THE SOCIO-ECONOMIC GENDER GAP IN ITALY: A TERRITORIAL ANALYSIS

Sara Casacci

Abstract. This paper proposes an experimental analysis of socio-economic gender inequality in Italy using the information potential of integrated administrative archives. There are several international indices to measure gender inequality at the national level, but they are not able to reflect territorial heterogeneity. Thus, a measure of socio-economic gender gap has been created to allow a comparative analysis of the Italian provinces/metropolitan cities. A set of indicators are analysed and a composite index is constructed. The dimension with the best performance in Italy is education; women have better values than men in the individual indicators. The analysis of the individual indicators of work and income confirms the strong disadvantage of women. It also shows a North-South dualism: the gender gap in the work dimension is greater in the Southern provinces, while the gender gap in income is greater in the North, especially in the North-East. The composite index highlights a greater gender gap in some provinces of the South but also in some provinces of Central and Northern Italy.

1. Introduction

The importance of gender equality is enshrined in national and global legal and policy frameworks, such as the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and the Sustainable Development Goals (SDGs). In recent decades, there has been much debate about gender inequality and the disadvantaged position of women compared to men. There is a growing interest in understanding the multiple levels at which this inequality affects the lives of men and women in all countries. The need to develop policies that lead to gender equality is increasingly recognized, at national and international level. Many actions have been taken to overcome this problem, although much remains to be done.

Gender equality is "also a driver of sustainable development in all its dimensions, from ending poverty and hunger, promoting prosperity and inclusive growth and building peaceful, just and inclusive societies to securing the protection of the planet and its natural resources" (UN Women, 2018). Access to decent work and regular income for women, for example, contributes to poverty reduction and supports better education, health and nutrition outcomes. Research (Blumberg, 2005; Kabeer and

Natali, 2012) suggests that improvements in gender equality, particularly in education and employment, contribute much more to economic growth than economic growth does to gender equality, especially in terms of health, well-being and rights.

One of the challenges in assessing gender inequality is to quantify it in such a way as to increase the precision of comparisons between different points in time or between different sectors, countries or regions. The construction of a composite indicator that measures the level of overall gender inequality in a given country can be a useful tool to complement different types of statistical information. These indicators have the advantage of focusing the attention of public opinion and decision makers directly to the problem of gender inequality[1] (Beneria and Permanyer, 2010). For this reason, several organisations have produced different indices to measure gender inequality across countries. For instance, the World Economic Forum's 'Global Gender Gap Index' (GGGI), annually measures the current state and evolution of gender parity across four key dimensions (economic participation and opportunity, educational attainment, health and survival, and political empowerment). The United Nations Development Programme's 'Gender Inequality Index' (GII) is a composite measure of gender inequality that encompasses three dimensions: reproductive health, empowerment and labour market (UNPD, 2022). At European level, the EIGE's (European Institute for Gender Equality) 'Gender Equality Indicator' is based on different dimensions that measure equality (employment, time management, economic resources, knowledge, health, power).

In Italy, gender inequality is still a widespread phenomenon (ASVIS, 2023). Data from the World Economic Forum of 2024 places Italy in 87th place in the global ranking (146 countries), far from many other European states (WEF, 2024). As is known, Italy is a country with significant territorial inequalities that cannot be improved if they are only addressed at the national level. The composite indices computed at national level do not highlight territorial differences. There are many data and studies that analyse the gender gap at a regional level (ISTAT, 2024a). This is true especially for some aspects of the gender gap, such as labour market participation and gender pay gap (Filippin, 2019; INPS, 2024). The ISTAT data on BES (Benessere Equo e Sostenibile) allow to identify the areas (generally, the regions) in which the differences between men and women are more pronounced. In fact, most indicators of well-being are disaggregated by sex (Istat, 2024b). Many indicators show a persistent female disadvantage. Focusing on the indicators that highlight a better female condition compared to that of males, the majority of them

[1] Nevertheless, composite indices represent a limited tool to approach issues of gender inequality, particularly in terms of understanding the complexities of gender relations, the significance of the care economy, and their effects on the lives of women and men.

fall into the dimensions of health and education and training. Alaimo and Nanni (2018) created a measure of gender gap that enables a comparative analysis of the Italian Regions.

