/B	Expanded Biogas Factory Workers (N) F = C x E	Biogas Factory Workers + Biogas Office Workers G = F x 2.92 ****
BIOAGR	52	24.374	59.597	108	4,4	264	771
BIOSLA	5	6.461	28.861	17	2,6	76	222
BIOMIL *	18	46.530	22.147	30	1,4	30	88
BIOSUG **	-	-	65.489	-	2,2	141	413
BIOFOO	1	0.438	5.809	2	4,6	27	77
BIOWAS	1	16.532	121.042	255	5,4	659	1,923
***	1	16.532	121.042	255	5,4	659	1,923
Total	64	94.334	302.945			1,197	3,494

*Column E = D/C.

** In the BIOSUG sector there is no sample data to relate Production with Biogas Factory Workers.

We applied the employment/production coefficient for Brazil's entire sugar and alcohol sectors.

*** In the BIOWAS sector employment we imputed from a conservative assumption based on units of biogas production of SANEPAR, the water and sanitation company for the PR state.

****To expand biogas factory workers to total biogas workers (that is, adding office workers), we expand using the coefficient 2.92 from Perrotta's (2021) study on biomass (1.92 office workers per factory worker).

Source: Own elaboration based on CiBiogás and GEF Biogás Brasil surveys and Perrotta (2021).

The calculations were quite straightforward in some sectors (BIOAGR, BIOSLA, and BIOFOO), while we needed some additional assumptions in the others (BIOAGR, BIOSUG, and BIOWAS). In the first three sectors, production can directly relate to employment (both total and biogas factory workers' subset) from Table 1. The biogas factory workers in the three states are 1,197 persons and the total workers are estimated at 3,494 workers (office plus plant).

4. Methodological Approach

Our first contribution is methodological. To study a small and modern sector, not disaggregated in official statistics, we use a bottom-up approach incorporating information on the cost and sales of different biogas value chains to study an economy where only national and highly aggregated regional Input-Output (IO) matrices are available.

An IO matrix is a basic input in building IO Models, which, in its simplest form, is a system of n linear equations with n unknowns, whose main goal is analyzing changes in demand or other inter-sectoral relationships. The IO Models are built from information contained in an IO Matrix containing information on intersectoral flows, the structure of final demand, and the value added in the different sectors. In addition to primary information reported in the previous section, we also have secondary information which includes national and state-level statistics of different dates and levels of aggregation. In no case was biogas considered a disaggregated sector, nor was it possible to determine its employment generation.

We use a physical satellite account Table for employment. We consider satellite accounts to be a first step in modeling employment creation. Also, a sensible approach could be to disaggregate products and sectors into more detailed categories, which presents a challenge because sectoral data may not be available at the required level of detail.

There are three main approaches to regionalizing Input-Output Tables: 1) Direct techniques employing mainly surveys and specific data of a strictly sectoral nature (usually expensive and time-consuming); 2) indirect or statistical techniques resting mainly on available secondary sources (often inaccurate); 3) a hybrid mix of the two methods (since the problem is focused on a few sectors for which primary data are available to add to secondary and more aggregated information) (Rojo et al., 2020).

The availability of an Input-Output Table, in turn, makes it possible to develop Social Accounting Matrices or SAMs. They are matrices in which rows (incomes) and columns (outflows) represent markets and institutions, and whose elements represent the transactions in the input and output markets while considering and accounting for interactions between government, firms, households, and the rest of the world (Miller and Blair, 2009). They represent national accounts' data about final consumption and value-added in an expanded and more detailed way than Input-Output Tables.

The Input-Output Table is based on location quotients (LQs). LQ techniques assume that regional technologies have the same structure as national ones but admit that interregional coefficients differ from national ones by a shared factor in regional trade, assuming the greater the region, the lower its import propensity. The surveys (primary information added to secondary, aggregate data) allow us to improve LQs using RAS or Cross-Entropy techniques (Flegg et al., 1995; Lahr, 1993; Stone, 1977).

In addition to the national Input-Output Tables, the location quotients use existing statistics on employment or value added. Regional and national data should be compatibilized, updated, and aggregated at the same level. There are many applications of such regional indirect methods for Mexico (Dávila Flores, 2015); Finland (Flegg and Tohmo,

2013; Kowalewski, 2015); Greece (Kolokontes et al., 2008); Germany (Kronenberg, 2009); and Argentina (Flegg et al., 2016; Romero et al., 2020, Romero et al., 2023 a and b), among others. Szabó (2015) presents an extensive survey of location quotient methods.

We use FLQ (Flegg LQ) because its theoretical ground is more plausible than other LQ methods (Flegg et al., 2016). Additionally, the Flegg and Webber (2010) evaluation of LQ techniques highlights that FLQ and Augmented FLQ (AFLQ) are preferable quotients, providing satisfactory results even for small regions. In addition, although the AFLQ is theoretically better than the FLQ, in practice they perform similarly according to Bonfiglio and Chelli (2008), Kowalewski (2015), and Lamonica and Chelli (2019).

The information from LQ is used jointly with a regional transaction matrix estimated via indirect methods. To ensure consistency between both sets of data, we use matrix balancing methods (RAS and/or cross-entropy) for the final adjustment. The above-mentioned RAS or method of bi-proportional adjustment is an iterative process that implies knowing row and column totals to adjust an initial matrix (Bacharach, 1970). The cross-entropy method, not employed here, on the other hand, minimizes a distance measure between an initial matrix and different calculated matrices meeting technological and transactional restrictions (Robinson et al., 2001, McDougall, 1999).

Our second contribution is empirical. Thus, we 1) compiled all the information, 2) made compatible sectors and dates, 3) produced the new sector entries in the matrix, 4) developed satellite accounts for employment coefficients, and 5) calibrated the input-output models we needed. Then, 6) we ran simulations and applied some sensitivity analysis to the former.

However, we had to add primary information on biogas production and employment to resolve points 4) and 5). We had information from two complementary surveys, which we identify as “CiBiogas” and “GEF Biogas Brasil”, following UNIDO (2023). Both surveys were conducted at the productive unit level. The first one focused on technology and production, and the second on investments and employment. By combining primary and secondary data on biogas, we were able to estimate the regional IO matrices with the entries we needed. Furthermore, we estimated the IO matrix that represents inter-industry relationships in the states based on national and state-level information and opens the biogas sector according to those surveys through indirect methods (Jensen et al., 1979; Flegg and Webber, 1997). Once the IO matrices and the biogas and employment satellite accounts were built, we were able to estimate the direct, indirect, and induced effects of increased demand, supply capacity, and substrate processing in the biogas sector using open and closed IO Models.

4.1. Regional Input-Output Model

We used an IO model based on regional coefficients to make a detailed analysis of how a given shock directly affects biogas and other related sectors.

The resolution is identical in both the regional and national models. According to the “open model”, all final demand is exogenous: private consumption, public expenditure, investment, and exports. This means that the increase in household income because of greater output does not cause additional (“induced”) demand due to greater consumption. The regional “open model” is as follows:

$$x^r = (I - A^{rr})^{-1}f^r = L^{rr}f^r \quad , \quad (1)$$

Where x^r is the production vector of the region, I is the identity matrix, A^{rr} is the matrix of the region’s technical coefficient, f^r is the region’s final demand vector, including purchases from other regions, r is the number of sectors, and L^{rr} is the requirement coefficients’ Leontief matrix, both direct (initial) and indirect (secondary).

We “close” the model by including households as just another sector of the model. The “closed model” thus changes to:

$$\bar{x}^r = (I - \bar{A}^{rr})^{-1}\bar{f}^r = \bar{L}^{rr}\bar{f}^r \quad , \quad (2)$$

Where \bar{x}^r is the region’s production vector including household income in the last row, I is the identity matrix, \bar{A}^{rr} is the technical coefficient matrix showing household income in the last row, and household expenditure in the column on the right, \bar{f}^r is the vector for the remaining final demand (without household consumption in the region), r is the number of

sectors, and \bar{L}^{rr} is the Leontief matrix for direct, indirect and induced (tertiary) requirement coefficients.

In addition to the simple product multipliers resulting from the “open model” (type 1 multiplier) and total product multipliers resulting from the “closed model” (type 2 multipliers), we also estimated job multipliers. Job multipliers are obtained by changing the measurement unit of the coefficients in matrices L^{rr} and \bar{L}^{rr} , using, for instance, the number of persons employed per product unit. These employment multipliers compute the number of jobs that the production increase generates.

4.2. Regional Input-Output Tables

To build Regional IO Tables we had an official IO matrix for Brazil, two official IO matrices for PR and RS, and an academic study with an IO matrix for SC, plus sectoral information on physical production and employment. Nevertheless, first, the information was inadequate. Second, the IO matrices differed by the time they were built. Third, the disaggregation of the sectors was different and insufficiently detailed for our purposes, and fourth, there was a general need for matching.

The information from LQ was used jointly with a regional transaction matrix estimated via indirect methods. We use RAS to ensure consistency between both sets of data. The latter, a specific instance of cross-entropy according to McDougall (1999), is more flexible as it enables us to include more constraints in regional technical coefficients to make an estimation.

For Brazil as a whole, we used the Input-Output Matrix for 2015 of the IBGE with 67 sectors (<https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9085-matriz-de-insumo-produto.html>). We have developed these entries because some sectors besides the biogas producers are also relevant to the biogas chain, and they are not open in the IBGE matrix. These include bovine, porcine, and poultry (included in cattle), beer, flour, sugar, and alcohol (in manufacture), urban solid waste, and sewerage treatment.

For RS and PR there are regional IO Matrices for 2008 and 2015, respectively. However, there are far fewer sectors than the national matrix (37 and 42). They were developed by the Fundação de Economia e Estatística (FEE) in RS (<https://arquivofee.rs.gov.br/indicadores/pib-rs/matriz-insumo-produto-rs-miprs/mip-rs-2008/>) and by the Instituto Paranaense de Desenvolvimento Econômico e Social (IPARDES) in PR (<https://www.ipardes.pr.gov.br/Pagina/Matriz-Insumo-Produto>). These matrices, as well as the national ones, were updated to the 2018 values. Given the absence of an official matrix in SC, we developed it by applying indirect methods based on Haddad (2018).

To update the information to the year 2018 in the three states we used sector and activity information published by the Sistema de Contas Regionais do IBGE open into 18 sectors (<https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9054-contas-regionais-do-brasil.html?edicao=34530>). In PR and RS, and because of the existence of earlier matrices, they were updated by the RAS method, where the borders were corrected with data published for the region in 2018. For SC, the matrix was estimated through indirect methods referenced on data of GVP and intermediate consumption. The entries for the four matrices were made compatible in 35 sectors, including six for biogas production, and those related producers of maize, manioc, sugar cane, bovine, porcine, poultry, slaughterhouses, flour mills, alcohol from sugar cane, beer breweries, dairy, and other food industries. The entries are listed in Table 3, together with their corresponding GVP (in thousands of US\$ and percentages).

The estimate of the Employment Vector for the three states' IO Matrices was based on IBGE's “Pesquisa Nacional por Amostra de Domicílios Contínua” or PNAD Contínua (<https://www.ibge.gov.br/estatisticas/sociais/trabalho/9171-pesquisa-nacional-por-amostra-de-domicilios-continua-mensal.html>), which is the best source to estimate both formal and informal employment within the sector and the geographic disaggregation that the study needed. The estimates of employment for each sector correspond to the average of the four quarters in 2018 and include all persons who worked at least one hour in a remunerated activity (formal or informal) during a reference week for each survey. The sample data for each state were expanded to the total population using weights provided by the survey (Variable V 1028). Time classification is a 5-digit disaggregation of “Classificação Nacional de Atividades Econômicas Domiciliares 2.0.” We were then able to build a correspondence

table for each group's employment according to the sectoral disaggregation of the IO Matrices of each state.

The employment vector for each state was calculated as a satellite account, see Table 3. The table presents the number of workers employed in each sector in each state and the region, and the coefficient of job creation by a unit of GPV.

Table 3: Homogeneous Sectors in the Input-Output Matrices of the Southern States in Brazil

Sector	GPV				Employment / GPV			
	PR	SC	RS	South	PR	SC	RS	South
Maize	0.311%	0.119%	0.137%	0.204%	41.71	99.90	73.89	57.14
Cassava	0.049%	0.013%	0.007%	0.025%	85.58	179.81	292.50	118.55
Sugar cane	0.171%	0.001%	0.002%	0.070%	35.30	29.94	86.56	35.95
Bovine Cattle	0.092%	0.061%	0.130%	0.100%	435.57	799.43	352.01	440.79
Swine Cattle	0.131%	0.338%	0.199%	0.201%	20.64	29.56	16.92	22.38
Poultry	0.289%	0.196%	0.224%	0.245%	26.39	71.10	23.30	32.84
<i>Biogas from Cattle</i>	<i>0.002%</i>	<i>0.004%</i>	<i>0.001%</i>	<i>0.002%</i>	<i>54.55</i>	<i>54.60</i>	<i>54.48</i>	<i>54.56</i>
Rest of Agriculture, Forest, and Fishing	5.401%	3.501%	6.198%	5.308%	18.75	31.15	21.34	21.63
Extractive Industries	0.656%	0.560%	2.555%	1.365%	5.26	5.53	1.36	2.48
Meat food industry	4.327%	2.504%	2.188%	3.122%	6.86	17.89	9.26	9.37
<i>Biogas from slaughterhouses</i>	<i>0.002%</i>	<i>0.000%</i>	<i>0.001%</i>	<i>0.001%</i>	<i>27.44</i>	<i>26.81</i>	<i>27.35</i>	<i>27.36</i>
Mills sector	0.002%	0.002%	0.000%	0.001%	22.16	19.97	37.97	22.1
<i>Biogas from Mills</i>	<i>0.002%</i>	<i>0.000%</i>	<i>0.000%</i>	<i>0.001%</i>	<i>14.96</i>	<i>11.24</i>	<i>0.00</i>	<i>14.93</i>
Sugar and Alcohol	0.401%	0.000%	0.000%	0.163%	7.88	886.98	1798.47	8.69
<i>Biogas from Sugar and Alcohol</i>	<i>0.005%</i>	<i>0.000%</i>	<i>0.000%</i>	<i>0.002%</i>	<i>23.86</i>	<i>0.00</i>	<i>25.56</i>	<i>23.87</i>
Beer	0.262%	0.772%	0.552%	0.481%	8.43	4.63	8.87	7.34
<i>Biogas from Beer, Dairy, and other Food</i>	<i>0.000%</i>	<i>0.000%</i>	<i>0.000%</i>	<i>0.000%</i>	<i>47.25</i>	<i>42.57</i>	<i>46.51</i>	<i>47.14</i>
Oil and Gas Refineries, Petrochemical Ind.	16.918%	1.381%	11.889%	11.720%	0.85	5.92	0.49	0.83
Machines and Equipment, incl. Maintenance	2.801%	2.486%	3.866%	3.144%	5.21	16.09	5.60	7.20
Automotive Industry	4.707%	1.570%	5.467%	4.340%	2.63	6.78	2.13	2.70
Rest of Manufacturing	20.908%	34.150%	23.306%	24.613%	7.75	11.02	8.42	8.95
Electricity	1.779%	1.935%	1.234%	1.602%	2.51	2.69	4.57	3.17
<i>Biogas from Sewerage and Solid Urban Waste</i>	<i>0.004%</i>	<i>0.001%</i>	<i>0.007%</i>	<i>0.005%</i>	<i>50.80</i>	<i>50.99</i>	<i>50.78</i>	<i>50.80</i>
Distribution of Electricity, Gas, and Water	1.779%	0.858%	2.103%	1.710%	1.63	4.71	1.71	1.99
Construction	3.693%	4.963%	2.675%	3.569%	35.96	29.36	46.04	36.94
Commerce	8.265%	10.741%	8.110%	8.726%	37.98	34.22	39.36	37.50
Transport, Store, and Mail	5.198%	5.966%	4.009%	4.902%	17.44	16.14	22.16	18.59
Hotels and Restaurants	1.264%	2.031%	1.486%	1.511%	62.24	44.44	51.91	53.31
Information and Communication	2.485%	2.722%	2.746%	2.635%	9.77	11.47	8.30	9.55
Finance, Insurance, and Connected Services	2.612%	2.654%	3.799%	3.077%	8.02	11.11	6.07	7.66
Real Estate	3.208%	4.473%	3.280%	3.502%	3.43	3.40	4.23	3.71
Professional, Scientific, and Technical Services	3.355%	4.044%	3.080%	3.394%	53.81	51.38	62.44	56.21
Public Administration, Defense, Education, Health	5.526%	7.459%	8.752%	7.172%	46.25	40.98	34.04	39.37
Art, Culture, Sports, Recreation and Other Services	3.057%	4.012%	1.866%	2.801%	5.43	5.16	10.58	6.67
Domestic Services	0.337%	0.481%	0.131%	0.288%	299.70	190.70	807.27	350.04
<i>TOTAL BIOGAS</i>	<i>0.015%</i>	<i>0.005%</i>	<i>0.009%</i>	<i>0.011%</i>	<i>34.47</i>	<i>52.16</i>	<i>49.25</i>	<i>41.14</i>
TOTAL (MM USD)	327,963	169,944	310,592	808,499	16.51	20.94	17.57	65.22

Sources: MIP Nacional 2015 (Instituto Brasileiro de Geografia e Estatística IBGE), Valores Brutos de Produção 2018 (IBGE), MIP Regional Paraná 2015 (Instituto Paranaense de Desenvolvimento Econômico e Social IPARDES), MIP Regional Rio Grande do Sul 2008 (Fundação de Economia e Estatística FEE), Fatores de Conversão e Potenciais 2019 (GEF Biogás Brasil), Parâmetros Técnicos e Dados dos Setores de Biogás 2019 (GEF Biogás Brasil), Quantidades, Preços e VBP Setoriais 2017 (Censo Agropecuário IBGE), Produção Setorial 2019 (Produção Agrícola Municipal PAM), Preços Setoriais 2018 (Pesquisa de Orçamentos Familiares).

The models incorporate some technological parameters to develop the economic numbers. We develop converters of biogas produced per ton of processed substrate following Mariani (2019), aggregated to sector level, as a weighted average of the different substrates processed by each sector. In the case of cattle, the coefficient is different in the three states, while it is uniform for the three states in the rest of the sectors. For the electricity generated by m3 of biogas, we used a uniform technical value of energy efficiency in the conversion of 1.51 kWh/Nm3. We established the cost of one unit of 1 MW of equivalent productive capacity obtained from biogas at 2018 US\$ 3.13 million (UNIDO, 2023). Self-consumption of electricity was assumed at 90 percent on average for all sectors and states, the rest being sold or (minimally) enriched to produce biomethane. The conversion of Nm3 of biogas produced in employment is 8.51 jobs/Nm3 on average for the South Region.

Table 4: Technical Coefficients for Conversion

Place	Sector	Biogas production per unit of the substrate (Nm3 / tons)	Employment generated by a unit of biogas produced (jobs / Million Nm3)
PR	BIOAGR	47.23	9.28
SC	BIOAGR	35.83	18.02
RS	BIOAGR	40.88	18.85
South Region	BIOSLA	98.62	9.45
South Region	BIOFAR	5.90	5.16
South Region	BIOSUG	13.43	2.37
South Region	BIOFOO	82.92	56.67
South Region	BIOWAS	NA	17.54
South Region	TOTAL		8.51

Source: Own elaboration based on “CiBiogás” and “GEF Biogás Brasil” surveys, Freddo et al. (2019). Mariani (2019) for conversion factors, and UNIDO (2023) for investments.

Table 5 presents the baseline for the sector and the state of the initial calibrated model. The biogas sector generates 303 million Nm3 biogas in the South Region, equivalent to 457,500 MWh of electricity generation, a GPV of 2018 US\$ 85 million, and a Value Added (VA or GGP –Gross Geographic Product-) of 2018 US\$ 14 million. Since the composition of the biogas sector is different in each state, the relation between employment generation and VA or GPV varies in each state, reaching values of 252 and 41 jobs created per million in 2018 US\$, respectively.

Table 5: Southern states of Brazil, 2018. Biogas and employment, by state

State	Biogas production (MM of Nm3 / year)	Electricity Equivalent (MWh)	Production		Jobs (C)	Jobs / GPV (C/A)	Jobs / VA (C/B)
			Gross Value (MM of 2018 US dollars) (A)	Value Added (MM of 2018 US dollars) (B)			
Parana	196.02	295,985	48.00	8.02	1,669	34.77	208.10
Santa Catarina	27.98	42,251	9.22	1.29	481	52.17	372.87
Rio Grande do Sul	78.95	119,211	27.27	4.55	1344	49.28	295.38
South	302.95	457,447	84.90	13.86	3,494	41.15	252.09

Source: Own elaboration based on processed primary information from “CiBiogás” and “GEF Biogás Brasil” surveys and processed secondary information (see references in Table 3).

The biogas sector is small in terms of the economies and the employment of the three states: its GPV is 0.01 percent of 2018 US\$ 808.5 billion produced by the three states, and the jobs created report only 0.024 percent of the employment in the South Region. Nevertheless, the generation of employment per unit of GPV more than doubles the average of the economy.

5. Scenarios and Results

5.1. Scenarios

We devised three scenarios linked to three questions:

- 1) What would happen with production and employment in the biogas sector if the (current) idle capacity were used completely?
- 2) What would happen with production and employment in the biogas sector if current capacity were doubled?
- 3) What would happen with production and employment in the biogas sector if all biomass generated in the country's South Region were employed to produce biogas?

We can imagine the first scenario as a response to a shock, for example, if a significant rise in fossil fuels were to occur; the second one can be assimilated by some policy that guarantees that all production would be sold; the third scenario is more hypothetical and related to more demanding environmental demands, for example, related to emission control commitments to the international community.

We called the first scenario Demand Pull, and since idle capacity is roughly 50 percent, it is equivalent to a 100 percent increase in sales. The second scenario is one of Supply Push, and the hypothesis is a 100 percent increase in capacity (and full capacity utilization). The third scenario is called Full Use of Substrate. The third scenario demands considerably greater investments than the second. The second and third scenarios differ from the first in the weight of investments which demands transient activity and job generation in the construction and implantation stages of the process, in addition to permanent production and employment once the plants have been built.

5.2. Results

The point of departure is a GPV of 2018 US\$ 85 million in the South Region, employing 3,494 persons (1,197 biogas factory Workers and the rest office Workers). All scenarios include certain conservative assumptions on technical parameters: a constant intensity of job creation in the industry, a certain time rate of capacity utilization (including time for repairs and maintenance), the current relative prices for machinery, and a prudent energy potential generation of the biogas. Table 6 presents the aggregate results for each scenario, considering direct, indirect, and induced effects on production and employment.

Table 6: Results of Production Increase (in millions 2018 US\$) and Gross Employment Increase (jobs)

Scenario	Production Increase					Gross Employment Increase				
	Direct	Indirect	Induced	Total	Multiplier	Direct	Indirect	Induced	Total	Multiplier
Scenario 1: Demand Pull	83.3	104.1	101.9	289.3	3.47	3,605	2,484	1,819	7,908	2.19
Scenario 2: Supply Push	530.6	468.9	636.2	1,635.7	3.08	13,163	9,077	11,016	33,256	2.53
Scenario 3: Full Use of Substrate	3,979.6	3,728.7	5,031.9	12,740.2	3.20	109,030	82,175	92,433	283,638	2.60

Source: Own elaboration

If idle capacity is fully employed, GPV increases by 2018 US\$ 83 million as a direct consequence, 104 million considering indirect effects, and 102 million by induced effects.

The total increase is 289.33 million or 247 percent, and the maximum potential for job creation reaches 8,840 employees.

Instead, if capacity is doubled, given that all production is sold, the total increase in production is 2018 US\$ 1,635 million and the creation of 33,255 jobs. This occurs because the new plant's construction contributes to the generation of several jobs in construction, equipment, transportation, etc.

Lastly, if all (currently) available biomasses were used, the increased production would increase to 2018 US\$ 12,740 million (or 4.53 percent of the GPV of the region), and total job creation would be 283,637 (or 2 percent of total employment in the region).

In Table 7 the results for the direct effects on production and employment are presented by state and in Table 8 are presented by biogas subsector within each state. Finally, in Table 9 the information contained in Tables 7 and 8 is crossed for job creation, showing employment increase in each state and each biogas subsector.

The effects of the demand-pull scenario 1 are modest, and its effects are more intense in the PR state. Production and employment virtually doubled from the initial levels since the capacity utilization at the beginning of the exercise is roughly half of the industry potential. In the supply push scenario 2 the increase in production and employment is greater than in the former case for several reasons: it assumes that all production is sold, full idle initial capacity is employed, and brand-new capacity is built and employed. Moreover, there is a significant increase in production and employment which is transient in the construction phase of the new capacity building. Finally, the full use of substrate scenario 3 shows a very important growth in production and employment. This scenario assumes all substrates are used, all capacity needed is built and all production is sold, which is very ambitious and unrealistic, nevertheless, it is useful to calculate the full potential of the sector. Direct and total effects are shown. In scenarios 2 and 3 the total effects are more pronounced than in scenario 1 which does not include building of brand-new capacity. Since PR is the state with currently the idle capacity, it concentrates the greatest share of changes both in production and employment in scenarios 1 and 2. However, since substrates are more evenly distributed among the three states in the current capacity, differences moderate in scenario 3, because of the different intensity of labor of each substrate and the different composition of the biogas sector in each state.

Table 7: Results of Production Increase (in millions 2018 US\$) and Gross Employment Increase (jobs) by state

Scenario / State	Production Increase				Employment Increase			
	Direct	%	Total	%	Direct	%	Total	%
Scenario 1: Demand Pull								
PR	48.8	59%	161.8	56%	1,834	51%	3,602	46%
SC	20.4	24%	82.9	29%	1,096	30%	2,878	36%
RS	14.1	17%	44.7	15%	675	19%	1,429	18%
Scenario 2: Supply Push								
PR	363.0	68%	1,070.9	65%	8,759	67%	20,056	60%
SC	77.4	15%	294.9	18%	2,223	17%	7,243	22%
RS	90.2	17%	269.8	16%	2,180	17%	5,957	18%
Scenario 3: Full Use of Substrate								
PR	1,673.7	42%	4,925.1	39%	41,430	38%	93,728	33%
SC	1,046.8	26%	4,003.2	31%	30,630	28%	96,118	34%
RS	1,259.1	32%	3,812.0	30%	36,970	34%	93,791	33%

Source: Own elaboration

Table 8 shows the same results but with different degrees of detail. Instead of opening results by state, they are open by subsector of biogas. In agriculture most of the current idle capacity is concentrated, and potential for production and employment growth. However, when the consideration is focused on the greater potential for growth, solid waste and wastewater have the same potential as agriculture. In practice, one-third of the production and

employment potential can be adjudicated to agriculture, one-third to industry, and one-third to solid waste and wastewater.

Table 8: Results of Production Increase (in millions 2018 US\$) and Gross Employment Increase (jobs) by type of biogas

Scenario / Type of Biogas	Production Increase				Employment Increase			
	Direct	%	Total	%	Direct	%	Total	%
Scenario 1: Demand Pull								
BIOAGR	42.7	51%	154.4	53%	2,327	65%	5,013	63%
BIOSLA	11.2	13%	36.8	13%	306	8%	697	9%
BIOFAR	2.5	3%	8.4	3%	37	1%	158	2%
BIOSUG	16.0	19%	55.6	19%	383	11%	1,060	13%
BIOFOO	1.5	2%	4.7	2%	72	2%	118	1%
BIOWAS	9.5	11%	29.5	10%	481	13%	862	11%
Scenario 2: Supply Push								
BIOAGR	200.7	38%	648.8	40%	5,661	43%	14,484	44%
BIOSLA	60.7	11%	181.7	11%	1,331	10%	3,309	10%
BIOFAR	28.2	5%	84.4	5%	518	4%	1,506	5%
BIOSUG	113.4	21%	341.2	21%	2,378	18%	6,033	18%
BIOFOO	9.8	2%	28.7	2%	267	2%	577	2%
BIOWAS	117.9	22%	350.9	21%	3,008	23%	7,348	22%
Scenario 3: Full Use of Substrate								
BIOAGR	1,227.5	31%	4,068.0	32%	37,402	34%	99,173	35%
BIOSLA	548.0	14%	1,779.6	14%	12,221	11%	35,160	12%
BIOFAR	195.9	5%	620.0	5%	3,584	3%	11,782	4%
BIOSUG	467.8	12%	1,409.5	11%	9,817	9%	28,437	10%
BIOFOO	117.0	3%	369.8	3%	3,382	3%	8,043	3%
BIOWAS	1,423.4	36%	4,493.4	35%	42,623	39%	101,042	36%

Source: Own elaboration

Table 9 crosses information from Tables 7 and 8, considering only employment and percentages. It is useful to assess the location of job gains by subsector and state. In scenario 3 each state participates in one-third of total employment, while in scenarios 1 and 2, which are proportional to current capacity, most of employment is generated in PR.

The First Scenario is quite possible to attain. The second implies heavy investments and the third scenario is highly hypothetical and should be considered an intellectual exercise. However, it shows the potential maximum capacity of biogas production if the biomass supply is exhausted.

Table 9: Results of total gross employment Increase (jobs) by type of biogas and state

Scenario 1: Demand-Pull				
Subsector	PR	SC	RS	Total
BIOAGR	21%	35%	8%	63%
BIOSLA	6%	1%	2%	9%
BIOFAR	2%	0%	0%	2%
BIOSUG	12%	0%	1%	13%
BIOFOO	1%	0%	0%	1%
BIOWAS	3%	1%	7%	11%
Total	46%	36%	18%	100%

Scenario 2: Supply Push				
Subsector	PR	SC	RS	Total
BIOAGR	20%	20%	4%	44%
BIOSLA	8%	0%	2%	10%
BIOFAR	4%	0%	0%	5%
BIOSUG	18%	0%	0%	18%
BIOFOO	1%	0%	0%	2%
BIOWAS	9%	2%	11%	22%
Total	60%	22%	18%	100%
Scenario 3: Full Use of Substrate				
Subsector	PR	SC	RS	Total
BIOAGR	7%	17%	11%	35%
BIOSLA	3%	4%	5%	12%
BIOFAR	3%	1%	0%	4%
BIOSUG	8%	0%	2%	10%
BIOFOO	1%	1%	1%	3%
BIOWAS	11%	11%	14%	36%
Total	33%	34%	33%	100%

Source: Own elaboration

6. Conclusions

We aim to measure the current and potential production and employment in the biogas value chain in three southern states in Brazil (Paraná, Santa Catarina, and Rio Grande do Sul), motivated by the growing importance of renewable energies to cope with SDGs, and the potential of these states to produce biogas since biomass abundant sources and convenient tropical climate.

We offer two contributions. First, we examine a method to study the problem of determining how to measure production and gross job creation in regional economies with differently opened sectoral entries and periods of measurement in sectors that are not currently disaggregated and need primary data to complete the information, as well as construct coherent monetary (production) and physical units (employment). Second, we estimate direct, indirect, and induced production and (gross) employment for the biogas-producing sectors in the South Region. In doing so, we calibrate an Input-Output Model for each state with the biogas sectors now included as separate activities, produce simulations of interest for policymakers, and apply some sensitivity tests.

Thus, one dimension of our analysis is the combination of monetary with physical units, while the other one is regionalization. Our method calibrates regional IO matrices of the three states with compatibilized sector entries, opening new ones for those missing in official statistics (secondary data) from primary specific data from surveys. Once the baseline has been established, we consider three scenarios: demand-pull that achieves full capacity utilization, supply push that addresses new investments in the sector, assuming guaranteed demand, and the use of the full potential of substrate generated for biogas production.

For the three southern states in Brazil – Paraná, Santa Catarina, and Rio Grande do Sul – our estimates of Gross Value of Production total US\$ 85 million, Value Added reaches US\$ 14 million, direct gross employment amounts to 3,494 workers, and indirect and induced gross employment is 7,261 jobs in the baseline. In the demand-pull scenario, all job creation registers 8,840 workers, while in the case of duplication of current capacity (assuming its full utilization) jobs created number 33,255. On the other hand, in the highly hypothetical case of full use of all substrates currently generated to produce biogas, gross job creation reaches 283,637 workers. Employment multipliers are in line with the literature on comparative activities from elsewhere in the world.

We offer a methodological approach to measure the current and expected contributions of the biogas subsector facing shocks (exogenous or induced by policies) in terms of product, and gross employment. As general conclusions: 1) the biogas industry is more labor intensive than other energy industries (for comparable energy units); 2) it creates jobs in concentrated points (such as a sewerage plant for a large city) or in sparse points in the country (farms), of different scales; 3) it directly employs skilled and non-skilled blue and white collar workers; 4) it indirectly employs people to build plants, equipment and machinery, to provide transportation, repairing and other commercial or general services; 5) it provides green jobs, in “circular” activities, taking advantage of substrates otherwise wasted and, thus, reducing emissions of GHG.

A limitation of the study is related to the current role of biogas as a complement to other sources of energy. If the sector gains scale and its commercial use replaces its current overwhelmingly self-consumption, it can transform into a substitute for fossil fuels. Thus, employment created in the biogas sector would replace some jobs in the fossil fuel industry, even though the net effect is expected to be positive since the biogas sector is comparatively more labor-intensive than oil and natural gas. Besides, a possible extension of this paper is to estimate the GHG emissions that biogas contributes to saving by replacing fossil fuels.

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REGIONAL DYNAMICS AND STATE-LEVEL PERFORMANCE IN INDIA'S INDIRECT TAX SCENARIO: EXPLORING GOODS AND SERVICES TAX (GST) REVENUE JOURNEY

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Abstract

Goods and Services tax was implemented in India from 2017 as a new indirect tax law intended to simplify and consolidate the previous tax system. India is a country with large population with diverse geographical regions, it becomes paramount for assessing the GST performance across different regions of the nation. For achieving the goal of the research secondary data of GST revenue from all 28 states and 8 union territories were collected and categorized into six regions. For the study Graph analysis, descriptive analysis, and Kruskal-Wallis tests were employed using Jamovi statistical software. The results of the study demonstrated the States/UTs that excel in terms of GST collection in their designated regions. In Northern region Haryana stands out, Assam leads the pack in Northeastern region, in central region Uttar Pradesh demonstrated a strong performance, in Eastern region West Bengal excels, Maharashtra performs well in the Western region and in Southern region the State of Karnataka is the best performer. These States demonstrated exceptional performance in collecting GST revenue within their regions. Additionally, the study revealed an upward trend in GST revenue performance across all regions of India particularly in Western region. However, it also indicates that certain States/UT's & regions are not performing up to expectations when considering their population size. This research work gives a valuable perspective for the tax department, researchers and policymakers empowering them to develop strategies that can boost the region wise GST revenue collection and will help in promoting economic growth of the country.

Keywords: Indirect Tax, Goods and Services Tax (GST), Revenue performance, Region, India

JEL classification: H71, H20, H21

1. Introduction

The taxation system of India is divided into direct tax (Jha, 2019) and indirect tax (Majumder et al., 2021). Direct tax law is progressive in nature, which means that higher the income higher is the tax (Muduli et al., 2022) and it consist of Income tax act. The progressive nature of taxation helps in redistributing wealth and reduce income inequality amongst the public. Indirect tax is regressive in nature which means that burden of tax fall equally to everyone irrespective of the income level and is a major contributor to government treasury. Indirect tax was covering a number of taxes in Indian tax laws but from 1 July 2017 Goods and Services Tax (GST) was implemented with major agenda to streamline and simplify the complex indirect tax system into one unified tax law in India (Sandhu & Atwal, 2019). In the year of 2000 the concept of GST was introduced in India with the intention to replace existing tax structure (Kumaraswamy, 2020). The previous indirect tax such as Central excise duty, Custom duty tax, Service tax and a variety of state level indirect taxes were replaced after GST introduction (Salim et al., 2019). With introduction of GST law, the cascading effect of multiple taxes has been eliminated (Kumar & Babu, 2018). GST is charged when Good or services are supplied to customers and it is termed as consumption-based tax (Maheshwari & Mani, 2022). This basically means that States/UT's or Regions with

higher distribution of population are expected to have a higher GST collection. India being one of the fastest growing economies (Tripathi, 2018a), the tax policies play a crucial role in shaping a country's advancement and exert a direct influence on its economic efficiency and fairness. An effective taxation policy should ensure equitable income distribution while generating substantial tax revenues for both the Central and State Governments (Nayyar & Singh, 2018) and ultimately connected to the tax potential of the country (Shemyakina et al., 2019). With continuous increase in the population size (Tripathi, 2017b) and with a total of 28 states and 8 union territories in India (Mondal et al., 2023) it becomes crucial to discuss the possible influence of the new tax law. Especially a country like India which is having a regional inequality & diverse economic geography (Dwivedi & Arora, 2020; Chakraborty & Mukherjee, 2023) the study of such a major tax law becomes utmost important.

GST has completed only 6 years since its implementation. The implementation of GST law in India has been considered as the biggest milestone in the countries Indirect tax structure and therefore it becomes very important to evaluate the performance of this tax law in all the States/UT's and regions of India. Particularly important questions need to be answered like how are these 28 states and 8 union territories performing under the GST law? what are the regional dynamics when it comes to GST revenue performance? Does the population size of respective regions and States/UT's play a role in GST revenue performance? Keeping this question in mind an attempt is made by the authors in this research paper to study in detail the State's/UT's & regional wise GST revenue performance in India.

2. Review of literature

Several studies globally have been undertaken in the area of tax performance and Goods and services tax. Many authors have tried to study cross-country tax revenue performance for example (Haldenwang & Ivanyina, 2012) made a comparative study on tax performance in developing countries and tried to study what are the regional patterns, governance, and non-tax revenue. They have adopted quantitative and qualitative approaches in their study. They took a total of 177 countries for their studies and got the result that 36 countries qualified as high tax performers, 41 countries fell into low tax performer groups and 100 countries were average performers. (Morrissey et al., 2016) studied in developing countries the tax revenue performance and what are the vulnerability. They have split the sample into lower and higher income groups and concluded that lower-income countries are susceptible to shocks, particularly concerning trade, while resource-rich countries are more vulnerable to revenue fluctuations, except in the case of natural disasters. One more study (Khujamkulov & Abizadesh, 2023) investigated the trend in tax revenue amongst 33 transitional countries from the period of 1991-2015. They studied the relationship between Per capita GDP and Tax revenue. The core finding of their research was that there exists a positive correlation between per capita GDP growth and increased tax ratios across all tax categories, though to varying degrees. (Mitsopoulos & Pelagidis, 2021) studied the impact of taxation policy on labour. They advocated that in the era of macro-economic factors, globalisation pressure, and the technological advancement it becomes important to study the impact of taxation on labour market. Their finding suggested that competitive nations can use taxation on investment and flexible wages to influence employment whereas less competitive nations are relying on taxation on Investments. (Feder & Mustra., 2018) studied the relationship between fiscal consolidation and regional economics resilience and how they affect each other. They found that fiscal consolidation and regional economics resilience negatively correlated with the negative effect of taxation more than the positive effect of public spending. Further (Savoia et al., 2023) have taken cross-country data for 31 countries and adopted panel time series analysis to study the constraints on executive and taxation revenue in the long run and concluded that tax revenues and political institutions can mutually reinforce each other over time, leading to a co-evolution in the long run. (Anastasiou et al., 2023) examine the presence and direction of causal relationships between tax revenue levels and a specific set of determinants within 26 European countries during the period from 2015 to 2018. The analysis confirms long-run cointegration relationships and significant interdependence among 26 European countries' tax revenue. (Apeti & Edoh, 2023) tried to study the correlation between mobile money and tax revenue. The authors tried to analyse the effect of the use of mobile

money on tax revenue performance and took a total of 104 developing countries from 1990 to 2019. The authors concluded that Mobile money adoption in developing countries increases tax revenue relative to non-mobile money countries. The transparency and efficiency of mobile money systems enhance tax compliance and reduce tax evasion, leading to higher tax collection in developing economies. A few authors have also tried to study Tax performance in their respective countries (Mu et al., 2023) studied revenue collection performance from the Amhara region of Ethiopia. They have taken factors like tax evasion, taxpayer's psychological egoism, and its impact on tax revenue collection. For the analysis, SEM and Multiple regression were adopted and they concluded that tax evasion and psychological egoism have adverse effects on tax revenue collection performance. On the other hand, tax education and technology play crucial roles in significantly and positively impacting tax revenue collection performance. One study from Burundi (Nadoricimpa, 2021) tried to develop an association between tax reforms and civil conflicts with tax performance. After conducting an estimation of a tax equation, the findings suggest that civil conflicts and tax reforms had no significant impact on total tax revenue, international trade taxes, or income taxes. One more study from sub-Saharan Africa (Alabede, 2018) conducted a study to examine the relationship between economic freedom and tax revenue performance in sub-Saharan Africa. The research aims to determine if higher levels of economic freedom in the region contribute to improved tax revenue outcomes. The author concluded that economic freedom has a positive effect on tax revenue performance. Specifically, property rights freedom, freedom from corruption, investment freedom, and composite economic freedom all demonstrated a substantial and positive impact on tax revenue. A study from the tourism sector by (Feshari et al., 2016) tried to build up a relationship between tax ratio, tourism receipt, and GDP per capita in select Islamic regions. Their study highlighted that the tax ratio is affecting both tourism receipts and GDP per capita. One study from Australia (Smith, 2020) mentioned the advantages and disadvantages of the GST revenue arrangements which have undergone shifts since its introduction in 2000 in Australia, and highlighted that GST as a revenue source for Australian states remains uncertain, as federal financial relations are subject to long-term uncertainty. A study from Australia (Giesecke et al., 2021) adopted econometrics analysis to study the impact of GST on States and territories economies. They identified the specific States and territories that have been negatively affected by changes in the Goods and Services Tax. Additionally, the authors provided an in-depth analysis of the regional structural factors responsible for the variations in the impacts experienced across different regions. In Nigeria (Omodero, 2019) tried to explore the relationship between the Shadow economy and corruption. The author investigated the influence of the informal economy and graft on tax revenue performance in Nigeria. For the study, the author collected secondary data spanning the period from 1996 to 2018. The multi-regression analysis shows that the shadow economy and corruption negatively impact tax revenue performance in Nigeria. Both factors are found to have adverse influences on the country's tax revenue generation.

In India, few studies have been undertaken to study the revenue performance of GST. (Khoja & Khan, 2020) empirically examined the potential impacts of GST on cascading effects and consequently revenue collection in the Indian economy. For the study they have adopted time series data from 1990 to 2017. From the analysis the authors concluded that the cascading effect had been reduced due to the introduction of GST law and at the same time it had boosted the tax revenue of the country. (Paliwal et al., 2019) studied in detail the overall effect of GST on tax revenue collection in the country. Utilizing the tax buoyancy approach they seek to assess how the implementation of GST has influenced tax revenue generation in the country. The authors' findings reveal that after the implementation of GST India's tax revenue has displayed reduced responsiveness to changes in GDP. Couple of papers had addressed and studied the impact of Covid 19 on GST in India. (Naik & Haldankar, 2021) studied how covid 19 pandemic had an impact on GST revenue performance of all 28 states of India. They concluded that the covid 19 pandemic had led to a revenue loss of the government, Interestingly the impact of the COVID-19 pandemic on GST collection in larger states appears to be non-significant. However, for smaller states like Manipur and Goa, there is a notable difference in GST revenue collection and distribution between the periods before and after the lockdown. In one more study (Haldankar et al., 2022) tried to study the revenue

performance of GST in India. Their conclusion indicates that various components of GST, such as CGST, SGST, IGST, and Comp. Cess, had a positive impact on India's indirect tax collection. Nevertheless, the pandemic of COVID-19 significantly affected the country's indirect tax revenue resulting in a decline in overall GST tax collection.

Some studies addressing GST revenue performance have been conducted at the individual State level in India for example (Dey, 2021) studied the impact of GST on the indirect revenue performance of Odisha state of India. For the study, the author collected GST revenue data from July 2017 to March 2021. The author concluded that as of now Odisha state has not been able to realize the expected tax revenue and the situation may become unfavourable when the Central Government discontinues providing Compensation cess after July 2022. In one more study (Nayaka & Panduranga, 2019a) analysed the impact of GST on Indirect taxes of the Indian state of Karnataka. They made use of secondary data and concluded that there has been a noticeable upward trend in indirect tax collections for the state, attributed to the enhanced features of GST compared to previous tax systems. The implementation of GST has led to increased tax collections, higher registration rates, and greater return filings for the State.

From the above literature review, it is evident that no substantial and complete studies have been under to study the States/UTs and region-wise GST revenue performance in India, hence this research paper aims to address the notable research gap concerning the GST revenue performance in Indian states, Union territories & regions. Further, an in-depth analysis has been conducted by the researchers to understand the probable impact of GST tax law on revenue generation amongst the regions. This paper will offer a better understanding of the revenue disparities observed allowing the different stakeholders and policymakers to understand the effectiveness of the new tax reform.

3. Research methods and materials

3.1. Objectives of the study

The overall objective of this paper is to study and compare region wise performance of Goods and services tax (GST) revenue collection in India since its inception and also to examine individually the performance of GST revenue in each State and Union territories of India.

3.2. Hypotheses of the study

To achieve the objective of the study of the following hypotheses have been constructed

Ho1: There is no significant difference between GST revenue performance of Northern regions of India.

Ho2: There is no significant difference between GST revenue performance of Northeastern regions of India.

Ho3: There is no significant difference between GST revenue performance of Central regions of India.

Ho4: There is no significant difference between GST revenue performance Eastern region of India.

Ho5: There is no significant difference between GST revenue performance of Western regions of India.

Ho6: There is no significant difference between GST revenue performance of Southern regions of India.

Ho7: There is no significant difference between region wise GST revenue performance of India.

3.3. Study design and Sources of data collection

The researchers have adopted the categorization of all 28 states and 8 union territories of India into six regional zones based on the States Reorganisation Act, 1956 enacted by the government of India (Table 1). Additionally graphical representation of these six regions have been incorporated through the map to offer a clear understanding of the geographical distribution of the region along with inadapt analysis (Figure 1). The map categorization was

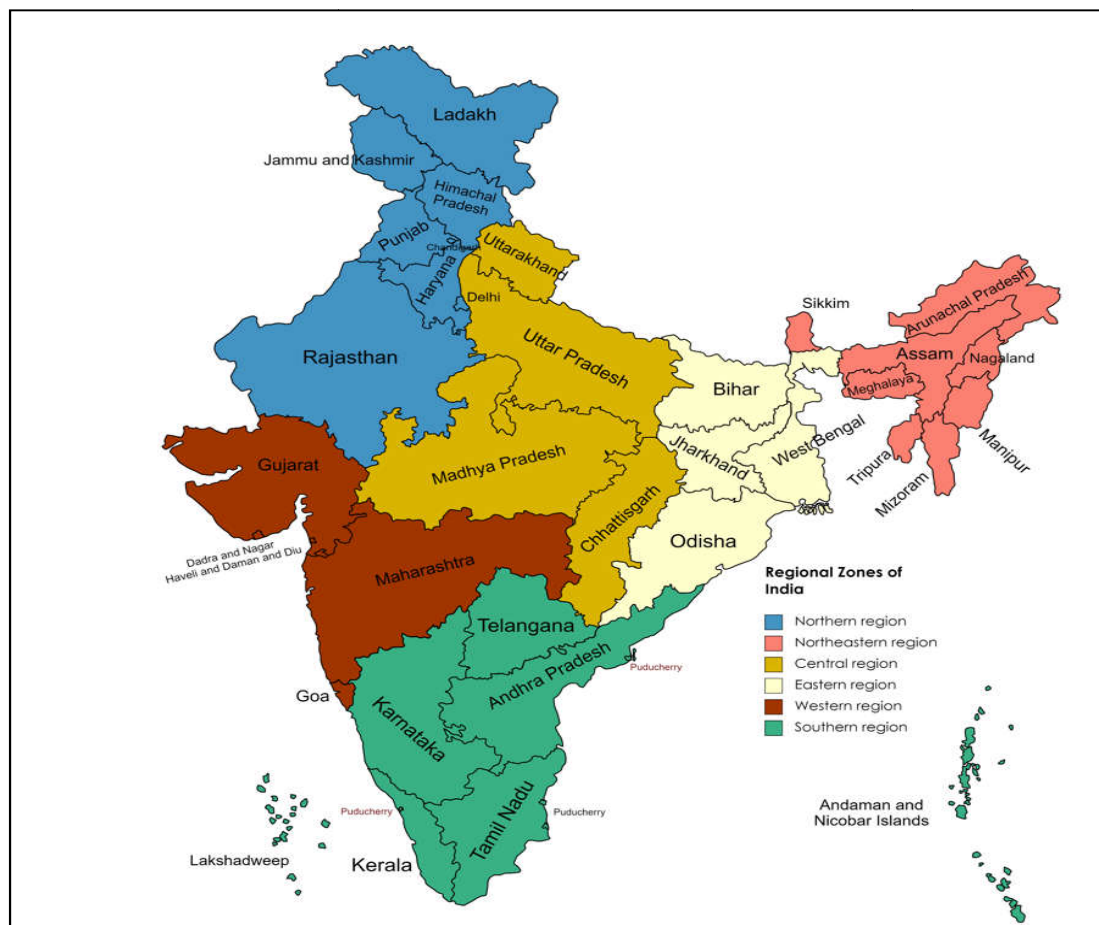
drawn using mapchart.com <https://www.mapchart.net/india.html>. These zones have been classified on the basis of their culture, demography, climate, and different language (Bairwa & Sharma, 2019). The regional classifications are as follows:

Table 1. Region-wise categorization of States and Union territory of India

Regional Zones	States/Union Territory
Northern region	Chandigarh (UT), Delhi (UT), Jammu and Kashmir (UT), Ladakh (UT), Himachal Pradesh, Haryana, Punjab, and Rajasthan
Northeastern region	Sikkim, Arunachal Pradesh, Meghalaya, Nagaland, Manipur, Assam, Mizoram, and Tripura.
Central region	Chhattisgarh, Madhya Pradesh, Uttarakhhand, and Uttar Pradesh.
Eastern region	Bihar, Jharkhand, Odisha and West Bengal.
Western region	Dadra & Nagar Haveli and Daman & Diu (UT), Goa, Gujarat, and Maharashtra.
Southern region	Puducherry (UT), Andaman and Nicobar Islands (UT), Lakshadweep (UT) Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Telangana.

Source: Author’s compilation.

Figure 1: Map of region wise categorization of States/UT’s



Source: created by authors as per State Reorganisation Act 1956, Government of India

The research is based on already published secondary raw data. The data was collected from official government websites. The first one is from the GST council of India website <https://gstcouncil.gov.in/gst-revenue>. The Second one is from GST statistic portal website <https://www.gst.gov.in/download/gststatistics> and the third one is from the Press Information Bureau, Government of India website <https://pib.gov.in>. For fulfilling the objective of the study monthly raw data of GST collection of each 28 States and 8 Union territories have been collected for the period from July 2017 to June 2023. This raw data was then organized and grouped into six regions using Microsoft Excel. A total of seven hypotheses have been framed for the study. The Hypothesis from Ho1 to Ho6 is framed and tested to understand if there is a significant difference between GST revenue performance of States/UTs of within each region of the country. Additionally, to understand if these six regions have differences when it comes to GST revenue performance hypothesis Ho7 is framed and tested to understand regional

dynamics. The assumption of normality of data was tested through Shapiro wilk test and subsequently, non-parametric Kruskal-Wallis test was applied for testing each hypothesis. The analysis was conducted through Jamovi statistical software. Further to get major insights about which States/UTs from each region as well as to assess the overall performance of all the regions in terms of GST revenue, graph analysis and descriptive statistics are employed. Since GST is a consumption-based tax, the population size also plays an important role in influencing the growth of GST revenue collection. Hence the authors further have tried to add to the discussion of the study by establishing a relation between population and important States from each region. The population data has been referred from the latest population census of India.

4. Results

4.1. Performance of GST revenue collection of northern regions of India.

In Table 2 result of Normality of data has been provided. In Table 1 Shapiro-wilk test (Shapiro & Wilk, 1965) the result shows that the assumption of normality is violated as p value is less than 0.001 and hence, we applied Kruskal-Wallis's test (Kruskal & Wallis, 1952) Table 2. Kruskal-Wallis's test (Table 2) was applied to understand if there was a significance difference in GST revenue performance amongst the States/UT's of Northern regions of India. The test has given chi-square statistic result of 525 with 7 degrees of freedom and the p value was < 0.001. This suggests that there were significant differences in GST revenue performance among the States/UT's of Northern regions of India hence the null hypothesis (Ho1) stands rejected.

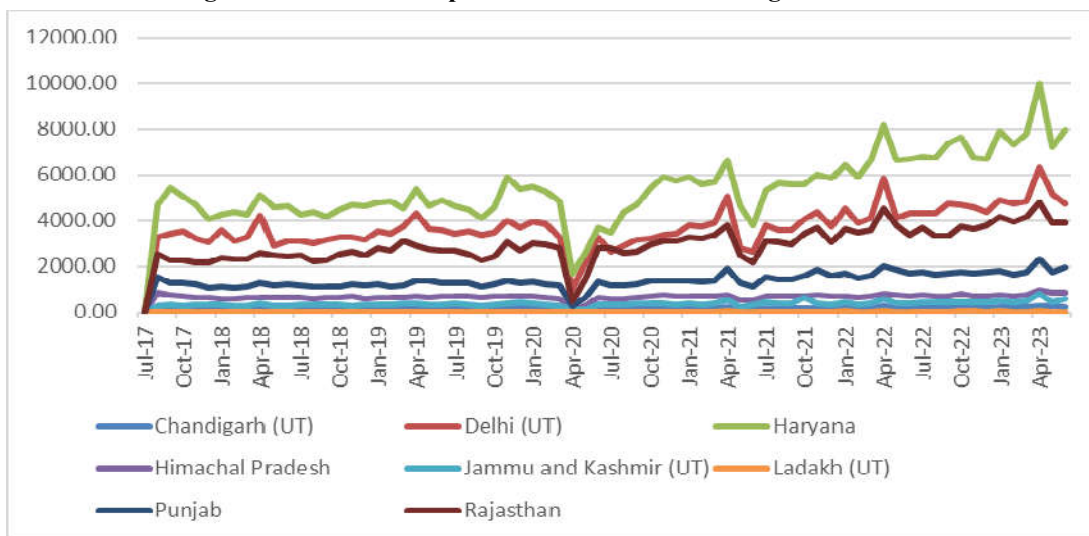
Table 2. Northern regions Shapiro-Wilk test & Kruskal Wallis test

Normality test -Shapiro-Wilk		Kruskal-Wallis test		
Statistic	P Value	χ^2	Df	P Value
0.743	<.001	525	7	<.001

Source: Author's calculations.

Figure 2 provides graphical representation of GST revenue performance in the Northern regions. The highest GST collection is demonstrated by the state of Haryana with a total of Rs. 3,86,568.30 crores in six years and average of Rs. 5369 crores (645.07 million USD approx.). This is followed by Union territory of Delhi with a total collection of Rs. 2,65,306 crores and average of Rs. 3685 crores (443.12 million USD approx.). On fourth is the State with the largest area in the nation is Rajasthan with a GST collection totalling to Rs 2,10,331.10 crores and average yearly collection is Rs. 1921 crores (231.49 million USD approx.). Punjab state is on fourth rank with total of collection of Rs. 98,141.95 crores and average collection of Rs. 1363 crores (164.17 million USD approx.). Fifth with a total collection of Rs. 47,340 crores is the State of Himachal Pradesh with an average collection of Rs, 658 crores (79.28 million USD approx.). It is followed in sixth place by UT of Jammu and Kashmir with Rs. 25,520 crores total collection and average collection of Rs. 355 crores (42.73 million USD approx.). This is followed by another UT on seventh position, Chandigarh with total GST collection of Rs. 11,671.48 crores with average collection of Rs. 162 crores (19.49 million USD approx.) and last with lowest total collection in Northern region is of the UT of Ladakh with a total Rs. 736 crores with an average of only Rs. 10.2 crores (1.23 million USD approx.). From the graph 1 it is clear that there are fluctuations in GST revenue collection across different States and UT of Northern regions. Some States are witnessing higher collection while other are experiencing lower collections. Overall, the Northern regions are showing a positive upward trend in GST revenue collection with slight dip due to Covid 19 pandemic.

Figure 2: GST revenue performance of Northern regions of India



Source: Drawn by the authors

4.2. Performance of GST revenue collection of northeastern regions of India.

In Table 3 Shapiro-wilk test the result shows that the assumption of normality is violated as p value is less than 0.001 and we applied Kruskal-Walli’s test Table 3. As per the test p-value is less than 0.001 which indicate that that there are significant differences in GST revenue performance among the Northeastern regions of India hence the null hypothesis (Ho2) stands rejected.

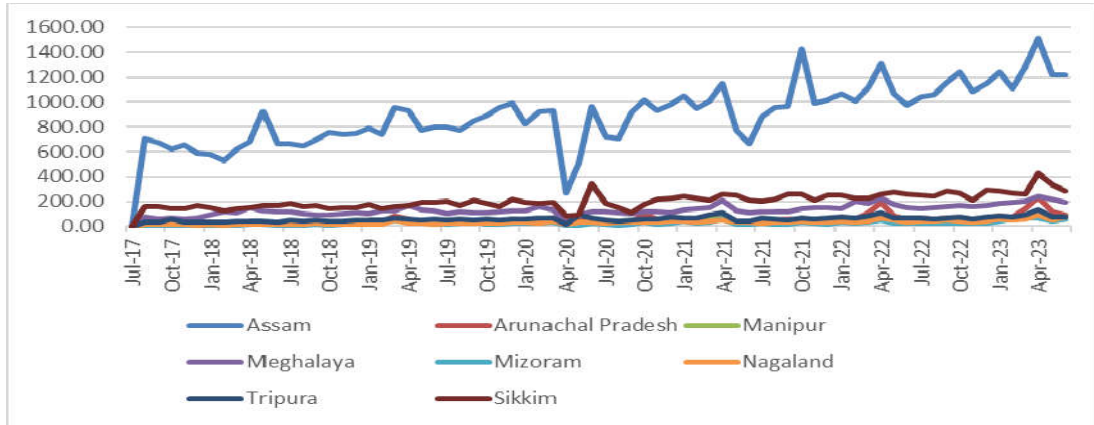
Table 3. Northeastern regions Shapiro-Wilk test & Kruskal Wallis test

Normality test (Shapiro-Wilk)		Kruskal-Wallis test		
Statistic	P Value	χ^2	Df	P Value
0.661	<.001	439	7	<.001

Source: Author’s calculations.

In figure 3 it is clear that the State of Assam is having highest average GST revenue of Rs. 889.7 crores (107.08 million USD approx.) with a total GST revenue collection of Rs.64,055 crores in six years. The State of Sikkim with average collection of Rs. 203.2 crores (24.47 million USD approx.) and collection totalling to Rs. 14,631 crores ranks second. Attaining the third rank is the state of Meghalaya collecting an average of Rs.130 crores (15.64 million USD approx.) and a total GST collection of Rs. 9361.10 crores. Following closely is the state of Tripura, ranking fourth with a total GST collection of Rs. 4215.12 crores and an average collection of Rs. 58.40 crores (7.02 million USD approx.). Arunachal Pradesh having the largest area in the region claims the fifth position, gaining total of Rs. 3930.15 crores and average collection of Rs. 54.60 crores (6.57 million USD approx.). Sixth in line is Manipur State. Its average collection is Rs. 36.20 crores (4.37 million USD approx.) and aggregate is Rs. 2614.60 crores. On Sixth rank is the State of Nagaland with average yearly collection of Rs. 31.20 crores (3.75 million USD approx.) and total collection of around Rs.2242.02 crores. Mizoram State took the last place with lowest average collection of Rs. 24 Crores (2.89 million USD approx.) and total collection of Rs. 1731.12 crores. Overall in Figure 3 it is evident that there has been a positive growth in revenue performance of states in Northeastern region with a visible impact due to covid 19 pandemic.

Figure 3: GST revenue performance of Northeastern regions of India



Source: Drawn by the authors

4.3. Performance of GST revenue collection of central regions of India.

In Table 4 Shapiro-wilk test the result shows that the assumption of normality is violated as p value is less than 0.001 and we applied Kruskal-Wallis’s test Table 4. As per the test p-value is less than 0.001 which indicate that that there are significant differences in GST revenue performance among the Central regions of India hence the null hypothesis (Ho3) stands rejected.

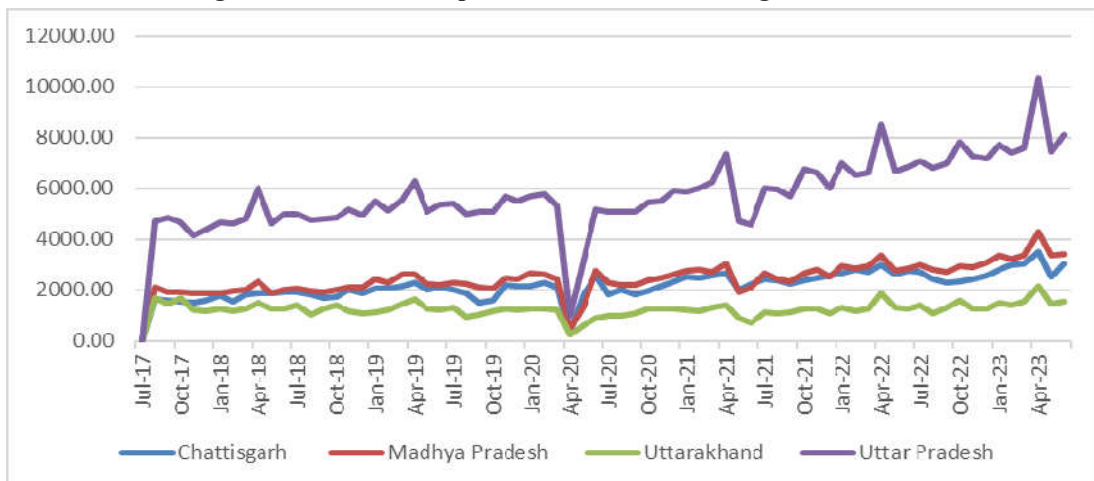
Table 4. Central regions Shapiro-Wilk test & Kruskal Wallis test

Normality test (Shapiro-Wilk)		Kruskal-Wallis test		
Statistic	P Value	χ^2	Df	P Value
0.836	<.001	216	3	<.001

Source: Author’s calculations

In Figure 4 it is evident that in Central regions of India Uttar Pradesh State is having highest GST total collection of Rs 4,10,873 crores with an average collection of Rs. 5707 crores (687.08 million USD approx.) in six years. This is followed by the state with largest area in the region, Madhya Pradesh ranks second with Rs. 2432 crores (292.86 million USD approx.) average collection and total Collection of Rs. 1,75,091.27 crores. Chhattisgarh stands on third rank with an average collection of Rs. 2154 crores (259.47 million USD approx.) and total collection Rs.1,55,093.28 crores and last State in Central region is Uttarakhand with an average collection of Rs. 1233 crores (148.35 million USD approx.) and a total collection of Rs.88,803.31 crores. Overall, the Figure 4 illustrates that there has been an upward growth in GST revenue performance in Central regions of India with little dips in between due to covid 19 pandemic.

Figure 4: GST revenue performance of Central regions of India



Source: Drawn by the authors

4.4. Performance of GST revenue collection of eastern regions of India.

In Table 5 Shapiro-wilk test the result shows that the assumption of normality is violated as p value is less than 0.001 and we applied Kruskal-Walli’s test Table 5. As per the test p-value is less than 0.001 which indicate that that there are significant differences in GST revenue performance among the Eastern regions of India hence the null hypothesis (Ho4) stands rejected.