The aim of this work is to propose a composite index of gender gap that allows a comparative analysis of the Italian Provinces and Metropolitan Cities. In fact, gender inequalities may differ between contexts as well as determinants and causes of such inequalities. This paper deals only with socioeconomic aspects of gender inequality.

The paper is structured as follows. Section 2 presents the theoretical framework, Section 3 describes data and methods, while Section 4 presents the empirical results. Conclusions are drawn in Section 5.

2. Theoretical framework

Gender is one of the fields where inequality is hardest to evaluate, for while there is ample evidence that women are worse off than men in a number of dimensions, it is not easy to determine how to measure gender inequalities.

The literature on inequalities in general and on gender inequalities in particular is vast. A widespread conceptualization assesses that measuring inequality means trying to describe how unequally outcomes are distributed in society. Important issues include what outcomes are considered (i.e. inequalities of what), which groups of people are addressed (i.e. inequalities among whom), the time frame over which outcomes are assessed (i.e. static or dynamic measures), how inequalities relate to deprivations, and whether inequalities are due to circumstances beyond people's control or to their own efforts and initiatives (OECD, 2017).

Gender inequality is a measure of "horizontal" inequality (Stewart, 2009), since it focuses on the gap between population groups defined by specific characteristics, whereas measures of "vertical" inequality look at the unequal distribution of outcomes across all individuals in society.

Following the outcome-based conceptualization, Richardt defined the gender gap as "systematic differences in the outcome of men and women on a variety of issues ranging from economic participation and opportunity, political empowerment, and educational attainment to health and well-being" (Richardt, 2008: 277).

Some of the literature on gender inequalities refers to the capability approach. Sen has claimed that "the question of gender inequality […] can be understood much better by comparing those things that intrinsically matter (such as functionings and capabilities), rather than just the means [to achieve them] like […] resources. The issue of gender inequality is ultimately one of disparate freedoms" (Sen, 1992: 125). Resources are only the means to improve people's well-being, while attention should be focused on what matters intrinsically, namely people's functioning and

capabilities. Nevertheless, the focus on capabilities does not deny the important contribution that resources can make to people's well-being. Indeed, inequalities in resources can be significant causes of inequalities in capabilities and therefore need to be studied[2]. Following Ingrid Robeyns (2023, 64) a "complete analysis of gender inequality should not only map the gender inequalities in functionings and capabilities, but also analyse which inequalities in resources cause gender inequalities in capabilities and functionings". This is particularly important for assessing which policies can reduce gender inequalities, because intervening in the distribution of resources will be a crucial (although not the only) way of affecting the distribution of capability well-being.

Some authors (Camilletti, 2024; Nanni, 2023; Gauthier *et al.*, 2018); point out some other important issues. First, the concept of "women" refers to a heterogeneous group, where social and personal circumstances, such as being old or young, being a single mother, or belonging to an ethnic or religious minority, shape the challenges and needs they face in various ways. In particular, some gender inequalities emerge before birth and worsen over time, while others are age-specific. Moreover, gender inequalities can manifest differently across various geographical locations and contexts, and measures may need to be adapted when tested in different realities.

3. Data and method

As is known, constructing a composite indicator is not a straightforward process, because it requires a number of decisions/choices (methodological or not) to be taken. In particular, the main steps to be followed are: (1) Definition of the phenomenon to be measured; (2) Selection of a group of elementary indicators; (3) Exploratory analysis; (4) Normalization of the elementary indicators; (5) Aggregation; (6) Validation of the composite index; (7) Presentation of the results (Salzman, 2003, Mazziotta and Pareto, 2024).