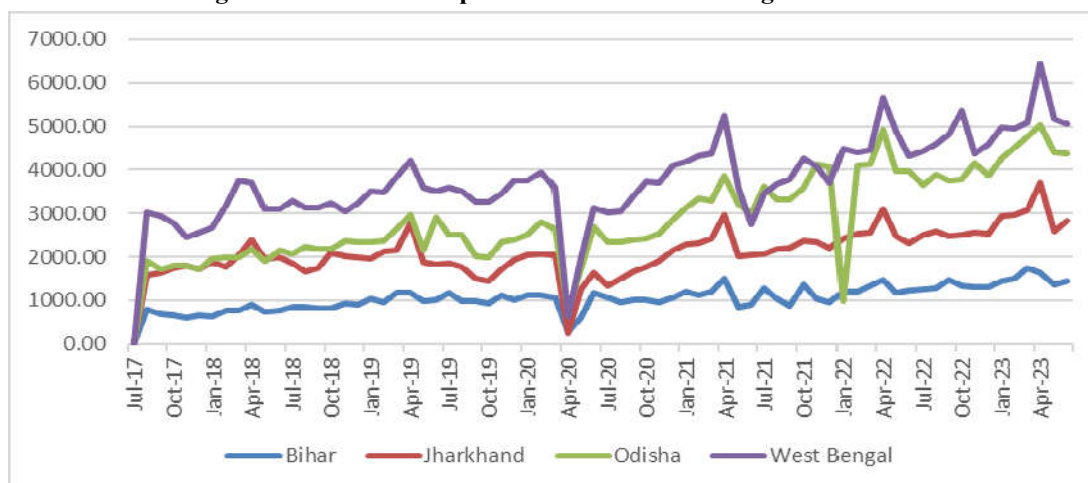
Table 5. Eastern regions Shapiro-Wilk test & Kruskal Wallis test

Normality test (Shapiro-Wilk)		Kruskal-Wallis test		
Statistic	P Value	χ^2	Df	P Value
0.950	<.001	192	3	<.001

Source: Author’s calculations.

Figure 5 is depicting that the State of West Bengal is having highest total collection of Rs.2,68,782.87 crores with average collection of Rs. 3733 crores (449.22 million USD approx.) in six years followed the largest state of Eastern region, Odisha with a total collection Rs. 2,05,894.56 crores and average collection of Rs. 2869 crores (345.56 million USD approx.). Jharkhand state has taken third place with average collection of Rs. 2089 crores (251.63 million USD approx.) and total collection is Rs.1,50,393.03 crores. On last, State with a lowest collection in eastern region is Bihar with an average collection of Rs. 1043 crores (125.85 million USD approx.) and a total collection of Rs.75,067 crores. Overall, as per the analysis it is evident that there has been an upward trend in GST collection in Eastern regions with some variations with visible impact due to covid 19 pandemic.

Figure 5: GST revenue performance of Eastern regions of India



Source: Drawn by the authors

4.5. Performance of GST revenue collection of western regions of India.

In Table 6 Shapiro-wilk test the result shows that the assumption of normality is violated as p value is less than 0.001 and we applied Kruskal-Walli’s test Table 6. As per the test p-value is less than 0.001 which indicate that that there are significant differences in GST revenue performance among the Western regions of India hence the null hypothesis (Ho5) stands rejected.

Table 6. Western regions Shapiro-Wilk test & Kruskal Wallis test

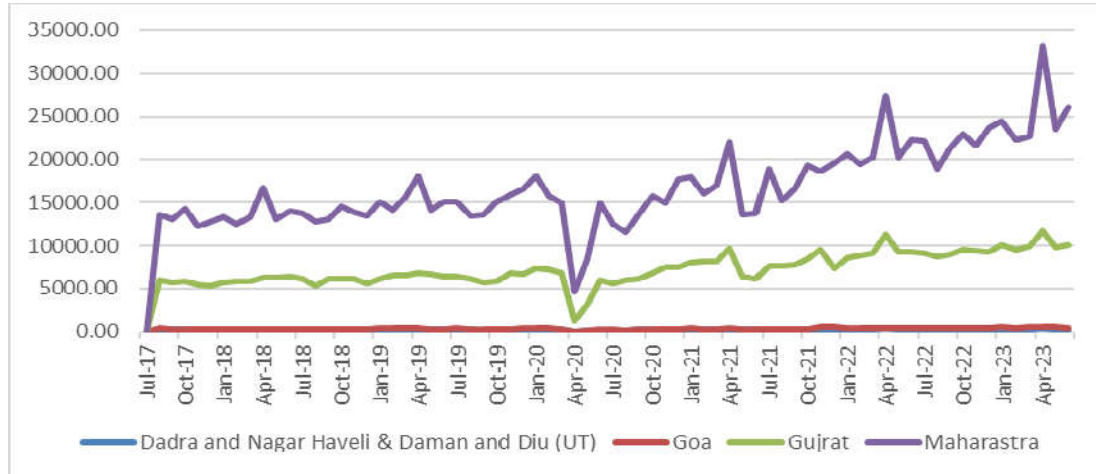
Normality test (Shapiro-Wilk)		Kruskal-Wallis test		
Statistic	P Value	χ^2	Df	P Value
0.756	<.001	242	3	<.001

Source: Author’s calculations

In figure 6 it is clear that the Maharashtra State which is having the largest area in Western region is the top performing State with an average of Rs. 16,636 crores (2 billion USD approx.) and a total of collection of Rs. 11,97,789.10 crores in six years followed Second is the state of Gujarat with average of Rs. 7161 crores (861.46 million USD approx.) and total collection of Rs. 5,15,537.81 crores. The state of Goa ranks third with total collection of Rs.

25,926.21 crores and average collection of Rs. 360 crores (43.37 million USD approx.). The UT of Dadra & Nagar Haveli and Daman & Diu is ranked last with total collection of Rs. 18,564.84 crores and average GST collection of Rs. 258 Crores (31.05 million USD approx.). Overall, the graph depicts that there has been an overall growth in GST revenue performance in Western regions of India with slight impact due to covid 19 pandemic.

Figure 6: GST revenue performance of Western regions of India



Source: Drawn by the authors

4.6. Performance of GST revenue collection of southern regions of India.

In Table 7 Shapiro-wilk test the result shows that the assumption of normality is violated as p value is less than 0.001 and we applied Kruskal-Wallis test Table 7. As per the test p-value is less than 0.001 which indicate that that there are significant differences in GST revenue performance among the Southern regions of India hence the null hypothesis (Ho6) stands rejected.

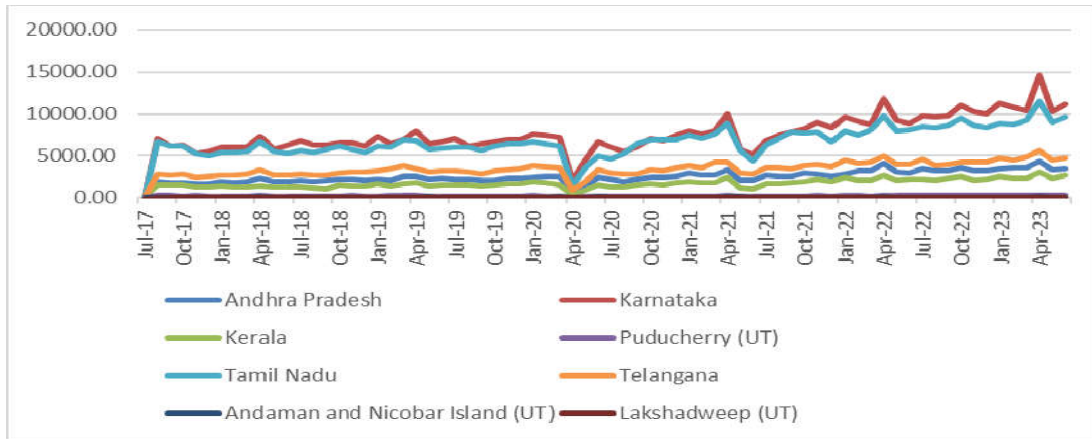
Table 7. Southern regions Shapiro-Wilk test & Kruskal Wallis test

Normality test (Shapiro-Wilk)		Kruskal-Wallis test		
Statistic	P Value	χ^2	Df	P Value
0.781	<.001	523	7	<.001

Source: Author’s calculations

In Figure 7 it is clear that the largest State of Southern region Karnataka is having highest average GST collection of Rs. 7,510.69 crores (904.07 million USD approx.) with total collection of Rs.5,40,769.97 in six years. Tamil Nadu is on second position with average collection of Rs. 6656.98 crores (800 million USD approx.) and total of Rs. 4,79,302.49 crores. Telangana State ranks third with average collection of Rs. 3411.40 crores (411.16 million USD approx.). Telangana total collection stands at Rs.2,45,626.56 crores. Fourth is Andhra Pradesh with average collection of Rs. 2,457.20 crores (295.68 million USD approx.) and total of Rs.1,77,002.17 crores. Kerala State is on fifth rank with average of Rs. 1686.66 crores (203.29 million USD approx.). The cumulative collection of Kerala comes to Rs.121,439.30 crores. Next is UT Puducherry with average of Rs. 160.84 crores (19.37 million USD approx.) and aggregate of Rs. 11,580.19 Crores. On seventh is UT of Andaman and Nicobar Islands with average GST collection of Rs. 26.94 crores (3.24 million USD approx.) and aggregate of Rs. 1938.48 crores. Last in Southern region is the UT of Lakshadweep which is having the lowest area in the country. Its total GST collection is only Rs. 126 crores with a low average collection of just 1.76 crores (2,10,000 USD approx.)

Figure 7: GST revenue performance of southern regions of India



Source: Drawn by the authors

4.7. Region wise performance of GST revenue collection in India.

In Table 8 Shapiro-wilk test the result shows that the assumption of normality is violated as p value is less than 0.001 and we applied Kruskal-Wallis test Table 8. As per the test p-value is less than 0.001 which indicate that that there are significant differences in GST revenue performance among the regions of India hence the null hypothesis (Ho7) stands rejected.

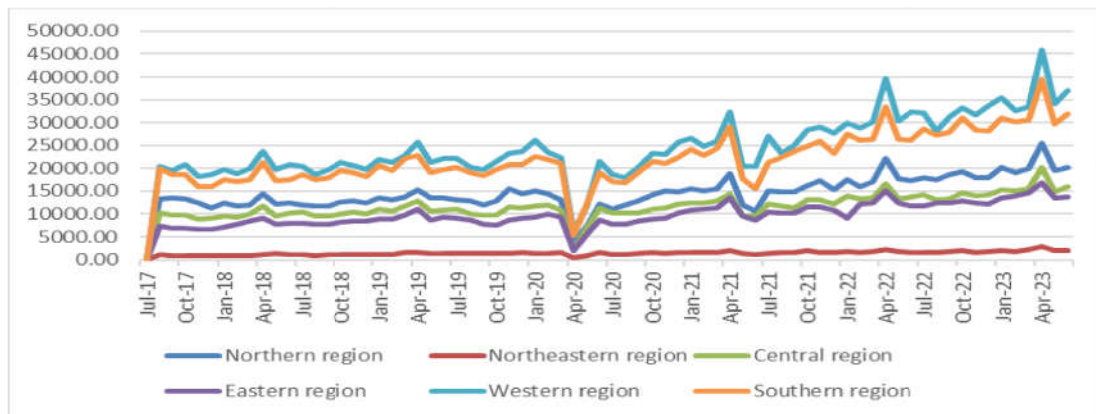
Table 8. Region wise Shapiro-Wilk test & Kruskal Wallis Test

Normality test (Shapiro-Wilk)		Kruskal-Wallis test		
Statistic	P Value	χ^2	Df	P Value
0.892	<.001	338	5	<.001

Source: Author’s calculations

In Figure 8 it is clear that the western region is having highest average GST revenue of Rs. 24,415 crores (2.93 billion USD approx.) and total collection of Rs. 17,57,853.95 in last six years followed by Southern region with average collection of Rs. 21,914 crores (2.63 billion USD approx.) and total collection of Rs. 15,77,786.53 crores. Northern region is on third rank with average collection is Rs. 14,522 crores (1.74 billion USD approx.) and total collection of Rs.10,45,617.91 crores. On fifth rank is Central region with an average collection of Rs. 11,526 crores (1.38 billion USD approx.) and total collection of Rs.8,29,861.54 crores. Eastern region is on sixth place with an average collection of Rs. 9,724 crores (1.17 billion USD approx.) and total collection of Rs.7,00,137.54 crores and last amongst the regions is Northeastern with an average collection of only Rs. 1,428 Crores (171.86 million USD approx.) and total GST collection of Rs. 1,02,782 crores. As per the data & graph analysis it is very much clear that all the regions are moving on upward direction in GST revenue performance with a noticeable disparity amongst this region

Figure 8: Region wise GST revenue performance in India



Source: Drawn by the authors

5. Discussion

The examination and analysis of performance of GST revenue collection across regions of India clearly shows that there has consistent upward trajectory in all these regions. Even though there has been upward trend there has been a significant variation amongst this States and Union territories within these regions which is evident after applying Kruskal Wallis test for each region. If we talk about Northern region the state of Haryana has been on top in revenue collection as compared to other States and Union territories within the region. Interestingly Haryana State is on third rank in terms of population size in Northern region below the state of Rajasthan and Punjab, this is majorly due to the fact majority of automobiles production of the country takes place in the state of Haryana. Moving to the Northeastern region, Assam takes the lead as the best performer and it's having the highest population in the region. Notably, Sikkim, with its comparatively lowest population in the region, ranks second in total GST collection after the state of Assam. This is primarily due to the reason that Sikkim industrial sector is heavily based on agriculture economy and as well as the state is home to numerous pharmaceuticals companies. Next region is the Central region in which the most populous state of the country, Uttar Pradesh stands out with highest GST revenue. Shifting to the Eastern region, West Bengal leads in GST collection compared to its counterparts. Its noteworthy that the third populous state of the nation, Bihar contributes the lowest GST revenue among the eastern region group. This is mainly attributed to the fact that Bihar's per capita is the lowest in the country. In the western region, the state of Maharashtra which is the economic hub of the nation demonstrates the highest GST revenue collection and it is one of the highest populous states in India. Interestingly the state of Goa in this region which is the smallest State in India with low population has been performing very well as compared to all the other small states. This success is mainly due to the large tourism related activities happening in Goa and also Goa is having highest per capita in the country. In the Southern region, Karnataka takes the lead, despite being the second most populous state in the group after the State of Tamil Nadu, primary due to the strong presence of number of IT companies in Bangalore the capital city of Karnataka. Overall, the Western region has exhibited a strong GST revenue performance majorly driven by the state of Maharashtra as compare to other regions of the country. Surprisingly the total population of western region ranks fourth amongst the group. This is primary due to Maharashtra's capital city of Mumbai which is considered as the financial city of the country which has attracted global businesses, has a strong hold in service industry and very high presence of commercial & retail activities. In summary our research study has given strong evidence that some States and UT's with large population are having low GST performance. The major reason for this phenomenon is that GST is a Consumption based tax (Dash & Kakarlapudi, 2022; Garg et al, 2023), Some States/UT's which are producing goods or service are supplying this to other States/UT's and this States are getting the benefit of GST collection as these goods or services are consumed in their State/UT's. In this manner the manufacturing/producing States/UT's are losing GST revenue collection. This finding aligns with the finding of (Nayaka & Panduranga, 2019b). The consequences of this will be the State/UT's will face revenue shortfall resulting in fiscal imbalance in the respective States/UT's.

Additionally, it is essential for researchers from States/UT's & region with lower revenue performance to delve into the other underlying factors contributing to this disparity compared to other states or union territories in their respective regions at a ground level. Different factors as suggested by various researcher such as Human capital formation (Hussain & Das., 2023), level of consumption (Das & Ray., 2019), Consumer behaviour (Jolley et al, 2017) , Tax rate of GST (Amri et al, 2019) etc will have probable impact on revenue performance of the country.

6. Conclusion

In conclusion, this research delves and explores the six-year journey of Goods and Services Tax (GST) implementation in India, concentrating on regional dynamics and state-level performance. The study categorizes the 28 States and 8 Union territories into six regions and studies the GST revenue collection across these regions. Utilizing statistical tools such as graph analysis, descriptive analysis, and Kruskal-Wallis tests, the research identifies

States/UT's that excel in GST revenue performance within their respective regions. The findings highlight significant variations in GST performance among States and Union territories within each region. The state of Haryana is the best performer in Northern region. In Northeastern region the state of Assam leads. Uttar Pradesh State exhibits very good performance in Central region. In Eastern regions West Bengal outperformance, Maharashtra is top performer in Western region. The study has highlighted overall a positive upward trend in GST revenue collection across all the regions with some dips due to the recent covid 19 pandemics with Western region being the best performing region. It is noted that GST is consumption-based tax and it is implied that the state with high population will have better revenue performance but our finding is challenging the assumption that population size directly correlates with revenue collection. It is revealed that few States/UT's and regions are not meeting their tax revenue expectations whereas some states are performing very well as considering their population size. The researcher has highlighted the underlying reasons for the same. The author's underscore that being a consumption-based tax GST can result into budgetary disparity amongst the States/UT's and across the regions. In fact, the states which are producing or manufacturing may come across difficult situation in collecting GST revenue as their output will be consumed by other States/UTs. Our finding emphasizes that the policymakers, tax authority and researchers to study other possible factors and develop appropriate strategies addressing the regional disparities. Additionally, this study provides a valuable resource for the countries policymakers to indulge into a process of improving the regional economics along with addressing the fiscal imbalance across the regions. In summary, this research adds to the existing literature by providing in-depth perspectives into the GST revenue performance at the States/UT's and regional levels. As India persist to navigate the complexities of its new indirect tax system, the findings offer a valuable foundation for future research and policy development aimed at improving effectiveness of GST implementation and encourage inclusive economic growth.

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PERCEIVED AND DESIRED IMAGES OF SOCIETY: HOW (UN)EQUAL IS SOCIETY?

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Abstract

In the contemporary world, it is very important to understand how people see and perceive our societies themselves. The main research objective of this article is to study imagined – perceived and desired – types of society using comparative analysis. The target group is composed of the 23 countries which participated in social inequality studies of the International Social Survey Programme (ISSP) in 2009 and 2019. Among the questions to answer in this study are: What is the gap between the assessment of perceived and desired types of society? How are the perceived images of society related to different macro socioeconomic and political conditions? How are individual assessments influenced by sociodemographic and attitudinal characteristics? The shortage of studies on topics relating to these questions justifies the importance of this article. A novelty of this study is not only in the cross-national comparison of images of society, but also in the linking of this concept to human and social capital, well-being, and subjective identities. The research results show that contemporary societies are perceived as socially unequal in most countries; however, the majority of populations still expect to live in more just societies in future.

Keywords: Images of society; inequality; subjective social class; International Social Survey Program.

JEL classification:

1. Introduction

Today, most countries in the developed world are referred to as welfare states, where at least a minimum level of prosperity is guaranteed for all citizens. A welfare state is usually described as a system of governance in which the government is committed to ensuring the economic and social security of its people and to provide at least minimum standards of social welfare. The principles of the welfare state are aimed at reducing social inequalities and the differences between various groups in society. The emergence of the welfare state in the 20th century was common to all societies and was a policy response to social inequalities or to the fragmentation of society in terms of income, wealth, education, employment, and other socioeconomic indicators. This was also a response to the social and political conflicts arising from this fragmentation. There are various indicators for measuring the wellbeing of society, including: the GINI index, which measures the extent of income inequality; the absolute poverty rate; or GDP per capita (International Comparison Program (ICP), World Bank), which shows how rich countries are and how effectively they can provide welfare for their citizens. But how do people themselves see their societies; how socially just do they imagine them? Both questions require separate answers.

As Evans and Kelly (2017:316) argued, inequality and class are the most important aspects of human society, acting as a source of solidarity and conflict. This is largely true, as in many cases these factors are second in importance after religion and ethnicity. In general, the political history of the Western World since the 19th century and the beginning of the 20th century is a history of class and inequality. This can also be considered as a conflict between the Left, which elevates equality, and the Right, which tolerates inequality. In the modern world, since the emergence of the welfare state, this observable conflict has determined most political decisions, but the neoconservative Reagan–Thatcher revolution in the early 1980s was the starting point of a dizzying rise in inequality within countries that continues to this day. Income and wealth inequalities have been on the rise nearly everywhere since the 1980s, and contemporary global inequalities are close to early 20th century peak-Western-imperialism levels. Global wealth inequalities are even more pronounced than income inequalities. The poorest half of the global population barely owns any wealth at all, possessing just 2% of the total. In contrast, the richest 10% of the global population own 76% of all wealth. While inequality has increased within most countries over the past two decades, this has occurred more sharply in some than in others. The gap between the average incomes of the top 10% and the bottom 50% of individuals within countries has almost doubled, from 8.5x to 15x (Chancel et al. 2021:10–11).

However, in a political sense, according to Evans and Kelly (2017:316), the objective reality of inequality and the class reality of the structure of society is not so important, but rather how these phenomena are perceived by members of that society. If inequality is unrecognizable, it may not have any political consequences, but if it is clearly perceived or imagined, it will have clearly felt consequences. Therefore, it is important to understand how people perceive and imagine the society in which they live.

Looking from constructivist perspective different images of society can be seen as expressions of perceived inequality. In the early 1960s, there was a broad interest within social sciences in how different societies perceive and imagine their class structures, i.e., class images (Goldthorpe and Lockwood 1963). Since then, this interest has grown gradually (Goldthorpe et al. 1969; Lockwood 1966; Platt 1971; Platt 1984; Bulmer 1975; Savage 2000). According to Vanneman and Cannon (1987:101), perhaps the best-known study of this kind and of that time is the British survey of “affluent workers”, or study of the embourgeoisement thesis by Goldthorpe et al. (1969), based on a poll conducted in 1962.

Meanwhile, if initially a key point of reference – the “working class” – was used in a neutral, categorical sense, in the 20th century the term moved into popular usage and became highly politicized. Moreover, the strong political element in the terms “working class” and “middle class” is a disadvantage of the traditional subjective class identification question, especially in trying to understand (1) people’s perception of their place in the stratification hierarchy, (2) how that perception is shaped by their social structural location, and (3) whether that perception links their structural location to class consciousness or political ideology. Furthermore, because the degree to which these terms are politicized varies from country to country, comparative analyses using them are not genuinely comparable. Also, we must devise a set of pictorial questions about class that uses none of the traditional politicized terms (Evans, Kelly and Kolosi 1992:462).

The new development of questions to assess images of the social stratification began in Hungary in the late 1970s (Kolosi, Papp, Gombar, Pal, and Bara 1980:114-134; Bokor and Karajannis 1989, cited from Evans, Kelley, and Kolosi 1992:462). Surveys of specific occupational groups suggested: that these images are measurable; that there is no universally shared image of society; that considering perceptions of class composition provides insights into subjective class identification; and that the link between one’s class self-location and one’s perception of the class composition of society is real but weak (Kolosi et al. 1980, cited from Evans, Kelley, and Kolosi 1992:462). For comparative analysis, particularly between capitalist and communist societies in the late 1980s, an extended module of pictorial questions which was suitable for both capitalist and communist societies was developed, and was fielded in Hungary in 1987 and in Australia in 1987 and 1989 (Evans, Kelly and Kolosi 1992:462).

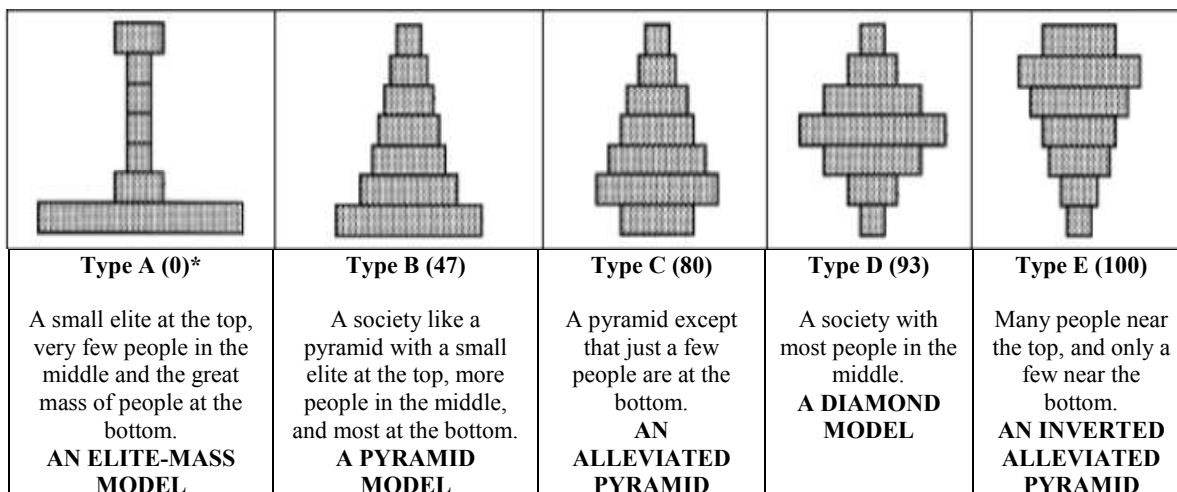
The surveys of the Hungarian and Australian populations used visual questions – which evolved from the research of the Hungarian scholars mentioned above – about the imaginary

structures of societies in these countries. These questions were later applied extensively, and they are also used by the International Social Survey Programme in the module “Social Inequality”, the data of which is analyzed in this article.

Perceptions of inequality and class stratification might vary to a large degree. Some people hold an elitist image, i.e., a large mass at the bottom of society and a small, privileged elite at the top; others perceive society as equalitarian, with the largest classes in the middle, or a society in which most people have a good position and access to a good life; and yet others have intermediate views between elitist and equalitarian (Kelley and Evans 2017:56). Naturally, a society with most of its members at the bottom and only a small elite at the top is very different from one where most people are perceived to belong to the middle class.

The visual question has a set of five diagrams representing a range of plausible societies, each accompanied by a brief description (Figure 1). These diagrams each have an approximately equal area, but differ in relative class sizes. They range from an extremely elitist society with tiny middle classes (such as a stereotypical medieval agrarian society or the traditional Marxist image of a capitalist society) through to a top-heavy egalitarian society in which the lower classes have dwindled away to almost nothing (such as the traditional socialist ideal or some images of post-industrial society) (Kelley and Evans 2017: 56). While they may seem strange, these questions are easy for respondents to answer, even in very socially and culturally different countries.

Figure 1. Types of society.



Source: publicly available data (ISSP 2009).

* Degree of inequality, from 0 for the most elitist type of society to 100 for the most equalitarian, with intermediate types scored in proportion to their coefficient of variation.

Figure 1 shows perceived types of society, and the degree of egalitarianism is indicated in parentheses next to each type. Type A, according to Riedl and Haller (2014:16), which is named an elite-mass model, has a small elite at the top, very few people in the middle and a great mass of people at the bottom. It is absolutely elitist and is the most socially unjust model with a zero degree of egalitarianism. A pyramid model society, or type B, is organized like a pyramid, with a small elite at the top, more people in the middle, and most at the bottom. This is a somewhat more socially just model of society than the elite-mass, but it remains much more elitist than egalitarian. An alleviated pyramid model, or type C, has a social pyramid, except that only a few people are at the bottom. In this model, the lower class is much smaller and the middle class is correspondingly more numerous, but still this type remains moderately elitist. Type D, or a diamond model, is a society with most people in the middle. This is a clearly egalitarian society with few upper and lower classes. Type E, or an inverted alleviated pyramid model, has many people near the top, and only a few near the bottom. This society is the most egalitarian and socially just, as most of its members are at the top and only a few at the bottom.

Riedl and Haller (2014:12-13), who studied the effects of increasing income inequality on individual beliefs of inequality in contemporary Central East European societies, observed that people’s attitudes can be egalitarian, functionalist, or meritocratic. Egalitarian views

support substantive equality and redistribution, whereas functionalists strongly oppose this idea and thus are anti-egalitarian. Functionalists are also characterized by an accent towards the positive effects of social inequality, and a belief in achievement as the basis of unequal rewards. The meritocratic position prefers a social order that guarantees the appreciation of high-quality work, a good education, and equality of opportunities (Haller et al., 1995 cited from Riedl and Haller 2014: 13). Riedl and Haller assumed that meritocracy is of minor relevance in post-socialist societies, while functionalism – as the dominant ideology of a market-driven capitalist society – and egalitarianism – as the dominant ideology of communism – are the prevalent ideologies (2014:13).

Evans, Kelly and Kolosi (1992) found that the perceptions of people living in different political regimes regarding type of society differed considerably, and these differences were illustrated by the examples of capitalist Australia and communist Hungary. Later research by the same scholars also showed that the collapse of communism, both in Hungary and in other post-communist countries, dramatically changed the perception of inequality. The main outcome in these countries was that “in sharp contrast to these diverse perceptions, ideals are shared, almost everyone preferring prosperous egalitarian societies” (Evans and Kelly 2017:315).

Evans, Kelly and Kolosi (1992:467) noted that the reference group theory and available heuristic arguments also imply that people project their own situation and the situations of their families and friends onto the broader social world. Along these lines, it was found that people of high objective socioeconomic status (in terms of education, occupation, and family income) thus tend to perceive the society in which they live as more egalitarian, and, by contrast, people lower in the hierarchy have a more conflicting view, seeing society as structurally elitist and other people as poor and belonging disproportionately to the lower classes. On the other hand, the reality blend theory helped the arrival of two more conclusions, i.e.: the more developed a nation, the more egalitarian its citizens will perceive it to be; and societies that are actually very unequal are perceived as only moderately unequal (Evans and Kelly 2017:323).

Often in surveys on the types/images of society, respondents are asked to tell not only what kind of society they live in, but also what type of society they would prefer to live in. The greater the gap between the perceived and the desired type of society, the more people are frustrated and feel that they live in a socially unjust society. Although we would not normally find the same perceived model of society within any one society, and the dominant models vary even more across different countries, the ideal society is common to all – the vast majority of people prefer egalitarian models (usually type D, less often type E (Evans and Kelly 2017:344).

Psychological factors are also important in assessing inequality in society. People generally do not accurately assess the extent of inequality in a largely depersonalized society. They tend to perceive the structure of society from the starting point of the social status of the people they know, i.e., reference groups. People do not expect absolute equality, because this depends on hard work and/or exceptional human talents. However, social inequality is tolerated as long as equal opportunities to achieve one’s goals are ensured. Inequality is caused by moral dissatisfaction, when welfare inequalities are perceived as a form of fraud or a reluctance to contribute to the common good. In this way, inequality becomes inequity (Nielsen 2017). Niehues (2014), Gimpelson and Treisman (2016) have also shown that the extent of inequality perceived by people in societies is sometimes even very different from the inequality measured by objective indicators. Here it is very important to note that a subjective social class or a subjective identity of belonging to particular social class has a very high correlation with perceived and desired images of society. In this study, the authors also tried to test a linkage between human capital and social capital (emphasizing the most important variable of social trust) on the one hand, and images of society on the other.

However, the general picture of the objective structure of society shows very well to what extent the society is perceived as socially right or wrong (equal or unequal) by its members. The Human Development Index (HDI) is rather a good measurement to reflect the general structure of different societies, as it is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and have a decent standard of living (Human Development Index). This indicator was applied in this

study of societal images along with other socioeconomic variables, including GDP per capita in PPP and the GINI Index.






Finally, this study attempts to test a linkage between images of perceived and desired types of society on the one hand, and accumulated political characteristics – the EIU Democracy Index and the V-Dem Liberal Democracy Index – of different countries on the other.

2. Data and Methods

The primary units of analysis in this article are the countries which took part in the International Social Survey Programme (ISSP) polls on social inequality in 2009 and 2019. The ISSP conducted surveys on social inequality in 1987, 1992, 1999, 2009, and 2019. The following analysis is based on the Social Inequality IV ISSP module from 2009 (ISSP Research Group: International Social Survey Programme: Social Inequality IV - ISSP 2009) and the Social Inequality V first release from 2019 (ISSP Research Group: International Social Survey Programme: Social Inequality V - ISSP 2019) – the latest two rounds of the Social Inequality module. In addition to countries as units of analysis, observations were made about individual-level perceptions of types of society along with some sociodemographic and attitudinal characteristics (Table 1). In this case, individuals are the unit of analysis.

The analysis of perceived and desired types of society in this article is based on two questions from the ISSP surveys about the perceived and desired structure of the society in which respondents live. These questions follow the methodology of visual questions earlier proposed by Evans, Kelly and Kolosi (1992), where respondents are presented with five possible types of society and choose which society, they think they live in and what kind of society they would prefer to live in (Figure 2). In the first case, the perceived type of society is shown; in the second case, the desired, or ideal, type of society is described, which demonstrates the expectations of the respondents. This study also performed a correlation analysis between the perceived type of society and the sociodemographic characteristics of the respondents.

Figure 2. ISSP questions about perceived and desired types of society.

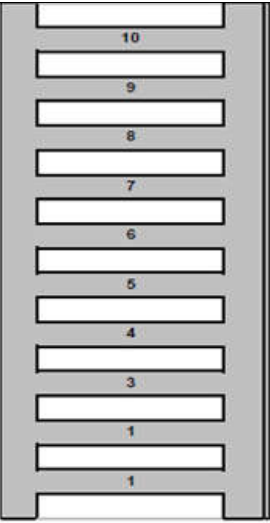
<p>Q14a*. These five diagrams show different types of society. Please read the descriptions and look at the diagrams and decide which you think best describes <country>... First, what type of society is <country> today – which diagram comes closest? Q14b. What do you think <country> ought to be like – which would you prefer?</p>				
				
<p>Type A A small elite at the top, very few people in the middle and the great mass of people at the bottom.</p>	<p>Type B A society like a pyramid with a small elite at the top, more people in the middle, and most at the bottom.</p>	<p>Type C A pyramid except that just a few people are at the bottom.</p>	<p>Type D A society with most people in the middle.</p>	<p>Type E Many people near the top, and only a few near the bottom.</p>

Source: publicly available data (ISSP 2009). The same questions were asked in the ISSP 2019 survey.

*Q15a and Q15b in the 2019 ISSP study, respectively

In an attempt to establish specific patterns about how the choice of perceived and desired types of society relate to the respondent's self-perception in the social hierarchy, and to assess factors of personal success, Pearson's correlation coefficient was calculated to measure associations between variables. Statistical significance of all correlations was also checked (p-value). This coefficient was chosen because mainly all analyzed questions used ordinal scales to measure respondents' attitudes. For the correlation analysis, questions were chosen about the respondents' attitudes on factors which are important in order to achieve something in life, also they were asked to self-place themselves on an imagined "ladder" or a top-bottom scale of society. Eventually, each respondent was questioned about subjective assessment of class position (i.e., belonging to a specific social class or a self-assessed different social class) (Table 1).

Table 1. Selected ISSP questions and sociodemographic characteristics.

Question	Answer categories
Q1. How important you think it is for getting ahead in life...: ... is coming from a wealthy family? ... having well-educated parents? ... is having a good education yourself? ... is having ambition? ... is hard work? ... is knowing the right people? ... is having political connections? ... is giving bribes? ... is a person's race? ... is a person's religion? ... is being born a man or a woman?	<ul style="list-style-type: none"> • Essential • Very Important • Fairly important • Not very important • Not important at all • Can't choose
Q10a (Q13a in 2019). In our society, there are groups which tend to be towards the top and groups which tend to be towards the bottom. Below is a scale that runs from top to bottom. Where would you put yourself now on this scale?	
Q20 (Q22a in 2019). Most people see themselves as belonging to a particular class. Please tell me which social class you would say you belong to?	<ul style="list-style-type: none"> • Lower class • Working class • Lower middle class • Middle class • Upper middle class • Upper class
Current employment status	<ul style="list-style-type: none"> • Employed-full time, main job • Employed-part time, main job • Employed, less than part-time • Helping family member • Unemployed • Student, school, vocational training • Retired • Housewife, -man, home duties • Permanently disabled • Other, not in labour force
Occupation ISCO/ ILO 1988	Coded in descending order from the professionals with the highest qualifications to the unskilled workers.
Trade union or a similar organization membership	<ol style="list-style-type: none"> 1. Currently member 2. Once member, not now 3. Never member
Attendance of religious services	<ol style="list-style-type: none"> 1. Several times a week 2. Once a week 3. 2 or 3 times a month 4. Once a month 5. Several times a year 6. Once a year 7. Less frequently than once a year 8. Never
Type of community: respondent's self-assessment	<ul style="list-style-type: none"> • Urban, a big city • Suburb, outskirts of a big city • Town or small city • Country village, other type of community • Farm or home in the country

Source: publicly available data (ISSP 2009). The same questions were asked in the ISSP 2019 survey.

This study also performed a correlation analysis between the perceived images of society and the sociodemographic characteristics of the respondents. Variables such as gender, age,

education (number of years of schooling and highest education level), employment status, occupation status, trade union membership, attendance of religious services, and type of community were analyzed (Table 1). This selection of variables followed a framework of analysis applied by Gethin et al. (2021) for a recent study of political cleavages in Western countries. The linkage between images of society and human capital was also analyzed, primarily based on education-related variables. Basically, this choice on education-related variables was made because the human capital theory points to the fact that people invest in themselves through education, training, coaching and similar activities. The correlation between sociodemographic variables and the desired type of society was not calculated, because most respondents preferred the same type of society: type D. All above-discussed variables consider sociodemographic factors and their effects on attitudes about the perceived and desired types of society.

The concept of social capital emphasizes the networks of relationships between people in a particular society, allowing that society to function effectively. Still, the key function of social capital is the distribution of trust, and the social trust-images of society link was tested in our study. We presumed that higher social trust level in different societies would lead to more often to choose of more equal perceived types of society. This part our research was based on indicators of social trust from International Social Survey Programme. In the ISSP studies, social trust is measured by a question whether people can be trusted or that you can't be too careful in dealing with people, or generalized trust – i.e., the perceived trustworthiness of the generalized other.

An individual perception of a particular type of society depends on the macroeconomic and macrosocial characteristics of the particular society. At least, such a hypothesis might be formulated. Among the variables used in this study to assess the impact of socioeconomic factors on attitudes towards types of society are the Human Development Index (HDI), GDP per capita in PPP, and the GINI Index.

As additional indicators for cross-sectional analysis of a linkage between perceived and desired types of society, two political characteristics about countries in the ISSP polls are employed – i.e., the EIU Democracy Index, and the V-Dem Liberal Democracy Index. Certainly, there are more possible evaluations of political regimes – such as the Freedom House ranking, the Polity IV project, Bertelsmann Stiftung's Transformation Index, the Democracy Barometer developed by Wolfgang Merkel and associates, the Worldwide Governance Indicators, and so on. However, as Coppedge et al. noted, “measuring an abstract and contested concept such as democracy is hard and some problems of conceptualization and measurement may never be solved definitively” (Coppedge et al. 2017:2). The two indices mentioned above present a particularly detailed measurement of the different polities.

The Liberal Democracy Index (LDI) from the Varieties of Democracy (V-Dem) project measures the quality of elections, suffrage, freedom of expression and the media, freedom of association and civil society, checks on the executive, and the rule of law (see Coppedge et al. 2017).

Another cumulative index is the Economist Intelligence Unit's (EIU) Democracy Index. This index belongs to a group of so-called “thicker” indexes: “a key difference in measures is between “thin”, or minimalist, and “thick”, or wider, concepts of democracy (Coppedge 2005). The thin concepts correspond closely to an immensely influential academic definition of democracy, that of Dahl's concept of polyarchy (1971). The Economist Intelligence Unit's index is based on the view that measures of democracy which reflect the state of political freedoms and civil liberties are not thick enough” (The Economist Intelligence Unit 2018:62). The “thick” notion of democracy encompasses not only Dahl's (1971) concept of polyarchy, but also various aspects of society and political culture in contemporary polities.

The EIU Democracy Index is based on five categories: electoral process and pluralism, civil liberties, the functioning of government, political participation, and political culture. Among our arguments for selecting the EIU Democracy Index was the fact that it is not only based on experts' assessments of countries, but is also supplemented with, where available, public opinion surveys – mainly the World Values Survey. Other sources are also leveraged, including Eurobarometer surveys, Gallup polls, the Asian Barometer, the Latin American Barometer, the Afrobarometer, and various national surveys. All this means that evaluations in this index have better evidence and proof compared to those in other similar indexes.

3. Perceived and desired types of society: results and discussion

According to Riedl and Haller (2014:16), an individual's perception of a particular type of stratified society depends on their membership in a particular welfare regime. Thus, populations in post-Soviet countries and people in countries with high socioeconomic inequality (for, instance, Latvia, Lithuania, Russia, or Ukraine) will see the stratification of their society more as an elite-mass type, but will prefer to live in the inverted pyramid type. Populations in Central-East European countries such as the Czech Republic, Slovakia, Croatia, or Hungary will perceive their societies mostly as pyramidal, and would prefer a middle-class type.

However, data from the 2009 and 2019 ISSP studies shows that most of the population in the countries surveyed said that they lived in pyramidal, or type B, societies (Table 2). Societies with a small elite at the top, some people in the middle, and most people at the bottom exist in very diverse countries such as Chile, Taiwan, the Czech Republic, Estonia, Germany, Israel, Italy, Japan, Philippines, Slovenia, and the United Kingdom. Data from 2019 was not available for all countries, but in 2009 in addition to the previously named countries, where most respondents perceived their societies as belonging to type B, Belgium, China, France, South Korea, Spain, the USA, and Venezuela can be added. Of course, this type is not a completely elitist model of society, but its degree of egalitarianism is low. Respondents from many post-autocratic countries as Bulgaria, Croatia, Hungary, Lithuania, Russia, Slovenia, and South Africa claimed to be living in the least egalitarian societies – type A. In addition, in 2009 in mainly new and flawed democracies as Argentina, Latvia, Poland, Portugal, Slovakia, Turkey, and Ukraine, most respondents saw their societies as belonging to the same A type. This type of society, as it was already noted, is the most socially unjust, in which most people are at the bottom of society.

Table 2. Perceived type of society, 2009 and 2019 (%).

Country	Type of society**									
	Type A		Type B		Type C		Type D		Type E	
	2009	2019	2009	2019	2009	2019	2009	2019	2009	2019
BG-Bulgaria	63.5*	56.3	27.2	33.2	5.5	7.0	3.3	2.9	0.5	0.6
CH-Switzerland	6.7	5.1	24.8	24.0	25	31.3	39.8	34.5	3.7	5.1
CL-Chile	24.3	20.9	48.0	39.7	13.1	16.4	11.7	17.4	2.9	5.7
CZ-Czech Republic	30.9	12.8	35.1	37.0	18.5	31.0	13.5	16.7	2.1	2.6
DE-Germany	18.8	14.7	35.4	30.8	23	31	18.6	21.2	4.2	2.3
DK-Denmark	1.6	1.6	10.7	13.6	25.5	27.4	58.7	53.2	3.5	4.2
EE-Estonia	32.6	20.1	46.6	44.5	9.6	18.6	9.8	14.2	1.5	2.7
FI-Finland	6.9	6.9	23.7	17.9	32.6	31.7	35.6	41.3	1.2	2.2
GB-Great Britain	14.9	18.3	41.9	42.1	18.8	19.0	20.9	18.2	3.5	2.4
HR-Croatia	57.4	55.2	28.8	28.1	6.4	11.6	5.5	3.2	1.9	1.9
HU-Hungary	56.6	49.8	32.3	37.8	6.0	5.4	3.7	5.4	1.4	1.6
IL-Israel (Jews & Arabs)	18.6	16.6	55.8	29.3	15.3	22.5	9.3	29.3	1.1	2.3
IS-Iceland	9.7	4.0	18.6	16.6	19.5	22.2	47.6	50.7	4.5	6.6
IT-Italy	32.4	30.8	41.0	40.5	12.8	14.4	11.7	11.6	2.1	2.7
JP-Japan	11.1	9.9	38.5	35.3	26.4	28.9	20.0	22.8	4.0	3.0
LT-Lithuania	48.8	41.7	36.2	37.7	7.4	15.0	5.9	3.8	1.7	1.8
NZ-New Zealand	6.5	10.6	33.0	34.0	25.5	29.0	33.3	24.5	1.7	1.9
PH-Philippines	31.5	29.6	40.4	44.5	11.2	11.1	10.1	9.6	6.8	5.2
RU-Russia	40.7	49.6	35.0	27.9	12.5	10.1	8.4	7.9	3.4	4.5
SI-Slovenia	26.4	28.6	31.5	26.0	27.2	22.0	12.3	20.9	2.7	2.4
TW-Taiwan	18.3	11.7	36.9	36.4	26.3	31.2	16.0	18.5	2.4	2.2
ZA-South Africa	50.8	31.2	31.8	27.4	8.7	25.3	6.6	11.7	2.2	4.4
Median	25.4	19.2	35.1	33.6	16.9	22.1	12.0	17.8	2.3	2.5

Source: ISSP 2009; ISSP 2019.

* In grey cells are the dominant types, i.e., those that were supported by the most respondents.

** Those who did not answer and/or can't choose were excluded.

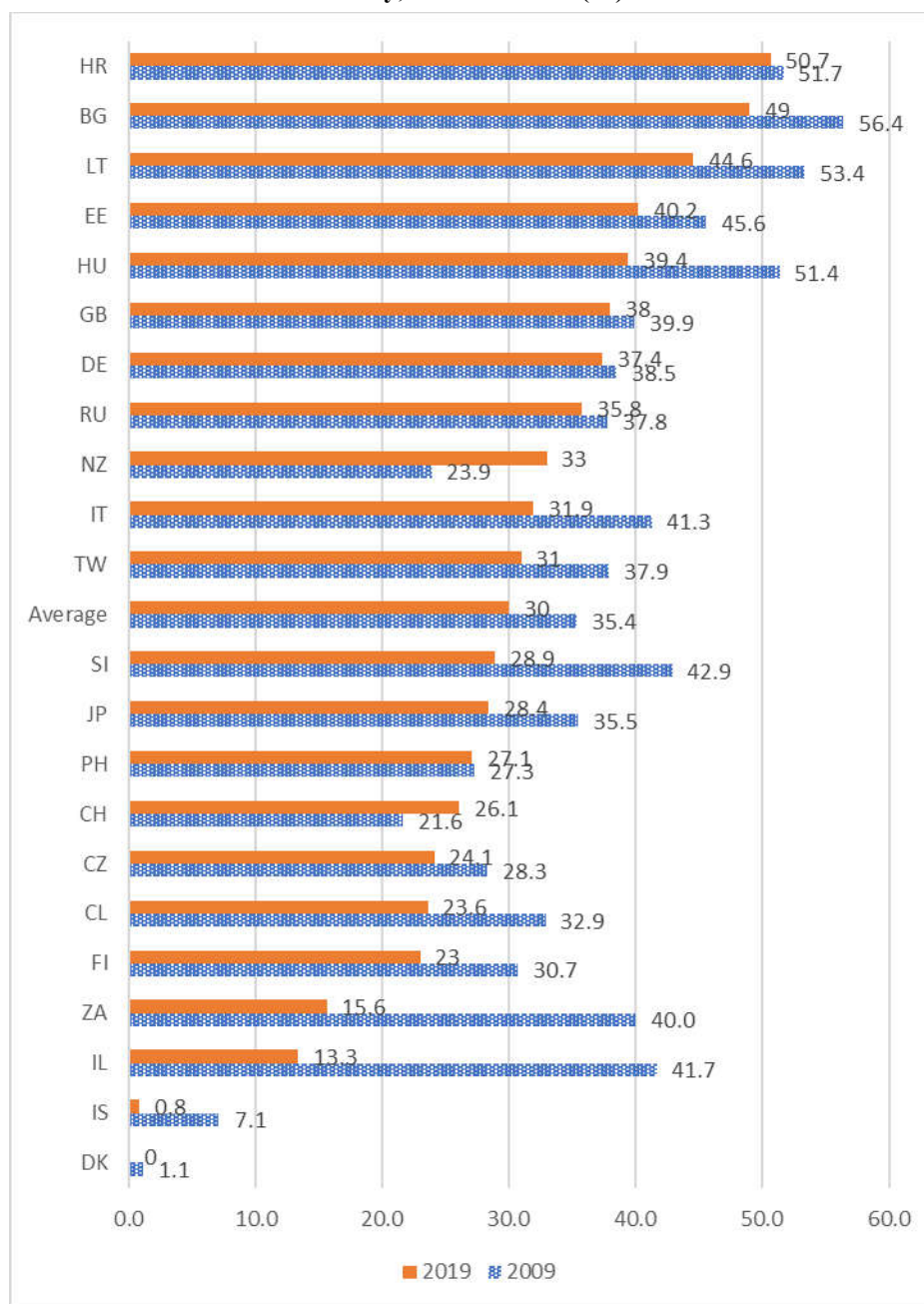
In 2019 in full democracies as Germany, and in 2009 in Austria and Cyprus, most respondents believed that they lived in an alleviated pyramid model, or type C, society, which differs from the pyramid image in that there are fewer members at the very bottom the society (Table 2). The most obvious correlation between a country's development and economic

welfare is observed in the case of countries that chose a diamond image, or type D, society. Most respondents in 2019 in affluent Western countries as Denmark, Finland, Iceland, and Switzerland thought that they lived in societies where the majority of population belonged to the middle class (Table 2). In 2009 respondents from 8 affluent Western countries – Australia, Denmark, Finland, Iceland, New Zealand, Norway, Sweden, and Switzerland – chose the D type. The diamond type is highly egalitarian, with a low level of social inequality where an absolute majority of members of such a society have equal opportunities to achieve their goals. The most egalitarian type of society is the inverted alleviated pyramid model, or type E, where most people are at its top and only a few are at the bottom, but this type was not perceived as a dominant social model in any country.

The availability of 2019 ISSP data from only 22 countries (Table 2) restricted comparative cross-national and cross-sectional analysis about types/ images of society. However, if trends and changes among nations in the 2009–2019 period are compared, and there is a quite clear status quo: in no country did views about a dominant perceived type of society change fundamentally, except Israel. The case of Israel requires an in-depth qualitative analysis to explain changes between the 2009 and 2019 surveys. In 2019, all 22 countries along the variable of perceived type of society can be grouped in the following way: a) post-communist European countries (an exception is the Czech Republic), with most respondents perceiving the current social model as highly unequal; b) Western and Southern European and Asian countries, where many viewed type B as the dominant model, which is a hierarchical society that is not as unequal as a type A society; and c) Northern European countries, where a relatively equal or type D model was the main choice in the ISSP polls. A general tendency here is that societies which are more economically affluent and have historically broader and longer welfare coverage tended to see themselves as more equal.

When it comes to people's perceptions of what societies they live in, it should also be noted that while these are subjective assessments, according to Kelley and Evans (2017:57), they still reflect reality somewhat well because the objective truth is that developing and poorer countries are generally less egalitarian (as measured by the GINI Index) than developed or richer countries.

The extent to which respondents feel living in an unjust society particularly well is shown by the gap between the perceived and the desired, or current and ideal, models of society. Bulgaria, as an example, is the country most dissatisfied with the perceived type of society, because the gap between most desired (diamond model) and actual (A type) form of society reached as high as 56.4% in 2009, and slightly decreased to 49% in 2019 (Figure 3). This gap was a little smaller in Lithuania – in 2009 it was equal to 53.4%, and 44.6% in 2019; in Croatia, it was 51.7% and 50.7%, respectively. A large gap (35–45%) between perceived and desired types of society also existed in Estonia, Germany, the United Kingdom, and Russia in both the 2009 and 2019 ISSP polls. These gaps between the perceived and desired models of society show that in many countries social needs are rather not satisfied, which in turn leads to broad perceptions of high social injustice (Ranking of the Gini index by country 2020). Still the expectations of people for a just society were met most satisfactorily in Denmark and Iceland, where the gap between the desired and the perceived model of society was just a few percent (Figure 3).

Figure 3. A cross-national comparison of the differences between perceived and desired type of society, 2009 and 2019 (%)

*. Source: ISSP 2009; ISSP 2019.

* The difference between dominant desired type (indicated by the percent of respondents) and respective perceived type was calculated; i.e., if the dominant desired type was D, then the difference between the percentages of desired and perceived type D was calculated.

It is noteworthy that most respondents in all countries, despite different political histories, various current political backgrounds, distinct socio-economic development, chose the diamond model or type D society, with a numerous middle class exclusively as the desired societal model. Moreover, in 2009 the median preference for type D societies in 22 countries was 55.3%, and 50.5% in 2019 (Table 3). And these findings show that the general situation is frozen. Still as global inequalities have been rising around the world due to the COVID-19 pandemic, however – especially in the extreme level of wealth concentration (Chancel et al. 2021) – this might lead even towards an increase in perceptions of more unequal societies in future.

Although the most egalitarian type of society is the alleviated pyramid type, or type E, this was not the most desirable in any country. In 2009, the median preference for type E societies was 23.4%, and in 2019 this figure increased to 26.5%. In both years, type E was the second

choice in most countries. This extremely egalitarian type of society remains more of a utopia rather than a real alternative to contemporary feelings of inequality.

Table 3. Desired type of society, 2009 and 2019 (%).

Country	Type of society									
	Type A		Type B		Type C		Type D		Type E	
	2009	2019	2009	2019	2009	2019	2009	2019	2009	2019
BG-Bulgaria	0.2	0.9	3.4	2.6	14.0	12.6	59.7	51.9	22.7	32.0
CH-Switzerland	1.4	0.9	9.0	7.3	18.0	13.1	61.4	60.6	10.2	18.0
CL-Chile	0.8	2.6	4.8	9.5	14.6	18.6	44.6	41.0	35.2	28.2
CZ-Czech Republic	1.2	2.1	6.5	12.2	29.1	29.5	41.8	40.8	21.4	15.4
DE-Germany	1.5	0.4	10.4	3.2	18.2	15.4	57.1	58.6	12.9	22.3
DK-Denmark	0.1	1.6	1.8	13.6	8.2	27.4	59.8	53.2	30.1	4.2
EE-Estonia	0.6	1.5	5.3	7.6	20.4	12.2	55.4	54.4	18.2	24.3
FI-Finland	0.1	0.2	3.4	2.2	8.7	9.2	66.3	64.3	21.4	24.1
GB-Great Britain	1.4	0.9	6.7	8.0	15.6	16.8	60.8	56.2	15.4	18.1
HR-Croatia	1.2	2.0	2.5	3.3	9.6	6.4	57.2	53.9	29.5	34.3
HU-Hungary	1.7	2.4	4.4	6.8	19.3	23.5	55.1	44.8	19.5	22.5
IL-Israel (Jews & Arabs)	1.2	0.8	11.3	5.9	20.6	13.2	51.0	42.6	16.0	37.6
IS-Iceland	0.2	0.4	1.5	1.4	8.3	7.3	54.7	51.5	35.3	39.5
IT-Italy	0.8	2.6	5.6	10.3	12.9	17.2	53.0	43.5	27.7	26.5
JP-Japan	0.8	0.6	9.2	9.1	17.5	18.1	55.5	51.2	16.9	20.9
LT-Lithuania	1.0	1.1	3.9	3.9	11.7	13.1	59.3	48.4	24.0	33.5
NZ-New Zealand	0.7	0.6	3.4	3.1	14.0	10.6	57.2	57.5	24.7	28.2
PH-Philippines	5.9	5.3	15.1	16.2	12.4	16.6	37.3	36.7	29.3	25.2
RU-Russia	1.8	3.4	7.7	6.7	14.8	17.9	46.2	43.7	29.5	28.3
SI-Slovenia	1.4	1.3	3.9	3.8	17.1	10.7	55.2	49.8	22.3	34.3
TW-Taiwan	0.3	0.3	4.7	4.9	8.5	13.4	53.9	49.5	32.6	31.8
ZA-South Africa	2.4	10.1	8.1	16.1	9.9	20.1	46.6	27.3	33.0	26.4
Median	1.1	1.2	5.05	6.8	14.3	14.4	55.3	50.5	23.4	26.5

Source: ISSP 2009; ISSP 2019.

When considering macro-level explanatory variables, it was decided to test two groups: socioeconomic – as GDP per capita, GINI Index, and HDI; and two political indices, the EIU Democracy Index and the V-Dem Liberal Democracy Index. Correlations were calculated between perceived and desired type D societies with the above mentioned socioeconomic and political variables. Firstly, it should be noted that most correlations were statistically significant except the GINI Index. Secondly, the explanatory power of correlations was high in each case, but the strongest and most positive association was between perceived society and GDP per capita and the EIU Democracy Index – 0.70 in both cases (Table 4). HDI was in third position, but from the perspective of social research this correlation was strong as it reached 0.62. Slightly lower correlations – between 0.32 and 0.62 – were observed with the desired model of society. A general conclusion can be drawn that macro socioeconomic and political indicators might predict perceived and desired images of society quite well. Additionally, a typical trend was observed as countries with high economic and social development levels tended to see themselves now and in future as more equal societies compared with lower economically and socially developed polities.

Table 4. Correlations between type D society and socioeconomic and political indicators, 2019.

	GDP per capita, PPP, 2019 USD with D type	HDI 2019 with D type	GINI Index 2020 with D type	EIU Democracy Index, 2019 with D type	V-Dem Liberal Democracy Index, 2019 with D type
Perceived society	0.70	0.62	-0.36	0.70	0.53
Desired society	0.58	0.62	-0.63	0.41	0.32

*All correlations were statistically significant, except the GINI Index.

After describing general macro trends about perceived and desired types of society, it is necessary to look at attitudes on the individual level. These attitudes were divided into two groups: subjective social positioning, social self-placement as a subjective social class, or top-bottom placement in societal structure; and personal attitudinal perceptions about factors which are important for getting ahead in life (Q1 in Table 1). Unfortunately, the absence of a complete integrated ISSP file for all 22 countries in the 2019 study not allowed to analyze individual level attitudes on perceived and desired types of society in a consistent manner. Still, some trends can be observed even from this limited data.

Perceived image of society is highly dependent on individual self-assessment within the top-bottom structure of society. Correlation analysis showed that there is a statistically significant relationship between at which stage of the so-called “ladder” of social status (Table 1) the respondents see themselves and to which type they assign their society. This echoes well to the conclusion of Evans, Kelly and Kolosi (1992:468), that those who see their societies as egalitarian are more likely to see themselves higher in the hierarchical structure of society. Moreover, if a respondent sees themselves in a higher position in society, then this leads to them choosing a more egalitarian perceived image of society (Table 5). The same logic is used in the self-assessment of belonging to a social class – the higher the social class the respondent assigns themselves to, the more socially equal the image of perceived society is, and vice versa. To sum this up, the 2009 and 2019 ISSP data shows that top-bottom self-placement in social hierarchy and subjective social class have strong relationship with perceived type of society (Table 5).

Table 5. Subjective social self-placement and attitudinal characteristics of evaluations of perceived type of society, 2009 and 2019: Pearson correlation coefficient.

		Q14a (Q15a). Type of society: What type of society is [Rs country] today - which diagram comes closest?	Q10a (Q13a). Groups tending towards top bottom. Where would you put yourself on this scale?	Q20 (Q22). Which social class you would say you belong to?	Q1a. For getting ahead in life...how important is coming from a wealthy family?	Q1f (Q1e). For getting ahead in life...how important is knowing the right people?	Q1g (Q1f). For getting ahead in life...how important is having political connections?
Q10a (Q13a*). Groups tending towards top+bottom. Where would you put yourself on this scale?	2009	0.241**	-	-	-	-	-
	2019	0.195					
Q20 (Q22). Which social class you would say you belong to?	2009	0.209	0.524	-	-	-	-
	2019	0.200	0.471	-	-		
Q1a. For getting ahead in life...how important is coming from a wealthy family?	2009	0.124	0.125	0.117	-	-	-
	2019	0.130	0.091	0.144	-	-	
Q1f (Q1e). For getting ahead in life...how important is knowing the right people?	2009	0.097	0.082	0.069	0.351	-	-
	2019	0.086	0.037	0.048	0.326	-	-
Q1g (Q1f). For getting ahead in life...how important is having political connections?	2009	0.120	0.100	0.082	0.405	0.489	-
	2019	0.165	0.103	0.137	0.421	0.513	-
Q1h (Q1g). For getting ahead in life...how important is giving bribes?	2009	0.147	0.147	0.102	0.348	0.307	0.513
	2019	0.153	0.104	0.173	0.373	0.337	0.572

Source: ISSP 2009; ISSP 2019. As for 2019, the integrated ISSP file involved 15 countries: Chile, Croatia, the Czech Republic, Denmark, Finland, Germany, Italy, Japan, New Zealand, Philippines, Russia, Slovenia, South Africa, Switzerland, and Thailand.

* Numbering of questions for the 2019 ISSP study is in brackets

** for all cases $p < 0.01$.

In assessing the relationship between the respondents' predisposition for meritocratic or egalitarian attitudes and the perceived type of society, it can be concluded that the relationship between these two variables is statistically significant but not particularly strong (Table 5). Also, there is a statistically significant relationship with all possible factors of success in life except hard work, but the strongest relationships are with giving bribes, being from a wealthy family, having political connections, and knowing the right people as prerequisites for success. Correlation coefficients show that the less important the above factors are to persons, who tend to see perceived society as egalitarian, and vice versa – the more important these success factors are to whom, those think that they live in an elitist society.

Many researchers have already shown – i.e., Evans and Kelley (2017) – the sociodemographic characteristics of respondents, especially their socioeconomic status or so-called SES variables, strongly influence their attitudes towards the structure of the society in which they live. The socioeconomic status of a person is described primarily by their income, education, and occupation. Persons with a higher socioeconomic status tend to see their actual society as more socially just and egalitarian, while lower socioeconomic status respondents tend to see perceived society as more elitist and not providing opportunities for a good life for everyone, or at least the majority.

Furthermore, there is a statistically significant relationship not only with the individual's socioeconomic status but also with several other individual social and demographic characteristics. Both education and the number of years spent in education, as well as occupation and employment status, are related to the assessment of the perceived society (Table 6).

An important objective of this study was testing the linkage between human capital, on the one hand, and images of society, on the other. Human capital theory rests on the assumption that education is its main variable. Despite well-known criticisms of human capital theory, it is still the important approach for understanding personal income distribution (Fix 2018:15). However, this article now leaves aside the human capital-income link while taking education as the most important element of human capital and using this restrictive definition as a variable to understand different perceptions of models of society. Three education-related variables were selected from two ISSP studies to find out the hypothetical linkage of human capital with different models of perceived society: firstly, education as the number of years of schooling; secondly, highest comparative completed degree of education; and, thirdly, occupation, as the previous two variables have significant intercorrelations with occupation. In addition, occupation has an element of [social] hierarchical rank, which is also helpful in understanding human capital (see Fix 2018).

What conclusions might follow here? All education-related variables of human capital had correlations with perceived types of society in 2009 and 2019 ISSP studies on social inequality. Moreover, a few interesting trends were observed: less educated and less skilled respondents, in an occupational sense, tended more frequently to choose highly unequal A or B type of perceived societies than more educated and more skilled respondents. The respondents with a tertiary level of education preferred type C or D variants of perceived society. This means that educated populations and those with higher human capital have more positive evaluations from the perspective of social equality. Still human capital needs further testing for a measurement of images of society as correlation coefficients are rather weak.