By looking at the nature of the concept (gender gap) and its definition, the measurement model (which refers to the relationship between the latent variable measuring gender inequality and the individual indicators selected for each dimension) is formative. This approach assumes that a concept is a function of a group of indicators, identified in order to define it. This means that changes in formative indicators (Blalock, 1964) determine changes in the value (and meaning) of the latent variable. According to this approach, indicators are not interchangeable

[2] For example, Bina Agarwal (1994: 1455) has argued that "the gender gap in the ownership and control of property is the single most critical contributor to the gender gap in economic well-being, social status, and empowerment".

(omitting an indicator is omitting part of the construct) and internal consistency is of minimal importance: two uncorrelated indicators can both serve as meaningful indicators of the same construct (Maggino, 2017).

In the literature, the most commonly considered dimensions for the construction of gender gap indices are: economic participation and opportunity, educational attainment, health and survival, and political empowerment. In this paper, the focus is only on socio-economic dimensions. In particular, the considered dimensions are: (1) Education, (2) Income, (3) Work and (4) Politics.

The indicators used in this application come from two data sources. They are:

a) A collection of microdata produced as part of the ArchIMEDe Project of the Italian National Institute of Statistics to study the socio-economic conditions of individuals and households in Italy at the municipal level (Garofalo, 2014). This microdata collection is based on the integration of several administrative sources and statistical registers. The information derived from administrative sources allows a complete coverage of the reference populations (the universe of individuals and households resident in Italy). Nevertheless, it should be noted that there are some informational gaps and comparability with surveys is not guaranteed.
b) The "Register of Local and Regional Administrators" of the Ministry of the Interior, which collects data on the register of persons elected to local and regional offices in Italy.

Table 1 provides the list of selected indicators. The selection of indicators is based on a reasoned choice supported by the literature, but limited by the availability of data at a low territorial level. All selected basic indicators (with the exception of percentage of women in municipal councils) represent differences between women and men. Before constructing the composite index of gender gap, an exploratory analysis of the elementary indicators chosen for each dimension was performed. Firstly, the number of the aggregates used to calculate the indicators (population by sex and provinces, by age group, employment status, and educational attainment) was checked for each province. The aim was to ensure that the numbers were high enough to compute all the indicators. The layer with the lowest number counts 591 cases. Secondly, the correlations between the elementary indicators are quite low, with the exception of the correlation between work intensity exceedance and employment rate gap. Nevertheless, the correlations between basic indicators are not very relevant, since a formative model is adopted for the measurement of the gender gap.

Table 1 – *List of indicators*

Indicator	Dimension	Reference population
At least upper secondary education gap	Education	People aged between 25 and 64 years
Tertiary education gap	Education	People aged between 30 and 34 years
Labour income gap	Income	Individuals employed throughout the year aged between 15 and 64 years
Retirement income gap	Income	People over 64 years of age
Work intensity exceedance	Work	People aged between 15 and 64 years
Employment rate gap	Work	People aged between 15 and 64 years
Women in municipal councils (%)	Politics	

The individual indicators were normalized by a Constrained Min-Max transformation (Mazziotta and Pareto, 2022), so that they were directly comparable. In fact, assuming that the individual indicators have the same importance, only normalization methods that eliminate variability should be tested (Mazziotta and Pareto, 2024). Constrained Min-Max normalizes the range of individual indicators, similarly to the Min–Max method, but uses a common reference that allows to "centre" them, without forcing them into a closed range. Given the value x_{ijt} for location i on indicator j at time t, the normalized value is as follows:

$$y_{ijt} = \frac{x_{ijt} - x_{j0}}{\max_{x_j} - \min_{x_j}} \quad (1)$$

where $\min_{x_j}$ and $\max_{x_j}$ are, respectively, a minimum and a maximum that represent the possible range of indicator j for all locations over time (goalposts) and x_{j0} is the reference value or base for indicator j (e.g., the mean at time t= 0 or a benchmark). This method allows to compare the values of the locations, both in space and time, with respect to a common reference. The value '0' is the reference value for all indicators used in this work, with the exception of percentage of women in municipal councils, for which the reference is '50'. This choice allows to obtain normalized indicators that assume a value of 0 in case of equality between the two genders, positive values in case of a gender gap in favour of women and negative values in case of a gender gap in favour of men.