Other sociodemographic indicators also are weakly linked with perceived types of society. Gender and age influence choice of perceived types of society: males and younger people are more likely to see actual society as providing more opportunities to succeed and achieve goals for a larger number of people, while females and older people are more likely to perceive today's societies as elitist. Belonging to a trade union or similar employee advocacy organization has a positive relationship with respondents' attitudes towards seeing actual societies as more socially just. Attitudes of perceived types of society are also influenced by a variable of religiosity – more frequent participation in religious ceremonies outside special

occasions such as weddings or funerals increases the likelihood that such a person will consider their society to be more egalitarian. Finally, a place of residence, is related to the respondent's perception of the societal model – urban respondents are more likely to view perceived societies as elitist or less socially equitable, but in less populated or rural areas, respondents see the same societies as more egalitarian (Table 6).

Table 6. Perceived type of society and respondents' sociodemographic characteristics, 2009 and 2019.

Variable	Pearson r coefficient*	
	2009	2019
Education I: years of schooling	0.049	0.141
Education II: highest education level	0.072	0.122
Current employment status	-0.044	-0.022
Occupation ISCO/ ILO 1988	-0.119	-0.136
Trade union or a similar organization membership	-0.105	-0.088
Attendance of religious services	0.075	0.104
Place of living: urban- rural	0.024	0.014
Working for private or public sector or self-employed*	-0.011	-0.024

Source: ISSP 2009; ISSP 2019. * For all cases $p < 0.01$.

An interaction between social capital and perceived types of society is important to study too. The 2009 and 2019 ISSP studies have shown that more socially trusting populations, for instance, Northern European countries, tend to choose type D or equality-based societies more often, whereas less socially trusting, as Eastern European, societies tend to choose B or A type of perceived societies.

Recently Gethin, Martínez-Toledano, and Piketty (2021) discussed the reversal of the educational cleavage, which is being strongly linked to the emergence of a new “sociocultural” axis of political conflict. Equality as a political value was for many decades related to the Left-wing political parties, as votes for them historically came from lower-educated and low-income voters. However, in the new millennium, this linkage has changed and has gradually become associated with higher-educated voters in Western countries (Chancel et al. 2021:1). Both 2009 and 2019 ISSP surveys showed that the highest completed degree of education and years of schooling as variables of education correlated positively with the assessment of the current type of society, and better educated respondents saw more equal contemporary societies compared to lower educated respondents. In other words, the latter group of respondents perceived today's society as less just. The same tendencies were observed for the desired types of society: more educated respondents tended to choose more socially equal types (mainly type D) compared to less educated respondents.

Along the Left-Right political divide in both ISSP polls, respondents identifying with Right/conservative political ideologies assessed perceived society as relatively more equal than Center/liberal and Left/center left respondents. However, there were no significant differences in thinking about the desired model, as respondents from different political leanings preferred type D society almost evenly.

4. Conclusions

The main findings from two ISSP studies on social inequality show that contemporary societies are perceived as socially unjust in most countries. Still, most populations expect to live in more equal societies in future. Variations in perceptions of both perceived and desired types of society are significantly determined by the overall level of wellbeing in the country (measured by GDP per capita and HDI), and the distribution of human and social capital. However, an important factor here might be (in)equality of income and wealth distribution within society as well. But this still requires more in-depth study and discussion. To sum up all arguments, variations of perceptions are tightly linked to (in)equality of different societies.

The majority of respondents in the ISSP Social Inequality IV and Social Inequality V surveys indicated that they lived in a pyramid-type society with a small elite at the top, a much larger proportion in the middle, and a large number of the population at the bottom. One of the most socially equal types of society is the diamond-type society, with a dominant middle class. This image of society was mostly opted for in socially and economically

developed countries. The least egalitarian type of elite-mass society was highly typical of those countries with high-income inequality, for instance, Bulgaria, Russia, or Lithuania. On the other hand, the most desired model of society was type D, with a large middle class. However, the gap between perceived and desired types of society was large (no less than 30 percent on average) in almost all countries.

Human capital is major factor in explaining the differences in perceptions between lower- and higher-educated populations, as the latter prefer more socially equal perceived and desired types of society.

Social trust as major component of social capital is important in the selection of perceived society type, as higher trust correlates well with a perception of more equal types of society. However, this is not a significant variable in the choice of desired type of society, as the preferences of all respondents fell within type D society.

Analysis of the 2009 and 2019 ISSP data on social inequality also discovered that individuals with higher subjective social class and higher socioeconomic status tend to see their society as more socially just and more egalitarian, while respondents of lower subjective class and with lower socioeconomic status tend to view their society as more elitist.

This study as a kind of introduction to more systematic enquiry about subjective images of society. Among future avenues or agendas for future studies might be considered to explore interactions within the triangle of human capital-social capital-subjective images of society.

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GLAMPING IN LOW-DENSITY TERRITORIES: THE CASE OF SANTO ALEIXO DA REASTAURAÇÃO

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Abstract

The promotion of tourism in rural areas, in a sustainable and appealing manner, through the specification and diversification of tourist offerings, becomes fundamental for the valorization, visibility, and notoriety of the communities living in these spaces. This study analyzes a new concept of tourist activity, Glamping, whose mission is to promote territories in a sustainable and socially appealing way, where the articulation of natural heritage with tourism seeks to contribute to making territories and rural spaces more charming. In this context, this study emerges with the purpose of investigating "How does investment in enriching the tourist accommodation offer, particularly through the Glamping option, constitute an added value for the local development of an Alentejo village?" It was based on the need to identify the direction of change that a strategic analysis of a tourist project in rural areas was carried out, aiming to formulate recommendations with intervention proposals to support its implementation. The study thus sought to inquire about the strategic challenges and associated objectives, the actors involved, the conflicts, and alliances around these objectives, using the ACTors, Objectives, Force Relations Method (Saragoça et al., 2017 and Pescada, 2019) and resorting to the combination of different data collection techniques (interviews and documentary research) and analysis (PESTEL and SWOT). The results of the strategic analysis revealed that: the main alliances are structured around the objectives "contribute to a more sustainable tourism, aiming at the preservation and conservation of all natural and cultural heritage" and "create new jobs," with strong mobilization from the Local Authority, the Social Center, and the Regional Development Administration; the Local Development Association stands out as the most influential actor, and among the less dependent actors, the Social Center emerges, which, being a local institution, is largely unaffected by the influences of the actors involved. Observing some constraints, especially where trends that jeopardize the implementation and sustainability of the project intersect with the acquisition of financial and human resources, led to formulating as strategic recommendations the need for an economic and social feasibility study and the creation of partnerships and alliances among local and regional actors

Keywords: Strategic Analysis, Community Development, Rural tourism, Glamping

JEL classification: J30, J80, O10, M10, R10, R58

1. Introduction

In recent years, competitiveness, in the search for new audiences, between regions has grown strongly. New challenges arise as a consequence of changes driven by new economic conditions, wars and pandemics. In response to these events, territories must present factors that allow them to place their products or services on the global market. As a response to these profound changes in the pattern of economic activity, this study analyzes a new concept of economic activity, Glamping. Glamping's mission is to promote the territory, respecting environmental and social sustainability and seeking to increase the competitiveness of territories. The sustainable and attractive promotion of tourism in rural areas, through the specification and diversification of tourist offers, is fundamental for the valorization, visibility and notoriety of these spaces. The articulation of natural heritage with tourism has been important in the response to these challenges, since the integration of heritage, traditions, genuineness and identity in the development of tourist activities can contribute to the attractiveness of these spaces. Natural and cultural heritage is an asset of the greatest importance in valuing territories and promoting them as excellent tourist destinations (Barros, 2009 and Souza and Chiodi, 2023). To recognize the potential attractiveness of the natural and cultural heritage of the Alentejo, the Monte of Castanheiro Agritourism project – Country Club & Glamping was created, with the mission of valuing endogenous resources through the promotion of creative and cultural activities in a village in the municipality of Moura – Saint Aleixo of the Restoration. Based on the need to evaluate the conditions for the implementation of a rural tourism enterprise in an Alentejo village, the following research question was defined “How does investment in enriching the tourist accommodation offer, particularly via the Glamping option, constitute a more -value for the sustainable development of Santo Aleixo da Restauração?” To answer this question, we opted for an exploratory research methodology, using semi-direct interviews, as a privileged technique for data collection. Interviews were carried out with six local stakeholders, with the aim of understanding their perceptions about the added value of implementing this project for the sustainable development of the village of Santo Aleixo de Restauração.

2. Literature Review

Considering the positive impact on employment, productivity, innovation and economic growth, entrepreneurship and entrepreneurs have taken on a very relevant role in the development of regions (Sousa et al., 2019). There are different opinions on the meaning of entrepreneurship, Sarkar (2014, p 47) mentions that entrepreneurship is “being in the market between supplier and consumer”, on the other hand, Hisrich et al. (2014) refer to entrepreneurship as a “process of creating something new with value by devoting the necessary time and effort, assuming the corresponding financial, psychological and social risks and receiving the consequent rewards of economic and personal satisfaction and independence” (p 29). For rural development to occur, the entrepreneur is the fundamental actor as a guide for the enterprise. However, for innovation and development to occur in a region, it is necessary to establish a high level of incorporation of resources, local integration and connection between contexts (Kibler, Kautonen & Fink, 2014; Della Corte et al., 2018; Perkins et al., 2020). Müller and Korsgaard (2018) highlight two concepts that link rural enterprise with spatial context, spatial embeddedness (local integration) and non-local connection. These two terms refer to local integration as a characteristic arising from entrepreneurs who use the specific resources of the local area. Spatial embeddedness refers to access to resources that presuppose a process of passing through networks and local communities. In turn, non-local connections refer to rural entrepreneurs' connections beyond the local area looking for markets, partners and resources. This means that entrepreneurs use other means outside the local area without exclusivity to local resources (Müller & Korsgaard, 2018). The study by Müller and Korsgaard (2018) allowed us to verify that the spatial context influences entrepreneurship, mainly through the analysis of two mechanisms such as resource endowment and spatial connections. Entrepreneurship in rural spaces has been an important response to dynamizing territories, making them more cohesive and competitive (Osunmuyiwa & Ahlborg, 2022). Rural spaces have undergone changes that have resulted in population loss and the abandonment of agricultural activities (Castillo et al.,

2020). In recent years, awareness of the gravity of the situation has become clear and measures and policies have been formulated and implemented to promote the growth of the most socially and economically disadvantaged rural areas (Klofsten et al., 2020). On the one hand, there has been an attempt to take advantage of the agricultural potential of the fields through a focus on organic agri-food products and those of controlled origin, on the other hand, there has been a patrimonialization of a diversity of local resources, such as natural, historical and monumental (Palmi & Lezzi, 2020). The tourist exploitation of these heritage sites and the touristification of rural areas and communities has been growing through investment in tourist ventures and activities (Rosalina et al., 2021; Lourdes, 2023; Marques, 2023). Investment in tourist activities in rural spaces, in a sustainable and attractive way, through the specification and diversification of tourist offers, has contributed to the appreciation, visibility and notoriety of these spaces (Souza & Chiodi, 2023). The articulation of natural heritage with tourism has been a way of responding to these challenges, to the extent that the integration of heritage, tradition, genuineness and identity in the development of tourist activities can contribute to the attractiveness of these spaces (Lourdes, 2023). Natural and cultural heritage is an asset of the greatest importance in valuing territories and promoting them as tourist destinations of excellence (Barros, 2009; Lourdes, 2023; Souza & Chiodi, 2023). Rural tourism is seen as an activity that generates economic development for rural areas, stimulating many other local economic activities that interact with it, and is therefore considered fundamental for the development of the most ruralized regions. This type of tourism contributes to boosting activities, such as handicrafts, the production and sale of traditional products on farms, including certified agricultural products and foodstuffs, transport services, entertainment, guides, among others (Lourdes, 2023; Marques, 2023; Souza & Chiodi, 2023). Several authors have shown that positive socioeconomic effects sustain tourism support behavior. The potential of tourism is based on the natural and cultural resources incorporated into the location. The main challenges are greater assertiveness on the part of the local government, improvements in infrastructure and services, collaboration between actors and social participation. Research highlights the importance of tourism for the diversification of the rural economy and guides managers and institutions with proposals aimed at boosting the revitalization of the rural environment (Kalantaridis, 2010; Lang & Novy, 2014; Souza & Chiodi, 2023).

Tourism is a human phenomenon that involves the voluntary and temporary movement of people to places other than their usual places of residence, motivated by the desire for leisure activities. In this sense, it can be understood as a complex system of relationships between people (those who visit and those who are visited), either through movement between geographic points instigated by curiosity or the need to travel outside their usual places of residence, or because it is an economic activity or industry with a huge impact on the lives of many cities, regions and countries and which employs around 100 million people worldwide (Quinteiro & Baleiro, 2017). Tourism in Rural Spaces (TER) emerged in Portugal in the late 1970s, in an experimental way, having been given the name "housing tourism" as a way of taking advantage of the architectural, historical and landscape richness of some regions (Gonçalves, 2016). TER is a form of tourism that aims to allow more direct and genuine contact with nature, agriculture and local traditions, in a rural environment. TER are accommodations that must be installed in rural areas, having inherent to them "a set of activities and services carried out and provided for remuneration in rural areas, according to different types of accommodation, complementary activities and services for entertainment and tourist entertainment, with a view to providing customers with a complete and diversified offer". This type of accommodation must have typical architectural features of the region and must be sustainable. Nature Tourism (TN) emerges as "a result of the evolution of the model of society in which we live, in mutual respect, in the involvement and promotion of natural resources and life" (Rebocho & Correia, 2017, p.2). The TN is defined as "the tourist product, made up of establishments, activities and services of accommodation and environmental tourist entertainment carried out and provided in areas integrated in the National Network of Protected Areas (...) comprises houses and tourist enterprises of Tourism in Space Rural". Therefore, a TER establishment is considered a TN only if it is located within a Protected Area (PA) (Decree-Law no. 56/2002, 2002).

A glamping project encompasses the two types of tourism mentioned above, TER and TN, however, in addition to these types of tourism, it is equally important to address the notion of camping. The word glamping is a combination of two words whose meanings are slightly different, camping and glamour. Camping is an activity carried out outdoors. Participants leave their homes in urban areas and typically camp in nature, where they spend the night in a campsite or other preferred location. Camping involves the use of tents, caravans, huts or other types of provisional accommodation. The glamor associated with traditional camping has led to a new type of accommodation, glamping. Glamping “emerges as a result of the continued increase in this comfort, associated with the experience of sleeping inside a tent with all the comfort of the best hotels, valued by the location” (Henriques, 2016, p.31). Authors like Budiasa, Suparta and Nurjay (2019) define glamping as a set of camping activities that “do not neglect comfort and luxury”. They also mention that glamping is “a luxurious camp with extraordinary nature-based settings”, and that “it appears as a comfortable and more expensive service (...)” (p. 1). In this sense, glamping is considered an innovative concept, a “new way of traveling and camping with glamour, in which we seek a differentiating, memorable experience, in a non-traditional type of accommodation, maintaining the comfort and luxury of luxury accommodation. high quality” (Long, Lane & Gartner, 2000; Rebocho & Correia, 2017). This type of accommodation combines the “luxury of a hotel with coexistence with nature”, offering holidays in tents (Henriques, 2016, p. 10), but with the luxury of a five-star hotel always present throughout the entire journey. stay. According to MacLeod (2017), glamping emerged in the United Kingdom and Ireland at music festivals where some of its market segment were people over 30. So that some of this target audience could be more comfortable (and taking into account “some disposable income above average” and the “high profile of some of these events”), the need arose to create some VIP areas, where there were a range of very attractive and charming accommodation and services. The exclusivity of this accommodation and the services associated with it led its practitioners to look for similar facilities elsewhere (MacLeod, 2017). The experience in these accommodations was designed to provide its customers with a personalized service and offer organic products, as well as providing contact with nature and connection with the local community (Boscoboinik & Bourquard, 2012). The increasing demand for comfort and luxury in campsites has driven the growth of the glamping concept (Brooker & Joppe, 2013). However, it is still a topic that is very little explored in the literature, but is increasingly sought after by tourists, which justifies investigations around it (Rebocho & Correia, 2017).

3. The Monte of Castanheiro Project – Country Club & Glamping

The design of the Monte of Castanheiro – Country Club & Glamping project has as its main strategic objective the promotion of the village of Santo Aleixo da Restauração, respecting environmentally sustainable and socially stable and attractive rules. This project aims to promote an increase in the competitiveness of agriculture that is currently practiced on this farm, but above all taking into account the need for restructuring, development and innovation, essential in these rural areas, where the diversification of economic activities is fundamental for the sustainability of the rural world. The articulation of natural heritage with tourism aims to be present in a very intimate way, as heritage, tradition, authenticity, identity and tourist activities can contribute to the appreciation, visibility and notoriety of this territory. Guided, hunting or equestrian experimentation routes and Mediterranean products and flavors will also be valued in the project. Nowadays, there is an increasing attraction for rural areas. More and more people tend to want to know rural areas, the habits and customs of the people who live there, so Monte of Castanheiro – Country Club & Glamping will give its customers the opportunity to get to know the local population, their habits and customs.

4. Methodology

In order to evaluate the conditions for implementing the Country Club & Glamping project in the village of Santo Aleixo da Restauração, an exploratory and descriptive investigation was carried out, using qualitative methods and techniques, as tools to support the formulation of intervention proposals that support a rural tourism project in this Alentejo village. The study defined the following specific objectives: 1) know and identify the main strategic

challenges and objectives associated with the implementation of the project; 2) know and identify the relevant local actors to achieve the project's strategic objectives; 4) identify the necessary resources and obstacles to project implementation; 5) identify potential project partners; 6) formulate strategic recommendations that contribute to the implementation and success of the project. To respond to these objectives, semi-structured interviews were carried out with six local stakeholders organized according to the typology identified in table 1.

Table 1: Stakeholder Typology

Typology	Stakeholders Description
Regional Development Coordination	Alentejo Regional Coordination and Development Commission
Regional Tourism Entity	Alentejo and Ribatejo Tourism
Local Administration	Moura City Council
	Safara e Santo Aleixo da Restauração Parish Council
Associations	Association for the Development of Moura Municipality
	Social and Parish Center of Santo Aleixo da Restauração

Source: Author's data

The interviewees were selected intentionally considering the following criteria: 1) regional entities, with competencies in the area of regional development and tourism; 2) Local public administration entities (local authorities); Private sector associative entities with skills in the area of local development. In this sense, six stakeholders were involved in the study: the Alentejo and Ribatejo Regional Coordination and Development Commission; Alentejo and Ribatejo Tourism; the Moura City Council; the Parish Council of Safara and Santo Aleixo da Restauração; the Social and Parish Center of Santo Aleixo da Restauração; and the Association for the Development of the Municipality of Moura.

The interviews followed a script, constructed based on literature (Nunkoo, 2017; Della Corte et al., 2018; Perkins et al., 2020; Souza & Chiodi, 2023). The script was organized into four thematic axes with a total of 7 questions. The first thematic axis intended to characterize the entity. The second focused on questions about the strategic challenges and objectives associated with the implementation of a tourism enterprise in rural areas via the Glamping option. In the third axis, data was obtained on the necessary resources and obstacles to implementing the project. The fourth axis aimed to ask about potential project partners; The fifth and final block contained questions about the main challenges and key success factors of the project. The interviews were carried out in person and through online platforms, lasting between 40 minutes and 1 hour. All interviewees were informed of the purpose of the interview and authorized its recording. Subsequently, the interviews were recorded and transcribed in full. Its content was subject to categorical analysis, organized into three phases: 1) pre-analysis, 2) exploration of the material; 3) treatment of results, inference and interpretation (Bardin, 2016). In an initial phase, the content extracted from the interviews was organized and systematized, and then the analysis itself was operationalized. The analysis was organized based on the dimensions and categories identified in the literature and in the interviews based on new themes that emerged as patterns of responses from the interviewees.

5. Results

From the interviews, it was possible to identify the main challenges and strategic objectives associated with the implementation and sustainability of the Monte of Castanheiro – Country Club & Glamping project, as well as the necessary resources, obstacles and potential partners relevant to establishing alliances. Three strategic challenges were identified–Sustainable Tourism Development (D1); Economic-Social Valorization of the Territory and the Village (D2); Support and incentive policies for Rural Tourism and Glamping (D3), and sixteen associated objectives, namely: Contribute to the development of tourism in Santo Aleixo da Restauração so that it occurs at all times of the year and not just during festive seasons (O1); Contribute to more sustained tourism, with a view to preserving and conserving all natural and cultural heritage of the village of Santo Aleixo da Restauração and the surrounding territory (O2); Valuing and promoting local heritage and its endogenous resources (O3); Allow potential clients to enjoy various types of tourism, such as cultural, gastronomic, ethnic, nature or ecotourism (O4); Provide potential clients with a distinct, striking and differentiating travel and accommodation experience (O5); Promote sustainable

tourism and natural and cultural heritage, both at local and regional, and national and international levels (O6); Attract tourists with different profiles, from different social and cultural contexts, with a view to boosting the village and region (O7); Promote interaction between tourists and the local community (O8); Stimulate the supply of qualifications/training in the area of sustainable tourism (O9); Create new jobs (O10); Contribute to the establishment and attraction of the young population (of working age) in the village and the territory (O11); Invest in the region's human potential (O12); Contribute to boosting the local economy (O13); Encourage local entities to support investment in tourist activities in the village and territory (O14); Capture public investment for the development of tourism projects in rural areas (O15); Encourage the de-bureaucratization of licensing processes (O16). The objectives considered by the interviewees to be the most relevant are, in descending order: Providing potential customers with a distinct, striking and differentiating travel and accommodation experience; Allow potential clients to enjoy various types of tourism, such as cultural, gastronomic, ethnic, nature or ecotourism; Create new jobs; Contribute to the establishment and attraction of the young population (of working age) in the village and the territory; Contribute to more sustainable tourism, with a view to preserving and conserving all natural and cultural heritage of the village of Santo Aleixo da Restauração and the surrounding territory; Stimulate the supply of qualifications/training in the area of sustainable tourism. Therefore, the objectives that generated the most controversy among interviewees are linked to the second and third challenges - the Economic-Social Valorization of the Territory and the Village and the Policies to support and encourage Rural Tourism and Glamping, respectively. Among the most controversial objectives, the following stand out: Attracting tourists with different profiles, coming from different social and cultural contexts, with a view to boosting the village and region (O7); Contribute to boosting the local economy (O13); Capture public investment for the development of tourism enterprises in rural areas (O15); Encourage the reduction of bureaucracy in licensing processes (O16). The majority of actors stated that, in order to achieve the objectives, financial and human resources are needed, through public financing to support the implementation of project actions and potential services that may emerge during its implementation, attracting and attracting younger people and their training using specialized professional training. Investment in material resources and the creation of partnerships and alliances between local entities also appear as fundamental resources for project implementation. The following obstacles were highlighted: the lack of an economic-financial feasibility study for the project; the proximity to protected areas, which may make it impossible to carry out some of your activities; the reduced supply of restaurant and local accommodation services in the village and in Moura; bureaucracy in terms of documentation required within the licensing processes for tourist developments; carrying out outdoor activities may be restricted during the winter season; The project is aimed at an upper-class customer segment and profile, which will imply a strong investment in financial and material resources to guarantee a quality and excellent service.

6. Discussion

The results of the study confirmed the importance of a tourist development, via Glamping, as an added value for the local development of this village, by integrating the natural and cultural elements that make up the heritage and local identity. Furthermore, from the perspective of the interviewed stakeholders, this type of tourist activity, by bringing together the different types and types of tourism (natural tourism, cultural tourism, wine tourism, hunting tourism, food tourism, rural tourism), contributes favorably to attracting new audiences and, consequently, to boosting the local economy (Barros, 2009; Rosalina et al., 2021; Lourdes, 2023; Marques, 2023; Souza & Chiodi, 2023). Similar to other research, this study highlighted the importance of tourism for the diversification of the economy and investment in tourist enterprises with value propositions for the village, with a view to boosting the revitalization of rural areas (Barros, 2009; Kalantaridis, 2010; Lang & Novy, 2014; Müller & Korsgaard, 2018; Rosalina et al., 2021; Lourdes, 2023; Marques, 2023; Souza & Chiodi, 2023). The literature highlights that the potential of tourism is based on the natural and cultural resources incorporated into the location. In this sense, for the majority of interviewees, as pointed out by Kibler, Kautonen and Fink (2014), Nunkoo (2017), Della

Corte et al. (2018), Perkins et al. (2020), Souza and Chiodi (2023), for development to occur in rural spaces, the entrepreneur is the fundamental actor as a guide for the venture. However, to achieve this, the entrepreneur must seek to establish a high level of incorporation of resources, local integration and connection between contexts. Respondents agreed that physical resources are fundamental. As an example of this type of resources, natural resources and raw materials used in the Glamping typology were identified. Resources related to human capital as a source of business, services, products, knowledge and experience were also identified as fundamental resources for the development of a business. To increase local collective human capital, especially during high seasons or when specific training is required, which is limited in the village and municipality of Moura, project promoters must resort to external services (for example, hiring people) and products from other local companies (Müller & Korsgaard, 2018). The social resource is considered by the stakeholders interviewed as a critical element, where the community must be used as a resource through participation and collaboration, especially in more isolated and remote spaces, such as this village (Müller & Korsgaard, 2018). The interviewees also valued intangible resources when combined with physical resources and should be used to promote the enterprise. Likewise, financial resources were highlighted as necessary sources for starting and expanding the venture, preventing entrepreneurs from resorting to risk capital (Müller & Korsgaard, 2018). The results of the study reiterate what other empirical investigations have pointed out about the importance of investing in a strong incorporation of resources, as they interfere in decisions about the activities of the tourism enterprise project (Jack & Anderson, 2002; Kibler, Kautonen & Fink, 2014; Müller & Korsgaard, 2018). Being involved in local context is a precondition for entrepreneurial activity. However, as the authors Jack and Anderson (2002) warn, there may be constraints to imagination and creativity depending on the practices and norms of the local and national context. Another aspect highlighted by interviewees is related to the need for entrepreneurs to create links between other activities and ventures, as well as to use strategic resources to attract potential customers, partners and to promote products and services. As argued by Kalantaridis (2010), Lang and Novy (2014), Müller and Korsgaard (2018), these connections create new opportunities for entrepreneurs and strengthen their local integration. The main challenges highlighted by the interviewees are related to the institutional support of the local authority and local associations, as well as greater local integration and coordination between enterprises (Müller & Korsgaard, 2018; Souza & Chiodi, 2023).

7. Conclusions

The results of the study made it possible to respond favorably to the research question formulated, that is, the investment in enriching the tourist accommodation offer, particularly via the Glamping option, constitutes an added value for the local development of Santo Aleixo da Restauração. However, the success of this type of tourism enterprise depends on the degree of interaction and collaboration in networks between the different tourism stakeholders. The results of the study allowed us to conclude that: the main alliances are structured around the objectives “contribute to more sustainable tourism, with a view to preserving and conserving all natural and cultural heritage of the village of Santo Aleixo da Restauração and the surrounding territory” and “create new jobs”, with strong mobilization of the actors that make up group 1 (Moura City Council; Social and Parish Center of Santo Aleixo da Restauração and CCDR Alentejo and Ribatejo). On the contrary, the objectives “Stimulate the reduction of bureaucracy in licensing processes”, “Attract tourists with different profiles, from different social and cultural contexts, with a view to boosting the village and region” and “contribute to boosting the local economy”, generated some disagreement between the following stakeholders: Development Association of the Municipality of Moura; the Parish Council of Safara and Santo Aleixo da Restauração and Tourism of Alentejo and Ribatejo. Based on the observation of some constraints, especially where trends that put the project's economic and social viability at risk intersect with the attraction of financial and human resources (attracting financing and qualified people), strategic recommendations were formulated for implementation and sustainability of a rural tourism project in the village of Santo Aleixo da Restauração, namely: 1) prepare an

economic-financial feasibility study of the project; 2) define measures to attract qualified people to join work teams; 3) define the customer profile; 4) analyze investment options in material resources; 5) obtain and analyze the information necessary for the licensing process of tourism enterprises; 6) clarify the options regarding the actions and activities to be promoted, in order to assess whether they are in line with the preservation of protected spaces/areas; 7) investigate and establish possible and desirable synergies, that is, promote the creation of partnerships and alliances between local and regional entities.

It can be concluded that regional power and local power are fundamental to creating favorable conditions for the implementation of the Project, with responsibility in terms of support and support for the agents of this project. Furthermore, they are, par excellence, promoters of the use of endogenous resources for the village's differentiation and sustainable development. The creation of cooperation networks, especially between local entities, from the public and private sectors, are equally fundamental for the development of this type of tourist enterprise. In this sense, municipalities and local associations can be the main drivers of the Monte of Castanheiro Project – Country Club & Glamping. It is therefore essential to stimulate and establish networks of cooperation and partnership with local actors identified as key to implementing the project (Nunkoo, 2017; Della Corte et al., 2018; Perkins et al., 2020; Souza & Chiodi, 2023).

8. References

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ESG INTEGRATION IN EVALUATING AND FINANCING LOCAL GOVERNMENT: A NEW PROSPECTS FOR LOCAL GOVERNMENTS AND MODERN SOCIETIES

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Abstract

The discourse on Environmental, Social and Governance (ESG) factors in the financial markets brings a prime opportunity for local governments to the fore. This opportunity pertains to their efforts to reduce their environmental impact, improve the living conditions of local communities and reform their decision-making processes. This paper is an attempt to capture the said perspective of the Local Government through the critical overview of the relevant theoretical background and much more of the existing successful practices. The supreme challenge is to find the optimal ratio between economic growth, socially fair development and the preservation of natural resources. In this equation, one could argue that the independent variables are human resources, finite natural resources, the institutional framework (that should set limits to depletion), as well as the financing of activities aimed at Sustainable Development. Urban sustainability derived from ESG factors can provide a more comprehensive approach to the above equation by challenging the central authority to establish appropriate rules and approve good practices and the markets to further insist on sustainable investments. In order to perform comprehensive research for the synergies ESG criteria in the Local Government, we chose to use the systematic literature review's guidelines. Furthermore, the purpose of this paper is to shape an ESG integration model for Greek local authorities by utilizing the existing literature.

Keywords: Sustainable Finance, Environmental Social and Governance (ESG), Sustainable Regions, Sustainable Cities, Municipal Green Bonds

JEL classification: R10, Q01, Q50, G10, G30, H10, H30, H70

1. Introduction

Sustainable development (Nijkamp, 2011; Almeida et al., 2017; Amoiradis et al., 2021) and inclusive development literature shows that achieving sustainability in the local government, without making trade-offs between economic, social and environmental goals, is rare. Politics tends to make compromises in favor of the economy (Kokkinou et al., 2018; Constantin, 2021; Koudoumakis et al., 2021), at the expense of social and ecological issues. Therefore, while sustainable development in the local communities has environmental, social and economic aspects, the difficulties in optimizing all three aspects for current and future generations have led to the emergence of schemes that usually combine two of the three elements, such as "green growth", "green society", "inclusive growth". Although, Turok (2010) suggests that regional approaches to development provide multiple benefits for

inclusive growth: (1) allow new approaches to inclusive development to be developed and tested in a local area, with successful actions and good practices in local communities and then used in other regions with a relevant level of development; (2) the focus of inclusive development policies on local communities at (urban-urban level) allows for a consolidation of actions and an approach with different local actors dealing with a unified objective, (3) also allows better targeting to social groups that may not have benefited from the increased standard of living of the region, (4) identifies the development potential of the local community, (5) and allows coordination of the political agenda of inclusive development at local community level, and (6) because the composition of development tends to be at local social level, they delimit development and actions for local development by adaptations of development policy in a specific local context.

However, the concept that should be particularly emphasized is that of inclusive sustainable development in the local communities. Such a notion must be redefined, as “a dynamic process of interaction between employment policies and social policies at the regional and local level, which adopts a basic postulate: economic growth does not always benefit all citizens and does not prevent phenomena of poverty and social exclusion, especially in underdeveloped areas. The benefits of economic growth are not channeled holistically to all groups of the population, while in several cases the gap between specific categories widens”.

About 6.25 billion people will live in urban areas by 2050 (Ritchie and Roser, 2018). At national and regional level, horizontal sustainable development policies are likely to contribute to processes of social exclusion and environmental degradation at regional and national level, if multilateral impacts and the multidimensional nature of local communities are not taken into account. Although that, widespread concern about social inequality, local policymakers often have limited powers to directly address the problem and improve policies for inclusive growth (Lee et al., 2016). Until today, green growth and inclusive growth have prevailed as the two most dominant dualities. A similar concern is anchored in the political and scientific agendas to promote sustainable development goals at national and regional level. Scholte in 2019 also points out the contradiction that even as ideas of liberal globalization and institutions of global governance are attacked by populist nationalism and local communities, the actual processes of globalized production, distribution and consumption continue. Therefore, he argues that the dynamics produced by globalization and its results feed the new realistic upheavals at global, national, and regional level and affect in a direct or indirect way the development of local communities. In such a political context, giving up on the struggle to preserve and improve the ideals and institutions of global governance would be nonsense. Only when the benefits of globalisation can be expressed in a more understandable human way, and demonstrated in a fairer and more sustainable way at national, regional and local level, will it be possible to convince those left behind that globalisation can be good and become a guide to mitigate nationalist populism in local communities (Scholte, 2019).

However, it should be stressed that while regions and cities clearly have an important role to play in developing new ideas (Kokkinou et al., 2018; Napolskikh and Yalyalieva, 2019) and applied operational strategies (Ruxho and Ladas, 2022a,b) for inclusive local development, this role is inevitably limited compared to the role of policies at national government level. It should be pointed out that local development policy makers have more responsibilities and may be responsible and framed by the relevant powers to stimulate growth in local communities and the sustainable development agenda is also an important scope of investment development strategies at local level to address broader societal challenges. Investment strategies (Alexiadis and Ladas, 2011; Myakshin and Petrov, 2019) and economic local development (Pedrana, 2013), productivity, skills, employment regulation and wages must be an integral part of efforts to achieve greater justice and social inclusion in the local community.

In this context of investment development strategies, the acronym ESG criteria or factors encodes the ever-increasing international trend within the Sustainable Financial Market to evaluate listed companies in terms of how they manage issues related to the Environment, Society and Governance, focusing on value they can generate in the long term. This trend is part of the need of strategic investors for as transparent and reliable information as possible

on the actions undertaken by companies internationally. Environmental criteria (E) may relate to the entity's energy use, waste, pollution, management of potential environmental risks, etc. The social criteria (S) mainly examine the operation of the entity in terms of the subjects that do business with it (collaboration with suppliers who share the same values, donations, voluntary actions, safety or anti-discrimination policies towards employees, etc.). Regarding the criteria of governance (G), useful information is mainly whether the company uses accurate and transparent accounting methods, if conflicts of interest are avoided for the selection of board members, as well as their involvement in illegal practices. Depending on the information available, a company will receive more or less favorable treatment in financing from a Sustainable Capital Market. In that context a suggestion definition of *Sustainable Capital Market* is as “*the capital market that promotes Sustainable Development by implementing mandatory or voluntary sustainable management policies*”. These policies are effective when designed horizontally-holistically and determined with the basic idea of not causing asymmetric information and permanent oligopolistic conditions (Sepetis, 2020).

In view of the debate on Environmental, Social and Corporate Governance (ESG) factors in financial markets, a first-class opportunity arises for Local Authorities to reduce their environmental impact, improve the living conditions of local communities and reform decision-making processes. Today, more than ever, it is recognized that although the application of ESG criteria at company level is necessary, it is not sufficient. It is necessary to implement them at the level of central public administration as well as local government. The proximity, in particular, of local government to the natural environment and local communities makes it a protagonist in environmental protection, inclusive growth and transparency/accountability when making the relevant decisions. Regarding that a main Research Question (RQ) arise: Does the regions and cities sustainability resulting from ESG factors can provide a more integrated approach to the above equation, challenging both central governments to establish appropriate rules and adopt good practices and markets to further insist on sustainable investments?

This study is an attempt to capture this perspective of Local Government related to the Environment, Society and Governance criteria through Critical review of the relevant theoretical background and much more of the existing successful practices. This study analyzes, the global approach in terms, as well as the existing position Local Government of Greece towards this specific group. Furthermore, it sets out steps and actions to shape an ESG integration model for Greek municipalities and regions by utilizing the existing literature and successful case studies that have been taken or need to be taken in the future out to this direction, in relation to the perspectives and the benefits for the Greek Local economy. To achieve the above objectives basic research systematic peer review of the accessible literature of papers on subjects related to the areas of Social and Legal Sciences and Economic Sciences published in Web of Science, Scopus, Google Scholar, EconPapers, Ecolin, etc, which contains journal articles as well as “gray literature,” such as conference proceedings and reports. The search was performed using the following terms, keywords, and abbreviations: Sustainable Finance and Sustainable Region-Cities, ESG and Sustainable Region-Cities, ESG and Local Authorities Sustainable Regions, Sustainable Cities, Municipal Green Bonds, etc.

The following of the paper is classified in five sections. The second section investigates the way in which Local Government interacts with the tripartite environment-society-governance, connecting this interaction with the need for sustainable and smart cities. Moving on to the more technical part, the third section examines – through successful examples – various models of evaluating the ESG performance of local authorities, while the fourth section lays out the growth of green bond market, explaining the reasons they are widely used as a key financing tool for local governments across the world. The fifth section presents the prospects for ESG integration in the Greek Local Government, by describing the relevant current political and social status, the main financing tools for local governments and the alliances (both existing and potential) with critical social partners. Having examined all the above parameters, the last section is an attempt of designing a model for ESG integration in Greek Local Government.

2. Interaction of Local Government with the Environment, Society and Governance

2.1. The Environmental Dimension in the Sustainability of Local Societies

Local Government, especially since the 2009 recession, is considered, according to Davey (2011), the key player in addressing climate change and rising energy prices. The following are considered key tasks for local government: improving the energy efficiency of municipal buildings, increasing the use of renewable energy sources, reforming transport, increasing storm water drainage capacity (Davey, 2011). The required actions for the protection of the urban environment and/or its restoration are divided into two categories. As Bithas notes (2001), the state takes direct and indirect environmental actions. Examples of direct actions are the reform of urban planning, the prohibition of activities with a negative environmental impact (e.g. open burning of materials, water pollution, etc.) and some “green benefits” of the State (e.g. creation of green areas, parks etc.). More indirect actions include tax charges (e.g. plastic bag charge) or incentives (subsidies for replacing old electrical appliances).

According to literature review of the ‘sustainable city’ is the most frequently occurring category and, in a map of keyword co-occurrences, by far the largest and most interconnected node, linked closely to the ‘eco city’ and ‘green city’ concepts. Recently, the more narrow concepts of ‘low carbon city’ and ‘smart city’ have been on the rise, judging by their frequency of occurrence in academic journals; the latter in particular appears to have become an increasingly dominant category of urban modernization policy. On their part, ‘resilient city’ and ‘knowledge city’ represent distinct concepts, albeit with comparatively low frequency. Overall, the findings point to the need for rigor and nuance in the use of these terms, not least if one wishes to comprehend their implications for urban development and regeneration policy and practice. Bibri and Krogstie conclude that the applied theoretical inquiry into smart sustainable cities of the future is deemed of high pertinence and importance—given that the research in the field is still in its early stages, and that the subject matter draws upon contemporary and influential theories with practical applications (Bibri and Krogstie, 2017).

2.2. The Social Dimension in the Sustainability of Local Societies

The urbanization of modern societies transferred social problems to the cities, making imperative the adoption of holistic approaches. Even supranational phenomena, such as the global financial crisis, highlighted pathologies in public administration, such as corruption (arbitrariness in urban planning, excessive public procurement, etc.). As Yarimoglu et al. (2015) summarize the main difference between the private and public sector is that social responsibility activities can be more charitable in municipalities since their main goal is not profit and also their tasks are almost the same as the nature of social responsibility activities. Furthermore, Rani and Hooda (2013) emphasized that the goal of government social activities is to establish integrity between business and society, by developing “social municipality management”.

Gupta and colleagues add to the concept of inclusive sustainable development the "development that involves marginalized people, sectors and countries in social, political and economic processes for increased human well-being, social and environmental sustainability and empowerment" (Gupta et al., 2015). Without a strong countervailing force, a vicious circle is created where resources are concentrated in the hands of the already powerful few (Gupta & Vegelin, 2016). Lupton and Hughes in 2016 propose to define the concept that "the basic idea is that if we want to have societies that are more equal citizens and have less poverty, we need to focus on the economy and the relationships between economic and social policies at the regional level" (Lupton and Hughes, 2016). Similarly, allowing more people to participate fully in economic activity must be fundamental to local development in prosperous and sustainable economies. Within this concept, Lupton and Hughes argue that there are different perspectives on "what" inclusive growth involves and on "what" it actually is at the local community level, and emphasizes that for some scientists this identifies, a "growth plus" model (Lupton and Hughes 2016; Lupton et al., 2017).

2.3. The Dimension of Governance in the Sustainability of Local Societies

Many countries, especially the more developed ones, have carried out public administration reforms in order to make their government more transparent, efficient, productive and responsive. This conversion brings governance into the equation as a factor in restoring citizens' trust in public administration. For example in Spain, since 2010, the Autonomous Community of Extremadura has focused on building a good “brand” based on Social Responsibility. Rakitovac and Bencic (2020) recently stated that municipal social responsibility is a permanent commitment of local authorities to transparently provide public services that will improve the quality of life of their citizens and enhance sustainable competitiveness by co-creating a supportive business environment.

The sustainability and social responsibility orientation of municipalities has different elements, according to the UN, which has identified three elements as part of the fundamental principles of public administration: transparency, accountability, efficiency (Lawton and Doig, 2006). The academic literature has also considered transparency as a key element for good governance. Authors such as Nevado-Gil et al. (2013) dealt with mechanisms of administrative transparency, such as public information through websites, while others (Gibson et al., 2005), linked accountability to transparency arguing that it serves as a control measure to determine how power is exercised and to what extent the general interest is reflected during decision making. Furthermore, several theorists concluded that good governance also requires the consistency of applied policies, and the fact that a public organization does not by nature participate in market competition, does not mean that it should not be concerned with improving its efficiency (Hendriks & Tops, 1999).

Kim et al. (2005) measured the attractiveness of the municipality (citizens' belief in the responsibility of the municipality, preeminence among other municipalities, responsiveness). Similarly, Gremler and Gwinner (2000) investigated citizens' personal connection with the municipality (satisfaction with service, quality of relationship between citizens and employees, general municipality-citizen relationship), while Mael and Ashforth (1992) examined people's emotional identification with the municipality (feeling offended when the municipality is criticized, concern for others' beliefs about the municipality, identification with its successes, discomfort from negative publicity in the media). Finally Yoon et al. (2004) investigated participation (if the citizens make proposals to improve the services provided or if they request immediate resolution of the municipality's failures).

2.4. The Connection of ESG Factors with the Need for “Smart & Sustainable” Cities

In the light of the seventeen Sustainable Development Goals of the United Nations (SDGs) that have been adopted by the member-states, cities are called upon to develop respecting future generations (ICLEI, 2015)¹. The 11th Goal speaks of sustainable cities and communities, including affordable housing, protection from natural disasters, reduction of waste and air pollution, green spaces, stronger links between urban and rural areas and protection of cultural and natural heritage. The SDGs were also included in the legal order of the European Union under the “European Green Deal”. The importance of data and Information & Communication Technology (ICT) in smart sustainable cities is great. Measuring water and air pollution with sensors, monitoring seawater quality and generally collecting environmental, economic, geospatial, administrative and transportation data accelerate the transformation into a smart and sustainable city, favoring its positive assessment in the light of ESG criteria. The need for smart cities is inherent to the ESG discourse and essentially includes balanced economic, social and environmental development and a commitment to democratic processes and participatory governance (Yeh, 2017).

¹ For more information Word Bank (2023). ICLEI (2015). Cities and the Sustainable Development Goals (K. Brekke, & M. Woodbridge). <https://www.local2030.org/library/232/ICLEI-Briefing-Sheets-02-Cities-and-the-Sustainable-Development-Goals.pdf> (Assessed 12 December 2022)

In the light of the above, the two demands for smart and sustainable cities seem to have merged into one. The key aspects of transforming a city into a smart and sustainable one has already been captured in the recent literature (Bibri and Krogstie, 2017).

3. ESG Performance Evaluation in Local Government and its Impact

The efforts of the developed capital markets for the disclosure of ESG factors are considered fragmentary and not part of a single, holistic and properly designed strategy (Sepetis, 2020). The OECD published in 2012 the working paper “Defining and Measuring Green Investments”, which provides a comprehensive review of concepts and definitions related to “green” investments. In the same vein, the United Nations (UNEP FI) published the Principles of Responsible Investment (entitled “*Fiduciary Duty in the 21st Century Programme*”) urging investors on integrating ESG factors into investment analysis and decision-making processes. Moreover, the UN also developed the *Sustainable Stock Exchanges Initiative*, which in 2018 published a progress report on how securities regulators can support sustainable development goals by sharing information.

In Europe, the Commission published the *Regulation 2020/852/EU (Taxonomy)* which defines when an economic activity is characterized as environmentally sustainable and, subsequently, the *Climate Delegated Act*, the *Disclosure Delegated Act* and the *Environmental Delegated Act*. It has also published the *Non-Financial Reporting Directive (2014/95/EU)* and the *Sustainable Finance Disclosure Regulation (2019/2088/EU)*, obliging large companies to include in their public reports a non-financial report about the impact of their activities on the environment, society, labor, human rights, corruption and bribery (Brühl, 2022).

ESG factors are mostly used to assess the sustainability and ethical impact of companies. However, as demonstrated by the analysis of the previous section, Local Government interacts in an increasingly emphatic way with the concepts of environment, society and governance. Regarding the ESG criteria, these can be evaluated in a similar way to the companies, taking as a model methodologies based on international standards (SASB, GRI, etc.) and regulations. The ideal disclosure approach should focus on data quality, impartiality, broad scope, management involvement in determining ESG strategies, accuracy of information and easy accessibility on ESG information (Athens Exchange Group, 2022). The ESG evaluation of a local authority implies the need to use publicly available data for the grading and ranking of the Municipalities and Regions. The aim here – just like companies – is to provide investors with quantitative, qualitative, extensive, accurate and unbiased information on sustainability. The following five case studies are representative of ESG ranking issues, when it comes to congener entities.

The recent study by Caldeira dos Santos and Pereira (2022) comparing the performance of three ports (Bremen, Santos, Barcelona) with similar characteristics (cargo and tonnage throughput and the importance of the primary hinterland) shows that ranking could be one of the best strategies for creating a comparison table suitable for use by prospective investors. Caldeira dos Santos and Pereira concluded that environmental impact is one of the first elements that investors consider when deciding to allocate resources to high-polluting entities such as port organizations. Respectively, indicators, such as “Regional Dialogue” reflect investors' demand for positive social impact, while indicators such as “Management” and “Board” reflect investors' demands for good governance.

Similarly, the study by Paz et al. (2021), although not directly dealing with ESG criteria, attempted to use a multi-criteria approach to a set of 31 sustainability indicators and develop a dashboard to contribute to the dynamic and comparative analysis of 217 municipalities of Maranhao, a Brazilian region. The Microsoft Power BI tool was used for the data analysis and visualization, while the research methodology was based on qualitative and quantitative evidence, as it is considered less prone to bias. The TOPSIS method was also used for data classification. The output consists of graphs showing overall comparisons between municipalities, comparisons based on the ranking on social themes (using coefficients of Education, Infrastructure, Population and Health), as well as more direct comparisons based on speedometer graphs. This study concludes that the approach will help governments meet

the real needs of each region, as it allows the identification of the strengths and weaknesses of each region, pushing for the appropriate policies that will gradually eliminate the large inter-municipal inequalities.

Elgert (2018) investigated how municipal performance metrics have influenced sustainability policies. The study drew some interesting conclusions about how evaluations shape the knowledge-policy interaction. As part of this research, *STAR Communities (Sustainability Tools for Assessing and Rating communities)* was studied. STAR is an urban sustainability assessment system that was launched in 2007, to rank municipalities in the U.S.A. A city, town, or county can be signed up for the program by a “sustainability director” or other city official, who then coordinates the data collection and reporting procedure through an online reporting tool. STAR has seven goal areas (built environment, climate-energy, education etc), refined into 44 strategic objectives, which are in turn assessed by more than 500 individual indicators. Points from the indicators are tallied and cities receive a score. The conclusion reached by the interviewees (officials, investors) is that thanks to such a rating system, “high-quality” residents, businesses and investments can be attracted. However, some negative aspects were also found, such as difficulty in collecting data, data inadequacy for every single indicator and a tendency for superficial and uncontentious policies, so as to be rewarded with more points.

Bruno and Henisz (2022) attempted to assess the interaction between a series of ESG indicators and US municipal credit risk over two decades. Having carefully reviewed the relevant literature, they demonstrate that ESG variables are associated with shifts in the economic health (e.g. changes in population, income or median housing values) and fiscal health (e.g. fiscal balance, operating balance, revenue per capita, debt ratio and pension funded ratio). They concluded that the elimination of environmental problems and social inequalities ends up being rewarded by the market with favorable municipal bond yields.

Similarly, Rashidi et al. (2019) examined whether the creditworthiness of local governments can be positively affected by the adoption of energy and climate change mitigation policies. Semi-structured interviews were conducted with decision makers (municipal officials, investors, rating agency executives) in cities of developed economies, specifically in Europe and North America. The results of the interviews showed that rating agencies do take environmental and climate considerations into account in their rating processes, giving value to all three concepts raised by the researchers: financial benefits, regulatory risk management, global environmental benefits.

4. The Financing of Local Government in the Light of ESG Factors

4.1. The Emergence of Green Bonds at International Level

A major turning point in the green movement came in 2015, the year the Paris Agreement was adopted. In particular, this treaty provided a global framework for limiting global warming to below two degrees Celsius relative to pre-industrial levels, and ultimately for limiting this increase to one and a half degrees Celsius. As of July 2021, 191 UN members had signed the agreement. Issuance of green bonds increased exponentially after the Paris Agreement.

Green bonds are debt instruments issued by governments or corporations to finance environmentally friendly projects. They are the main funding tool for ESG policies. In recent years, the use of green bonds in the municipal market has gained increasing attention as municipalities around the world seek to finance the transition to a more sustainable and resilient future. The groundwork was laid in 2007 when the Intergovernmental Panel on Climate Change (a body of the United Nations) published a report linking human activity to global warming, urging key players in the financial system (such as the World Bank) to be part of the solution (CBI, 2021)².

² For more information Climate Bonds Initiative (2021). Sustainable Debt Global State of the Market 2020, <https://www.climatebonds.net/resources/reports/sustainable-debt-global-state-market-2020> (Assessed 16 January 2023)

First, it is important to understand the concept of green bonds and how they differ from traditional bonds. Green bonds are similar to traditional bonds in that they are issued by governments or corporations to raise capital, and investors receive regular interest payments and principal repayment. However, green bonds require a specific use of the funds which must be invested in appropriate projects, such as renewable energy, energy saving or sustainable transport – which is why they are a vital part of what is called *socially responsible investing* (SRI). Sustainable debt includes projects that are financed along with green bonds, either with social or sustainability bonds (GSS bonds). Social bonds are used to finance projects that contribute to achieving positive social outcomes, e.g. projects that provide access to basic services (e.g. health, education, affordable housing). According to Word Bank (2023)³ the cumulative amount of GSS bonds issued reached USD 3.8 trillion at the end of 2022. Green bonds represent 64% and emerging market issuances 16% of the total amount. In 2022, GSS bond issuances reached USD 948 billion, a 19% decrease compared to 2021. Across all labels, social bonds saw the largest decline in volume (-39%) in 2022 compared to 2021.

Many municipalities around the world face challenges such as climate change, air and water pollution, and natural disasters, thus green bonds can be a source of financing for projects that address these challenges (ICMA, 2021⁴). One of the main benefits of using green bonds in the municipal market is the ability to raise funds for environmentally friendly projects without increasing the burden on taxpayers. In addition, the use of green bonds can help promote transparency and accountability in the municipal market, as green bonds are subject to strict eligibility criteria and reporting requirements. This can help strengthen the credibility and attractiveness of green bonds, as well as increase public confidence in municipalities. In the US, in addition to the government and corporate bond categories, municipal bonds (often referred to as munis or muni bonds) are quite widespread.

In a survey conducted by Bloomberg⁵ (Hirtenstein and Husband, 2018) the green bond boom in the US also affected the financial sector of local governments, boosting the issuance of municipal green bonds, for the period 2007-2018. Their total dollar value has been steadily increasing from 2011 to 2018, reaching an all-time high of \$11.2 billion in 2017. In that year, municipal green bonds accounted for 2.6% of the total bond market. The main issuers are New York (\$8 billion), California (\$7.8 billion) and Massachusetts (\$3.1 billion). Together, they account for around 63% of all green bonds (Flammer, 2020). Compared to conventional bonds, municipal green bonds on average worth more (\$6.3 million compared to \$2.4 million), have longer durations (11.8 years compared to 9.5 years), and they have a higher credit rating (40.4% of municipal green bonds have a AAA rating, compared to just 16.6% of conventional bonds). According to SIFMA (2022) the muni bond market is one of the largest and most liquid sub-sovereign bond markets in the world, measured at US\$4trn in 2022.

Recently two study for UN PRI⁶ with title “ESG Integration in Sub-Sovereign Debt: The US Municipal Bond Market (2021)” and “The thematic ESG approach in US municipal bonds (2023) concluding that across many fixed income asset classes, muni bond investors have

³ For more information Word Bank (2023). Green, Social, and Sustainability (GSS) Bonds Market Update. <https://thedocs.worldbank.org/en/doc/98c3baab0ea4fc3da4de0e528a5c0bed-0340012023/original/GSS-Quarterly-Newsletter-Issue-No-2.pdf>

⁴ For more information International Capital Market Association (2021). Green Bonds Principles, [https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principlesgbp/#:~:text=The%20Green%20Bond%20Principles%20\(GBP,credentials%20alongside%20an%20investment%20opportunity](https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principlesgbp/#:~:text=The%20Green%20Bond%20Principles%20(GBP,credentials%20alongside%20an%20investment%20opportunity) (Assessed 3 February 2023)

⁵ For more information Hirtenstein, A., Husband, S. (2018). Security That Triggered a Recession Reworked to Green the Earth, Bloomberg, <https://www.bloomberg.com/news/articles/2018-10-09/security-that-triggered-a-recession-reworked-to-green-the-earth> (Assessed 15 January 2023)

⁶ For more information UN PRI ESG Integration in Sub-Sovereign Debt: The US Municipal Bond Market (2021). <https://www.unpri.org/sub-sovereign-debt/the-thematic-esg-approach-in-us-municipal-bonds/10851.article> and The thematic ESG approach in US municipal bonds (2023) <https://www.unpri.org/sub-sovereign-debt/the-thematic-esg-approach-in-us-municipal-bonds/10851.article>

started to address ESG factors more explicitly to mitigate risk in their portfolios. Some have also gone beyond seeking better risk-adjusted investment performance to adopt an ESG thematic strategy, which involves allocating capital to themes or assets that are tied to certain environmental or social outcomes. This approach, and more broadly weighing the real-world outcomes of muni bond holdings (both positive and negative), is less common than the risk mitigation approach, but momentum is building. The two approaches are not necessarily mutually exclusive and could deploy the same techniques (for example exclusion or engagement). If anything, the US muni bond market is well suited to embracing both ESG strategies simultaneously, given the many public benefits funded by proceeds.

According Capital monitor⁷ in Europe there is not much data on the green bond market or on the reasons why this market develops at a different pace from country to country. To date, the issuance of such bonds by European local authorities occupies a small part of the relevant market (GSS bonds). European municipalities and regions are responsible for just 0.8% of total European sustainable bond issuance between the beginning of 2019 and the end of the first quarter of 2022, raising \$7.4 billion. Sweden has the highest number of issuers over this time period, followed by Germany, closely followed by Switzerland, Russia, France, Iceland, Spain, Norway and Finland.

To distinguish between certified and non-certified green bonds, the certification information provided in the CBI database is accompanied by the identity of the certification body (Sustainalytics, Vigeo Eiris, Ernst & Young, CICERO, etc.). The two leading standards that ensure the integrity of the green bond label are the Green Bond Principles (GBP) and the Climate Bond Standards (CBS). In short, the certification process is divided into two phases. At the pre-issuance phase, the certifier verifies that (i) the projects to be financed are eligible according to the specified certification standards and (ii) the issuer has established internal procedures and audits to monitor how these proceeds are used (e.g. by submitting annual reports). In the post-issuance phase, the certifier verifies that the proceeds have been allocated to green projects according to the standards (Flammer, 2020). To performance, the coupon is on average lower for green bonds (3.3% vs. 3.5% for conventional bonds), as Zerbib (2019) points out. This difference is more difficult to interpret because of the many factors that affect green bond yields. In his analysis of green bond yields, Zerbib (2019) compares the yield to maturity of green bonds against conventional bonds that have similar characteristics (maturity, credit risk, liquidity, etc.). He finds that green bonds have a lower yield to maturity – that is, investors demand a lower yield – although the difference is relatively small. Finally, they tend to be safer, as 30.3% of green bonds have a triple-A rating (compared to 8.5% for conventional bonds), according to Bloomberg's Composite Credit Rating (Flammer, 2020). According the empirical research of Rizzi (2022) shows that natural capital loss affects financial markets and municipalities' borrowing costs. Municipal bond markets price natural capital loss risk following extreme weather events. on local tax revenue, and farming communities.

5. The Prospects for the Integration of ESG Factors in the Greek Local Government

5.1. The Political and Social Context for the ESG Integration

The special international circumstances that have arisen in recent years (climate crisis, war in Ukraine, independence of the EU from Russian energy, etc.) have directed mainly the private sector to intensive efforts of sustainable economic activity. However, in most countries the public sector has a large environmental and social impact, as it is the largest economic factor. In addition to being a provider of basic services (safety, health, transport, waste management) it is naturally a point of reference for the application of regulatory standards.

⁷ For more information Capital monitor (2023). Where Europe's cities are putting their green money

In 2021, the Chartered Institute of Public Finance and Accountancy (CIPFA)⁸ carried out the study “*Evolving Climate Accountability*”, which examined the prospect of sustainability reporting in the public sector, to the standards of the private. The need to disclose sustainability data has been deemed even more imperative in the public sector, as the public interest underlying environmental, social and governance issues increases public attention and justifies the demand for full transparency. Therefore, such disclosures create a regime of accountability for leadership on these issues. The main problem is that so far there is no agreed standard of disclosure in the public sector, while the lack of data and the lack of skills and knowledge in collecting sustainability data and drafting the relevant policies are causing difficulties.

So far only ninety (90) municipalities have started the implementation of the ministerial plan. The important role that local governments are called to play in the effort for sustainability is not only evident from the above facts. Moreover, Greek public opinion considers that Municipalities and Regions are more connected to citizens than any other public body, as revealed by Data Consultants' research, on behalf of the *Regional Policy Monitor*⁹ (47.4% of the sample considers that the mayor and deputy mayors represent the citizens more than anyone). According to the research, the most important problems of Greeks, in relation to the area they live in, are the condition of the road network (39.4%), the lack of cleanliness of public spaces (22.2%), poverty and unemployment (14.3%), the problems in waste collection (13.8%), the quality of public transport (10.8%), the lack of green spaces (10.2%) and the traffic (10.2%).

5.2. The Green Financing of Local Government in Greece

Based on international experience, ESG Local Government financing is linked to the issuance of municipal green bonds, as well as social and sustainability bonds (GSS). In Greece, the issuance of municipal bonds has not progressed, as the local authorities have not understood the advantages and risks involved. As Gekas (2020) notes, although municipal bonds are mainly used by regions, federal states or very large municipalities, they can also be issued by smaller municipalities, through inter-municipal partnerships. In any case, there is the legal possibility of issuing municipal bonds (as L. 3463/2006 dictates, “*Municipalities may issue bonds, to actualize the purposes of their competence, after approval by the Capital Market Commission*”)¹⁰.

The funding sources of Greek municipalities (Central Autonomous Funds, Public Investment Programs, grants in the form of co-financing from the EU and borrowing) play a critical role in the implementation of environmental and social policies. Due to the fiscal crisis, government funding was significantly reduced and new resources were sought through tools such as Jessica and Jeremie, Public-Private Partnerships (PPPs) and raising funds from the European Investment Bank.

The Hellenic Deposits and Loans Fund also includes several financial tools for local authorities, such as the “*Antonis Tritsis*”¹¹ Program (co-financed by the EIB) aimed at Municipalities and Regions of the country, in order to develop and upgrade their infrastructure, with total budget for the entire programming period (2020-2023), €2.5 billion. This program envisages lending to local authorities to modernize their

⁸ For more information CIPFA (2021), *Evolving Climate Accountability: A Global Review of Public Sector Environmental Reporting*, London, July 2021

⁹ For more information Data Consultants (2022). *The quality of life of Greeks & their perceptions of local authorities*. *Regional Policy Monitor*. <https://regionalpolicymonitor.org> (Assessed 14 March 2023)

¹⁰ For more information Gekas, P. (2020). *Municipal Bonds: Solution or problem?* <https://kede.gr/dimotika-omologa-lysi-i-provlima/> (Assessed 12 December 2022)

¹¹ For more information TDP (2022), “ANTONIS TRITSIS” Development Program <https://www.tpd.gr/eidiko-anaptyksiako-programma-antonis-tritsis2/> (Assessed 6 March 2023) TDP (2022). *Electricity production in local infrastructure facilities* https://www.tpd.gr/wp-content/uploads/net_metering.pdf (Assessed 6 March 2023)

basic infrastructure, mitigate the social consequences of the recent pandemic, strengthen their social structures and digital services, and modernize local civil protection.

The ELECTRA Program also enables public bodies to borrow from the Deposits and Loans Fund for energy upgrade projects of public buildings until December 31, 2025, with the possibility of extension. The buildings included in the Program should be upgraded at least to class B, while as defined in the announcement “*the subsidized actions concern the shell, the heating/cooling systems, the energy management systems and the autonomous systems*”. The categories of municipal buildings entitled to these interventions are educational and healthcare buildings (kindergartens, health centers, etc.), offices and other facilities (e.g. sports facilities, cultural event centers, etc.).

The Net Metering Program stipulates the installation of photovoltaic stations in municipal buildings in order to cover part of the energy needs of local governments (street lighting, water supply, sewerage) through energy production and energy offset. The resources of the Deposits and Loans Fund also come from the EIB, while the development of the program was assisted by the *Center for Renewable Energy Sources* (CRES). Conditions for financing through this program are the title deed or the legal lease of the space where the local authority wishes to install a photovoltaic station, the payment of all previous electricity bills, the connection of the photovoltaic station with a meter and the completion of the installation until the end of 2023.

In addition to the Deposits and Loans Fund, the **Green Fund**¹² also finances efforts to preserve or restore the environment and generally deal with climate change in the country. The Greek Green Fund (founded in 2010) publishes calls for proposals and may finance programs prepared by Ministries, decentralized administrations, and local governments, after first examining the adequacy of their resources (human, financial, etc.), the sustainability of the program, the social benefit, and the coherence of the action with national and community policies. The most characteristic programs of the Green Fund concerning Local Government are: i) the Program for the Protection of the Marine Environment (3 million €), ii) the Program for the Natural Environment with Innovative Actions (6 million €), iii) the Environmental Balance Program (28.7 million €) and iv) the Program for Ongoing Projects (20.5 million €).