The aggregation function is the arithmetic mean. Four composite indices (one for each dimension) were created and then aggregated into a comprehensive index of Gender Gap (GG). The dimensions are equally weighted. Two dimensions (Work and Income) concerns Economy. This introduces a further element of subjectivity, but this appears manageable as the economy "is a major social arena in which decisions are made in society about the distribution of material resources and through which individuals gain access to positions of authority and power" (Ridgeway, 1992, ix). A compensatory approach was adopted, similar to that used in the World

Economic Forum's GGGI. The GGGI computes four sub-indexes as the weighted average of the underlying individual indicators and a simple average of each subindex score is used to calculate the overall index score. However, the latter calculates weighted averages of non-normalized female-to-male ratios (and assumes a value of 1 in the case of equality between the two genders), whereas this study calculates simple averages of normalized female-to-male differences (and assumes a value of 0 in the case of equality between the two genders). The use of a compensatory approach is justified by the fact that, since we are dealing with "balances", a partially compensatory approach, such as a different power mean, would produce a downward bias (e.g. the geometric mean) or an upward bias (e.g. the quadratic mean).

The robustness of the composite indicators and the underlying policy messages may, however, be contested. For this reason, an Influence Analysis was performed, to assess the robustness of the composite indicator in terms of its ability to produce accurate and stable measures, and its discriminant power. The average shift in the ranking of the provinces, for each removed indicator, was calculated. On average, the provinces move more when the work (13.9 positions) or politics (14 positions) indicators are removed and move less when the education (8.7 positions) indicator is removed.

In order to facilitate the territorial analysis, the results are represented by "quartile maps" of the composite indices for the four dimensions and for the gender gap index, and by a LISA Cluster Map showing the provinces with statistically significant values of the LISA index (Anselin, 1995).

4. Results

4.1. Territorial analysis of the indices of dimensions

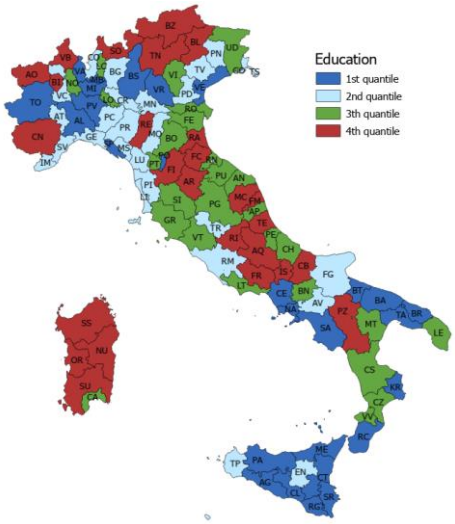
In all dimensions, with the exclusion of education, gaps are in favour of men in all provinces. In Italy, women are more educated than men; in 2023, 68.0% of 25-64 year-olds have at least a diploma or qualification (62.9% for men) and those with a tertiary qualification reach 24.9% (18.3% for men) (ISTAT, 2024a). Gender differences in this dimension are more marked in Italy than in the EU27 average. Figure 1a shows that low gaps in education are present in the provinces of Sicily, Puglia, Campania, and in some provinces of North-West. In the southern provinces, low gaps are associated with the lowest values of the elementary indicators.