There are also cases of multiple-sources financing, to address emergency local needs, such as the recent example of the *Reconstruction Plan for Northern Evia* for the reconstruction of the area after the wildfires of August 2021. The program is expected to be completed in 2030, while the budget amounts to € 381,642,000 and will be distributed to 71 projects related to infrastructure, the new forest, agri-food, human resources, health and welfare networks, special urban plans, tourism and marketing, culture and education, digitalization and innovation.

The implementing body will be the institution of Integrated Territorial Investment (ITI), with sources of funding the NSRF 2021-2027, the RRF, the Green Fund, the “Antonis Tritsis” Program, sponsorships and donations. The abovementioned master plan, which the head of the “DIAZOMA” union, Stavros Benos, undertook to prepare, has as its first pillar the creation of the new road axis Chalkida-Istiaia for the inclusive development of the area and as its second pillar the forest regeneration with the resin collectors and beekeepers – who have been active all these years in the wider area – as a point of reference.

¹²For more information Green Fund (2022). Programs and Beneficiaries, <https://prasinoameio.gr/programmata/> (Assessed 12 December 2022)

5.3. Alliances with Social Partners: Current Status and Prospects

The **Social Solidarity Economy** (SSE) is a mechanism offered for Local Government partnerships with social agencies. As the *Hellenic Agency for Local Development and Local Government*¹³ states in its annual report (2021), the social economy model focuses by its nature on the various daily issues that concern the local population, the provision of public services, and the involvement of citizens in solving local problems.

As far as the area of the Social Solidarity Economy is concerned, according to the Law 4430/2016, local governments also have the institutional/legal possibility to cooperate with the SSE organizations. In particular, the SSE organizations may implement public contracts in cooperation with local authorities (art. 4). Correspondingly, the latter are entitled to assign real estate and movable property (art. 4, par. 3) to the former, while these actions can also be financed by the EU and/or the national budget, as well as by the local governments themselves (e.g. by participating in *Social Cooperative Enterprises*, art. 13, par. 5).

Social Cooperative Enterprises (SCE) are characterized by autonomy, therefore local authorities can strengthen them and monitor the results of each action, without interfering in their administrative model, use of their proceeds, recruitment of staff, etc. Local governments, in the context of cooperation with SCE, could focus on the implementation of welfare schemes (e.g., social grocery stores, food distribution and exchanges), on educational services (student transportation, tutoring, scholarships), on the consolidation of ethical trade (peer-to-peer economy, with local products and gastronomy), in the organization of sports activities/structures and in the solid-waste collection and utilization.

Furthermore, the Centre for Renewable Energy Sources and Saving (CRES) deals with sustainable development, RES and energy saving, according to the dictates of the EU and national legislation. Its mission is to implement innovative actions for the consolidation and dissemination of new energy technologies, being a guide for the local governments throughout the territory. In addition to this, the Center generally supports the path of the municipalities towards sustainability, guiding them in matters of environmental protection, energy production from RES, green growth of the local economy, etc.

Through the BEACON Program (Bridging European and Local Climate Action), CRES supported five Greek municipalities (Agios Dimitrios, Kalamata, Ermoupoli, Farsala and Dorida) in actions concerning, according to the official press release, city collaborations for the climate (p (e.g. cooperation between the municipalities of Agios Dimitrios and Bottrop in Germany), transnational workshops for the exchange of experiences on sustainability policies between Greek and Portuguese municipalities, European municipal conferences on climate action and expert support for low carbon footprint measures.

In addition, Greece has established a transparent framework for the operation of energy communities in the country. Energy communities are essentially “urban cooperatives with an exclusive purpose”, which enable citizens and legal entities (such as local governments) to get involved in the production and utilization of clean energy sources. More specifically, municipalities or regions, as members of an energy community, can operate RES facilities with storage capacity, photovoltaic parks for solar social policy, wind farms for sale or self-production of electricity, biogas or biomass plants, municipal greenhouses with cogeneration units and desalination plants with renewable energy sources. Local government can therefore use energy communities as a tool to tackle energy poverty, by implementing a social policy to reduce energy costs. Also, it can function at the local level as a facilitator of collaborations and partnerships between citizens, small and medium enterprises and local authorities, giving prospects for innovation and employment.

6. Proposed Model of ESG Integration in the Greek Local Government

According to what was examined in the previous sections of this paper, the models for the evaluation and integration of ESG factors in Local Government include four main elements, each of which has its own autonomy and value. Therefore, when planning such a service in

¹³ For more information EETAA (2021). Local Government and Social Solidarity Economy (S.S.E.), Hellenic Agency for Local Development and Local Government

our country, it is considered more appropriate to divide the project into four (4) phases. Each phase should be carefully standardized, aiming for a homogeneous application of the model. The proposed phases are summarized in Table 1.

Table 1: Phases of ESG integration service in the Greek Local Government

Phase	Description	Tool
1st: Reporting Phase	Creation of a questionnaire with ESG indicators, to be completed by local authorities	ESG Questionnaire
2nd: Scoring Phase	Rating the responses and deriving an average	Scoring Methodology
3rd: Evaluation Phase	Written performance evaluation per indicator (steps of progress, shortfalls, etc.)	ESG Evaluation
4th: Ranking Phase	Using a model to compare two or more entities	TOPSIS & Power BI

1. Reporting Phase: At this stage, it is important to standardize the reporting methodology of the information that is deemed useful for capturing the “ESG profile” of the evaluated organization. The Report is divided into three sections: *Environment* (E), *Society* (S), *Governance* (G). Each section includes indicators (*E1, E2, E3 etc., S1, S2, etc. G1, G2 etc.*), while each indicator contains a small group of questions. The completion of the Questionnaire can be done either by the competent staff of the municipality/region or (preferably) by the evaluator, in the form of interviews and evaluation of any physical and/or electronic documentation that will be provided.

The creation of the indicators was based on the requirements set by the regulations and international standards, on which other evaluation models have been based. In particular, this model was based on the Global Reporting Initiative (GRI), the IR framework of the International Integrated Reporting Council (IIRC), the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), the CDP, the implementing laws of the General Data Protection Regulation (GDPR) and the Whistleblowing Directive, the guidelines of the Ministry of Environment and the National Energy and Climate Plan. Based on these standards, a small group of questions is developed for each indicator, which aims to obtain quantitative and qualitative data. If necessary, the ESG questionnaire will be updated.

2. Scoring Phase: At this stage, an attempt is made to evaluate the answers given to the questions of the ESG Questionnaire, with the individual grading of each indicator and, subsequently, the general grade of each section and the final overall score of the organization. Regarding the scoring methodology, among the methods used by the various models, the CDP Cities Scoring Methodology (with some elements from the STAR Rating System) was qualified. Local governments could be evaluated in four scoring bands that represent the levels of ESG integration in their operation. From lowest to highest, the scoring bands are:

D- or D: The organization at this level has just begun to organize how it will measure and record ESG data, but does not yet have the infrastructure, resources or structured plan to obtain the required information. At best, it can make estimates of potential risks or the impact of each issue {*disclosure scoring band*}.

C- or C: The organization at this level is already in the process of assessing the risks and impact of each issue. It has already started to apply measurement methodologies and has taken the first steps to manage each individual issue {*awareness scoring band*}.

B- or B: The organization at this level has managed to collect data successfully and is already working to mitigate risks and negative consequences in each issue. Partnerships with stakeholders and well-organized plans/policies are also taken into account here {*management scoring band*}.

A- or A: The organization at this level demonstrates best practice for each issue, sets ambitious goals and is making significant progress in achieving them. Any implemented holistic strategies that absolutely ensure that the organization's actions will reduce negative environmental, social and governance impact are taken into account here {*leadership scoring band*}.

Each question of each indicator will give either 0 points (in case of no data provision or a negative answer) or 1 point (in case of incomplete data provision or insufficient measures) or

2 points (in case of complete data provision or adequate measures) or 3 points (for answers that reveal integrated design, certified metrics, regularly updated data/practices, multiple safeguards).

Therefore, the score that the index will receive will result from the sum of the points of the questions it includes, taking into account the relevance of the answers both within the index and between the indicators. The average score of each section is proposed to be obtained as a result of the weighted average ($\sum w_{ixi}/\sum w_i$) of the graded indicators. The weighting will be decided after the evaluator's proposal to the organization, depending on the weight (%) that they will judge that each indicator has per municipality.

3. Evaluation Phase: At this stage, the final report is drawn up that captures the level of ESG integration, according to the conclusions obtained from the questionnaire and the score. The structure of the "ESG Evaluation" includes the *Introduction*, which briefly describes the process followed from the beginning to the writing of the final report, as well as the general targeting of the organization through the process in the reporting period. This is followed by the *Evaluation of ESG Indicators*, where the central objective per indicator is listed, the commentary on its overall performance, the progress but also the room for improvement per indicator, as well as any notable achievement in the specific reporting period (if any).

In the last part of the ESG Evaluation, the general conclusions will be presented, i.e. limitations in data collection, the ESG course of the organization during the reporting period, the key findings of this final report and the proposed high priority actions for the near future (e.g. adoption of GHG Emissions Report, drafting and publication of a Sustainability Policy, social activities, regulatory compliance with the GDPR, etc.). Optionally at this stage, it can be discussed between the evaluator and the organization the possibility of the latter being supported by the former in the implementation of some of the proposed actions. In any case, the ESG Evaluation should be published on the organization's official website or wherever else public access is considered easy.

4. Ranking Phase: At this stage, the comparability of the ESG performance of the evaluated local governments is attempted. The case of Maranhao's model showed that multi-criteria decision-making with the *TOPSIS* (Technique for Order of Preference by Similarity to Ideal Solution) method is quite effective when one is asked to analyze a set of sustainability indicators, with the aim of creating a table for comparative analyses. These tables contribute to the identification of points for improvement for each organization, thereby helping investment decisions. According to Niu et al. (2018), this method reduces subjectivity in the evaluation process. After all, many studies have used the TOPSIS method as a tool to analyze sustainability at different scales, such as regions, countries, states and cities. To visualize and analyze the results generated dynamically after applying the TOPSIS method, it is recommended to create tables using Microsoft Power BI. Thus, by using a table, there is the possibility of applying many filters and comparisons contributing to the critical analysis of the results.

7. Conclusion

This paper examined the issue of ESG integration in the Local Government. It was already established from the theoretical part, that the idea of Sustainability placed limitations on the insatiable economic development and depletion of natural resources. As it has been analyzed, cities gather the largest percentage of the world's population, exerting enormous environmental pressures on the planet. In addition, the intensifying and diverse social problems per region compel them to take immediate action for inclusive local growth. In the same vein, literature shows that local societies have become much more demanding in terms of transparency, accountability and efficiency of local authorities. The above dimensions of urban sustainability come to be reinforced by the demand for smart cities, again with environment, society and governance being the final recipients.

The study highlighted that there are several examples of ESG performance assessment, some of which are already being implemented in Local Government. The ESG model of the ports of Bremen, Santos and Barcelona was examined, while we also presented the ranking model of the municipalities of Maranhao, Brazil. Both models provide accurate and comparable data which helps investors make appropriate decisions for these areas. In the same vein, the STAR Communities model of US municipalities was cited.

Studies find that good municipal performance is rewarded by the market with favorable bond yields, although many municipalities tend to adopt easy and short-term sustainability solutions in order to get a favorable rating. In looking at sustainable finance, we saw that green bonds are a key tool. Since 2007, when they began to be issued, they have experienced immense growth, while in recent years there has been an increased issuance of municipal green bonds, which are issued by municipalities to finance infrastructure and services.

In Greece, the political and social conditions for the integration of ESG factors in Local Government they seem more mature than ever. The country's heavy public sector is extremely energy-intensive and it remains to be seen whether recent efforts by the Ministry of Environment to reduce consumption in public infrastructure will bear fruit. Apart from the Ministry, citizens also expect a lot from local authorities, as evidenced by recent research data, because they are closer to local communities than any other public body. Therefore, the challenge for local authorities is firstly to make the most of the available green funding and secondly to collaborate effectively with every social partner (SSE organizations, CRES, energy communities), to achieve a sustainable inclusive growth.

Such a necessity led this study to design a ESG integration model, customized for Greek municipalities and regions. Utilizing the knowledge of all the previous research, a service was designed that includes the collection of ESG data, the grading of their performance, the disclosure of these results and the comparison of performance between the organizations. Inevitably, a large field for future investigation is opened up, which includes the practical application of the proposed model in the country's Local Government and the findings from this application.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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CATALYZING ECONOMIC AND ENVIRONMENTAL INSIGHTS: APPLICATIONS OF IMPLAN'S ENVIRONMENTALLY EXTENDED INPUT-OUTPUT (EEIO) MODELING FOR ENERGY PRODUCTION SCENARIOS

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Abstract

In the United States, regional scientists and economists frequently employ IMPLAN, a proprietary input-output (I-O) software, for assessing the economic ramifications of diverse interventions on the local economy. IMPLAN has recently incorporated the Environmental Protection Agency's (EPA) Environmentally Extended Input-Output (EEIO) modeling as an optional extension within their subscription service. In this paper, we compare coal vs. solar production scenarios in Ohio (a state in the United States) as a case study to illustrate the seamless integration of EEIO modeling with traditional I-O modeling, showcasing its enhanced capabilities for evaluating economic and environmental impacts. In the case of Ohio, we found that the state's plans to increase solar energy capacity and decrease coal energy capacity have a net positive impact on its economy when considering both economic and environmental aspects.

Keywords: Input-output, coal, solar, environmental impact

JEL classification: C67, R15, E01, P18

1. Introduction

Input-output (I-O) modeling is an established technique for measuring the economic impact of changes in a local economy (Clouse et al., 2023). While various software packages exist to support I-O modeling, IMPLAN is commonly used by agricultural economists and regional scientists in the United States to measure economic impact. IMPLAN was developed by the U.S. Forest Service in the 1980s and later spun out as a private company (United States Department of Agriculture, 2023). Examples of I-O modeling using IMPLAN include user guides for interpreting forestry economic contribution analyses (Parajuli et al., 2019) and economic impact studies of 4-H programs (Harder and Hodges, 2011; Hill, 2015), forestry (McConnell, 2013), and other extension programs (Kerna et al., 2015), among others. Other academic journals have published similar IMPLAN studies documenting the economic impact of forestry and related industries (Henderson et al., 2017), agriculture (McKean and Spencer, 2003; English et al., 2014), and fisheries (Steinback, 1999).

Despite its roots in forestry, IMPLAN has been extended to measure impacts outside of the natural resource area, including colleges and universities (Carroll and Smith, 2006; Khalaf et al., 2022; Quddus et al., 2022), tourism Lacher and Oh (2012); Kwon et al.

(2020), transportation infrastructure (Brun et al., 2014; Chen and Haynes, 2015; Gao et al., 2019), and the circular economy (Zendejdel et al., 2021).

In recent years, a host of I-O studies (including some using IMPLAN) have emerged around measuring the economic impact of traditional and alternative sources of electricity and associated green industry sectors like biofuels. I-O modeling was used to estimate the short-term increases in prices across industries should the United States adopt a carbon tax to transition to net zero carbon by 2050 (Kay and Jolley, 2023). As the United States transitions to alternative sources of energy production, recent studies have explored the economic impact of closing traditional coal-fired power plants (Jolley et al., 2019) as well as the emergence of alternative sources of energy such as woody biomass (Perez-Verdin et al., 2008; Lester et al., 2015; Jackson et al., 2018), wind (Greene and Geisken, 2013; Khalaf, 2022), and solar (Bae and Dall'erna, 2016; Smith et al., 2018).

The National Renewable Energy Laboratory (NREL) has also recently introduced its own Jobs and Economic Development Impact (JEDI) models, the free and user-friendly I-O-based tools designed to estimate the economic impact of constructing and operating energy and fuel production plants at the state and local levels. The JEDI model's default data inputs, such as costs and spending patterns, are obtained from surveys and interviews with industry experts and local developers, but users can also modify data inputs for specific projects (National Renewable Energy Laboratory (NREL), 2017). The JEDI models offer various models to estimate local employment impacts of power plants based on specific energy sources such as coal, wind, solar, hydro, and geothermal. As a result, it has been a great complement to the IMPLAN input-output model.

The US energy sector is transitioning from coal to cleaner energy sources such as solar, wind, and hydropower. Coal-generated electricity has declined in the US since its peak in 2011 due to the declining cost of natural gas and the rapid growth of solar and wind power technologies (Feaster, 2023). From 2011 to 2022, the share of coal-generated energy in the US declined from 44% to 20% of the total energy production (Feaster, 2023). The US Energy Information Administration projects that the share of coal-fired energy will continue to drop to 8% of total energy production by 2050 (Tsao, 2023). Natural gas and various sources of renewable energy such as solar, wind, and hydroelectric have become the alternative sources of electricity production as coal-generated electricity phaseout continues.

Decision-making about energy production is a complicated process that often involves trade-offs between interdependent factors. The size and composition of the energy infrastructure, the security of the energy supply, the environmental impact of production, and the market response to changes in the sector are interconnected in ways that encourage linking their analysis (Del Granado et al., 2018). In particular, the transition to alternative energy sources creates changes in the structure of the energy sector that can have large regional economic effects (Jenniches, 2018).

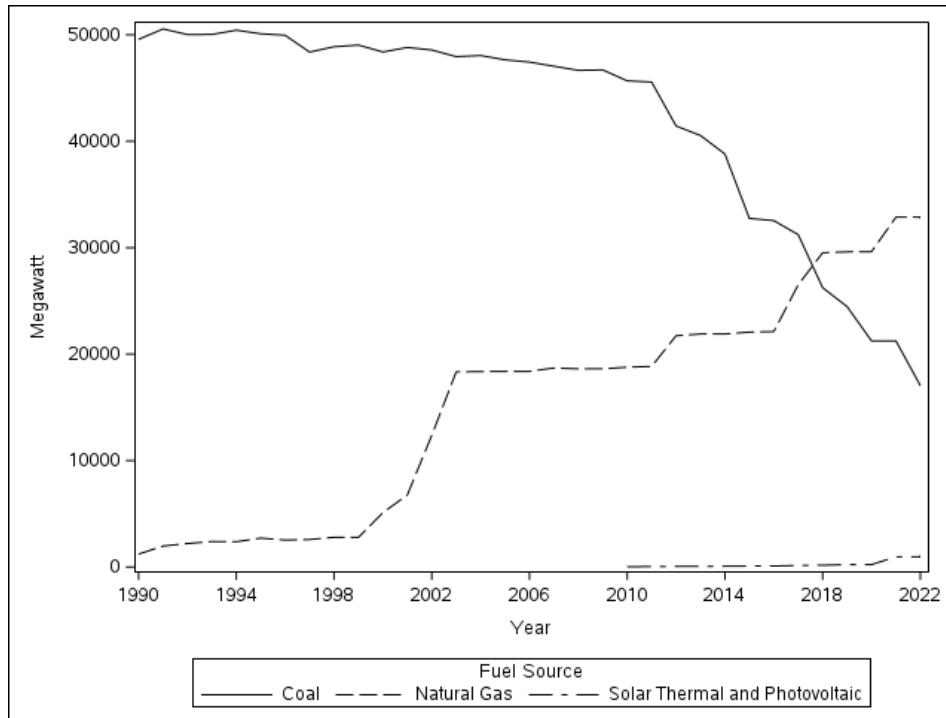
In the other direction, economic activity has environmental impacts that extend up the supply chain from the point of consumption through instances of transportation, construction, and material procurement (Nazir et al., 2024). Because of the multi-regional and cross-sectoral nature of supply chains, it can be difficult to fully account for these environmental impacts. EEIO modeling was developed as a tool to track these impacts along the chain of economic activity (Kitzes, 2013). This allows studies implementing EEIO to understand the true environmental impacts of economic activity more fully. Analyses using EEIO have become common and have been used to model impacts on a wide range of topics, including energy transition (de Bortoli and Agez, 2023), economic sector carbon management (Sun et al., 2020), food waste (Reynolds et al., 2015), and health care systems (Eckelman et al., 2020).

2. Economic and Environmental Scenarios in Ohio

Between 1990 and 2016, coal was Ohio's primary electricity production source, accounting for more than half of the state's total electricity production. Since 2011, however, the capacity for coal-generated energy in Ohio has decreased significantly. Over the last decade, from 2012 to 2022, coal-generated energy has declined by 59%,

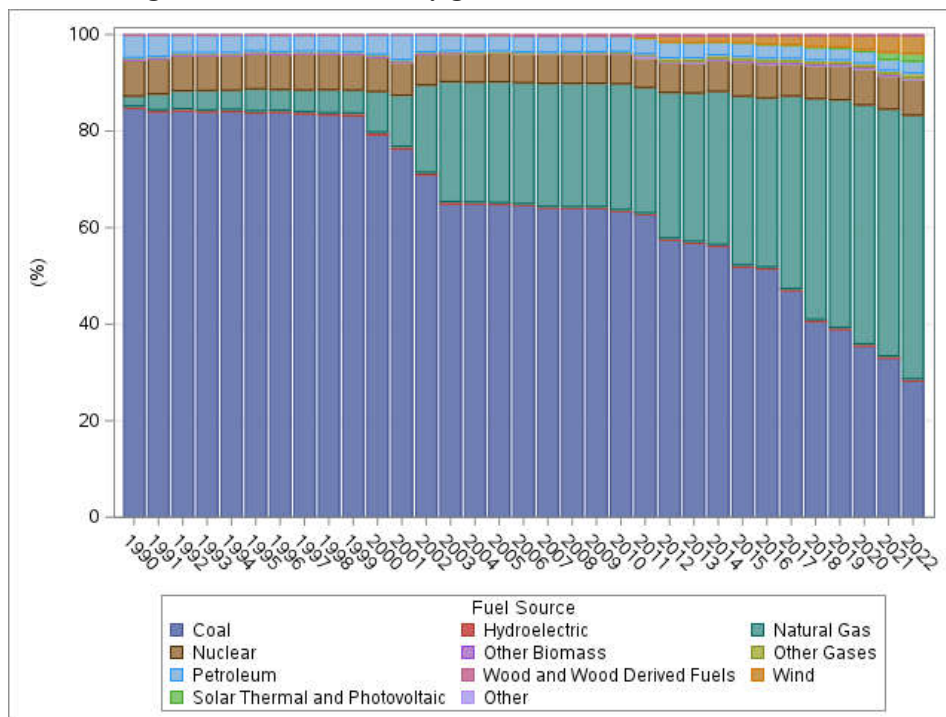
from 41,438.6 Megawatts (MW) to 17,032.4 MW. Consequently, in 2022, coal-generated electricity only comprised 28.29% of the state’s total electricity production (Figures 1 and 2). Two more coal-fired plants in Jefferson and Hamilton Counties in Ohio are scheduled to retire by 2028, further decreasing Ohio’s coal-fired energy capacity by 1,765 MW (U.S. Energy Information Administration, 2022).

Figure 1: Ohio’s electricity capacity by fuel type 1990-2022



Source: U.S. Energy Information Administration, 2022

Figure 2: Ohio’s electricity generation fuel shares 1990-2022



Source: U.S. Energy Information Administration, 2022

Since 1999, electricity from natural gas has rapidly increased in Ohio. In 2017, the capacity of natural gas electricity surpassed that of coal-fired electricity and became the largest source of electricity in the state (Figure 1). As of 2022, natural gas electricity in Ohio has reached a capacity of 32,863.2 MW, making up 54.6% of the

state's total electricity production (Figure 2). However, there are currently no plans to expand Ohio's natural gas energy capacity in the near future (U.S. Energy Information Administration, 2022).

Solar energy capacity in Ohio has not increased significantly since the installation of the first solar plants in the state in 2010. In 2010, solar energy capacity in Ohio was only 26 MW, accounting for only 0.4% of the state's total capacity. In 2022, solar energy reached a new capacity of 965 MW, or 1.6% of the state's total capacity (Figures 1 and 2). However, 17 new utility-scale solar projects with a total capacity of 2,498 MW are planned to be completed in Ohio by 2028 (U.S. Energy Information Administration, 2022). When completed, these new projects will bring the total solar energy capacity to 3,463 MW, or 5.7% of Ohio's total energy capacity.

Ohio's plans for a further transition away from coal-fired energy and replacing coal-fired energy with solar energy will have significant impacts on the state's economy and the environment. IMPLAN's recent incorporation of EEIO modeling as an extension of their traditional I-O modeling allows researchers to consider not just the economic impacts (jobs, labor income, value-added, and output) but also the corresponding environmental impacts (pollutants, emissions, greenhouse gases, etc.) associated with these economic activities. To demonstrate the EEIO tool, we compare the economic and environmental impacts associated with the production of 100 MW of energy from coal and solar in the state of Ohio and use the planned increase in solar power capacity and decrease in coal-fired power capacity in Ohio by 2028 to estimate the net impacts they might have on Ohio's economy and environment.

3. Methods and Results

In this study, we first examine and compare the environmental impacts of producing 100 Megawatts of coal-generated electricity and solar-generated electricity. The analysis includes a two-step process. First, we use the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impact (JEDI) model to calculate the number of direct jobs and labor income associated with generating 100 MW of power from coal-fired power plants and solar photovoltaic (PV). JEDI has been a common tool to complement and sometimes supplement IMPLAN modeling of energy impacts (e.g., Johnson and Solomon (2010); Bae and Dall'erna (2016)). Second, after obtaining the direct employment and labor income associated with 100 MW of energy production from each source, we then model these direct jobs and labor incomes in each energy production scenario via IMPLAN. This provides both the economic impacts and environmental impacts of each scenario (Table 1).

On average, solar energy supports more direct jobs than coal-fired energy; however, coal plants' employees earn higher incomes than solar plants' employees. The production of 100 MW solar energy supports 18.5 direct full-time jobs a year, while the production of 100 MW coal-fired energy supports 14.0 full-time jobs annually (Table 1). The average labor incomes from solar and coal-fired power plants are \$60,100 and \$89,300, respectively. The total value added and outputs from producing 100 MW of coal-fired energy are higher than that from producing the same amount of energy with solar PV (Table 1).

Solar PV is much more environmentally friendly than coal when considering the environmental impacts. For example, producing 100 MW of coal-fired electricity creates 134,447 metric tons of greenhouse gases, 824 times higher than the amount created by producing 100 MW of solar energy (Table 1). Note that 99.99% of the 134,447 tons of greenhouse gases created by producing 100 MW of coal-fired energy are carbon dioxide (CO₂). Coal-fired power also creates more than twice as much land use, water withdrawal, and pollution, such as waste, air emission, and releases to water and ground (Table 1).

Table 1: Comparison of the direct economic and environmental impacts of 100 MW of solar energy and 100 MW of coal-fired energy.

Direct Economic Impacts	Unit	100 MW Solar PV	100 MW Coal
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Employment	Jobs	18.5	14.0
Labor Income	\$	1,110,303	1,279,543
Value-Added	\$	2,878,465	5,269,512
Output	\$	5,021,086	11,113,976
Direct Environmental Impacts			
	Unit	100 MW Solar PV	100 MW Coal
Commercial Non-Hazardous Waste Excluding Construction Activities	ton	5.53	12.24
Commercial RCRA Defined Hazardous Waste	ton	0.21	0.47
Criteria and Hazardous Air Emissions	ton	24.75	54.79
Greenhouse Gases	ton	163.26	134,447.45
Land Use	m2*a	51,639.84	114,302.73
Point Source Industrial Releases to Ground	ton	0.07	0.16
Point Source Releases to Water	ton	14.52	32.15
Water Withdrawals	ton	1,589,165.34	3,517,554.44

Source: Calculations by authors using IMPLAN

In the next step, we use Ohio's planned transition from coal to solar energy as a case study to demonstrate the trade-offs between interdependent factors when making energy production decisions. By 2028, coal-fired energy capacity in Ohio will decline by 1,765 MW due to two coal-fired plants closing in Jefferson and Hamilton Counties. Also, by 2028, seventeen new solar plants will increase Ohio's solar capacity by 2,498 MW. To capture the net effect of the decrease in coal-fired energy and the increase in solar energy on Ohio's economy and environment, we first employ the same analysis as above to estimate the economic and environmental impacts of producing 2,498 MW of solar energy and 1,765 MW of coal-fired energy, then subtract coal energy's impacts from solar energy's impacts (Table 2).

The new solar capacity in Ohio will support 461 direct full-time jobs annually with an annual labor income of \$27.7 million and contribute \$85.2 million to Ohio's Gross State Product (GSP) (Table 2). The closures of two coal-fired plants in Jefferson and Hamilton Counties will result in 253 annual job losses, a \$22.6 million reduction in direct labor income, and a \$84.3 million decrease in Ohio's GSP (Table 2). As a result, the planned changes in Ohio's energy by 2028 will result in a net positive economic impact. The changes will support an additional 208 full-time jobs with a \$5.1 million increase in labor income and a \$878,836 increase in the state's annual GSP (Table 2). However, Ohio will also see a net loss of \$39.5 million in total outputs when switching from coal to solar energy due to the loss in sales of byproducts from coal burning, such as fly ash, gypsum, and slag, which can be sold and used as inputs to other industries like roofing materials, cement, and wallboard manufacturing.

Table 2: Net economic and environmental impacts of the new planned 2,498 MW of solar PV and planned retired 1,764 MW of coal-fired energy.

Direct Economic Impacts	Unit	2,498 MW Solar PV	1,765 MW Coal	Net Impacts
Employment	Jobs	461.3	253.0	208.3
Labor Income	\$	27,749,911	22,610,282	5,139,629
Value-Added	\$	85,189,605	84,310,769	878,836
Output	\$	144,144,055	183,660,836	-39,516,781
Direct Environmental Impacts				
	Unit	2,498 MW Solar PV	1,765 MW Coal	Net Impacts
Commercial Non-Hazardous Waste Excluding Construction Activities	ton	158.71	202.22	-43.51
Commercial RCRA Defined Hazardous Waste	ton	6.14	7.83	-1.68
Criteria and Hazardous Air Emissions	ton	710.62	905.43	-194.81
Greenhouse Gases	ton	4,686.81	2,221,773.08	-2,217,086.26
Land Use	m2*a	1,482,463.18	1,888,877.26	-406,414.08
Point Source Industrial Releases to Ground	ton	2.05	2.62	-0.56
Point Source Releases to Water	ton	416.96	531.27	-114.31
Water Withdrawals	ton	45,621,349.03	58,128,343.17	-12,506,994.14

Source: Calculations by authors using IMPLAN

Solar energy is much more environmentally friendly compared to coal-fired energy. For example, the changes in Ohio's energy capacity will result in a reduction of 2.2 million metric tons of carbon dioxide, a reduction of 12.5 million tons of water withdrawals, and a reduction of 406,414 square meters of annual land use (Table 2).

Deciding on energy production is a complicated process that should involve more than one factor. For example, in the case of Ohio, the net economic impacts from the energy transition alone can lead to a biased impression that there will be a significant loss in Ohio's total output. However, when considering the net environmental impacts, replacing coal-fired energy with solar energy can save us the cost of sequestering \$2.2 million tons of carbon dioxide. The baseline estimates of reducing carbon dioxide through forest conservation, a considerably cheaper method compared to new cleaning technologies or carbon taxes on fuels (Van Kooten et al., 2004; Obersteiner et al., 2001; Sohngen and Alig, 2000; Chomitz et al., 2000; Dudek and LeBlanc, 1990; Callaway and McCarl, 1996), is between \$12.71 and \$70.99 per ton (Van Kooten et al., 2004). When considering the opportunity costs of land use, the average cost of sequestering carbon dioxide through forest conservation is between \$31.84 and \$386.62 per ton (Van Kooten et al., 2004). By reducing coal-fired energy capacity and increasing solar energy capacity, Ohio can save between \$70.6 million and \$857.2 million annually in sequestering 2.2 million tons of carbon dioxide alone (Table 3).

Table 3: The cost of sequestering 2.2 million tons of carbon dioxide through forest conservation.