Considering the income dimension, the gender pay gap in Italy is lower (5.6% in 2022) than the EU average (12.7%) (ISTAT, 2025). Concerning our data, the largest gaps in the income dimension (Figure 1b) are found in some provinces of the North

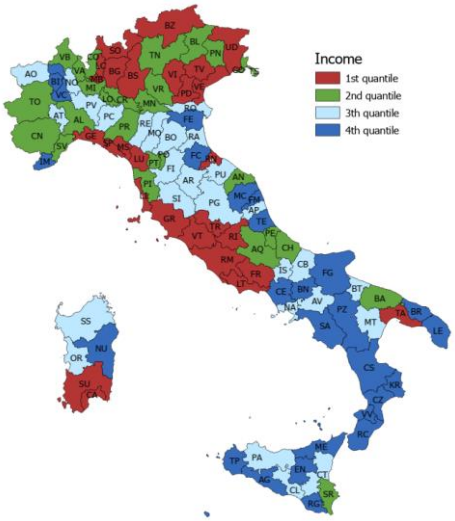
(mainly due to high gender gaps in labour income) and in some coastal provinces from Liguria to Campania, and southern Sardinia.

Figure 1 – *Composite indicators for the four dimensions. Quartile maps.*

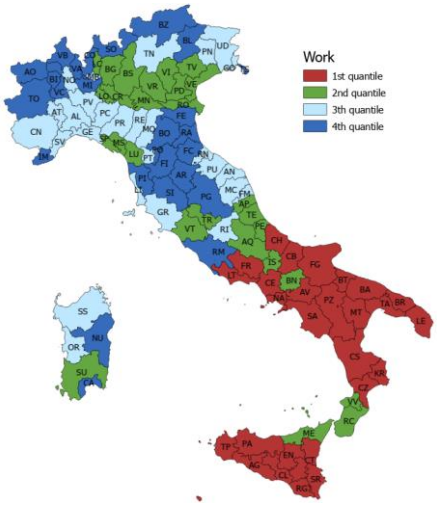
a) Education



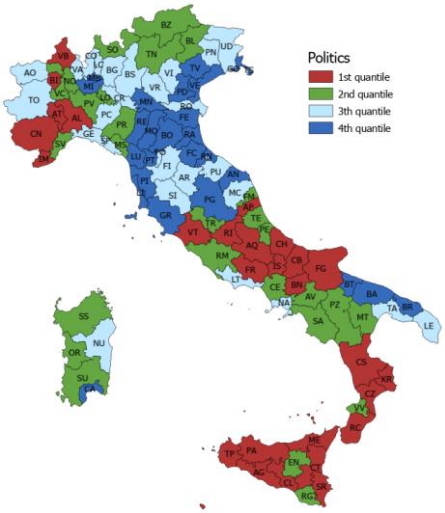
b) Income



c) Work



d) Politics



This result is consistent with other studies, which show that the pay gap is in favour of men in almost all regions, even if there are only very small differences in the southern Italian regions (Filippin, 2019; INPS, 2024).

Concerning the work dimension, in Italy, the greater female investment in education does not turn into a job advantage and the indicators that measure returns in the labour market are generally worse for women (ISTAT and CNEL, 2025). The gender gap between employment rates remains on average at 18 percentage points of difference and despite the slight annual decrease in the inactivity rate, to date 64% of inactivity in Italy continues to be female and mainly motivated by family needs (INAPP, 2024). Analyzing the territorial distribution (Figure 1c), almost all the southern provinces belong to the first quartile. The gap is smaller in the northernmost provinces of Italy, in the eastern provinces of Emilia Romagna (including Bologna) and in many provinces of Tuscany, and in Roma, Cagliari and Nuoro.