	Baseline cost		Appropriate cost	
	Low	High	Low	High
per ton of CO ₂	\$12.71	\$70.99	\$31.84	\$386.62
Total	\$28,179,163	\$157,390,935	\$70,592,018	\$857,169,789

Source: Calculations by authors using IMPLAN

4. Discussion

I-O and EEIO models are both common tools for measuring economic and environmental impacts. The new adoption of EEIO modeling within IMPLAN provides an efficient tool for integrating both measures. We have applied this model to the planned changes in Ohio's energy capacity to demonstrate the value in comparing the impacts within each model, as well as between the various scenarios.

From a sustainability perspective, our case study of Ohio shows the importance of integrating the environmental and economic impacts of energy transition. Sustainability requires micro-level changes in how individuals consume goods and services, with macro-level policies that shape production and consumption. Policies are often the product of a political process where information about the environmental and economic impacts is fiercely debated. By integrating these together, policymakers and the public can be better informed about the trade-offs that exist. In this respect, our work contributes to research on how policy can help achieve sustainability (Li and Miao, 2022; Wang and Yu, 2024) and the economic trade-offs involved (Davydenko and Hilbers, 2024).

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Announcements, Conferences, News

Cultural H.ID.RA.N.T

A worldwide awarded project of sustainable cultural and natural heritage management in Chalandri (Athens)



Event Overview¹

Cultural H.ID.RA.N.T. stands for Cultural Hidden Identities ReAppear Through Networks of WaTer. It is an Urban Innovative Actions' project, co-financed by the European Commission, the Municipality of Chalandri and the Greek Green Fund. Cultural H.ID.RA.N.T. (henceforth CH) regards the regeneration of the Roman times' Hadrian aqueduct as a common cultural, water and urban resource in a sustainable way applying circular economy practices and participatory planning and management.

CH started in July 2020 and will end in June 30, 2024. In its (co-)design and implementation seven more partners are involved -from architectural firms to the Attica water operator, and from the ephorate of antiquities to universities- and most importantly several local stakeholders. Among the latter critical has been the engagement of the Citizens Association for the Protection of the 'Rematia' river-stream, of the Oral History Group of Chalandri and of the Chalandri Schools' Parents Association which gave access to school communities involving more than 700 people (primarily students) in the project's participatory design workshops.

During Cultural H.ID.RA.N.T.'s life-span the subterranean and abandoned Hadrian aqueduct:

- a. re-emerges as an ancient and in harmony with nature technical work and monument,
- b. is utilized as a modern water resource with the construction of a new 4k long non-potable water pipelines, saving energy and 25.000 cubic meters of water annually, while promoting eco-friendly and sustainable water consumption and management,
- c. its history along the centuries (built in 2nd c. AD) is highlighted and its relationship with the local community is documented 'from below' with the creation of www.archalandri.gr,
- d. becomes the means of green and blue regeneration of four Chalandri neighborhoods (21,400 sq.m. in total) transformed into new open public-use spaces while they counter the effects of global warming locally,
- e. becomes a source of inspiration and artistic creativity related to water and the environment, cultivating ecological awareness by organising each summer the HIDRANT festival
- f. functions as a platform for active citizenship, with local inhabitants engaging in participatory regeneration planning, founding the Local History Archive Group and the Hadrian (water management) Community of Chalandri, co-organizing the HIDRANT festival.

The project's innovative and integrative approach to Hadrian aqueduct's regeneration combined with its participatory methodology have been recognized internationally by receiving various distinctions. More recently it has been nominated by the European Heritage Hub /Eurocities as one of the ten best examples of innovative cultural heritage management in the EU that promote the aims of 'triple transformation' (green, digital, social) of our societies. CH has also been shortlisted in three more international awards winning the prestigious 6th International Urban Innovation Awards of Guangzhou in the category of sustainable cultural heritage management. Besides, it has been invited and took part in international policy-making conferences on cultural heritage and urban water resources management (Creative Flip - Brussels, UIA Eurocities 2023 - Turin, Global Mayors' Forum - Canton).

¹ Event overview edited by Christos Giovanopoulos
Cultural H.ID.RA.N.T.'s project manager.

The Guangzhou awards are one of the most important processes for distinguishing urban management programs and policies around the world. They are co-organized every two years by the Municipality of Guangzhou (Canton, China) and two international organizations, UCLG (Union of Cities and Local Governments) and Metropolis (Union of Large Metropolis). Two municipal and regional authorities' networks that act as consultants at UN level in urban policies making, such as the Sustainable Development Goals (SDGs) and the New Urban Agenda (New Urban Agenda) which were the main criteria for the selection of the awards' winners. CH and the Municipality of Chalandri stood out as one of the best examples of sustainable management of urban, cultural and natural resources among 274 other nominations from 193 cities around the world, as decided by a 11-member international committee consisting of distinguished mayors, local governors and experts in urban policy.

The Guangzhou awards are combined with the Global Mayors Forum and this year took place in 7-9 December, 2023. This international conference is a meeting place for hundreds of cities, local government bodies, scientists and experts in urban policy matters, giving the opportunity to make known innovative projects and practices of urban management, to strengthen collaborations and exchange know-how. The delegation of CH and the Municipality of Chalandri, as one of the award-winning cities, was honored in various ways throughout this three-day event. Vice-Mayor Mr. Gerolymatos, who headed Chalandri's delegation, took part in the opening panel of the Global Mayors' Forum, and the next day in an open public event organized in the impressive new building of the municipal Guangzhou library. Mr. Gerolymatos held also various press conferences and interviews with the local and regional Chinese media, which focused primarily on the innovation of a program that brings back to life an ancient monument in an environmentally sustainable way and on the possibility of transferring know-how and developing relationships with other cities.

In addition CH's project manager Mr. Chr. Giovanopoulos took part in the Global Mayors' Forum thematic event "Sustainable management of urban and cultural resources", where he discussed with mayors and representatives from the cities of Guangzhou (China), Cairo (Egypt) and Antalya (Turkey).

CH and Chalandri's participation in such an event, highlighted the innovative importance of Cultural H.ID.RA.N.T.'s integrative approach and participatory methodology to tackling urban and environmental challenges, and gave the chance to the municipality of Chalandri to establish relations with a wide array of city authorities and urban policy makers from all over the world, broadening the perspectives of its role and contribution to local urban governance.

RSA Student & Early Career Conference
02 September 2024 to 03 September 2024
Cambridge, United Kingdom



Event Overview²

The RSA Student and ECR conference series is a well-established and has been running for many years. It serves as a vibrant platform for emerging scholars from across the world to present their research, engage in thought-provoking debates, and cultivate valuable connections. We offer a welcoming, supportive, and intellectually stimulating environment where participants from diverse backgrounds and disciplines converge to share knowledge and insights.

What you can expect:

1. **Networking and Collaboration:** Connect with like-minded peers and establish valuable collaborations in your field. Forge connections that can shape the future of your research and career.

- **Constructive Feedback:** Receive expert feedback on your research. Gain fresh perspectives and insights that can elevate your work to new heights.

- **Career Advancement:** Attend workshops designed to equip you with essential skills and knowledge that will empower your academic and professional journey, including "How to Get Published?"; "How to Win External Research Funding?"; and "How to Take the Next Steps in Your Career?"

- **Practical Takeaways:** Join a panel discussion with local leaders from both politics and business, and the Directors of CISE's three strategic research themes (Health, Performance, and Wellbeing; Sustainable Futures; Safe and Inclusive Communities) to explore fresh perspectives on how to drive positive regional change, promote sustainability, and nurture inclusivity within your community and beyond.

As the world faces unprecedented challenges such as climate change, the rise of AI, social inequality, and economic instability, researchers have a critical role to play in supporting regions in their transformation towards more sustainable and inclusive futures by leverage their expertise, research findings, resources, and networks. Co-organized by the Anglia Ruskin University's Centre for Inclusive Societies and Economies and the Global Sustainability Institute and in partnership with The University of Cambridge's Department of Land Economy the RSA Student and ECR Conference invites papers discussing topics including, but not limited to:

- The role of research(ers) in informing regional policy and practice,
- Strategies for fostering real-world impact from regional research,
- Innovative research methods and technologies for envisioning more sustainable and inclusive urban-regional futures,
- Collaborative processes for engaging with stakeholders and communities locally, regionally, nationally and internationally,
- Challenges and opportunities for scaling up regional initiatives,
- The role of universities as anchor institutions in promoting regional development.

Submission Details: Submit your abstract (up to 250 words and text only) through the RSA conference portal by 4th June 2024.

The conference will be of particular interest to current PhD student and early career researchers (within the first five years of completing your PhD) specializing in areas such as regional and urban studies, planning, geography, politics, development studies, economics, or related fields.

Please email lesa.reynolds@regionalstudies.org if you require assistance

Conference Website: <https://lounge.regionalstudies.org/Meetings/Meeting?ID=502>

² Event overview edited by Dimitrios Tsiotas, Assistant Professor, RSI J.

Academic Profiles



Professor Algis Krupavičius

Algis Krupavičius is Professor at the Faculty of Public Governance and Business, Mykolas Romeris University. His main research areas include comparative politics, political sociology, comparative public policy, quantitative and qualitative research methods, survey research, content analysis, AI and computational social science.

He was the first president of Lithuanian Political Science Association. In 2014 – 2021 he was Deputy Chair of General Assembly of European Social Survey, also in 2017 – 2021 member of Standing Committee of the International Social Survey Programme (ISSP). Now he is a member of the European Consortium for Political Research (ECPR) Standing Group on Presidential Politics and Standing Group on Political Parties.

He was visiting senior research fellow, King's College, University of London, also visiting professor, Northwestern University (USA). He had number of grants and fellowships including from Lithuanian Research Council, Social Science Research Council (USA), American Council of Learned Societies. Since 2019 he is a member of the Committee of independent eminent persons, the Council of the European Union.

He is a member of several editorial boards, including East European Quarterly, Polish Political Science Review, Polski Przegląd Politologiczny, Socialiniai mokslai (Social Sciences), Journal of Baltic Studies, Baltic Journal of Political Science and others.

Algis Krupavičius was leading various teams of researchers to put Lithuania on a map of well-known international scholarly and research infrastructural projects as MARPOR (Manifesto Research on Political Representation), European Election Studies (EES), International Social Survey Program, European Social Survey, Consortium of European Social Science Data Archives (CESSDA).

Among his recent publications are as follows:

- "Litewski semiprezydencjalizm: korzenie, konstrukcja, wyzwania" [Lithuanian semi-presidentialism: roots, structure, challenges]. In *Udana transformacja na peryferiach? / pod redakcją Justinasa Dementavičiausa i Artura Wołka*. Kraków: Ośrodek Myśli Politycznej, 2014, p. 131-176.
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Academic Profile by: Filipos RUXHO
Assistant Professor of Economics and Sustainable Development



Rector - Professor Armand Krasniqi

Professor Armand Krasniqi since 2021 and present is the Rector of the University "Haxhi Zeka" Peja, Republic of Kosovo. He first served as a full professor at the Faculty of Economics of the University of Prishtina, where during the period 2010-2012 he also held the position of Dean of the Faculty of Applied Sciences at the Peja Campus. At the same time, he has been working as a professor in various universities in the Western Balkans region such as Northern Macedonia, Albania, Bosnia and Herzegovina and Montenegro. He completed his Doctoral Studies at the Faculty of Law of the University of Prishtina together with his post-graduate MSc studies in Law and BSc. in Law.

Regarding his professional work, he has successfully practiced the advocacy as well as served as a legal advisor to the Government of Kosovo in the period 2008-2010, and an expert in drafting the concept for the transformation of the public university under the Ministry of Education, Science and Technology of Kosovo.

He is the author of nine texts: "International Commercial Arbitration Law", "Administration of Tourism and Hospitality Services", "Management Organizations and Destinations in Tourism", Business Law, "International Business Law", "Law of Business Contract", "Legal Ownership", "Public Administration of Tourist Agencies and Destinations in Kosovo - monograph", "Banking Law, Banking & E-banking".

Won several awards for his great contributions to thought and knowledge from the academic community of Kosovo for the institutional achievements and promotion of international cooperation in higher education through the Erasmus+ Program of the European Union which is a unique mechanism for transferring knowledge in students and academic staff with involvement in local and international development projects as well. He has successfully managed to transform "Haxhi Zeka" University by including in their curricula the teaching methods with applicable scientific research that guarantees quality in the educational process and provides opportunities for students to produce knowledge. He has also been evaluated by stakeholders, civil society, chambers of various industry sectors for his innovative initiatives in promoting the Dual Studies program that enables students to study and gain experience at the same time. Through these successful collaborative initiatives, he has managed to promote the contributing role in the society of Haxhi Zeka University, Peja, and simultaneously promoting the concept of lifelong learning in the youngest society of the new born state of Kosovo.

He is an editor, a member of scientific commissions and academic boards in several international scientific journals. His scientific work has been published in international scientific journals indexed in Scopus and WoS where it has been evaluated through citations with particular dominance in the legal, business, management and tourism spheres.

Academic Profile by: Filipos RUXHO
Assistant Professor of Economics and Sustainable Development

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Associate Professor Ligita Šarkutė

Ligita Šarkutė is an Associate Professor of Political Science, Vytautas Magnus University, Faculty of Political Science and Diplomacy, Department of Public Administration, Kaunas, Lithuania. She also holds position of senior research fellow. In 2022 L. Šarkutė started to work as an adviser in the Research Unit of the Office of the Seimas of the Republic of Lithuania.

Her research interests encompass a wide array of topics, including public policy decision-making, the dynamic interplay between interest groups and political parties, the evaluation of democracy's quality, political communication strategies, subjective well-being assessment within political contexts, political participation dynamics, citizen engagement and inclusivity, analysis of election manifestos issued by political parties, as well as automatic authorship attribution and profiling of political texts. As a professor, Šarkutė has played pivotal roles in major cross-national initiatives such as the European Social Survey (ESS), European Election Study (EES), and International Social Survey Programme (ISSP). She has also spearheaded national projects exploring the relationship between interest groups and political parties, funded by the Research Council of Lithuania. Additionally, she has contributed to interdisciplinary scientific endeavors focused on testing and analyzing human language technologies, particularly in the realms of automatic authorship attribution and profiling.

With extensive experience in comparative survey research, Šarkutė has been an integral member of the ESS Lithuanian team since 2012. Prior to that, she served on the ISSP Lithuanian team from 2010 to 2020 and was also involved with the EES (PIREDEU) in 2009. Her contributions to these endeavors have primarily involved the design and adaptation of survey questionnaires, and she has consistently utilized comparative survey data in her scholarly publications.

Academic Profile by: Filipos RUXHO
Assistant Professor of Economics and Sustainable Development



Professor Assistant Susana Soares Pinheiro Vieira Pescada

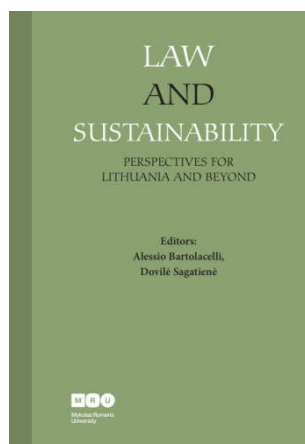
Susana Soares Pinheiro Vieira Pescada has a PhD in Sociology from the University of Évora, a master's in social service from the Portuguese Catholic University and a degree in Sociology from ISCTE- University Institute of Lisbon. Attends a PhD in Economic and Business Sciences (management specialty) at the Faculty of Economics of the University of the Algarve.

She started her professional activity in 2002 as a Local Development Technician at the in Loco Association. Between 2006 and 2011 she was a teacher at the Higher School of Education and Communication at the University of Algarve. In 2009, she was a Research Fellow at SOCIUS/Research Center for Economic and Organizational Sociology at ISEG – Higher Institute of Economics and Management of the Technical University of Lisbon. Her main activity in this research center was being a member of the research team of the Arquimed Project – Participatory design of adaptive groundwater management strategies in instruments in Mediterranean coastal water scarce areas as a response to climate change. Later, between 2017 and 2020 she taught at the Polytechnic Institute of Beja.

Currently, Susana Soares Pinheiro Vieira Pescada is an Invited Assistant Professor at the Faculty of Economics of the University of the Algarve and an integrated researcher at CinTurs (Center for Research in Tourism, Sustainability and Wellbeing). Since 2012, she has maintained her collaboration at the Interdisciplinary Center for Social Sciences at the University of Évora [CICS.NOVA.UÉvora] as a Collaborating Researcher. She has published in the areas of organizational behaviour and sustainable development of territories and supervised dissertations in the areas of organizational behaviour, human resource management, wellbeing and community development. Her current scientific interests include the health and wellbeing of communities, groups and organizations.

Academic Profile by:Filipos RUXHO
Assistant Professor of Economics and Sustainable Development

Book Reviews



Law and Sustainability: Perspectives for Lithuania and Beyond by Alessio Bartolacelli and Dovilė Sagatienė.

Sustainable development offers a framework for humanity to thrive in harmony with our environment. By embracing this paradigm, we can cultivate a symbiotic relationship with nature, nurturing and preserving it instead of perpetuating a cycle of exploitation and degradation. Law fostering sustainability and sustainable development is one of the fastest-developing, most challenging legal disciplines globally. Sustainability has many different definitions, but its essence was articulated by the Brundtland Commission, tasked by the UN in 1987 to formulate a global agenda for change: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The edited volume *Law and Sustainability* analyses the ways on how law and legal profession should change and contribute to sustainability.

In 2021, the Law School of Mykolas Romeris University (MRU) developed its 2022–2026 research program, focusing on exploring the intersection of the Rule of Law, sustainability, and emerging technologies. This volume represents one of the initial outcomes of this research endeavor. The collaboration of thirty scholars, predominantly from Lithuania but also beyond, has resulted in the compilation of 24 valuable contributions within this edited volume.

This book is structured into four distinct sections, each delving into various facets of the subject under examination: sustainability within national and international public law, the intersection of sustainability and private law, the adaptation of criminal law through a sustainability lens, and illustrative case studies demonstrating sustainability in practice from a legal perspective.

The first part of this edited volume, titled "National and International Public Law: Establishing Conditions for Sustainable Development," investigates into various themes, including the intersection of sustainable development and artificial intelligence, the incorporation of sustainability within national constitutions, the efficacy of green public procurement regulation in Lithuania, the evolution of international investment agreements, and the interplay between personal data processing and sustainable labor practices.

The second part, titled "Sustainability and Private Law," centers on various issues such as sustainable agency, the impact of sustainability on commercial contracts, strategies for promoting sustainable consumption through product quality guarantees, challenges and opportunities for shareholder activism, facilitating remote shareholder participation in private company general meetings, sustainable development trends in legal regulation concerning reorganization in Ukraine, and enhancing access to justice through mediation.

The third part, entitled "Transformation of Criminal Law in the Context of Sustainability," emphasizes the evolution of criminal law within the sustainability framework. It investigates into pertinent topics such as environmental crimes, sustainable approaches to criminalization, strategies for reducing drug consumption sustainably, ensuring accessibility and sustainability in criminal justice systems, and safeguarding individuals who report vulnerabilities.

The final part of this volume, named "Sustainability in Action: Examples and Experiences from a Legal Perspective," showcases various instances and experiences of sustainability through a legal lens. It encompasses topics such as integrating the principle of sustainable development into zoning and planning regulations, addressing the challenges of sustainable legal regulation concerning electric vehicle infrastructure, exploring the intersections of sustainability and electrification within the regulatory frameworks of the EU and Lithuania, advancing the sustainable development agenda through the calculation and reduction of greenhouse gas emissions in the waste management sector, and fostering synergy between law, finance, technology, and the sustainability of the legal profession.

This collective volume is the result of significant efforts to convene both national and international scholars, pooling their expertise to advance research at the intersection of sustainability and law.

**Book Review by
Filipos RUXHO, Assistant Professor - RSI J**



Sustainable Regional Development Scientific Journal SRDSJ



Welcome

Welcome to the Albanian Association of Regional Scientist (A.A.R.S) which publishes the 'Sustainable Regional Development Scientific Journal' (SRDSJ) as well as other journals in various languages. Our main aim is to promote Sustainable Regional Development Science and to give the opportunity to scientists worldwide to publish articles according to our regulations. The articles must be based on recent research and accredited studies and must focus on topics such as Sustainability, Regional Economic Policy, Regional Development as well as other similar areas of interest. Our website also aims to provide information about science conventions and new publications. You will also find information about our various activities which are presented through photo and video materials. The Albanian Association of Regional Scientists (A.A.R.S.) is a fresh source of thinking and reflection about Regional Science and as a non-profit organization we promote international cooperation in matters of research and the exchange of science views. We would also like to inform you that any materials from our archives of our science journals is available free of charge.

On behalf of the Board

Professor Assistant Filipos A. Ruxho
Member of the American Economic Association – AEA.

The Board of the ALBANIAN ASSOCIATION OF REGIONAL SCIENTISTS A.A.R.S – 2024.

[A.A.R.S.. is a Think Tank of groups of people with multidisciplinary work in the fields of Regional Sciences and Sustainability, which occurs with the selfless contribution of participants who offer their work to the global scientific community].

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The abstract consists of a single paragraph, no longer than 250 words. The font must be Times New Roman, size 11. The text must be justified. The title "Abstract" must be aligned left, in Times New Roman, size 11, in bold. A space of one line must be left between the title and the text of the abstract. The abstract must contain sufficient information, be factual, and include the basic data of the paper.

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1. Introduction

All articles must begin with an introduction, a section which demarcates the theoretical background and the goals of the paper.

The present document provides the necessary information and formatting guidelines for you to write your article. We recommend that you copy this file to your computer and insert your own text in it, keeping the format that has already been set. All the different parts of the article (title, main text, headers, titles, etc.) have already been set, as in the present document-model. The main text must be written in regular Times New Roman font, size 11, justified, with a 0.5 cm indent for the first line of each paragraph.

We recommend that you save this document to your computer as a Word document model. Therefore, it will be easy for you to have your article in the correct format and ready to be submitted. **The only form in which the file will be accepted is MS Word 2003**. If you have a later version of Microsoft Office / Word, you can edit it as follows:

- Once you have finished formatting your text, create a pdf file, and then save your file as a Word "97-2003" (.doc) file.

- Compare the two files – the pdf one and the Word “97-2003” (.doc) one.
- If you do not note any significant differences between the two, then – and only then – you can submit your article to us, **sending both the pdf and the Word “97-2003” (.doc) files** to our e-mail address.

If you use a word processor other than Microsoft Word, we recommend that you follow the same procedure as above, creating a pdf file and using the appropriate add-on in order to save your document in MS Word “97-2003” (.doc) form. Once you compare the two files (and find no significant differences), send us both.

2. General Guidelines on Paper Formatting

2.1. Body

The body of the text consists of different sections which describe the content of the article (for example: Method, Findings, Analysis, Discussion, etc.). You can use up to three levels of sections – sub-sections. For the Body of the text, use the default format style in Word, selecting the Times New Roman font, size 11, justified, with a 0.5 cm indent for the first line of each paragraph (this is further detailed in the section “Paragraphs”).

2.2. References

The references included in the paper must be cited at the end of the text. All references used in the body of the paper must be listed alphabetically (this is further detailed in the section “References”).

2.3. Appendices

The section “Appendices” follows the section “References”.

3. Page formatting

3.1. Page size

The page size must be A4 (21 x 29,7 cm), and its orientation must be “portrait”. This stands for all the pages of the paper. “Landscape” orientation is inadmissible.

3.2. Margins

Top margin: 2,54cm

Bottom margin: 1,5cm

Left and right margins: 3,17cm

Gutter margin: 0cm

3.3. Headers and Footers

Go to “Format” → “Page”, and select a 1,25cm margin for the header and a 1,25cm margin for the footer. Do not write inside the headers and footers, and do not insert page numbers.

3.4. Footnotes

The use of footnotes or endnotes is expressly prohibited. In case further explanation is deemed necessary, you must integrate it in the body of the paper.

3.5. Abbreviations and Acronyms

Abbreviations and acronyms must be defined in the abstract, as well as the first time each one is used in the body of the text.

3.6. Section headers

We recommend that you use up to three sections – sub-sections. Select a simple numbering for the sections – sub-sections according to the present model.

3.7. First level header format

For the headers of the main sections use the Times New Roman font, size 11, in bold and underlined, and leave a size 12 spacing before the paragraph and a size 6 spacing after the paragraph. The header must be aligned left. Use a capital letter only for the first letter of the header.

3.8. Second level header format

For second level headers, follow this model. Use the Times New Roman font, size 11, in bold, and leave a size 12 spacing before the paragraph and a size 3 spacing after the paragraph. Select a 0.5 cm indent. The header must be aligned left. Use a capital letter only for the first letter of the header.

3.8.1. Third level header

For third level headers, follow this model. Use the Times New Roman font, size 11, in bold and italics, and leave a size 6 spacing before the paragraph and a size 0 spacing after the paragraph. The header must be aligned left, with a left indent of 1 cm. Use a capital letter only for the first letter of the header.

4. Paragraphs

In every paragraph, use the Times New Roman font, size 11, with single line spacing. We recommend you modify the default (normal) format style in Word and use that in your text. For all paragraphs, the spacings before and after the paragraph must be size 0, and the line spacing single. Use a 0,5cm indent only for the first line of each paragraph. Leave no spacings nor lines between paragraphs.

4.1. Lists

In case you need to present data in the form of a list, use the following format:

- Bullet indent: 1,14cm
- Text:
 - Following tab at: 1,5 cm
 - Indent at: 1,5cm

Use the same format (the above values) if you use numbering for your list.

1. Example of numbered list 1
2. Example of numbered list 1

5. Figures, images, and tables

5.1. Figures and images

Insert your figures and images directly after the part where they are mentioned in the body of text. They must be centered, numbered, and have a short descriptive title.

Figures put together “as they are”, using Office tools, are absolutely inadmissible. The figures used must have been exclusively inserted as images in Word, in gif, jpg, or png form (with an analysis of at least 200dpi), and in line with the text. The width of an image must not exceed 14,5cm so that it does not exceed the margins set above.

The images, figures, and tables must be inserted “as they are” in the text, in line with it. **Figures and images which have been inserted in a text box are absolutely inadmissible.**

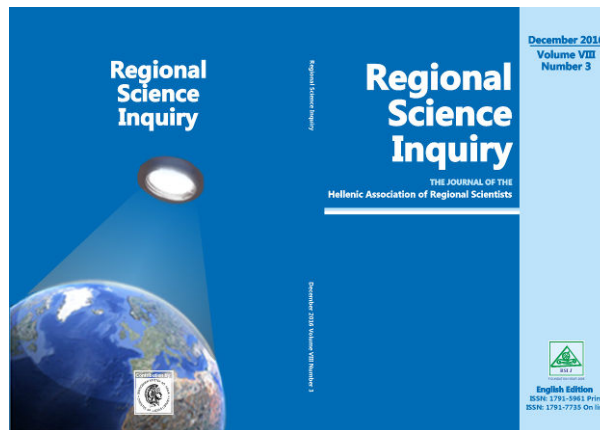
5.1.1. Reference inside the text

Avoid phrases such as “the table above” or the “figure below” when citing figures and images. Use instead “in Table 1”, “in Figure 2”, etc.

5.1.2. Examples

A model of how to format figures/images follows. For the title, use the Times New Roman font, size 10, in bold. Write the title above the figure, and set a size 6 spacing before the title and a size 0 spacing after it. The line spacing of the title must be 1.5 line. Both the image and its title must be centered.

Image 1: Title



Source: cite the source

Directly below the figure you must cite the source from which you took the image, or any note regarding the figure, written in Times New Roman, size 10. Write it below the figure, leaving a size 0 spacing before and after it, use a line spacing of 1.5 line, and make it centered.

5.2. Tables

For the title, use the Times New Roman font, size 10, in bold. Write the title above the table, and set a size 6 spacing before the title and a size 0 spacing after it. The line spacing of the title must be 1.5 line. Both the table and its title must be centered. The width of the table must not exceed 14,5cm so that it does not exceed the page margins set.

Table 1. Example of how a table must be formatted

Age	Frequency	Percentage %
Under 40	44	32.1
40 - 49	68	49.6
Over 50	25	18.2
Total	137	100.0

Source: cite the source

If the table needs to continue on the next page, select in the “Table properties” that the first line be repeated as a header in every page, as in the above example of Table 1. **Tables (or figures or images) which are included in pages with a “Landscape” orientation are absolutely inadmissible.**

Every table must have horizontal lines 1 pt. wide at the top and bottom, as shown in the example. The use of vertical lines and color fill at the background of the cells is strictly prohibited.

Directly below the table you must cite the source or any note regarding the table, written in Times New Roman, size 10. Write it below the table, leaving a size 0 spacing before and a size 6 spacing after it, and make it centered.

6. Mathematical formulas

There is a variety of tools in order to insert and process mathematical formulas, such as the “Mathematics”, found in the most recent editions of Word, “Math Type”, “Fast Math Formula

Editor”, “MathCast Equation Editor”, “Math Editor”. Since it is impossible for us to provide you with compatibility with all these tools in all their editions, **we can only admit your paper if it contains mathematical formulas solely in the form of images.**

Keep a continuous numbering for the mathematical formulas and center them in the page, as shown in the following example:

$$y = ax^2 + bx + c \quad (1)$$

The same stands for formulas or particular mathematical symbols you may have integrated in your text. For instance, if you want to use the term ax^2 in your text, you must insert it as an imaged, in line with the text. The images containing the mathematical formulas must be legible (at least 300dpi).

In the exceptional case of a text which may contain a great number of mathematical formulas, the writer may send it to us in TeX form if they so wish.

7. References

We recommend that you use the Chicago Manual of Style Author-Date system, as it is recommended by the AEA (American Economic Association) for the journals included in the EconLit database, and it is the dominant style of bibliography in the field of Economics. For more information you can go to the following links:

- <https://www.aeaweb.org/journals/policies/sample-references>
- http://www.chicagomanualofstyle.org/tools_citationguide.html
- <http://libguides.williams.edu/citing/chicago-author-date#s-lg-box-12037253>

7.1. Online references (internet citations)

Check your links again before sending your file, to confirm that they are active.

Avoid long internet links. Where possible, also cite the title of the website operator-owner. Return the font color to black, and remove the hyperlink. Links such as the following are impractical and distasteful, therefore should be avoided.

Example of an inadmissible hyperlink

<https://el.wikipedia.org/wiki/%CE%9F%CE%B9%CE%BA%CE%BF%CE%BD%CE%B%CE%BC%CE%B9%CE%BA%CE%AC>

7.2. References Formatting

For your list of references, use the Times New Roman font, size 10, with single line spacing. The paragraph format must include a size 0 spacing before the paragraph and a size 0 spacing after it, aligned left. Use a 0,5 cm indent only for the first line of each paragraph. Leave no spacings or lines between paragraphs.

7.3. Example of how References must be formatted

Bureau of Labor Statistics. 2000–2010. “Current Employment Statistics: Colorado, Total Nonfarm, Seasonally adjusted - SMS0800000000000001.” United States Department of Labor.

<http://data.bls.gov/cgi-bin/surveymost?sm+08> (accessed February 9, 2011).

Leiss, Amelia. 1999. “Arms Transfers to Developing Countries, 1945–1968.” Inter-University Consortium for Political and Social Research, Ann Arbor, MI. ICPSR05404-v1. doi:10.3886/ICPSR05404 (accessed February 8, 2011).

Romer, Christina D., and David H. Romer. 2010. “The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks: Dataset.” American Economic Review. <http://www.aeaweb.org/articles.php?doi=10.1257/aer.100.3.763> (accessed August 22, 2012).

Ausubel, Lawrence M. 1997. “An Efficient Ascending-Bid Auction for Multiple Objects.” University of Maryland Faculty Working Paper 97–06.

Heidhues, Paul, and Botond Köszegi. 2005. “The Impact of Consumer Loss Aversion on Pricing.” Centre for Economic Policy Research Discussion Paper 4849.

Zitzewitz, Eric. 2006. “How Widespread Was Late Trading in Mutual Funds?” <http://facultygsb.stanford.edu/zitzewitz>.