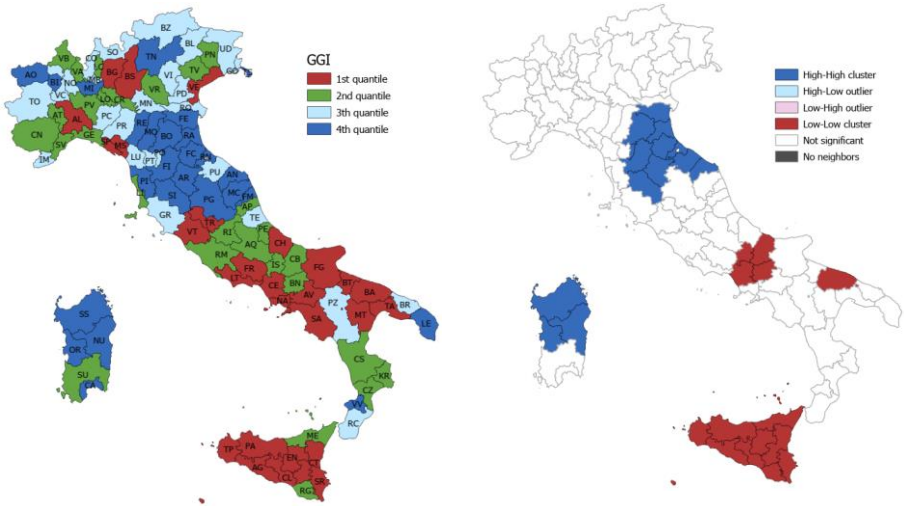
For politics' dimension, the largest gaps are present in some provinces of the South (especially Sicily, Calabria, Molise and Abruzzo), in some provinces of Lazio and North-west.

4.2. Territorial analysis of GG composite index

No Italian Province has achieved gender equality in any dimension. The composite index highlights a greater gender gap in some provinces of the South but also in some provinces of Central and Northern Italy (Figure 2a). The provinces in the North and Centre where the gap is smaller are Aosta, Trento and Milan, the provinces of Emilia Romagna, the provinces of Tuscany (with the exception of Massa Carrara and Livorno) and Marche. In the South, however, the gap is smaller in the provinces of Sardinia, Lecce, and Vibo Valentia. The composite index shows that there is a larger gender gap in some provinces of Eastern Lombardy (Bergamo and Brescia), in Venice, Alessandria and in the provinces of La Spezia and Massa Carrara. The provinces of Lazio and Southern Italy are mostly in the first quartile of the distribution of the composite index. This also applies to Campania, Puglia and Sicily. The LISA cluster map shows the provinces with statistically significant values of the LISA index (Figure 2b). A discrete spatial interaction is observed, highlighted by the value assumed by the Moran index (equal to 0.48). In Sicily a certain positive autocorrelation is found with seven provinces with low values observed in one province and low values also in its neighbourhood. Two other low-low clusters are present in the South. Eight provinces between Tuscany and Emilia-Romagna form a high-high cluster; two other high-high clusters are present in Sardinia and Marche. Finally, no outliers are identified.

Figure 2 – *Composite index of gender gap. Quartile map and LISA cluster map*.

a) Quartile map b) LISA cluster map



5. Conclusions

Gender equality is still a long way off. Addressing the multiple dimensions of gender inequality requires action on several fronts, at the individual, interpersonal, household, and structural levels (Camilletti, 2024). The significance of regional disparity, and in particular, the pending effort to be made in terms of gender, is a long work still in progress. Besides, integrated and multi-level policy solutions are needed to achieve positive effects on gender equality. Adequate information is required for the implementation, monitoring, and evaluation of policies at the regional and local level (European Commission, 2010).

This paper presents an experimental analysis of socio-economic gender inequality in Italy at provincial level, by exploiting the potential of integrated administrative archives. The results underline the potential of this kind of data for territorial analysis, even if they are currently limited and not comparable with official data. A composite indicator approach was followed. The composite indicator is an important first step in comparing and monitoring the gender gap in a territorial perspective. The perspectives of analysis point to the possibility of providing useful knowledge to support decision-makers and the implementation of policies for specific areas. Nevertheless, the complexity of the situation shows that further investigation is still needed. Future work should also look at longitudinal analyses,

taking into account the role of external vicissitudes in reducing or increasing differences.

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Sara CASACCI, Istat, casacci@istat.it